PROPOSED UP TO 480MW OSLAAGTE SOLAR 3 PHOTOVOLTAIC PROJECT SOUTH EAST OF KROONSTAD, FREE STATE PROVINCE

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

DFFE REFERENCE NO.: 14/12/16/3/3/2/2306

DRAFT

MAY 2023

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TITLE AND APPROVAL PAGE

Project Name:	Proposed Up To 480MW Oslaagte Solar 3 Photovoltaic Project South East of Kroonstad, Free State Province
Report Title:	Environmental Impact Assessment Report
Authority Reference:	14/12/16/3/3/2/2306
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EXECUTIVE SUMMARY

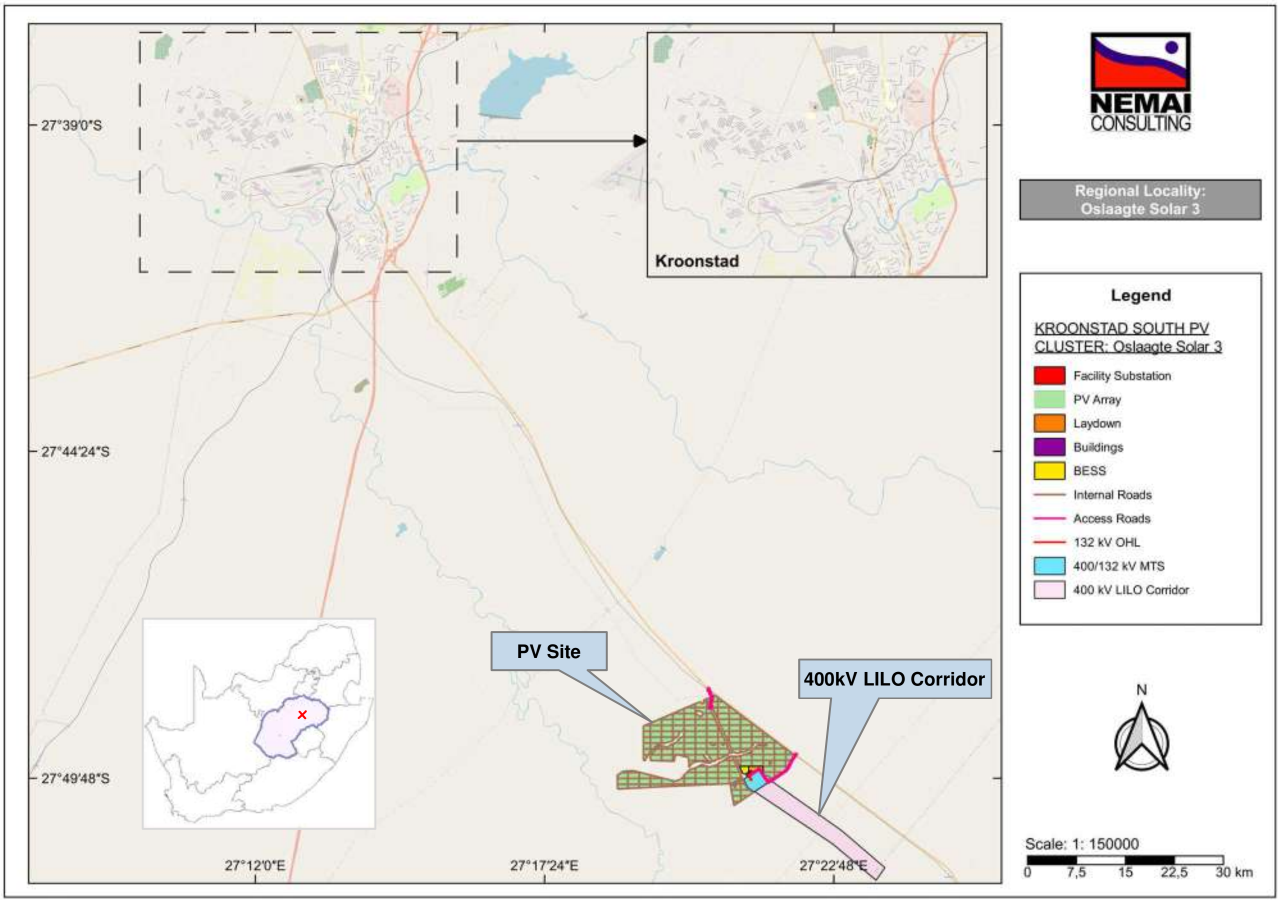
A. PROJECT BACKGROUND AND MOTIVATION

Electricity generation sources need to be diversified to ensure security of supply and reduction in the carbon footprint created by the current heavy reliance of South Africa (SA) on coal to produce electricity. Oslaagte Solar 3 (Pty) Ltd (the "Applicant") has proposed the development of up to 480MW Oslaagte Solar 3 Photovoltaic (PV) Project near Kroonstad, in the Free State Province (the "Project"). The electricity generated by the Project will be transmitted through a 132kV power line from the new facility substation to a new 400/132 kV Main Transmission Substation (MTS). Included in this application is the proposed development of the 400/132kV Main Transmission Substation (MTS) and 400kV Loop in Loop Out (LILO) Powerlines between the new MTS and existing Eskom 400kV Powerlines. The Applicant intends to bid for the current and future Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) bid windows and/or other renewable energy markets within SA.

This document serves as the **draft Environmental Impact Assessment (EIA) Report** for the proposed Project.

B. PROJECT LOCATION

The Project is located approximately 20km to the south east of Kroonstad central business district (CBD) and falls within Ward 2 of the Moqhaka Local Municipality, in the Free State Province. The R76 runs along the eastern boundary of the site.



Regional locality map

The project footprint covers a combined area of approximately 810 hectares (ha). The Project will connect to the Eskom National Grid via 132 kV powerlines from the facility substation to a new 132/400 kV Main Transmission Substation (MTS). The 132kV powerline is approximately 135 meter (m) long.

The construction of a 400/132kV Main Transmission Substation (MTS) and three (3) 400kV LILO powerlines (100 m wide assessment corridor) which are 4.55 kilometres (km) in length is included in this application. The proposed lines originate approximately south east of the MTS and terminate at the proposed MTS. Five (5) 132kV powerlines, from the proposed five (5) solar energy facilities (Oslaagte Solar 1, Oslaagte Solar 2, Oslaagte Solar 3, Leeuwspruit Solar 1 and Leeuwspruit Solar 2) will enter the new 400/132kVkV MTS.

C. LEGISLATION AND GUIDELINES CONSIDERED

Pertinent legislation that has possible bearing on the proposed Project from an environmental perspective is briefly discussed in this EIA Report.

The relationship between the Project and the following key pieces of environmental legislation is also explained:

- National Environmental Management Act (Act No. 107 of 1998) (NEMA);
- National Environmental Management: Waste Act (Act No. 59 of 2008);

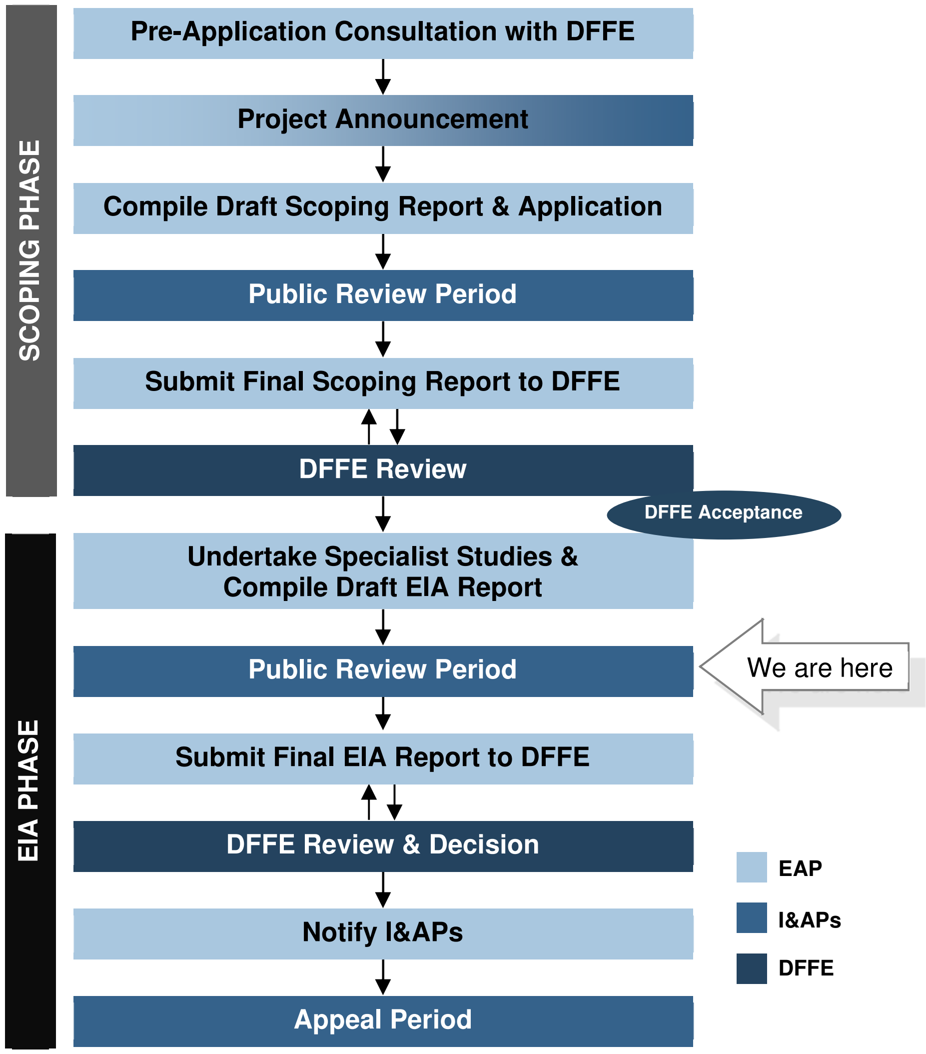
- National Water Act (Act No. 36 of 1998);
- National Environmental Management Air Quality Act (Act No. 39 of 2004);
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004); and
- National Heritage Resources Act (Act No. 25 of 1999).

D. SCOPING AND EIA PROCESS

The process for seeking Environmental Authorisation for the Project under the NEMA is being undertaken in accordance with the EIA Regulations of 2014 (as amended), published under Government Notice (GN) No. 982 in Gazette No. 38282 of 4 December 2014 and amended by GN 326 of 7 April 2017 published in Gazette No. 40772 (the “EIA Regulations”). In terms of NEMA, the lead decision-making authority for the environmental assessment is the Department of Forestry, Fisheries and the Environment (DFFE). Nemai Green was appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the environmental assessment for the proposed Project.

Based on the types of activities involved the requisite environmental assessment for the Project is a Scoping and Environmental Impact Reporting (S&EIR) process. An outline of the process is provided in the diagram to follow.

DFFE accepted the Scoping Report and Plan of Study for the EIA on 14 May 2023, which allowed the commencement of the EIA phase.



Overview of S&EIR Process

E. PROJECT'S TECHNICAL DESCRIPTION

The technical details of the proposed Project are captured below.

Technical details of the proposed Project

No.	Component	Alternative 1 - Description / Dimensions	Alternative 2 - Description / Dimensions
1	Height of PV panels	Up to 5.5 m	Up to 5.5 m
2.	Area of PV Array	Up to approximately 760 ha	Monofacial or Bifacial PV panels, mounted on either fixed-tilt, single-axis tracking, and/or double-axis tracking systems. Area: Up to 760 ha

No.	Component	Alternative 1 - Description / Dimensions	Alternative 2 - Description / Dimensions
3.	Area occupied by inverter / transformer stations / substations	Up to 1 ha (facility substation) Up to 36 ha (MTS)	It is estimated that the maximum size of the facility substation will not exceed 2 ha. The MTS will be 36 ha. Each facility will require inverter-stations, transformers, switchgear and internal electrical reticulation (underground cabling).
4.	Capacity of on-site substation	High voltage (132 kV)	The facility substation will collect the power from the facility and transform it from medium voltage (up to 33 kV) to high voltage (132 kV). A 400/132kV MTS (600m x 600m) is also planned. The MTS includes a switching station.
5.	BESS	Area up to ± 5ha	Area: up to ± 5 ha
6.	Area occupied by both permanent and construction laydown areas	Temporary: Up to 7ha Permanent: Up to 1 ha (located within the area demarcated for temporary construction laydown)	Temporary construction laydown area up to 10 ha. Permanent laydown area up to 1 ha (to be located within the area demarcated for the temporary construction laydown).
7.	Area occupied by buildings	Up to 1.5 ha	Up to 1.5 ha
8.	Length of internal roads	Up to 33 km	Up to 33 km
9.	Width of internal roads	The internal roads will be up to 6 m wide. The access roads will be up to 8 m wide.	The internal roads will be up to 6 m wide. The access roads will be up to 8 m wide.
10.	Height of fencing	Up to 3.5m	Up to 3.5m
11.	Type of fencing	Type will vary around the site, welded mesh, palisade and electric fencing	Type will vary around the site, welded mesh, palisade and electric fencing

The EIA Report provides an overview of the components of the proposed Solar PV Facility, as well as the BESS and grid connection. It further explains the project life-cycle, as well as the resources required to execute the Project.

The alternatives under consideration for the Project include layout alternatives and the no-go option.

F. PROFILE OF THE RECEIVING ENVIRONMENT

The EIA Report provides a general description of the status quo of the receiving environment in the Project Area. This serves to provide the context within which the assessment was conducted and allows for an appreciation of sensitive environmental features and possible receptors of the effects of the proposed Project.

The receiving environment is explained in terms of the following:

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

G. 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. Freshwater Aquatic Impact Assessment;
2. Terrestrial Biodiversity Compliance Statement, including Sungazer lizard study;
3. Avifaunal Impact Assessment;
4. Agricultural Compliance Statement;
5. Phase 1 Cultural Heritage Impact Assessment;
6. Paleontological Impact Assessment;
7. Visual Impact Assessment;
8. Traffic Impact Assessment; and
9. Social Impact Assessment.

The information obtained from the respective specialist studies was incorporated into the EIA Report in the following manner (amongst others):

- The information was used to complete the description of the receiving environment in a more detailed and site-specific manner;
- A summary of each specialist study is provided, focusing on the approach to each study, key findings and conclusions drawn;
- The specialists' impacts assessments, and the identified mitigation measures, were included in the overall project impact assessment;
- The evaluations performed by the specialists on the alternatives of the Project components were taken into consideration in the identification of the most favourable options; and
- Salient recommendations made by the specialists were taken forward to the final Conclusions.

H. IMPACT ASSESSMENT

The EIA Report assessed the pertinent environmental impacts that could potentially be caused during the pre-construction, construction and operational phases of the Project.

Impacts were identified as follows:

- Impacts associated with listed activities contained in the EIA Regulations' Listing Notices;
- Impacts identified during the Scoping phase;
- An appraisal of the Project's activities and components;
- An assessment of the receiving biophysical, social, economic and built environments;
- Findings from specialist studies;
- Issues highlighted by environmental authorities; and
- Comments received during public participation from Interested and Affected Parties (I&APs).

The impacts and the proposed management measures are discussed on a qualitative level and thereafter quantitatively assessed to ultimately determine the significance of the impacts. The assessment considered impacts before and after mitigation, where in the latter instance the residual impact following the application of the mitigation measures is evaluated.

The proposed mitigation of the impacts associated with the Project includes specific measures identified by the technical team (including engineering solutions) and environmental specialists, stipulations of environmental authorities and environmental best practices. The Environmental Management Programme (EMPr) for the PV Site and Generic EMPr's for the Power Line and Substation provide a comprehensive list of mitigation measures for specific elements of the Project, which extends beyond the impacts evaluated in the body of the EIA Report.

The implications of the "no-go option" are also assessed. The "no go option" was considered in light of the motivation as well as the need and desirability of the overall Project. Should the proposed Project not go ahead, any potentially significant environmental issues associated with the Project would be irrelevant and the status quo of the local receiving environment would not be affected by the Project-related activities. The objectives of this Project would, however, not be met. This will *inter alia* mean that the Project's intended benefits will not materialise. The "no-go option" is thus not preferred.

From a cumulative impact perspective, there are three (3) known renewable energy applications, two approved and one in progress, within a 30km radius of the Project's PV Site according to the REEA database. Cumulative impacts in relation to the Project were assessed individually in the EIA Report and mitigation measures were developed for each of the impact categories.

Other aspects identified in terms of cumulative impacts included:

- Traffic-related impacts in terms of the local road network;
- The cumulative impacts with regards to habitat loss and fragmentation, as well as cumulative risks to protected fauna and flora species;
- The clearance of vegetative cover for the Project's development footprint will exacerbate erosion and the proliferation of invasive alien species;
- Increase in the dust levels during the construction phase;
- Construction of the proposed facilities along with construction activities of other developments in the Project Area could potentially increase noise impacts on surrounding land uses;

- The proposed Project is expected to increase the cumulative visual impact experienced by the identified sensitive receptors;
- Problems associated with the influx of employment seekers; and
- Positive cumulative economic effects from the construction of multiple developments in the area.

I. ANALYSIS OF ALTERNATIVES

Based on the recommendations of the specialists, technical considerations, feedback from I&APs and the comparison of the impacts, PV Layout Alternative 2 was identified as the Best Practicable Environmental Option (BPEO).

J. PUBLIC PARTICIPATION

The EIA Report provides the details of the following tasks undertaken as part of the public participation process:

- Maintaining the database of I&APs;
- Review period for the draft EIA Report;
- Notification of review of the draft EIA Report;
- Means of accessing the draft EIA Report; and
- Commenting on the draft EIA Report.

K. CONCLUSIONS

The following key tasks were undertaken during the EIA phase for the proposed Project:

- The specialist studies identified in the Plan of Study for the EIA were undertaken and the findings were incorporated into the EIA Report in terms of understanding the environmental status quo and sensitive features, assessing the potential impacts and establishing concomitant mitigation measures, as well as identifying the preferred alternatives;
- Potentially significant impacts pertaining to the pre-construction, construction and operational phases of the Project were identified and assessed, and mitigation measures were provided; and
- 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.

Attention is drawn to specific sensitive environmental features for which mitigation measures are included in the EIA Report and EMPr’s. A combined sensitivity map overlaid with the Project’s BPEO is also provided. Key environmental features that contributed toward the sensitive areas shown in the map included wetlands and their associated buffer zones, as well as avifaunal habitats, as determined by the relevant specialist studies.

An Environmental Impact Statement is also provided, which includes highlighting key findings from the EIA, which may also influence the conditions of the Environmental Authorisation (if granted).

With the selection of the BPEO, the adoption of the mitigation measures included in the EIA Report and the dedicated implementation of the EMPr's, it is believed that the significant environmental aspects and impacts associated with this Project can be suitably mitigated. With the aforementioned in mind, it can be concluded that there are no fatal flaws associated with the Project and that authorisation can be issued, based on the findings of the specialists and the impact assessment, through the compliance with the identified environmental management provisions.

AMENDMENTS PAGE

Date	Nature of Amendment	Amendment No.	Signature
June 2023	Draft for Review by Authorities and the Public	0	

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LIST OF ACRONYMS & ABBREVIATIONS

AC	Alternating Current
AEL	Atmospheric Emission Licence
ASAPA	Association for Southern African Professional Archaeologists
BESS	Battery Energy Storage System
BPEO	Best Practicable Environmental Option
CBA	Critical Biodiversity Area
CBD	Central Business District
CCTV	Closed-Circuit Television
COD	Commercial Operation Date
CPV	Concentrated Photovoltaics
C&R	Comments and Response
CR	Critically Endangered
CRR	Comments and Responses Report
DALRRD	Department of Agriculture, Land reform and Rural Development
DARD	Department of Agriculture and Rural Development
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DEAT	Department of Environmental Affairs and Tourism
DEL	Department of Employment and Labour
DESTEA	Department of Economic, Small Business Development, Tourism and Environmental Affairs
DFFE	Department of Forestry, Fisheries and the Environment
DC	Direct Current
DD	Data Deficient
DMRE	Department of Mineral Resources and Energy
DoE	Department of Energy
DPRT	Department of Police, Roads and Transport
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EHS	Environmental, Health, and Safety
EMF	Electromagnetic Field
EMPr	Environmental Management Programme
EMS	Environmental Management System
EN	Endangered
ESA	Ecological Support Area
FEPA	Freshwater Ecosystem Priority Area
FSDPRT	Free State Department of Police, Roads and Transport
FSHRA	Free State Heritage Resources Authority
GHG	Greenhouse Gas

GIS	Geographical Information System
GN	Government Notice
GPS	Global Positioning System
GVA	Gross Value Added
H	High
HGM	Hydrogeomorphic
HIA	Heritage Impact Assessment
HIV/AIDS	Human Immunodeficiency Virus, Acquired Immunodeficiency Syndrome
HV	High Voltage
I&APs	Interested and Affected Parties
IBA	Important Bird & Biodiversity Area
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
IRP	Integrated Resource Plan
IUCN	International Union for Conservation of Nature
KZN	KwaZulu-Natal
L	Low
LC	Least Concern
LO	Likelihood of Occurrence
LSU	Large Livestock Unit
M	Moderate
MMM	Mangaung Metropolitan Municipality
MOSS	Metropolitan Open Space System
MP	Moderately Protected
Na	Sodium
NA	Not Assessed
NaS	Sodium-Sulphur
NEMA	National Environmental Management Act (No. 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Act (Act No. 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEM:PAA	National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
NEM:WA	National Environmental Management: Waste Act (Act No. 59 of 2008)
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
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
OG	Ordinary Game
OHS	Occupational Health and Safety
ONA	Other Natural Area
PES	Present Ecological State
PG	Protected Game
POSA	Plants of Southern Africa

PP	Poorly Protected
PPE	Personal Protective Equipment
PS	Performance Standards
PSSA	Palaeontological Society of South Africa
PV	Photovoltaic
REDZ	Renewable Energy Development Zones
REEA	Renewable Energy EIA Application
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RFI	Radio Frequency Interference
S	Sulphur
S&EIR	Scoping and Environmental Impact Reporting
SA	South Africa
SABAP2	South African Bird Atlas Project 2
SACAA	South African Civil Aviation Authority
SACAD	South Africa Conservation Areas Database
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency
SANS	South African National Standard
SAPAD	South African Protected Areas Database
SARAO	South African Radio Astronomy Observatory
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SOTER	Soil and Terrain
Spp.	Species
STD	Sexually Transmitted Disease
STI	Sexually Transmitted Infection
ToR	Terms of Reference
UFS	University of the Free State
VAC	Visual Absorption Capacity
VU	Vulnerable
WMA	Water Management Area
WP	Well Protected

UNITS OF MEASUREMENT

%	Percentage
°C	Degrees Celsius
ha	Hectare
hz	Hertz
km	Kilometre
kV	Kilovolt
l/s	Litres per second
m	Metre
m^2	Square metre
mm	Millimetre
MVA	Megavolt Amperes
MW	Megawatt
MWh	Megawatt hour
V	Volt

1 PURPOSE OF THIS DOCUMENT

Nemai Consulting was appointed by Oslaagte Solar 3 (Pty) Ltd (the "Applicant") to conduct the Environmental Impact Assessment (EIA) for the **proposed up to 480MW Oslaagte Solar 3 Photovoltaic Project southeast of Kroonstad, Free State Province** (the "Project").

The EIA is being undertaken according to the process prescribed in the EIA Regulations of 2014, published under Government Notice (GN) No. 982 in Gazette No. 38282 of 4 December 2014 and amended by GN 326 of 7 April 2017 published in Gazette No. 40772 (the "EIA Regulations"). The EIA Regulations were promulgated in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA). This document serves as the **draft EIA Report** for the proposed Project.

To date, the Scoping phase of the overall environmental assessment for the Project has been completed. The final Scoping Report and Plan of Study for the EIA were approved by the Department of Forestry, Fisheries and the Environment (DFFE) on 14 May 2023. DFFE is the competent authority to decide on the application in terms of NEMA.

According to the EIA Regulations, the objectives of the EIA process are to undertake the following, through a consultative process:

- Determine the policy and legislative context within which the activity is located and document 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 development footprint on the approved site as contemplated in the accepted Scoping Report.
- Identify the location of the development footprint within the approved site as contemplated in the accepted Scoping Report 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.
  - Degree to which these impacts -
- Can be reversed;
- May cause irreplaceable loss of resources; and
- Can be avoided, managed or mitigated.
- Identify the most ideal location for the activity within the development footprint of the approved site as contemplated in the accepted Scoping Report based on the lowest level of environmental sensitivity identified during the assessment.
- Identify, assess, and rank the impacts the activity will impose on the development footprint on the approved site as contemplated in the accepted scoping report 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.

The draft EIA Report will be made available to Interested and Affected Parties (I&APs) for a 30-day review period from **06 June 2023 until 06 July 2023**. All comments that are received will be addressed in the final EIA Report and will also be included in the Comments and Responses Report. The final EIA Report will then be submitted to the DFFE for review and decision-making.

2 DOCUMENT ROADMAP

As a minimum, this EIA Report aims to satisfy the requirements stipulated in Appendix 3 of the EIA Regulations. **Table 1** below presents the document's composition in terms of the aforementioned regulatory requirements.

Table 1: EIA Report Roadmap

Chapter	Title	Correlation with GN No. R. 982	GN No. R. 982 Description
1	Purpose of this Document	–	–
2	Document Roadmap	–	–
3	Project Background and Motivation	–	–
4	Project Location	3(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.
		3(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; and (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken.
5	Legislation and Guidelines Considered	3(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.
6	Scoping and EIA Process	3(1)(a)	Details of- (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae.
		3(1)(u)	An indication of any deviation from the approved scoping report, including the plan of study, including- (i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii) a motivation for the deviation.
		3(1)(v)	Any specific information that may be required by the competent authority.

Chapter	Title	Correlation with GN No. R. 982	GN No. R. 982 Description
7	Assumptions and Limitations	3(1)(p)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed.
8	Need and Desirability	3(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 development footprint within the approved site as contemplated in the accepted Scoping Report.
9	Project Description	3(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.
		3(1)(g)	A motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report.
		3(1)(h)(i)	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: (i) details of the development footprint alternatives considered.
		3(1)(h)(ix)	If no alternative development footprints for the activity were investigated, the motivation for not considering such.
		3(1)(t)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.
10	Alternatives	3(1)(h)(i)	Details of the development footprint alternatives considered.
11	Profile of the Receiving Environment	3(1)(h)(iv)	The environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.
12	Summary of Specialist Studies	3(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.
13	Impact Assessment	3(1)(h)(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- (i) can be reversed; (ii) may cause irreplaceable loss of resources; and (iii) can be avoided, managed or mitigated.
		3(1)(h)(vi)	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks.
		3(1)(h)(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

Chapter	Title	Correlation with GN No. R. 982	GN No. R. 982 Description
			on the geographical, physical, biological, social, economic, heritage and cultural aspects.
		3(1)(h)(viii)	The possible mitigation measures that could be applied and level of residual risk.
		3(1)(i)	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 development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including - (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (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.
		3(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.
		3(1)(m)	Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the Environmental Management Programme (EMPr) as well as for inclusion as conditions of authorisation.
14	Analysis of Alternatives	3(1)(h)(ix)	If no alternative development locations for the activity were investigated, the motivation for not considering such.
		3(1)(h)(x)	A concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted Scoping Report.
		3(1)(n)	The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment.
15	Public Participation – EIA Phase	3(1)(h)(ii)	Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs.
16	EIA Conclusions	3(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

Chapter	Title	Correlation with GN No. R. 982	GN No. R. 982 Description
			environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report 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.
		3(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.
		3(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.
17	References	-	-
Appendix A	Locality Maps	3(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.
Appendix E	Specialists' Reports	R23(5)	Specialist Reports containing all information set out in Appendix 6 of GN No. R. 982 of 4 December 2014 (as amended).
Appendix H	EMPr's	R23(4)	Environmental Management Programme containing all information set out in Appendix 4 of GN No. R. 982 of 4 December 2014 (as amended).
Appendix G	Comments and Responses Report	3(1)(h)(ii)	Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs.
		3(1)(h)(iii)	A summary of the issues raised by Interested and Affected Parties (IAPs), and an indication of the manner in which the issues were incorporated, or the reasons for not including them.
Appendix K	Oath of Environmental Assessment Practitioner	3(1)(s)	An undertaking under oath or affirmation by the EAP in relation to: (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and IAPs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to IAPs and any responses by the EAP to comments or inputs made by IAPs.
N/A		3(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.
N/A		3(1)(w)	Any other matters required in terms of section 24(4)(a) and (b) of the Act.

3 PROJECT BACKGROUND AND MOTIVATION

The South African Government ratified the Paris Agreement in 2016, and thereby showed the country's commitment to contribute to the global effort to address the challenge of climate change. Electricity generation sources need to be diversified to ensure security of supply and reduction in the carbon footprint created by the current heavy reliance of South Africa (SA) on coal to produce electricity. The electricity demand is increasing in SA, and in order to match that demand there is a need to supply a diversified power generation that includes renewable energy technologies. These technologies include solar, wind, small utility scale hydro, biomass, biogas and energy storage that the Department of Mineral Resources and Energy (DMRE) intends to develop and implement as identified in the approved Integrated Resource Plan (IRP) 2019.

The Applicant has proposed the development of the Oslaagte Solar 3 480MW Solar PV Project south east of Kroonstad, in the Free State Province. The electricity generated by the Project will be transferred via a 132 kV powerline from the facility substation to a new 132/400 kV Main Transmission Substation (MTS). The Applicant also proposed the development of the 400/132kV Main Transmission Substation (MTS) and 400 kV LILO Powerlines between the new MTS and existing Eskom 400kV Powerlines.

The Applicant intends to bid for the current and future Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) bid windows and/or other renewable energy markets within SA.

4 PROJECT LOCATION

4.1 Location of the Project relative to Solar Yield Area

The location of the Project in relation to SA's PV power potential is shown in **Figure 1** below. The Project Area is considered to have favourable solar irradiation levels, which makes it ideal for the production of solar power via PV Panels.

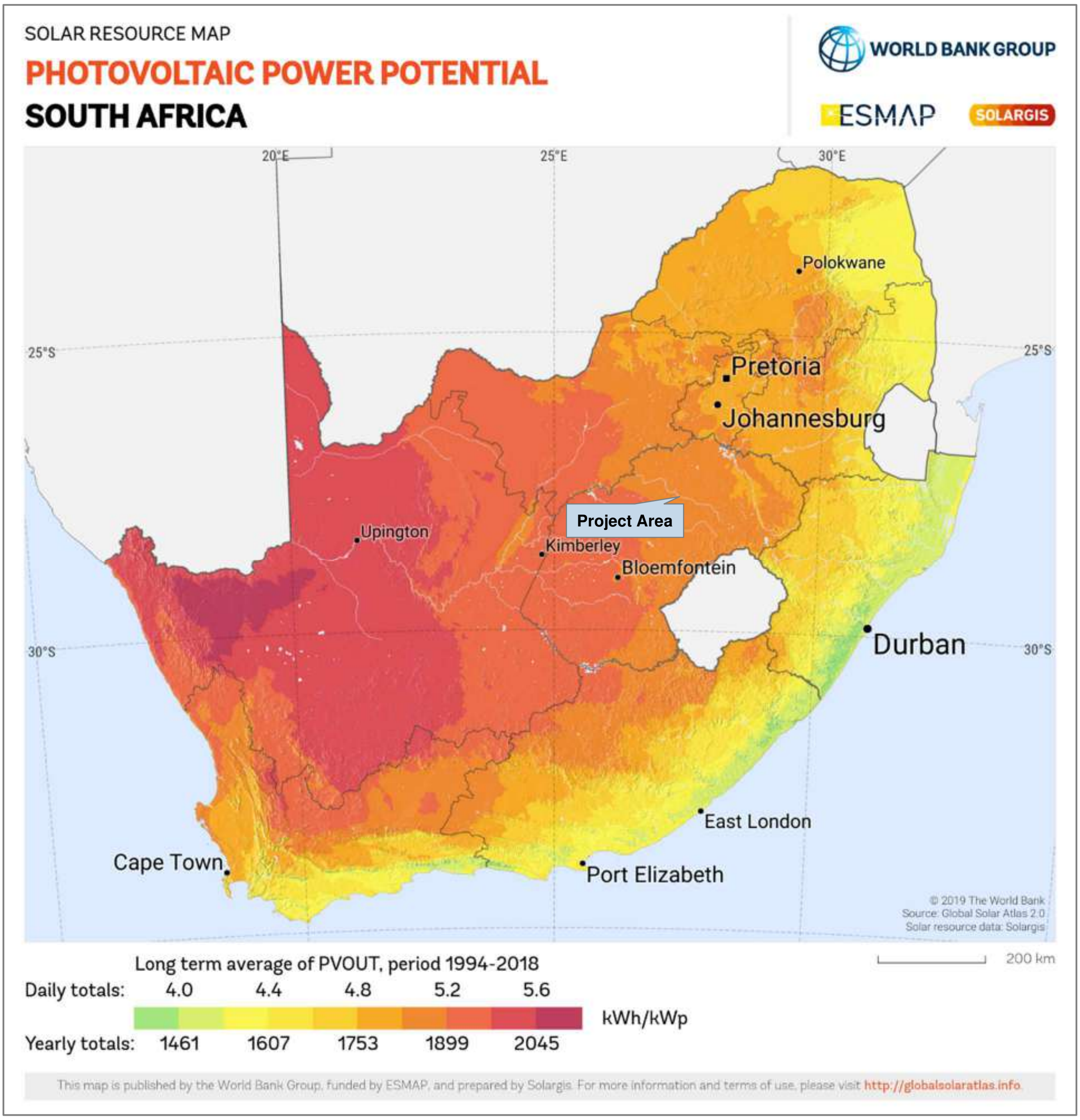


Figure 1: Location of the Project relative to PV Power Potential
(© 2019 The World Bank, Source: Global Solar Atlas 2.0, Solar resource data: Solargis)

4.2 Geographical Context

The Project is located approximately 20km to the south east of Kroonstad's central business district (CBD) and falls within Ward 2 of the Moqhaka Local Municipality (MLM), in the Free State Province. The R76 runs along the eastern boundary of the site. The locality maps are provided in **Figure 2** and **Figure 3** below, and are also contained in **Appendix A**.

The project footprint covers a combined area of approximately 810 hectare (ha). The 132 kV powerlines from the facility substation to a new 132/400 kV Main Transmission Substation (MTS). The 400/132 kV MTS and the 400 kV LILO Powerlines between the new MTS and existing Eskom 400kV Powerlines are located on various properties, in close proximity to the five (5) solar enegry facilities.

The details of the affected properties are provided in **Table 2** below.

Table 2: Details of the affected properties

Farm Details	21-digit Surveyor General No.
PV Site, 132kV Power Line Route and Main Transmission Substation	
Portion 0 of the Farm Oslaagte No. 2564	F02000000000256400000
400kV LILO Powerlines Corridor	
Portion 0 of the Farm Oslaagte No. 2564	F02000000000256400000
Portion 0 of the Farm Klein Geluk No. 2088	F02000000000208800000
Portion 0 of the Farm Fraaiuitzicht No. 576	F02000000000057600000
Portion 0 of the Farm Zonderweg No. 1699	F02000000000169900000
Portion 0 of the Farm Damspruit No. 1584	F02000000000158400000
Portion 0 of the Farm Welbedacht No. 1913	F02000000000191300000

The Project's coordinates are as follows (shown in **Figure 4** below):

- **PV Site property –**
  a) 27°49'30.06"S 27°19'15.03"E
  b) 27°48'56.90"S 27°19'14.09"E
  c) 27°48'25.71"S 27°20'34.60"E
  d) 27°49'26.00"S 27°22'5.06"E
  e) 27°49'41.00"S 27°21'54.83"E
  f) 27°50'14.74"S 27°20'56.24"E
  g) 27°49'55.76"S 27°20'51.96"E
  h) 27°50'0.38"S 27°18'46.10"E
  i) 27°49'45.38"S 27°18'45.58"E
  j) 27°49'41.54"S 27°19'6.20"E
  k) 27°49'51.01"S 27°19'49.93"E

l) 27°49'49.31"S 27°19'56.69"E
m) 27°49'40.07"S 27°20'5.61"E
n) 27°49'27.02"S 27°20'5.64"E
o) 27°49'24.75"S 27°19'50.59"E
p) 27°49'31.26"S 27°19'49.01"E

- **Access Roads**

  Road 1

  1. 27°48'19.10"S 27°20'27.76"E (start)
     27°48'28.55"S 27°20'31.96"E (midpoint)
  2. 27°48'37.80"S 27°20'29.26"E (end)

  Road 2

  3. 27°49'25.14"S 27°22'5.13"E (start)
     27°49'47.36"S 27°21'42.73"E (midpoint)
  4. 27°49'44.54"S 27°21'14.79"E (end)

- **Laydown Area**
  5. 27°49'38.16"S 27°21'20.31"E
- **Building**
  6. 27°49'42.78"S 27°21'14.77"E
- **Powerline**
  7. 27°49'49.28"S 27°21'15.22"E
- **Substation**
  8. 27°49'44.10"S 27°21'11.67"E
- **Battery Energy Storage System'**
  9. 27°49'39.86"S 27°21'8.55"E

- **MTS property –**

  a) 27°49'33.39"S 27°21'27.39"E (north-eastern corner);
  b) 27°49'45.04"S 27°21'8.08"E (north-western corner);
  c) 27°49'49.93"S 27°21'37.66"E (south-eastern corner);
  d) 27°50'0.87"S 27°21'19.02"E (south-western corner);

- **400kV Powerline Connection**

  e) 27°50'36.00"S 27°22'49.46"E
  f) 27°50'48.75"S 27°22'40.12"E
  g) 27°51'16.13"S 27°23'45.18"E
  h) 27°51'29.16"S 27°23'34.84"E

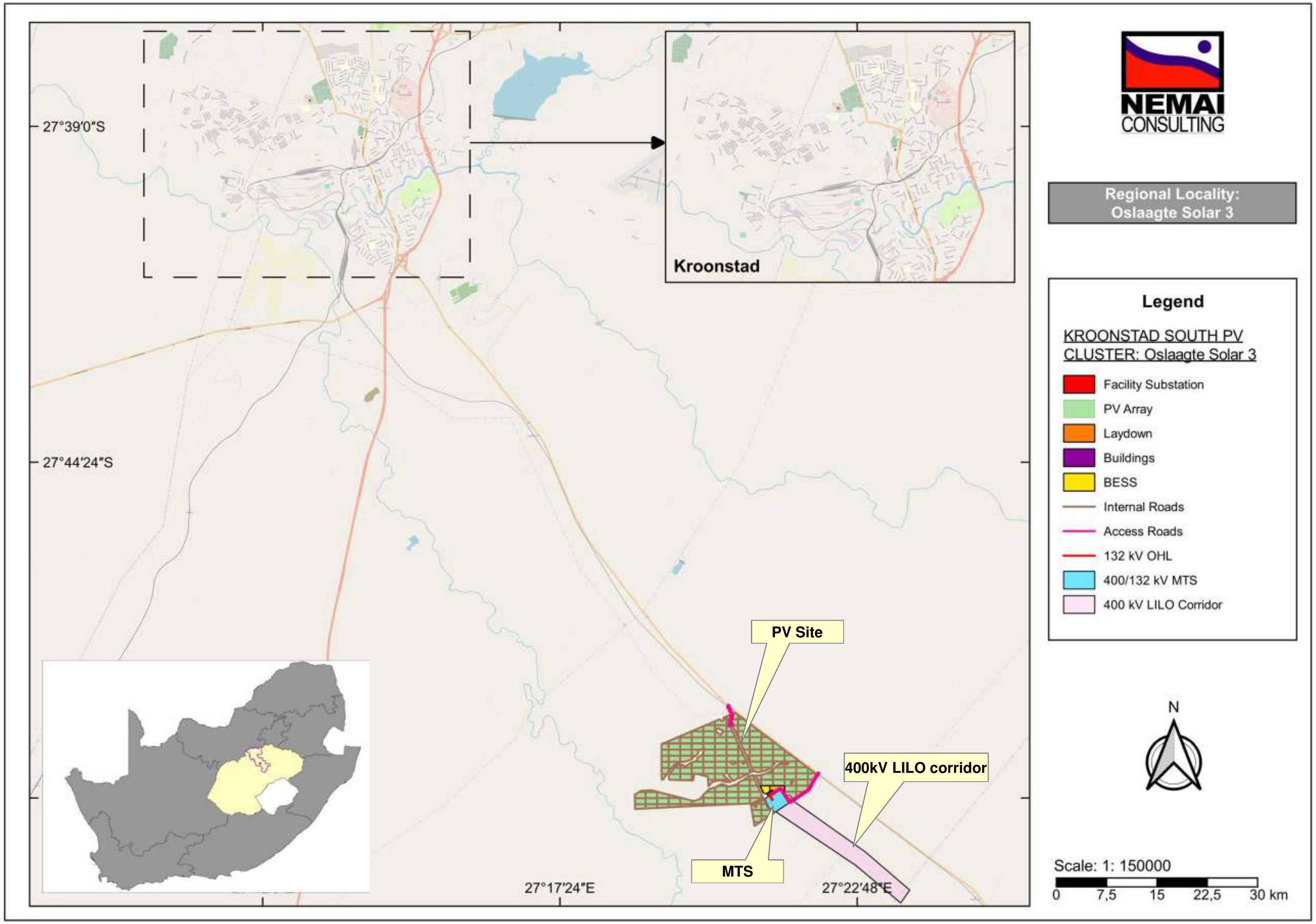


Figure 2: **Regional locality map** *(Note: not all Project components are shown due to scale)*

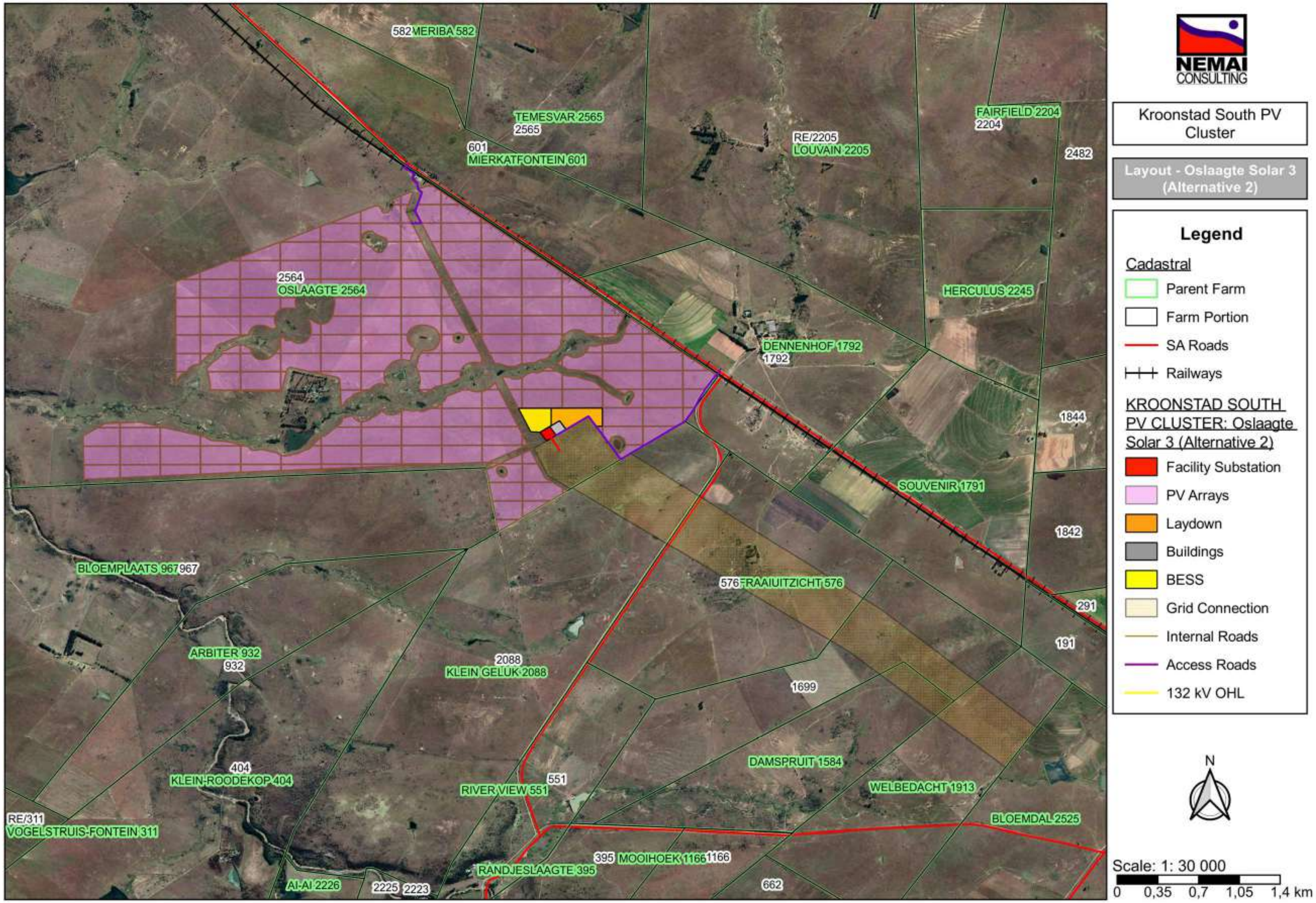


Figure 3: **Locality map (Orthophotograph map)**

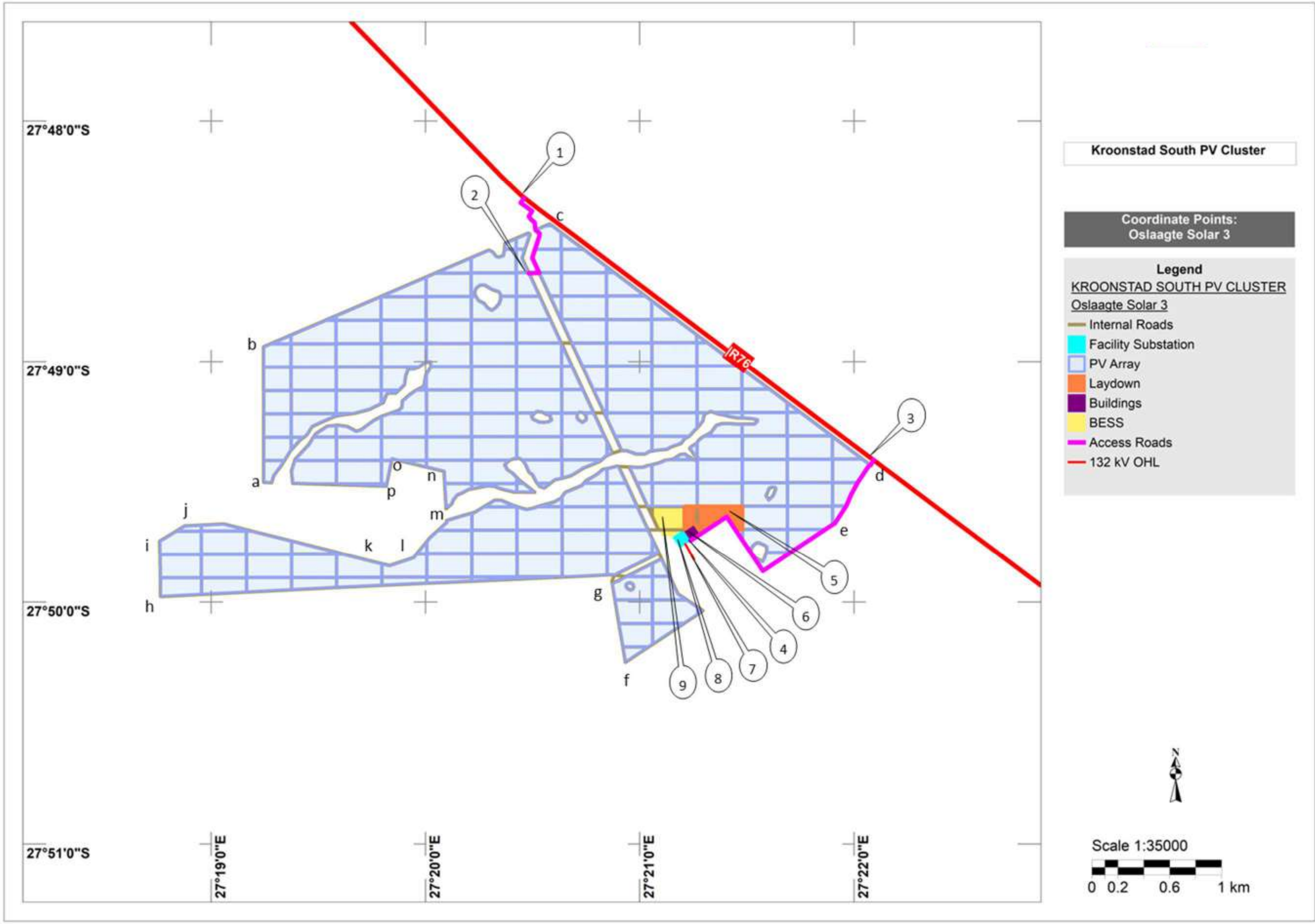


Figure 4: Project's coordinate points

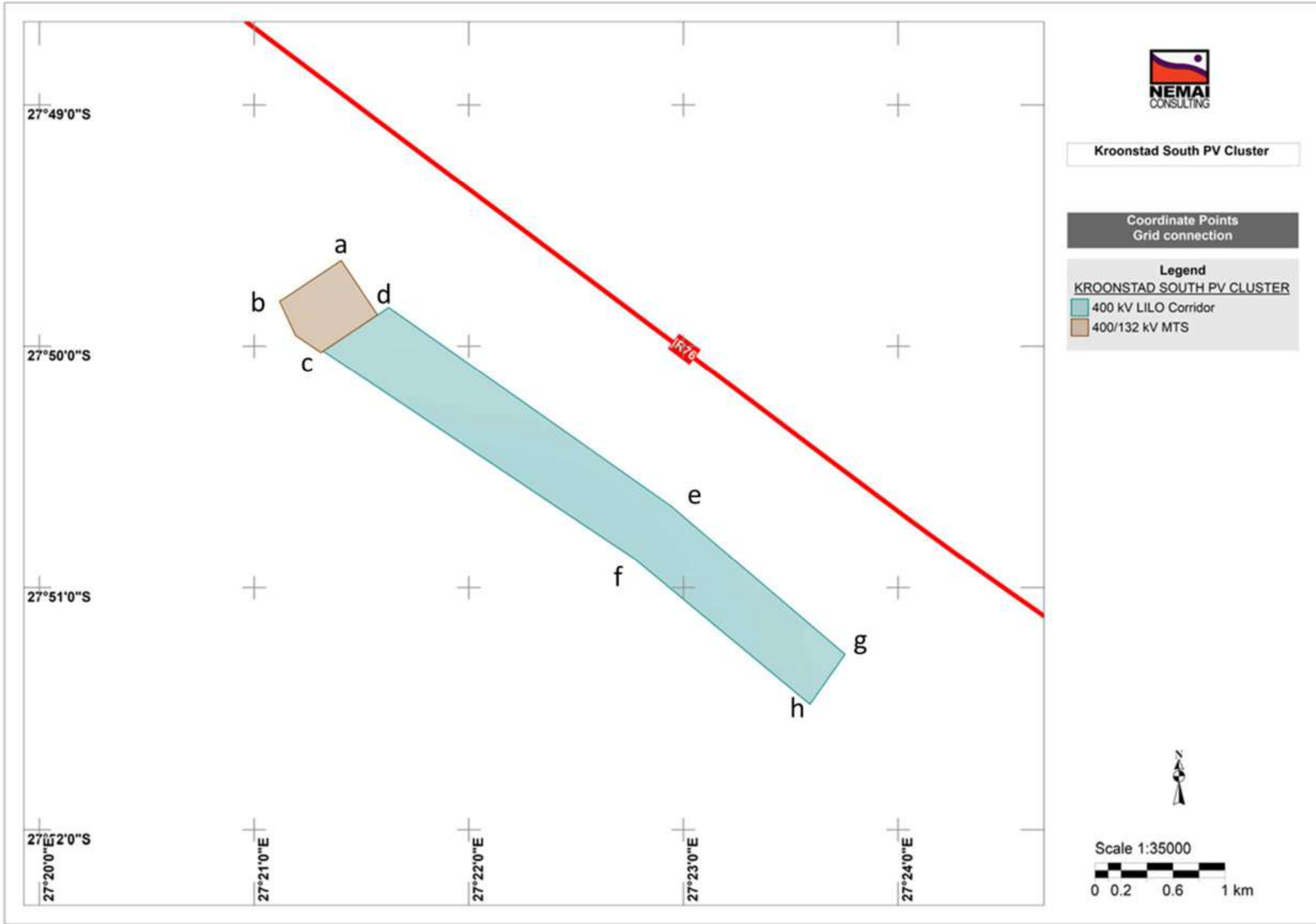


Figure 5: **Project's coordinate points**

5 LEGISLATION AND GUIDELINES CONSIDERED

5.1 International Finance Corporation - Performance Standards & Guidelines

Where relevant, the Project would strive to satisfy and incorporate the International Finance Corporation (IFC) Performance Standards (PS), which serve as an international benchmark for identifying and managing environmental and social risks.

The IFC PS offer a framework for understanding and managing environmental and social risks for high profile, complex, international and potentially high impact projects. The IFC PS encompass the following eight topics:

- Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts;
- Performance Standard 2: Labour and Working Conditions;
- Performance Standard 3: Resource Efficiency and Pollution Prevention;
- Performance Standard 4: Community Health, Safety, and Security;
- Performance Standard 5: Land Acquisition and Involuntary Resettlement;
- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- Performance Standard 7: Indigenous Peoples; and
- Performance Standard 8: Cultural Heritage.

IFC's Environmental, Health, and Safety (EHS) Guidelines provide technical guidelines with general and industry-specific examples of good international industry practice to meet IFC PS.

5.2 Legislation

5.2.1 *Environmental Statutory Framework*

The legislation that has possible bearing on the proposed Project from an environmental perspective is captured in **Table 3** below. Note this list does not attempt to provide an exhaustive explanation, but rather represents an identification of some of the most appropriate sections from pertinent pieces of legislation.

Table 3: Environmental Statutory Framework

Legislation	Description and Relevance
Constitution of the Republic of South Africa (No. 108 of 1996)	▪ Chapter 2 – Bill of Rights. ▪ Section 24 – Environmental Rights.
National Environmental Management Act (Act No. 107 of 1998)	▪ Key sections (amongst others): o Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment).

<table>
<tr><th>Legislation</th><th colspan="2">Description and Relevance</th></tr>
<tr><td></td><td colspan="2">o Section 28 – Duty of care and remediation of environmental damage.
▪ Environmental management principles.
▪ Authorisation type – Environmental Authorisation.
▪ Authorities – DFFE (national) (competent authority for this application) and the Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA) (provincial).</td></tr>
<tr><td>EIA Regulations</td><td colspan="2">▪ Purpose - regulate the procedure and criteria as contemplated in Chapter 5 of NEMA relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to EIA, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto.</td></tr>
<tr><td rowspan="3">GN No. R. 983 of 4 December 2014 (as amended) (Listing Notice 1)</td><td colspan="2">▪ Purpose - identify activities that would require environmental authorisations prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24D of NEMA.
▪ The investigation, assessment and communication of potential impact of activities must follow a Basic Assessment process, as prescribed in regulations 19 and 20 of the EIA Regulations. However, according to Regulation 15(3) of the EIA Regulations, Scoping and Environmental Impact Reporting (S&EIR) must be applied to an application if the application is for two or more activities as part of the same development for which S&EIR must already be applied in respect of any of the activities.
▪ The following activities under Listing Notice 1 are relevant to this Project:</td></tr>
<tr><td>GN No. R.983 – Activity 11(i):

The development of facilities or infrastructure for the transmission and distribution of electricity—
(i) <u>outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts</u>; or
(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more;
excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —
(a) temporarily required to allow for maintenance of existing infrastructure;
(b) 2 kilometres or shorter in length;
(c) within an existing transmission line servitude; and
(d) will be removed within 18 months of the commencement of development.</td><td>A 132 kV powerline from the new Facility Substation to a new 400/132kV Main Transmission Substation (MTS).

The capacity of proposed on-site substation is up to 132 kV. And 132/400kV for the MTS.

Approximate 4.5km LILO corridor.</td></tr>
<tr><td>GN No. R.983 – Activity 12(ii)(a) & (c):

The development of -
(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or
(ii) <u>infrastructure or structures with a physical footprint of 100 square metres or more</u>;
where such development occurs -
(a) within a watercourse;
(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 -
(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;
(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;
(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;</td><td>Alternative 1 and powerline - Crossing of watercourses by infrastructure (access road, power line, medium voltage AC cabling, and boundary fence) associated with the Project, as well as Solar PV infrastructure within 32m of a watercourse and drainage lines.

LILO corridor crossing watercourses.</td></tr>
</table>

Legislation	Description and Relevance	
	(dd) where such development occurs within an urban area; *(ee) where such development occurs within existing roads, road reserves or railway line reserves; or* *(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.*	
	GN No. R.983 – Activity 19: *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 -* *(a) will occur behind a development setback;* *(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;* *(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;* *(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or* *(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.*	*Alternative 1 and Powerline - Crossing of watercourses by infrastructure (access road, power line, medium voltage AC cabling, and boundary fence) associated with the Project, as well as Solar PV infrastructure within 32m of a watercourse and drainage lines.*
	GN No. R.983 – Activity 24(ii): *The development of a road -* *(i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or* *(ii) <u>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</u> -* *(a) which is identified and included in activity 27 in Listing Notice 2 of 2014;* *(b) where the entire road falls within an urban area; or* *(c) which is 1 kilometre or shorter.*	*The bell mouths/turning radii at the road intersections might need to be wider than 8m.*
	GN No. R.983 – Activity 27: *The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except 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.*	*Clearance of areas associated with the construction footprint.*
	GN No. R.983 – Activity 28(ii): *Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:* *(i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or* *(ii) <u>will occur outside an urban area, where the total land to be developed is bigger than 1 hectare</u>;*	*Footprint of Project on land that was previously used for agricultural purposes, outside of an urban area.*

Legislation	Description and Relevance	
	excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	
	GN No. R.983 – Activity 56 *The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre—* *(i) where the existing reserve is wider than 13,5 meters; or* *(ii) where no reserve exists, where the existing road is wider than 8 metres;* *excluding where widening or lengthening occur inside urban areas*	*The existing access road/access point for would need to be widened by more than 6m to accommodate heavy vehicle turning.*
GN No. R. 984 of 4 December 2014 (as amended) (Listing Notice 2)	▪ Purpose - identify activities that would require environmental authorisations prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24D of NEMA. ▪ The investigation, assessment and communication of potential impact of activities must follow a S&EIR process, as prescribed in regulations 21 to 24 of the EIA Regulations. ▪ The following activities under Listing Notice 2 are relevant to this Project:	
	GN No. R.984 – Activity 1: *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 Project involves the development of a PV facility with a total generation capacity of 480 MW renewable solar energy and BESS.*
	GN No. R.984 – Activity 9: *The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex*	*The Project proposes a 400kV LILO from the MTS to the existing Eskom lines. The MTS capacity is 132kV/400kV.*
	GN No. R.984 – 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.*	*Cumulative area of off indigenous vegetation to be cleared for entire Project (except linear components) may exceed 20 hectares.*
GN No. R. 985 of 4 December 2014 (as amended) (Listing Notice 3)	▪ Purpose - list activities and identify competent authorities under sections 24(2), 24(5) and 24D of NEMA, where environmental authorisation is required prior to commencement of that activity in specific identified geographical areas only. ▪ The investigation, assessment and communication of potential impact of activities must follow a Basic Assessment process, as prescribed in regulations 19 and 20 of the EIA Regulations. However, according to Regulation 15(3) of the EIA Regulations, S&EIR must be applied to an application if the application is for two or more activities as part of the same development for which S&EIR must already be applied in respect of any of the activities. ▪ The following activities under Listing Notice 3 are relevant to this Project:	
	GN No. R.985 – Activity 4 - (b)(i)(bb)(gg): *The development of a road wider than 4 metres with a reserve less than 13,5 metres.* *b. Free State* *(bb) National Protected Area Expansion Strategy Focus areas.* *(gg) kilometres from any other protected area identified in terms of NEMPAA or* *from the core areas of a biosphere reserve, excluding disturbed areas.*	*Some internal and access project roads fall within a NPAES Focus area.* *Internal and Access project roads fall 5km of a protected area, the Serndipidie Private Nature Reserve (although it could be argued that this area is disturbed).*
	GN No. R.985 – Activity 12 - (b) (iii)(iv):	*Clearance of areas of indigenous vegetation as part of the*

Legislation	Description and Relevance	
	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. *b. Free State* *(iii) On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning;* *(iv) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland.*	*development footprint and powerline within the following sensitive areas:* ▪ *100m from the edge of a watercourse.* *The Serndipidie Private Nature Reserve may be zoned as conservation.*
	GN No. R.985 – Activity 14(ii)(a) - (c) - (b)(i)(aa)(bb)(ff) and (gg): *The development of—* *(i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or* *(ii) <u>infrastructure or structures with a physical footprint of 10 square metres or more</u>;* *where such development occurs—* *(a) within a watercourse;* *(b) in front of a development setback; or* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* *excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.* *b. Free State* *i. Outside Urban Areas:* *(aa) A protected area identified in terms of NEMPAA, excluding conservancies;* *(bb) National Protected Area Expansion Strategy Focus areas;* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(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.*	*Development of Alternative 1 footprint and 400kV LILO powerlines within watercourse(s) / within 32 m from watercourse(s) within ESA and NPAES focus area; and sections of the powerline within ESA, NPAES focus area, and 5km from the Serndipidie Private Nature Reserve (protected area).* *The LILO powerlines traverse the Serndipidie Private Nature Reserve (protected area).*
	GN No. R.985 – Activity 18(b)(i)(bb)(gg) and (hh): *The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.* *b. Free State* *i. Outside Urban Areas:* *(bb) National Protected Area Expansion Strategy Focus areas;* *(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.* *(hh) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland;*	*Widening of existing roads may exceed 4m in width or 1km in length within 100 m of watercourse(s); within a NPAES focus area; and within 5km from the Serndipidie Private Nature Reserve (protected area).*
National Water Act (Act No. 36 of 1998)	▪ Sustainable and equitable management of water resources. ▪ Key sections (amongst others): o Chapter 3 – Protection of water resources. o Section 19 – Prevention and remedying effects of pollution.	

Legislation	Description and Relevance
	o Section 20 – Control of emergency incidents. o Chapter 4 – Water use. ▪ Authorisation type – General Authorisation / Water Use Licence. ▪ Authority – Department of Water and Sanitation (DWS).
National Environmental Management: Waste Act (Act No. 59 of 2008)	▪ Management of waste. ▪ Key sections (amongst others): o Section 16 – General duty in respect of waste management. o Chapter 5 – licensing of waste management activities listed in GN No. R. 921 of 29 November 2013 (as amended). ▪ Authorisation type – Waste Management Licence (*not required for the Project*). ▪ Authority – DFFE (national) and DESTEA (provincial).
National Environmental Management Air Quality Act (Act No. 39 of 2004)	▪ Air quality management. ▪ Key sections (amongst others): o Section 32 – Dust control. o Section 34 – Noise control. ▪ Authorisation type – Atmospheric Emission License (*not required for the Project*). ▪ Authority – DFFE (national), DESTEA (provincial) and municipality.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	▪ Management and conservation of the country's biodiversity. ▪ Protection of species and ecosystems. ▪ Authorisation type – Permit (*relevance to the Project to be confirmed*). ▪ Authority – DFFE (national) and DESTEA (provincial).
National Forests Act (Act No. 84 of 1998)	▪ Supports sustainable forest management and the restructuring of the forestry sector, as well as protection of indigenous trees in general. ▪ Section 15 – Authorisation required for impacts to protected trees. ▪ Authorisation type – Licence (*relevance to the Project to be confirmed*). ▪ Authority – DFFE.
National Environmental Management: Protected Areas Act (Act No. 57 of 2003)	▪ Protection and conservation of ecologically viable areas representative of SA's biological diversity and natural landscapes. ▪ No protected areas are directly affected by the Project.
Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)	▪ Equitable access to and sustainable development of the nation's mineral and petroleum resources and to provide for matters related thereto. ▪ Key sections (amongst others): o Section 22 – Application for mining right. o Section 27 – Application for, issuing and duration of mining permit. o Section 53 – Use of land surface rights contrary to objects of Act. ▪ Authorisation type – Mining Permit / Mining Right (*not required for the Project*). ▪ Authority – Department of Mineral Resources and Energy (DMRE).
National Heritage Resources Act (Act No. 25 of 1999)	▪ Key sections: o Section 34 – protection of structure older than 60 years. o Section 35 – protection of heritage resources. o Section 36 – protection of graves and burial grounds. o Section 38 – Heritage Impact Assessment for linear development exceeding 300m in length; development exceeding 5 000m^2 in extent, etc. ▪ Authorisation type – Permit (*relevance to the Project to be confirmed*). ▪ Authority – South African Heritage Resources Agency (SAHRA) and Free State Heritage Resources Authority (FSHRA).
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	▪ Control measures for erosion. ▪ Control measures for alien and invasive plant species. ▪ Authority – Free State Department of Agriculture and Rural Development (DARD).
Free State Province Nature Conservation Ordinance 8 of 1969	▪ Provides for the listing of certain protected plant species.
Occupational Health & Safety Act (Act No. 85 of 1993)	▪ Provisions for Occupational Health & Safety. ▪ Authority – Department of Employment and Labour (DEL). ▪ Relevant regulations, such as Electrical Installation Regulations, Construction Regulations, etc.
Hazardous Substance Act (No 15 of 1973) and Regulations	▪ Provides for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances, and for the control of certain electronic products ▪ Provides for the division of such substances or products into groups in relation to the degree of danger.

Legislation	Description and Relevance
	▪ Provides for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances and products.

The relationship between the Project and certain key pieces of environmental legislation is discussed in the subsections to follow.

5.2.2 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 982 (4 December 2014), as amended;
- Listing Notice 1 - GN No. R 983 (4 December 2014), as amended;
- Listing Notice 2 - GN No. R 984 (4 December 2014), as amended; and
- Listing Notice 3 - GN No. R 985 (4 December 2014), as amended.

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 3** above and **Table 4** below.

Table 4: Listed Activities Triggered by the Project

Project Components	Relevant Listed Activities	Description of relevance
Solar PV Plant	***GN No. R.983 (as amended)***	
	Activity no. 12(ii)(a) & (c)	Infrastructure and structures associated with the proposed Solar PV Plant Alternative 1 with a physical footprint of 100 square metres or more within 32 m from watercourses and crossing of watercourses by the proposed roads, medium voltage AC cabling and boundary fence.
	Activity no. 19	Construction activities associated with the proposed Solar PV Plant Alternative 1 within watercourses.
	Activity no. 28(ii)	Footprint of proposed Solar PV Plant on land that was previously used for agricultural purposes, outside of an urban area.
	GN No. R.984 (as amended)	
	Activity no. 1	The planned generation capacity of the proposed Solar PV Plant is 480 MW with BESS.
	Activity no. 15	The area of indigenous vegetation in the Project Area is approximately 600 ha, although vegetation will only be cleared for the hardstanding infrastructure, roads, and PV array structure foundations.
	GN No. R.985 (as amended)	
	Activity no. 12 - (b)(iv)	Clearance of indigenous vegetation as part of the development footprint within areas falling within 100m from the edge of a watercourse.
	Activity no. 14(ii)(a)(c) - (b)(i)(bb) & (ff)	Construction activities associated with the proposed Solar PV Plant Alternative 1.

Project Components	Relevant Listed Activities	Description of relevance
Power Line, LILO & Facility Substation	***GN No. R.983 (as amended)***	
	Activity no. 11(i)	Proposed 132 kV and LILO overhead power lines outside an urban area linking the proposed solar facility to the existing Eskom grid. The capacity of the proposed on-site substation is up to 132 kV/33 kV and the MTS is 132/400kV.
	Activity no. 12(ii)(a) & (c)	Crossing of watercourses by proposed powerline and LILO
	Activity no. 19	Construction activities associated with proposed power line or LILO within a watercourse.
	Activity no. 28(ii)	Footprint of proposed facility substation and powerline and LILO on land that was previously used for agricultural purposes, outside of an urban area.
	GN No. R.985 (as amended)	
	Activity no. 12 - (b)(iv)	Clearance of indigenous vegetation as part of the development footprint within areas falling within 100m from the edge of a watercourse.
	Activity no. 14(ii)(a)(c) - (b)(i)(bb) & (ff)	Construction activities associated with the proposed powerline within ESA, NPAES focus area, and 5km from the Serndipidie Private Nature Reserve (protected area).
Roads	***GN No. R.983 (as amended)***	
	Activity no. 12(ii)(a - c)	Access roads with a physical footprint of 100 square metres or more within 32 m from watercourses, as well as crossing of watercourses by proposed access roads.
	Activity no. 19	Construction activities associated with proposed access roads within a watercourse.
	Activity 24(ii)	The bell mouths/turning radii at the road intersections might need to be wider than 8m.
	Activity 56	The existing access road/access point for would need to be widened by more than 6m to accommodate heavy vehicle turning.
	GN No. R.985 (as amended)	
	Activity no. 4 - (b)(i)(ee)	The internal roads will vary from 6m to 8m wide. Certain sections of the internal project roads fall within a NPAES Focus area.
	Activity no. 12 - (b) (iv)	Clearance of indigenous vegetation as part of the development footprint within 100m from the edge of a watercourse.
	Activity no. 14(ii)(a) & (c) - (b)(i)(bb)(ff)	Development footprint within watercourse(s) / within 32 m from watercourse(s) within ESA and NPAES focus area.
	Activity no. 18(b)(i) (bb)(gg) and (hh):	The existing access road/access point for would need to be widened by more than 6m to accommodate heavy vehicle turning.

Note that the dimensions of the Project's proposed infrastructure and components should be regarded as approximates due to the dynamic nature of the planning and design process. As a conservative approach, all activities that could possibly be triggered by the Project were included in the Application Form that was submitted to the DFFE with the draft Scoping Report. Based on the comments received from DFFE on the draft Scoping Report, the proposed BESS does not trigger the storage of dangerous goods in terms of the EIA Listing Notices. Additional triggers under some of the listed activities on Listing Notice 3 applied for were added based on the findings of the Specialist Studies. Hence, and amended Application Form was compiled and submitted to DFFE with the draft EIA Report.

5.2.3 National Environmental Management: Waste Act

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

1. 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;
2. To provide for institutional arrangements and planning matters;
3. To provide for specific waste management measures;
4. To provide for the licensing and control of waste management activities;
5. To provide for the remediation of contaminated land; and
6. 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) (contained in **Appendix H**) makes suitable provisions for waste management, including the storage, handling and disposal of waste.
- Operational phase –
    - Minimum volumes of 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.

5.2.4 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:

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

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

Some 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 layout for Alternative 2 has taken watercourses into consideration by avoiding said watercourses, and therefore, Alternative 2 would not require authorisation in terms of NWA. Alternative 1 of Project falls within non-perennial drainage lines and would entail the following activities that constitute water uses in terms of Section 21 of the NWA:

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

The Applicant will seek authorisation from DWS in terms of the NWA for the above water uses associated with the Project since the Project falls within 500m of delineated wetlands.

5.2.5 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 key definitions from this Act include:

- "*Air pollution*" – any change in the composition of the air caused by smoke, soot, dust (including fly ash), cinders, solid particles of any kind, gases, fumes, aerosols and odorous substances.
- "*Atmospheric emission*" or "*emission*" – any emission or entrainment process emanating from a point, non-point or mobile source that results in air pollution.
- "*Non-point source*" – a source of atmospheric emissions which cannot be identified as having emanated from a single identifiable source or fixed location, and includes veld, forest and open fires, mining activities, agricultural activities and stockpiles.
- "*Point source*" – single identifiable source and fixed location of atmospheric emission, and includes smoke stacks and residential chimneys.

This Act provides for the listing of activities which result in atmospheric emissions that pose a threat to health or the environment. No person may without an Atmospheric Emission Licence (AEL) conduct any such listed activity. 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.

5.2.6 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).

The findings from the Wetland Delineation and Risk Assessment and Terrestrial Biodiversity Compliance Statement are included in **Section 12.3** and **Section 12.4** below, respectively.

5.2.7 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 -
    - Exceeding 5 000 m^2 in extent; or
    - Involving three or more existing erven or subdivisions thereof; and
- The re-zoning of a site exceeding 10 000 m^2 in extent.

The findings from the Phase 1 Cultural Heritage Impact Assessment and Palaeontological Impact Assessment that were undertaken for the Project are included in **Section 12.7** and **Section 12.8** below, respectively.

5.3 Governance of Energy 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):

- SA 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 Energy Policy (1998);
    - White Paper on Renewable Energy (2003);
    - Integrated Energy Plan (2003);

    - IRP 2010;
    - IRP 2019
    - National Climate Change Response White Paper (2011);
    - Post-2015 National Energy Efficiency Strategy;
    - The National Development Plan (2030);
    - Climate Change Bill (2018); and
    - Carbon Tax Bill (2019).
- 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 former Department of Environmental Affairs (DEA), which is now known as DFFE, developed EIA Guideline for Renewable Energy Projects (2015).
- SA's related voluntary instruments include –
    - South African National Standard (SANS) 941 energy-efficiency of electrical and electronic equipment; and
    - SANS 50001 energy management standard.

5.4 Guidelines

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

- Guideline on Alternatives, EIA Guideline and Information Document Series (DEA&DP, 2010);
- 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 (DEA, 2015); and
- Guidelines for Involving Specialists in the EIA Processes Series (Brownlie, 2005).

5.5 National and Regional Plans

The following regional plans were considered during the execution of the Scoping Phase (amongst others):

- MLM's Spatial Development Framework (SDF);
- MLM's Integrated Development Plan (IDP);
- Fezile Dabi District Municipality IDP;
- Free State Biodiversity Plan (2015) (Collins, 2016); and
- Relevant national, provincial and local policies, strategies, plans and programmes.

5.6 Renewable Energy Development Zones

A Strategic Environmental Assessment (SEA) was undertaken by the former DEA, which is now known as DFFE, in order to identify geographical areas most suitable for the rollout of wind and solar PV energy projects and the supporting electricity grid network. These areas are referred to as Renewable Energy Development Zones (REDZs), in which development will be incentivised and streamlined. The proposed Project footprint in relation to the REDZs are shown in **Figure 5** below.

As shown in **Figure 5** below, the Project is not located within any REDZs or Strategic Transmission Corridors. According to GNR 114 of 16 February 2018, where an Application for Environmental Authorisation for large scale wind or solar PV facilities is being made and these facilities fall outside of the REDZs then these applications will be considered in terms of the requirements of the EIA Regulations.

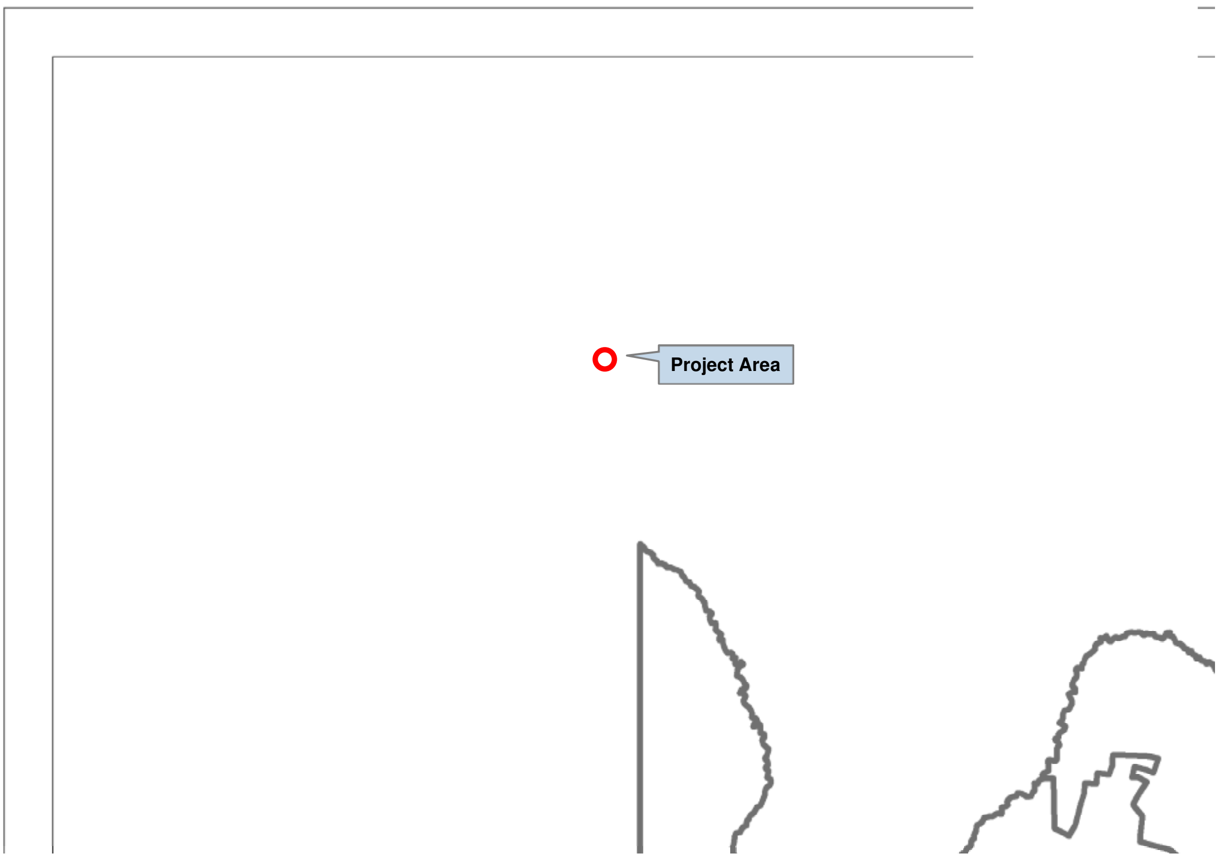


Figure 5: The Project in relation to REDZs

6 SCOPING AND EIA PROCESS

6.1 Environmental Assessment Authorities

In terms of NEMA the lead decision-making authority for the environmental assessment is DFFE, as the competent authority for renewable energy related applications. Due to the geographic location of the Project, DESTEA is regarded as one of the key commenting authorities in terms of NEMA during the execution of the EIA, and all documentation will thus be copied to this Department.

Various other authorities with jurisdiction over elements of the receiving environment or project activities will also be consulted during the course of the EIA. Refer to the database of Interested and Affected Parties (I&APs) contained in **Appendix F** for a list of the government departments.

6.2 Environmental Assessment Practitioner

Nemai Green was appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the environmental assessment for the proposed Project. In accordance with Appendix 2, Section 2(1)(a) of the EIA Regulations, this section provides an overview of Nemai Green and the company's experience with EIA's, as well as the details and experience of the EAP's that form part of the Scoping and EIA team.

Nemai Green is an independent, specialist environmental, social development and Occupational Health and Safety (OHS) consultancy. The company is a 100% black female owned company, with a level 1 BBBEE rating. The company is directed by a team of experienced and capable environmental engineers, scientists, ecologists, sociologists, economists and analysts. The company has offices in Randburg (Gauteng) and Durban (KZN).

The core members of Nemai Green that are involved with the S&EIR process for the Project are captured in **Table 5** below, and their respective Curricula Vitae are contained in **Appendix D**. The oath of the EAP is contained in **Appendix K**.

Table 5: Scoping and EIA Core Team Members

Name	Qualifications	Selected Experience - Renewable Energy & Bulk Power Projects
D. Henning (21 years' experience)	MSc (River Ecology)	▪ Matjhabeng 400 MW Solar PV Power Plant with 80 MW (320 MWh) Battery Energy Storage Systems, Free State Province, SA. ▪ Beaufort West 75MW Solar PV Project, Western Cape, SA. ▪ Extraction of Gas and Electric Power Production Plant in the Rubavu District, Rwanda. ▪ Impompomo Hydropower Plant, Mpumalanga, SA. ▪ Hydropower Plant within Hydraulic Network at Rand Water's Zoekfontein Site, Gauteng Province, SA.

Name	Qualifications	Selected Experience - Renewable Energy & Bulk Power Projects
		▪ uMkhomazi Water Project Phase 1 with hydropower facilities, KwaZulu-Natal, SA. ▪ Neptune-Poseidon Transmission Line, including 200km of 400 kV transmission line, Eastern Cape, SA. ▪ Makalu B (Igesi) Substation and Associated Transmission Loop-In Lines, Free State Province, SA. ▪ Anderson Dinaledi Transmission Line, including 80km of 132 kV transmission line with substations, North-West Province, SA.
D. Naidoo (25 years' experience)	BSc Eng (Chem)	▪ Bronkhorstspruit Biogas Plant, Gauteng Province, SA. ▪ Construction of the Xina Solar One Parabolic Trough Technology 100MW Solar Plant, Northern Cape Province, SA. ▪ Construction of the Biotherm Solar Photovoltaic Power Plants, Northern Cape, SA. ▪ Construction of the Roodeplaat Wind Farm, Eastern Cape, SA. ▪ North-South Strengthening Scheme, including 300km of 400 kV transmission line with substations, Mpumalanga, SA. ▪ Mookodi-Mahikeng 400 kV Transmission Line, North-West Province, SA. ▪ Watershed 275/88/132 kV Substation, North-West Province, SA.
J. Davis (10 years' experience)	BSc Hons Geography and Environmental Sciences	▪ Proposed Parys up to 200MW Solar Photovoltaic (PV) and Battery Energy Storage System (BESS) Hybrid Project near the town of Parys, in the Free State Province. ▪ Proposed 75MW Beaufort West Photovoltaic Project, Western Cape. ▪ Proposed Ferrum-Upington 400kV Powerline, Northern Cape ▪ Proposed SERE Solar Photovoltaic Plant Phase 1A and associated infrastructure, Western Cape Province. ▪ Emkhiweni 400kV Powerline Route Deviations, Mpumalanga and Limpopo Provinces. ▪ Proposed Emkhiweni Substation and 400KV Line from Emkhiweni Substation to Silimela, Mpumalanga and Limpopo Provinces.

6.3 Environmental Screening

According to GN 960 of 5 July 2019, an application for Environmental Authorisation must be accompanied by the report generated by the National Web Based Environmental Screening Tool ("Screening Tool"), as contemplated in Regulation 16(1)(b)(v) of the EIA Regulations.

The aims of the Screening Tool include the following:

- To screen a proposed site for any environmental sensitivity;
- To provide site specific EIA process and review information;
- To identify related exclusions and/or specific requirements including specialist studies applicable to the proposed site and/or development, based on the national sector classification and the environmental sensitivity of the site; and
- To allow for a Screening Report to be generated.

The respective Screening Reports for the proposed PV Site and power line were appended to the Application Form and were also included in the Scoping Report.

6.4 Environmental Assessment Triggers

The process for seeking authorisation under NEMA is being undertaken in accordance with the EIA Regulations, promulgated in terms of Chapter 5 of NEMA. Based on the types of activities involved the requisite environmental assessment for the project is a S&EIR process. Refer to **Section 5.2.1** and **Section 5.2.2** above for the Project's legal framework and specifically the activities triggered in terms of Listing Notices 1, 2 and 3 of the EIA Regulations.

6.5 S&EIR Process

6.5.1 Formal Process

An outline of the S&EIR process for the proposed Project is provided in **Figure 6** below. The objectives of the EIA process, based on the EIA Regulations, are captured in **Section 1** above.

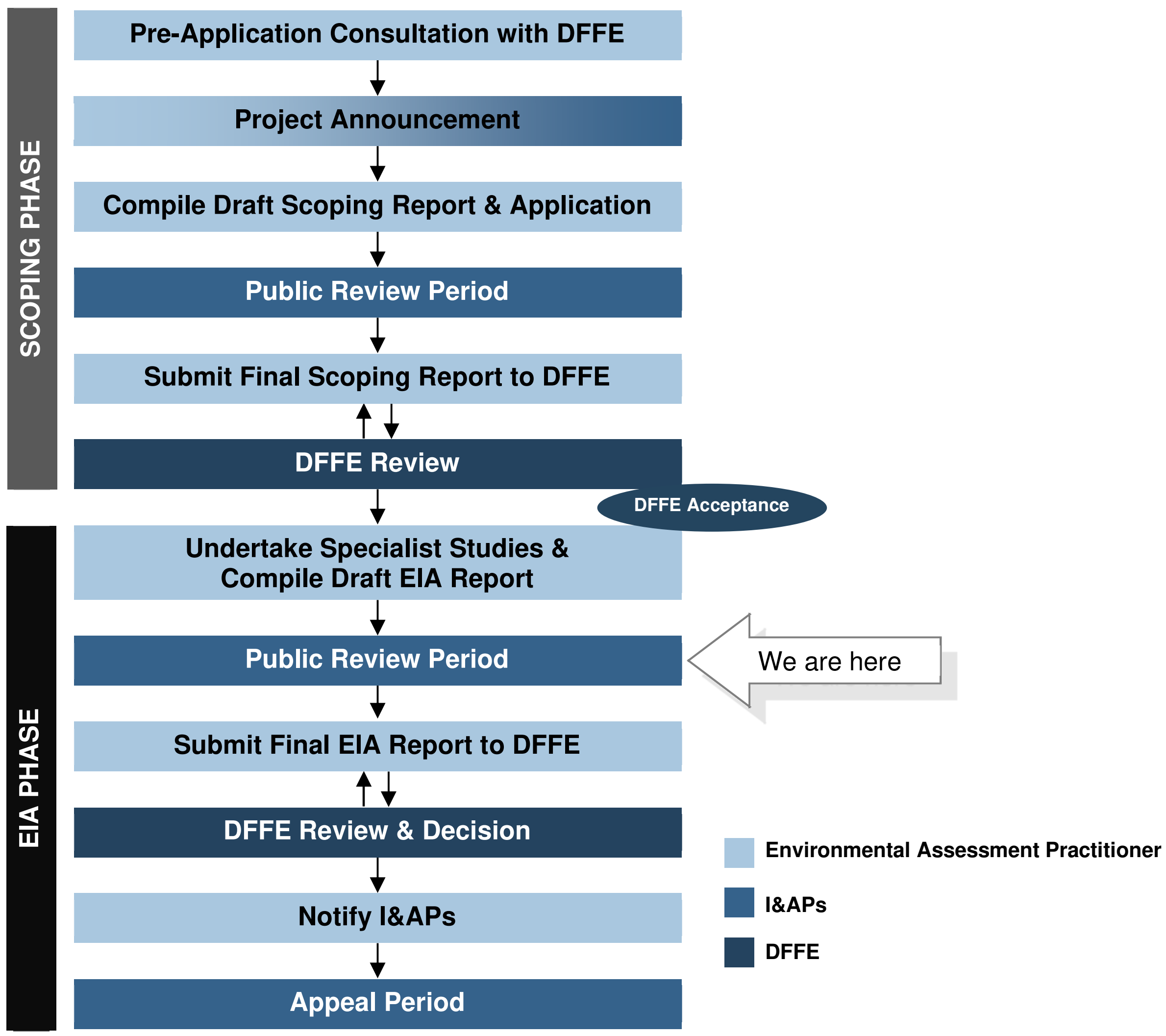


Figure 6: S&EIR process outline

6.5.2 The EIA Process to Date

The following key milestones have been reached to date as part of the EIA process:

1. A Pre-Application Meeting was held with DFFE on 31 January 2023.
2. A draft Scoping Report, which conformed to Appendix 2 of the EIA Regulations, was compiled. This document included the following salient information (amongst others):
   a. A Scoping-level impact assessment to identify potentially significant environmental issues for detailed assessment during the EIA phase;
   b. Screening and investigation of feasible alternatives to the project for further appraisal during the EIA phase; and
   c. A Plan of Study, which explained the approach to be adopted to conduct the EIA for the proposed project.
3. The Application for Environmental Authorisation and draft Scoping Report were submitted to DFFE on 09 February 2023.
4. The draft Scoping Report was lodged for public review from 13 February until 15 March 2023.
5. The final Scoping Report was submitted to DFFE on 27 March 2023.
6. DFFE accepted the Scoping Report and Plan of Study for the EIA on 14 May 2023 (refer to **Appendix B**), which allowed the commencement of the EIA phase.

6.6 Amended Application Form

An amended Application Form is contained in **Appendix C**, which includes the following changes:

- Refinement of the affected properties list;
- Amendment of the project description of the proposed PV facility; and
- Refinement of listed activities triggered by the Project.

6.7 Alignment with the Plan of Study

The Plan of Study, which was contained in the Scoping Report and was accepted by DFFE, explained the approach to be adopted to conduct the EIA for the proposed Project. The manner in which the EIA Report addresses the requirements of the Plan of Study is shown in **Table 6** below.

Table 6: Alignment of EIA Report with Plan of Study

No.	Plan of Study Requirement	Reference to Section in EIA Report
1.	Assess potentially significant environmental issues identified during Scoping through: 1. Applying an appropriate impact assessment methodology. 2. Conducting specialist studies. 3. Identifying suitable mitigation measures.	• **Section 12** • **Section 13**
2.	Assessment of feasible alternatives.	• **Section 14**
3.	Specialist studies to be completed in accordance with Terms of Reference.	• **Section 12** • **Appendix E**

No.	Plan of Study Requirement	Reference to Section in EIA Report
4.	Public participation to include the following: • Update the database of I&APs. • Allow for the review of the draft EIA Report. • Convene a public meeting. • Compile and maintain a Comments and Responses Report (CRR). • Notification of DFFE's decision.	**Section 15**
5.	EIA Report to satisfy the minimum requirements stipulated in Appendix 3 of the EIA Regulations.	**Section 2**
6.	Authority Consultation.	**Section 15**

6.8 Addressing DFFE's Requirements

The manner in which DFFE's specific requirements, as listed in the letter received from this Department for the acceptance of the Scoping Report (refer to **Appendix B**), have been attended to are described in **Table 7** below.

Table 7: DFFE's Specific Requirements - Acceptance of the Scoping Report

DFFE's Requirements	Response/Status
(i) Listed Activities	
(a) The EIAr must provide an assessment of the impacts and mitigation measures for each of the listed activities applied for.	Refer to **Section 13** below for the assessment of the listed activities and the identified mitigation measures
(b) The listed activities represented in the EIAr and the application form must be the same and correct	The listed activities contained in **Table 3** and **Table 4** above are the same as those contained in the amended Application Form (**Appendix C**). The listed activities triggered are explained in the context of the Project in **Table 3** and **Table 4** above. The findings of the specialist studies were considered in confirming the listed activities triggered.
(c) The EIAR must assess the correct sub-listed activity for each listed activity applied for. The onus is on the EAP and applicant to ensure that no other activities are triggered, and the correct activities are applied for.	Refer to **Table 3** and **Table 4** above for the sub-listed activity for each listed activity triggered by the Project.
(d) Listed activities triggered by proposed project under Listing Notice 3 are incomplete in the SR. Please ensure that the EIAr include all listed activities triggered and are written in full including the description of sub-listed activities.	Refer to **Table 3** and **Table 4** above for the sub-listed activity for each listed activity triggered by the Project.
(e) Project description provided in the SR cannot be linked with listed activity as it does not include the threshold of the proposed infrastructure. The Department take note that the thresholds are still to be confirmed during the EIAr phase. Please ensure that this information is provided in the draft EIAr	Refer to **Table 3** and **Table 4** above for the sub-listed activity for each listed activity triggered by the Project.
(ii) Public Participation	
(a) Please ensure that comments from all relevant stakeholders are submitted to the Department with the EIAr. This includes but is not limited to the Eskom, the Free State Department of Environment, Local and District Municipality, Department of Agriculture, the South African Heritage Resources Agency (SAHRA), The South African Civil Aviation Authority (SACAA),	Copies of the draft EIA Report were provided to the key regulatory and commentary authorities listed in **Section 15** below. Comments received on the draft EIA Report will be appended to the final EIA Report, which will be submitted to DFFE. These comments will also be incorporated into the CRR.

	DFFE's Requirements	Response/Status
	The Department of Transport, The Department of Water and Sanitation (DWS), The South African National Roads Agency Limited (SANRAL), The Endangered Wildlife Trust (EWT), The Endangered Wildlife Trust (EWT), Square Kilometre Array (SKA),The South African Astronomy Observation (SAAO) and the Department of Environment, Forestry and Fisheries: Directorate Biodiversity and Conservation.	
(b)	Please ensure that all issues raised, and comments received during the circulation of the draft SR and draft EIAr from registered I&APs and organs of state which have jurisdiction in respect of the proposed activity are adequately addressed in the final EIAr. Proof of correspondence with the various stakeholders must be included in the final EIAr. Should you be unable to obtain comments, proof should be submitted to the Department of the attempts that were made to obtain comments.	The CRR contained in **Appendix G** includes comments received during the Scoping phase. The CRR will be updated with comments received during the review of the final EIA Report.
(c)	A Comments and Response trail report (C&R) must be submitted with the final EIAR. The C&R report must incorporate all comments for this development. The C&R report must be a separate document from the main report and the format must be in the table format as indicated in Appendix 1 of this comments letter in chronological order. Please refrain from summarising comments made by I&APs. All comments from I&APs must be copied verbatim and responded to clearly. Please note that a response such as "noted" is not regarded as an adequate response to I&AP's comments	The CRR is contained in **Appendix G**.
(d)	Comments from I&APs must not be split and arranged into categories. Comments from each submission must be responded to individually.	The CRR, which is contained in **Appendix G**, does not categorise the comments received.
(e)	The Public Participation Process must be conducted in terms of Regulation 39, 40, 41, 42, 43 & 44 of the EIA Regulations, 2014, as amended	The approach to Public Participation during the EIA phase is explained in **Section 15** below.
(f)	The EAP is requested to contact the Department to make the necessary arrangements to conduct a site inspection prior to the submission of the final EIAr.	The EAP will liaise with the DFFE Case Officer once the draft EIAr is submitted to the Department.
(iii) Cumulative Assessment		
(a)	Should there be any other similar projects within a 30km radius of the proposed development site, the cumulative impact assessment for all identified and assessed impacts must be refined to indicate the following: • Identified cumulative impacts must be clearly defined, and where possible the size of the identified impact must be quantified and indicated, i.e., hectares of cumulatively transformed land. • Detailed process flow and proof must be provided, to indicate how the specialist's recommendations, mitigation measures and conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project. • The cumulative impacts significance rating must also inform the need and desirability of the proposed development. • A cumulative impact environmental statement on whether the proposed development must proceed.	Potential cumulative impacts associated with the Project and these other renewable energy applications are discussed in Section **13.28**.
(iv) Specialist assessments		
(a)	The EAP must ensure that the terms of reference for all the identified specialist studies must include the following: ▪ A detailed description of the study's methodology; indication of the locations and descriptions of the development footprint, and all other associated infrastructures that they have assessed and are recommending for authorisations.	Provision was made in the terms of reference for the specialist studies to cater for these requirements. Potential cumulative impacts associated with the Project are discussed in **Section 13.28** below.

DFFE's Requirements	Response/Status
▪ Provide a detailed description of all limitations to the studies. All specialist studies must be conducted in the right season and providing that as a limitation will not be allowed. ▪ Please note that the Department considers a 'no-go' area, as an area where no development of any infrastructure is allowed; therefore, no development of associated infrastructure including access roads is allowed in the `no-go' areas. ▪ Should the specialist definition of 'no-go' area differ from the Departments definition; this must be clearly indicated. The specialist must also indicate the 'no-go' area's buffer if applicable. ▪ All specialist studies must be final, and provide detailed/practical mitigation measures for the preferred alternative and recommendations, and must not recommend further studies to be completed post EA. ▪ Should a specialist recommend specific mitigation measures, these must be clearly indicated. ▪ Regarding cumulative impacts: o Clearly defined cumulative impacts and where possible the size of the identified impact must be quantified and indicated, i.e., hectares of cumulatively transformed land. o A detailed process flow to indicate how the specialist's recommendations, mitigation measures and conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project. o Identified cumulative impacts associated with the proposed development must be rated with the significance rating methodology used in the process. o The significance rating must also inform the need and desirability of the proposed development. o A cumulative impact environmental statement on whether the proposed development must proceed.	
(b) Should the appointed specialists specify contradicting recommendations, the EAP must clearly indicate the most reasonable recommendation and substantiate this with defendable reasons; and were necessary, include further expertise advice.	The specialists did not provide contradicting recommendations.
(c) It is further brought to your attention that Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation, which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. "the Protocols"), and in Government Notice No. 1150 of 30 October 2020 (i.e. protocols for terrestrial plant and animal species), have come into effect. Should this study be required, the specialist assessments must be conducted in accordance with these protocols. (d) The screening tool output: ▪ The screening tool and the gazetted protocols (GN R320 of 20 March 2020 and GN R 1150 of 30 October 2020) require a site sensitivity verification to be completed to either confirm or dispute the findings and sensitivity ratings of the screening tool. ▪ It is the responsibility of the EAP to confirm the list of specialist assessments and to motivate in the assessment report, the reason for not including any of the identified specialist studies including the provision of photographic evidence of the site situation. The site sensitivity verification	The relevant specialist studies complied with the requirements of these Protocols. Site sensitivity verifications were undertaken by the Specialists and are included in their respective reports as a separate chapter, as has been accepted by DFFE in other applications. **Section 12.2** below provide the reasons for excluding certain specialist studies that were identified during Environmental Screening. The site sensitivity verification for the studies not undertaken are included as a separate report under **Appendix E**.

DFFE's Requirements	Response/Status
for each of the recommended studies, as per the protocols, must be compiled and attached.	
(e) Additionally, the protocols specify that an assessment must be prepared by a specialist who is an expert in the field and is SACNASP registered for e.g.an aquatic assessment must be prepared by a specialist registered with SACNASP, with expertise in the field of aquatics sciences.	**Section 12** below provides the SACNASP registration details of the relevant specialists.
(f) Please be reminded that section 2(3) of NEMA requires developments to be socially, environmentally and economically sustainable, while section 2(4)(i) of NEMA requires the social, economic and environmental impacts of activities, including disadvantages and benefits, to be considered, assessed and evaluated.	Refer to the specialist summary under **Section 12** and the impact assessments under **Section 13**.
(g) Specialist findings and recommendations must be separated per project.	Refer to the specialist summary under **Section 12.**
(h) The following Specialist Assessments will form part of the EIAr: ▪ Terrestrial Ecological Impact Assessment; ▪ Aquatic Impact Assessment & Delineation ▪ Avifaunal Impact Assessment; ▪ Heritage Impact Assessment; ▪ Agricultural Impact Assessment; ▪ Social Impact Assessment; ▪ Visual Impact Assessment; and ▪ Desktop Palaeontological Impact Assessment.	It is noted that the Desktop Palaeontological Impact Assessment was expanded to include a field survey due to the Very High rating of the Palaeontological Sensitivity of Adelaide Subgroup (Beaufort Group, Karoo Supergroup) according to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS). Furthermore, a Traffic Impact Assessment was undertaken. Specialist studies are summarized under **Section 12** and the reports can be found under **Appendix E.**
(v) General	
(a) Recommendations of conditions to be included in the EA, must be done per project.	Refer to **Section 16.3** below.
(b) Details of the future plans for the site and infrastructure after decommissioning in 20-30 years and the possibility of upgrading the proposed infrastructure to more advanced technologies must be indicated.	The Applicant provided the following response: Ideally, the power purchase agreement (PPA) with Eskom and Implementation and Direct Agreement with the Department of Energy will be renegotiated at the end of the project lifespan (20 – 25years) in which case the facility won't be decommissioned. In the unlikely event that this isn't possible, various components of the proposed SEF which are decommissioned will be reused, recycled or disposed of in accordance with the relevant regulatory requirements. Some components may also be traded or sold as there is an active second-hand market for scrap metal. The decommissioning phase of the project is also expected to create skilled and unskilled employment opportunities.
(c) The EAP must provide landowner consent for all farm portions affected by the proposed project, whether the project component is linear or not, i.e. all farm portions where the access road, solar panels and associated infrastructure is to be located.	Regulation 39(1) of the EIA Regulations requires the proponent, if not the owner or person in control of the land on which the activity is to be undertaken, to obtain written consent of the landowner or person in control of the land in order to undertake such activity on that land. In line with Regulation 39(2)(a), the need to obtain landowner consent does not apply to linear activities. Therefore, the Project proponent has obtained written consent from the landowner for the activities related to the Solar PV facility. Landowner consent for the access road and powerline route are not included with this application, as per the EIA Regulations. In addition, the proposed 132kV powerline associated with this Project falls on the same property as the PV facility.
(d) Please also ensure that the EIAr includes the period for which the Environmental Authorisation is required and the date on	Refer to **Section 16.3** below.

DFFE's Requirements	Response/Status
which the activity will be concluded as per Appendix 3 of the NEMA EIA Regulations, 2014, as amended	

6.9 Other Applications in Project Area

DFFE has created the SA Renewable Energy EIA Application (REEA) Database, which contains spatial data for renewable energy applications for Environmental Authorisation. It includes spatial and attribute information for both active (in process and with valid authorisations) and non-active (lapsed or replaced by amendments) applications.

A map is contained in **Figure 76** below, which shows other renewable energy applications within a 30 km radius of the PV Site. According to the REEA Database, renewable energy applications have been made for properties to the east and north-west of the Project.

Potential cumulative impacts associated with the Project and these other renewable energy applications are discussed in **Section 13.28** below.

7 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations accompany the EIA process:

- As the design of the project components is still in feasibility stage, and due to the dynamic nature of the planning environment, the dimensions and layout of the infrastructure may change during the detailed design phase.
- Regardless of the analytical and predictive method employed to determine the potential impacts associated with the Project, the impacts are only predicted on a probability basis. The accuracy of the predictions is largely dependent on the availability of environmental data and the degree of understanding of the environmental features and their related attributes.
- The following assumptions, gaps and limitation were noted as part of the Specialist Studies:
    - Wetland Delineation and Risk Assessment (van Rooyen, 2023) –
        - This report is based on the information and layout received from the proponent;
        - The findings, observations, conclusions and recommendations are based on the author's best professional and scientific knowledge; and
        - The assessment of wetlands presented in this report is limited to the proposed project footprint and does not include the extended 500 m radius regulated area of the Oslaagte Solar 3 PV Facility. Therefore, this report cannot be used for WUL application.
    - Terrestrial Biodiversity Compliance Statement (Human, 2023) –
        - It is assumed that all information received from the client is accurate;
        - All datasets accessed and utilised for this assessment are considered to be representative of the most recent and suitable data for the intended purposes;
        - The handheld GPS utilised for the fieldwork had a maximum accuracy of 5 m. As such, any features spatially logged and mapped as part of this report may be offset by approximately 5 m; and
        - Only a single season survey was conducted for the respective studies, this would constitute a wet season survey, however the data received is considered sufficient to derive a meaningful baseline; since most species are present during the wet season survey apart from winter flowering plants.
    - Avifaunal Baseline and Impact Assessment (Clark, 2023) –
        - The assessment area was based on the area provided by the client and any alterations to the footprint and/or missing GIS information pertaining to the assessment area would have affected the assessment;
        - Fieldwork was undertaken for the cluster, whereas reporting has made consideration for the separate Solar PV projects;
        - No nocturnal assessments were conducted due to safety risks.
    - Phase 1 Cultural Heritage Impact Assessment (Kitto, 2023) –

  - This assessment assumes that all the information provided by the Environmental Assessment Practitioner (EAP) regarding the project footprint (Including the powerline) is correct and current.
  - The project area traverses various properties separated by fences, and access was often restricted by heavily eroded farm roads, localised flooding due to the rainy (summer) season and extremely dense vegetation (acacia thicket) in some areas.
  - The large area of the project footprint meant that it was not feasible to undertake a pedestrian survey of the whole area and the fieldwork therefore comprised a combination of vehicle and pedestrian investigation. The extremely dense and long vegetation in several areas meant that archaeological and heritage visibility was low in those areas. Therefore, there is a possibility that some heritage resources were not identified, specifically, graves or burial sites.
- Palaeontological Impact Assessment (Butler, 2023) –
  - The focal point of geological maps is the geology of the area and the sheet explanations of the Geological Maps were not meant to focus on palaeontological heritage. Many inaccessible regions of South Africa have never been reviewed by palaeontologists and data is generally based on aerial photographs alone. Locality and geological information of museums and universities databases have not been kept up to date or data collected in the past have not always been accurately documented.
  - Comparable Assemblage Zones in other areas is also used to provide information on the existence of fossils in an area which has not documented in the past. When using similar Assemblage Zones and geological formations for Desktop studies it is generally assumed that exposed fossil heritage is present within the footprint. A field-assessment will thus improve the accuracy of the desktop assessment.
- Visual Impact Assessment (Buys, 2023) –
  - Determining the value, quality and significance of a visual resource or the significance of the visual impact that any activity may have on it, in absolute terms, is not achievable. Visual perception is by nature a subjective experience, as it is influenced largely by personal opinions and world views. For instance, what one viewer may experience as an intrusion in the landscape, another may regard as positive. Such differences in perception are greatly influenced by culture, education, and socio-economic background. A degree of subjectivity is therefore bound to influence the rating of visual impacts. It is therefore impossible to conduct a visual assessment without relying to some extent on the opinion of an experienced consultant, which is inherently subjective. The subjective opinion of the visual consultant is however unlikely to materially influence the findings and recommendations of this study, as a wide body of scientific knowledge exists in the industry of VIA, on which findings are based.

  - A once-off field survey was sufficient to characterise the baseline visual characteristics of the site.
  - The primary objective of this study was to assess the visual environment.
  - The fieldwork relevant to this study was a once-off assessment that was conducted.
  - A preliminary layout was available. Detailed dimensions, such as the vertical offset of proposed surface infrastructure above ground level, were however not available and were assigned based on experience from similar infrastructure in previous projects.
  - All viewsheds were based on terrain level. As such these viewsheds do not incorporate distractive views in the form of vegetation or land use (infrastructure, buildings, etc.).
  - This study did not include an illumination or social assessment.
  - The assessment of impacts and recommendation of mitigation measures was informed by the site-specific aspects identified and based on the assessor's working knowledge and experience with similar activities
- Social Impact Assessment (Tanhuke & Chidley, 2023) -
  - The information obtained during the public participation phase provides a comprehensive account for the community structure and community concerns for the project.
  - The study was done with the information and the time frames available to the specialist at the time of executing the study. The specialist took an evidence-based approach in the compilation of this report and did not intentionally exclude information which is relevant to the assessment; and
  - No relocation of families will take place for this project.
- Agricultural Compliance Statement (Gouws, 2023) –
  - The observations are accepted as representative of the soil conditions. The author feels confident that this is the case.
  - There were sufficient observations made that no gaps in knowledge or data is expected.
- Traffic Impact Assessment (Johnson, 2023) -
  - This study is based on the project information provided by the Client.
  - According to the Eskom Specifications for Power Transformers (Eskom Power Series, Volume 5: Theory, Design, Maintenance and Life Management of Power Transformers), the following dimensional limitations need to be kept when transporting the transformer – total maximum height 5 000mm, total maximum width 4 300 mm and total maximum length 10 500 mm.
  - Maximum vertical height clearances along the haulage route is 5.2 m for abnormal loads.
  - Imported elements will be transported from the most feasible port of entry, which is deemed to be Richards Bay Port.

- If any elements are manufactured within South Africa, these will be transported from their respective manufacturing centres, which would be either in the greater Johannesburg area, Pinetown/Durban or Cape Town.
- All haulage trips will occur on either surfaced national and provincial roads or existing gravel roads.
- Construction materials will be sourced locally as far as possible.

8 NEED AND DESIRABILITY

This section serves to expand on the motivation for the proposed Project that is provided in **Section 3** above. The format contained in the Guideline on Need and Desirability (DEA, 2017) was used in **Table 8** below.

Table 8: Need for and desirability of the proposed Project

Question No.	Response
1. How will this development (and its separate elements/aspects) impact on the ecological integrity of the area? *1.1. How were the following ecological integrity considerations taken into account?:* *1.1.1. Threatened Ecosystems.* *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.* *1.1.3. Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs").* *1.1.4. Conservation targets.* *1.1.5. Ecological drivers of the ecosystem.* *1.1.6. Environmental Management Framework.* *1.1.7. Spatial Development Framework.* *1.1.8. Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).*	The following specialist studies will be undertaken to assess the impacts of the Project on the ecological integrity of the area: ▪ Aquatic Assessment; ▪ Terrestrial Ecological Assessment; and ▪ Avifaunal Assessment. The findings of the above studies are presented in the EIA Report. Furthermore, layouts were amended so that all sensitive areas were avoided, and ecological corridors were established. This is to ensure that the ecological integrity and processes would not be compromised. The Project will provide clean energy which is in line with several global and international responsibilities. Management objectives will be included in the EIA Report and EMPr to safeguard the sensitive ecological features. One of the goals identified in the municipal IDP (MLM, 2022) to domesticate the Sustainable Development Goals is to promote developments in renewable energy. This IDP further states that the MLM uses large amounts of energy and will face increased energy demand as a result of climate change over and above increases in population growth. The IDP notes that the energy sector is already embattled as it is and despite the increased focus on greener energy, the country is still very dependent on fossil fuels. An Agricultural Impact Assessment has been undertaken and the findings are presented in the EIA Report. The Applicant intends to bid for the current and future REIPPPP bid windows and/or other renewable energy markets within SA. The REIPPPP is a competitive tender process that was designed to facilitate private sector investment into grid-connected renewable energy (RE) generation in SA.
1.2. How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Potential disturbances to ecosystems may include the following: ▪ Clearance of large areas of indigenous vegetation associated with the construction footprint of the PV facility and associated infrastructure; ▪ Potential loss of sensitive environmental features; ▪ Pollution of water resources; ▪ Soil destabilisation and subsequent erosion; and ▪ Proliferation of alien and invasive species. The following specialist studies will be undertaken to assess the impacts of the Project on the ecological integrity of the area:

Question No.	Response
	▪ Aquatic Assessment; ▪ Terrestrial Ecological Assessment; and ▪ Avifaunal Assessment. The findings of the above studies are presented in the EIA Report. Furthermore, layouts were amended so that all sensitive areas were avoided, and ecological corridors were established. This is to ensure that the ecological integrity and processes would not be compromised. Mitigation measures are included in the EIA Report and EMPr to minimise disturbances to ecosystems, according to the mitigation hierarchy.
1.3. How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	The Project may cause surface water, groundwater, soil, air, noise and light pollution during the construction and operational phases. Environmental sensitivities were established through ground-truthing by specialists, these were overlaid on the scoping phase layout and the layout was refined so that all sensitive areas were avoided, and ecological corridors were established. This is to ensure that the ecological integrity and processes would not be compromised. The above impacts have been assessed during the EIA Phase and mitigation measures have included in the EIA Report and EMPr to manage these impacts.
1.4. What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	The waste to be generated by the Project includes the following: ▪ Construction – o Waste generated from site preparations (e.g. plant material), domestic waste, surplus and used building material, and hazardous waste (e.g. chemicals, oils, soil contaminated by spillages, diesel rags). 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 approved waste disposal sites. All the waste disposed of will be recorded. o Wastewater will include sewage, and water used for washing purposes. ▪ Operation – o Refuse (domestic waste) generated during the operational phase will be removed on a weekly basis and will be disposed of at a permitted waste disposal facility. Mitigation measures to manage all waste and wastewater generated during the construction and operational phases will be included in the EMPr.
1.5. How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Potential disturbances to cultural heritage may include the following: ▪ Possible direct impacts to graves, heritage resources and on below-ground archaeological deposits and fossils as a result of ground disturbance. ▪ Possible impacts to the cultural landscape as a result of the introduction of incompatible structures and infrastructure to the rural landscape A Heritage Impact Assessment was and the findings are presented in the EIA Report. Heritage finds were plotted against the proposed layout and the necessary amendments made to the layout in order to avoid heritage sensitivities and their prescribed buffers.

Question No.	Response
1.6. How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	During the construction phase electricity will be obtained from diesel generators and / or temporary supply via cables from the site power grid. No alternative energy sources were considered for the generation of electricity. The generation of electricity will be derived from a renewable energy source, namely, the sun. During the operational phase electricity will be sourced from this renewable energy-generation facility itself and/or from the existing electrical infrastructure on the property.
1.7. How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts? *1.7.1. Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life).* *1.7.2. Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)* *1.7.3. Do the proposed location, type and scale of development promote a reduced dependency on resources?*	The Solar PV Power Plant with BESS proposes to generate electricity from a renewable energy resource, namely the sun. In addition, some of this electricity will be stored in the BESS and will be discharged during evening peak hours when there is no sun. The total generation capacity of the Project will be 480MW renewable solar energy. The use of the resource will not jeopardise the integrity of the resource. Impacts to the receiving environment have been assessed during the EIA Phase and are presented in the EIA Report. The Project is a renewable energy project and will be generating cleaner energy to assist South African in moving away from more 'dirty' forms of energy generation.
1.8. How were a risk-averse and cautious approach applied in terms of ecological impacts? *1.8.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?* *1.8.2. What is the level of risk associated with the limits of current knowledge?* *1.8.3. 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?*	The following specialist studies will be undertaken to assess the impacts of the Project on the ecological integrity of the area: ▪ Aquatic Assessment; ▪ Terrestrial Ecological Assessment; and ▪ Avifaunal Assessment. The findings of the above studies will be presented in the EIA Report. The development layout was amended to avoid environmental sensitivities as far as possible as determined by the specialists.
1.9. How will the ecological impacts resulting from this development impact on people's environmental right in terms following: *1.9.1. Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space),*	Potential impacts to the social environment include the following: ▪ Construction phase –

Question No.	Response
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? *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?*	o Influx of people seeking employment and associated impacts (e.g. foreign workforce, cultural conflicts, squatting, demographic changes) o Safety and security o Use of local road network o Nuisance from dust and noise o Consideration of local labourers and suppliers in area – stimulation of local economy (positive impact) o Transfer of skills (positive impact) ▪ Operational phase – o Direct and indirect economic opportunities as a result of the Project. o Threats to human and animal health from electromagnetic field. A Social Impact Assessment was undertaken, and the findings are presented in the EIA Report. Mitigation measures to manage impacts to the social environment are included in the EMPr.
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.)?	The areas affected by the proposed Project footprint are rural in nature. The Project is located approximately 20 km south east of Kroonstad's CBD. There is evidence that the PV Site was previously used for agricultural purposes, which was assessed as part of the Agricultural Impact Assessment. The study found that since the project area was used for grazing, a loss of livelihood is not expected as employees could be retained to work at the solar facility and rental income to the landowner would cover lost grazing potential.
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?	Refer to the response to question no. 1 above.
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?	There were no site alternatives considered. The layout was assessed by the respective specialists during the EIA Phase and was adjusted to avoid sensitive features, as far as possible. Options under consideration are presented in **Section 10** below. The BPEO will be identified in the EIA Report below, taking into consideration of the specialists' findings. This was found to be alternative 2.
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?	Other renewable energy applications that have been made within a 30km radius of the PV Site, according to DFFE's REEA Database, are discussed in **Section 6.6** above. Cumulative impacts are discussed in **Section 13.28** below.
2.1. What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?: *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,* *2.1.2. Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),* *2.1.3. Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and* *2.1.4. Municipal Economic Development Strategy ("LED Strategy").*	The socio-economic environment is discussed in **Section 11.9** below. The following is noted from a planning perspective: ▪ One of the goals identified in the municipal IDP (MLM, 2022) to domesticate the Sustainable Development Goals is to promote developments in renewable energy. ▪ The Project will contribute towards both National and Provincial targets for renewable energy and Eskom's target for Independent Power Producer (IPPs), as well as assist in meeting the increasing electricity demands in South Africa and specifically in the grid network. ▪ The Project falls within an area that is designated for crop farming in terms of the SDF (MLM, 2020). An Agricultural Impact Assessment was undertaken during the EIA

Question No.	Response
	Phase and the findings are presented in **Section 12.7** and **13.15**. ▪ The PV Site and power line are located outside of the urban edge and should not impact on future urban expansion. ▪ The Project's proposed overhead power line will be aligned existing power lines as far as possible. ▪ According to the findings from the National Web Based Environmental Screening Tool, the PV Site has low sensitivity in terms of the relative civil aviation theme.
2.2. Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area? *2.2.1. Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?*	Refer to the response to question no. 1.9 above.
2.3. How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	
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?	
2.5. In terms of location, describe how the placement of the proposed development will: *2.5.1. result in the creation of residential and employment opportunities in close proximity to or integrated with each other,* *2.5.2. reduce the need for transport of people and goods,* *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),* *2.5.4. compliment other uses in the area,* *2.5.5. be in line with the planning for the area,* *2.5.6. for urban related development, make use of underutilised land available with the urban edge,* *2.5.7. optimise the use of existing resources and infrastructure,* *2.5.8. opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),* *2.5.9. discourage "urban sprawl" and contribute to compaction/densification,* *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,* *2.5.11. encourage environmentally sustainable land development practices and processes,* *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.),* *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),*	2.5.1. The Project will result in increased economic activity, as well as increased opportunities for employment and for SMMEs. 2.5.2. Not deemed to be relevant, due to the nature of the development. 2.5.3. Goods will be transported to site from Johannesburg and Richard's Bay predominantly according to the Traffic Impact Study. People may need to be transported from the surrounding areas during construction, and less so during operation. 2.5.4. The area is rural in nature with agriculture being the main land use practice, and generally grazing. Grazing of small livestock according to the Agricultural study will still be possible under the panels. 2.5.5. Refer to the response to question no. 2.1 regarding planning. 2.5.6. The PV Site and power line are located outside of the urban edge and should not impact on future urban expansion. 2.5.7. The resources and services required for construction and operation are discussed in **Section 9** below. 2.5.8. The Project does not include the expansion of any bulk infrastructure. 2.5.9. Not deemed to be relevant, due to the nature of the development. 2.5.10. Not deemed to be relevant, due to the nature of the development. 2.5.11. Provision will be made in the EMPr to manage the impacts associated with the Project. 2.5.12. Locational factors that favour the proposed site include the favourable solar irradiation levels, short distance to grid connection point, flat topography, suitable site access and availability of land. 2.5.13. The socio-economic benefits associated with the Project will be further identified in the **Section 12** below. 2.5.14. Refer to the response to question no. 1.5 above.

Question No.	Response
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 *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?*	2.5.15. Refer to the response to question no. 2.1 above regarding planning.
2.6. How were a risk-averse and cautious approach applied in terms of socio-economic impacts? *2.6.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?* *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?* *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?*	The findings of the Social Impact Assessment will be included in Section 12, assumptions and limitations are included under Section 8.
2.7. How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following: *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?* *2.7.2. Positive impacts. What measures were taken to enhance positive impacts?*	Refer to the responses to questions no. 1.9 and 2.1 above. Social impact assessment can be viewed under **Section 13.26**.
2.8. Considering the linkages and dependencies between human 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.)?	Refer to the responses to questions no. 1.7 and 1.10 above.
2.9. What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	The BPEO has been identified, taking into consideration the specialists' findings. Alternative 2 has been selected as the BPEO.
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, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? *Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?*	
2.11. What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	The areas affected by the proposed Project footprint are rural in nature. The PV Site is vacant, used for grazing. Consent has been provided by the landowner for the proposed development in terms of the Option to Lease Agreement.
2.12. What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	The findings of the Social Impact Assessment are included in the EIA Report. Mitigation measures to manage these impacts are included in the EMPr. Also refer to the response to question no. 1.9 above.
2.13. What measures were taken to: *2.13.1. ensure the participation of all interested and affected parties,*	**Section 15** below provides an overview of the public participation process to date, which includes the following: ▪ Compiling the database of I&APs;

Question No.	Response
2.13.2. provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, *2.13.3. ensure participation by vulnerable and disadvantaged persons,* *2.13.4. promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,* *2.13.5. ensure openness and transparency, and access to information in terms of the process,* *2.13.6. ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge, and* *2.13.7. ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were be promoted?*	▪ Notification provided during the announcement phase; ▪ Notification of review of the draft Scoping Report; ▪ Means of accessing the draft Scoping Report; ▪ Supplying copies of the draft Scoping Report to authorities; and ▪ Commenting on the draft Scoping Report. Comments received from authorities and I&APs during the process are included in the CRR and will be submitted with the final EIA Report.
2.14. Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g.. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	The findings of the Social Impact Assessment are included in the EIA Report. Also refer to the responses to questions no. 1.9 and 2.5 above.
2.15. What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	Health and safety related risks associated with the Project during the construction and operational phases are assessed in the EIA Report. These risks are addressed through mitigation measures that will be included in the EMPr. Additional management requirements will be included in the Project's Occupational Health and Safety system.
2.16. Describe how the development will impact on job creation in terms of, amongst other aspects: *2.16.1. the number of temporary versus permanent jobs that will be created,* *2.16.2. whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area),* *2.16.3. the distance from where labourers will have to travel,* *2.16.4. the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and* *2.16.5. the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).*	The Project will have a beneficial impact on local employment during the construction and operational phases. The exact number of employment opportunities was not available at the time of writing the report. There would be a larger number of opportunities during construction than operation. Labour will be sourced locally first and thereafter from surrounding areas where necessary. It is expected that more jobs will be created than might be lost.
2.17. What measures were taken to ensure: *2.17.1. that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and* *2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?*	There were no conflicts of interest. SA's commitment to renewable energy is reflected in its ratification of the Paris Agreement and the country's long-term energy planning iterations. Solar power represents a large component of the needed diversification of SA's electricity system. According to the Department of Energy (2017), energy is by nature an intergovernmental issue, cutting across energy security, economic prosperity, employment and environment, among others. In recognising these benefits, clean energy has been incorporated into the broader policy framework.

Question No.	Response
	The White Paper on Renewable Energy of 2003 is one of SA's policy documents that laid the foundation for the promotion of renewable energy technologies such as solar, hydro, biomass and wind (http://www.energy.gov.za/files/renewables_frame.html). Through this policy document, a ten year target of how renewable energy technologies could diversify the country's energy mix and secure cleaner energy was set. The Applicant intends to bid for the current and future REIPPPP bid windows and/or other renewable energy markets within SA. The REIPPPP is a competitive tender process that was designed to facilitate private sector investment into grid-connected renewable energy (RE) generation in SA.
2.18. What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?	The Solar PV Plant proposes to generate electricity from a renewable resource, namely the sun. The total generation capacity of the Project will be up to 480MW renewable solar energy. Some of the electricity generated from the renewable energy source will be stored in the BESS which may generate electricity during peak evening hours when the sun goes down. During the distribution of electricity, as the energy source is renewable, there will be no Greenhouse Gas Emissions (GHG), such as Carbon Dioxide, that will be released into the atmosphere, thus providing a clean environment for the local community and public in general. Impacts to the receiving environment have been assessed through various specialist studies that are included in the EIA Report. See **Section 13**.
2.19. Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	The intention is for the mitigation measures that will be included in the EIA Report and EMPr to be realistic and for the residual risks to be managed to an acceptable level. The solar PV facility will have an estimated lifespan of 25 years. It is at this time impossible to accurately predict the exact nature of the surrounding environment in 25 years' time or whether the area would have developed to the point where the solar PV facility will be upgraded to continue providing electricity, or decommissioned. Decommissioning of facilities that require environmental authorisation such as the solar PV facility is also a listed activity in terms of NEMA and will thus require the decommissioning and closure to be approved by the relevant authorities at the time, based on the current legislative framework. However, it is also not possible to predict the legal framework in 25 years' time. For the purposes of this EIA, it is assumed that the facility will eventually be decommissioned, and the site rehabilitated.
2.20. What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	
2.21. Considering the need to secure ecological integrity and a healthy bio-physical 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 socio-economic considerations?	The BPEO has been identified, taking into consideration the specialists' findings. Alternative 2 has been selected as the BPEO.
2.22. Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	Other renewable energy applications that have been made within a 30km radius of the PV Site, according to DFFE's REEA Database, are discussed in **Section 6.6** above. Cumulative impacts are discussed in **Section 13.3** below.

9 PROJECT DESCRIPTION

9.1 Solar Technology

Solar energy facilities operate by converting solar energy into a useful form (i.e. electricity). The use of solar energy for electricity generation is a non-consumptive use of a natural resource and consumes no fuel for continuing operation. Solar power produces an insignificant quantity of greenhouse gases over its lifecycle as compared to conventional coal-fired power stations. The operational phase of a solar facility does not produce carbon dioxide, sulphur dioxide, mercury, particulates, or any other type of air pollution, as fossil fuel power generation technologies do.

9.2 PV Technology Overview

PV technology produces direct current (DC) which is then converted to alternating current (AC) via power electronic inverters. The main technology categories are crystalline modules (mono or poly), thin film, and concentrated photovoltaics (CPV). **Figure 7** below provides an overview of a typical Solar PV Power Plant.

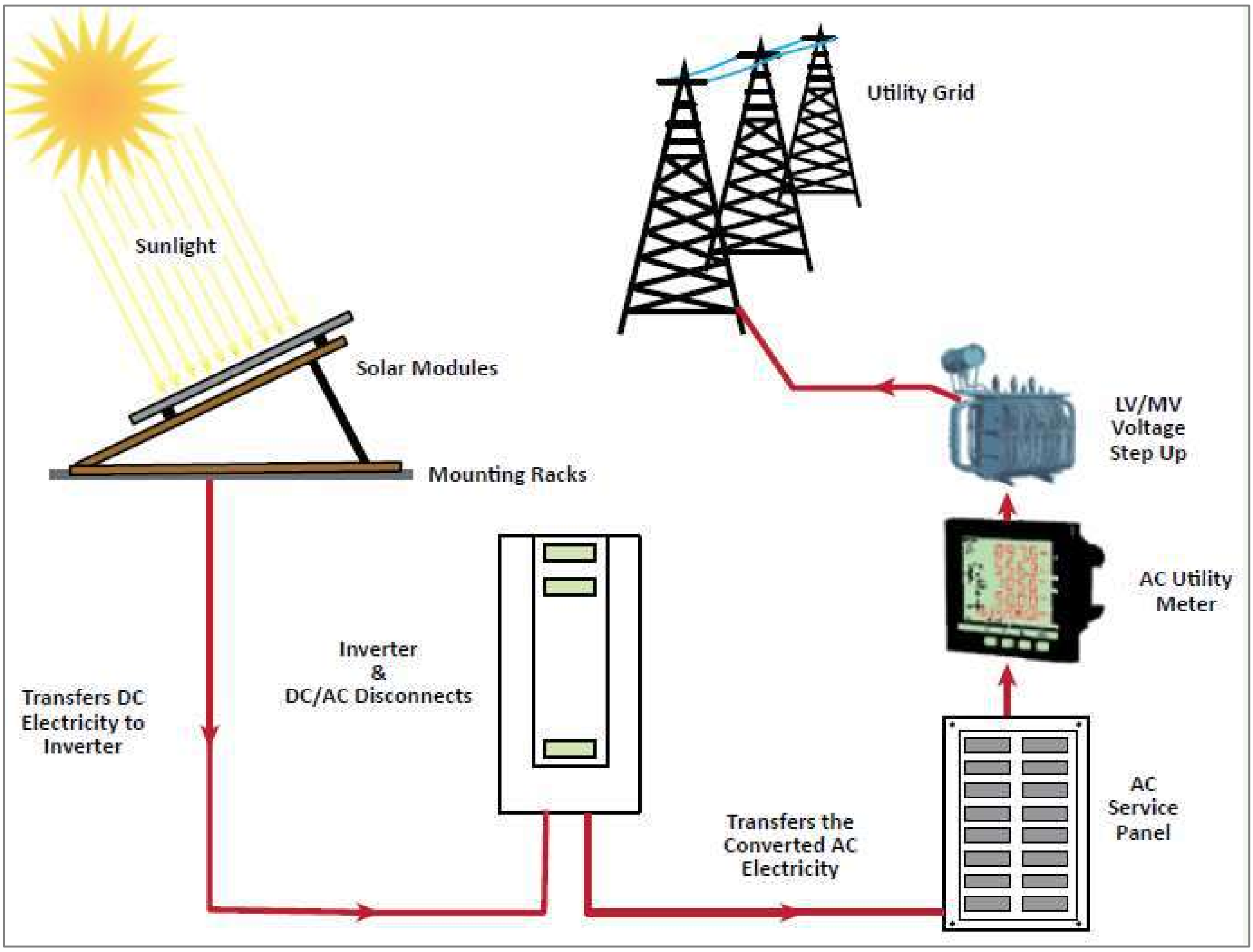


Figure 7: Overview of Solar PV Power Plant (IFC, 2015)

9.3 Project Overview

9.3.1 Overview of Technical Details

The technical details of the proposed Solar PV Plant are captured in **Table 9** below.

Table 9: Technical details of the proposed PV Plant

No.	Component	Alternative 1 - Description / Dimensions	Alternative 2 - Description / Dimensions
1	Height of PV panels	Up to 5.5 m	Up to 5.5 m
2.	Area of PV Array	Up to approximately 760 ha	Monofacial or Bifacial PV panels, mounted on either fixed-tilt, single-axis tracking, and/or double-axis tracking systems. Area: Up to 760 ha
3.	Area occupied by inverter / transformer stations / substations	Up to 1 ha (facility substation) Up to 36 ha (MTS)	It is estimated that the maximum size of the facility substation will not exceed 2 ha. The MTS will be 36 ha. Each facility will require inverter-stations, transformers, switchgear and internal electrical reticulation (underground cabling).
4.	Capacity of on-site substation	High voltage (132 kV)	The facility substation will collect the power from the facility and transform it from medium voltage (up to 33 kV) to high voltage (132 kV). A 400/132kV MTS (600m x 600m) is also planned. The MTS includes a switching station.
5.	BESS	Area up to ± 5ha	Area: up to ± 5 ha
6.	Area occupied by both permanent and construction laydown areas	Temporary: Up to 7ha Permanent: Up to 1 ha (located within the area demarcated for temporary construction laydown)	Temporary construction laydown area up to 10 ha. Permanent laydown area up to 1 ha (to be located within the area demarcated for the temporary construction laydown).
7.	Area occupied by buildings	Up to 1.5 ha	Up to 1.5 ha
8.	Length of internal roads	Up to 33 km	Up to 33 km
9.	Width of internal roads	The internal roads will be up to 6 m wide. The access roads will be up to 8 m wide.	The internal roads will be up to 6 m wide. The access roads will be up to 8 m wide.
10.	Height of fencing	Up to 3.5m	Up to 3.5m

No.	Component	Alternative 1 - Description / Dimensions	Alternative 2 - Description / Dimensions
11.	Type of fencing	Type will vary around the site, welded mesh, palisade and electric fencing	Type will vary around the site, welded mesh, palisade and electric fencing

9.3.2 *Project Layout*

The layout options of the PV Plant are shown in **Figure 10** and **Figure 11** below. Alternative 1 was proposed prior to specialists' inputs during the Scoping Phase of the application. Layout alternative 2 was proposed in response to the site sensitivity inputs form the various specialists and therefore takes the environmental sensitivities on the site into consideration as far as possible. The desirability of the earmarked site for the proposed Solar PV Plant is due to the following key characteristics:

- **Solar Irradiation**: The feasibility of a solar facility, especially a Solar Park of this magnitude, is dependent on the direct solar irradiation levels (refer to **Section 4.1** above).
- **Topography**: The suitability of the surface area is an important characteristic for the construction and operation of solar facilities. Most of the site has a low gradient slope and is suitable for this development.
- **Grid connection**: The electricity generated by the Project will be transmitted through a 132kV power line from the new facility substation to a new 400/132 kV Main Transmission Substation (MTS) and then from the MTS to the Eskom grid connection tie-in south east of the site.
- **Extent of site**: The overall extent of the site is sufficient for the installation of the PV facility.
- **Site access**: The site can be accessed via the R76, which runs along the eastern boundary of the site.

9.3.3 *Overview of Technical Details of the Main Transmission Substation and 400kV Powerlines*

The technical details of the proposed Project is captured in **Table 10** below.

Table 10: Technical details of the proposed Project

Component	Description / Dimensions
New MTS	600meters (m) x 600m i.e 36ha
400kV Powerlines	400kV within a 100m corridor

9.3.4 *400kV Powerlines*

A power line typically consists of pylons, which are tower-like structures that support electrical cables above the ground. The distance between each pylon is dependent on the type of terrain the lines cross. The standard width of a servitude for a 400kV Transmission line is 55m (27.5m on either side of the power line).

In order for maintenance staff to access the lines and undertake routine maintenance or repair faults, it may be necessary to construct access roads. To protect the surrounding landscape from soil erosion stormwater infrastructure may be required.

There are several types of towers/pylons. The types of pylons chosen for the project depend on several factors, these include:

- Terrain;
- Expense; and
- Recommendations from the visual specialist.

Very few new access roads may be required during installation of some sections of the towers and powerline; however, Eskom have advised that these access roads do not exceed any thresholds in terms of the EIA Regulations.

Below are several examples of 400kV power line types, which might be used.

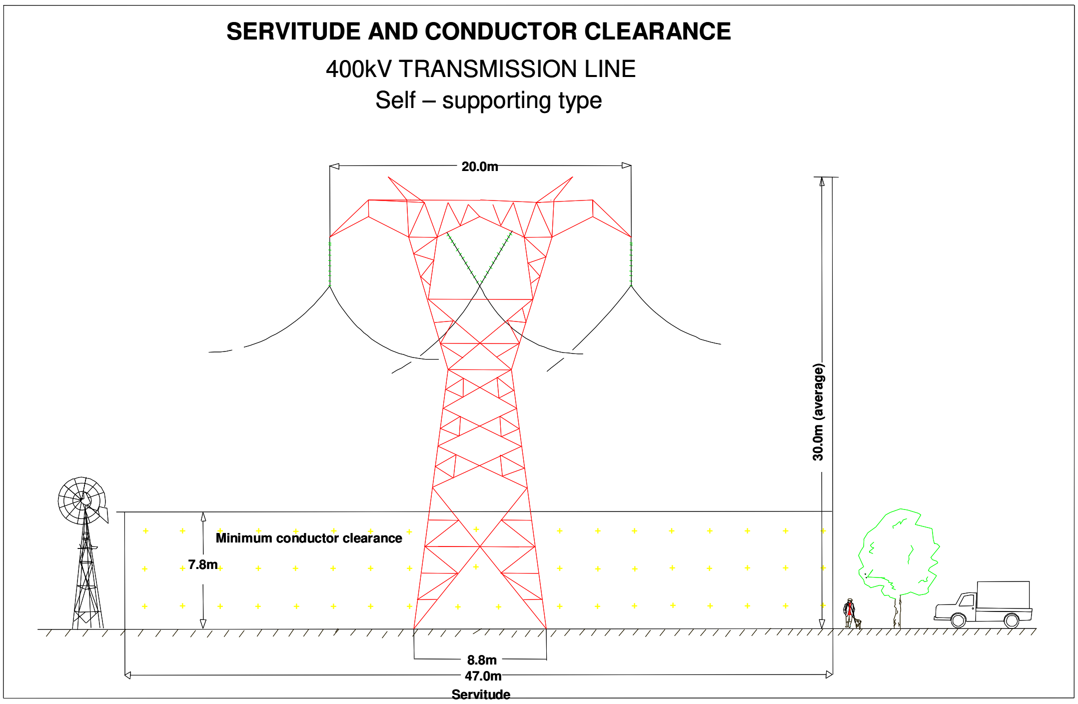


Figure 8: Servitude and Conductor Clearance for a 400kV Transmission Line, Self – Supporting Type Tower/Pylon

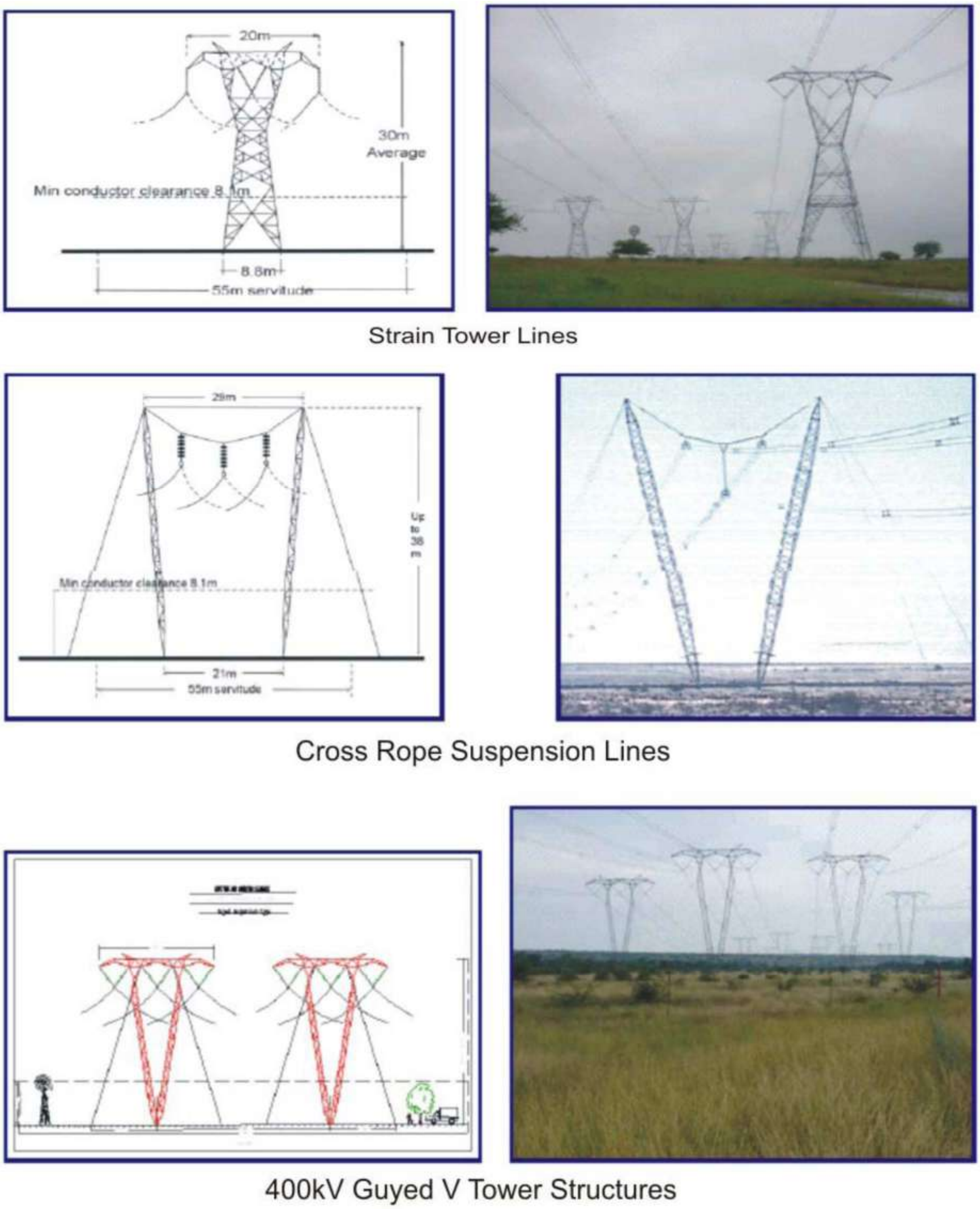


Figure 9: **Examples of Strain Tower Types, Cross Rope Suspension Lines and 400kV Guyed V Tower Structures**

9.3.5 MTS Substation

The new MTS would support the five (5) 132kV powerlines that will transfer the generated power from the solar energy facilities. The new MTS would have a 600m x 600m footprint which would include the following:

- Three (3) 400kV LILO;
- Five (5) 132kV powerlines (entering the MTS);
- Offices and control rooms;
- Transformers;
- Breakers; and
- Other equipment necessary for connecting the 400kV lines to the substation and the 132kV lines into the substation.

The loop-in lines (**Figure 10 and 11**) would traverse approximately 4.5km to loop into the new MTS

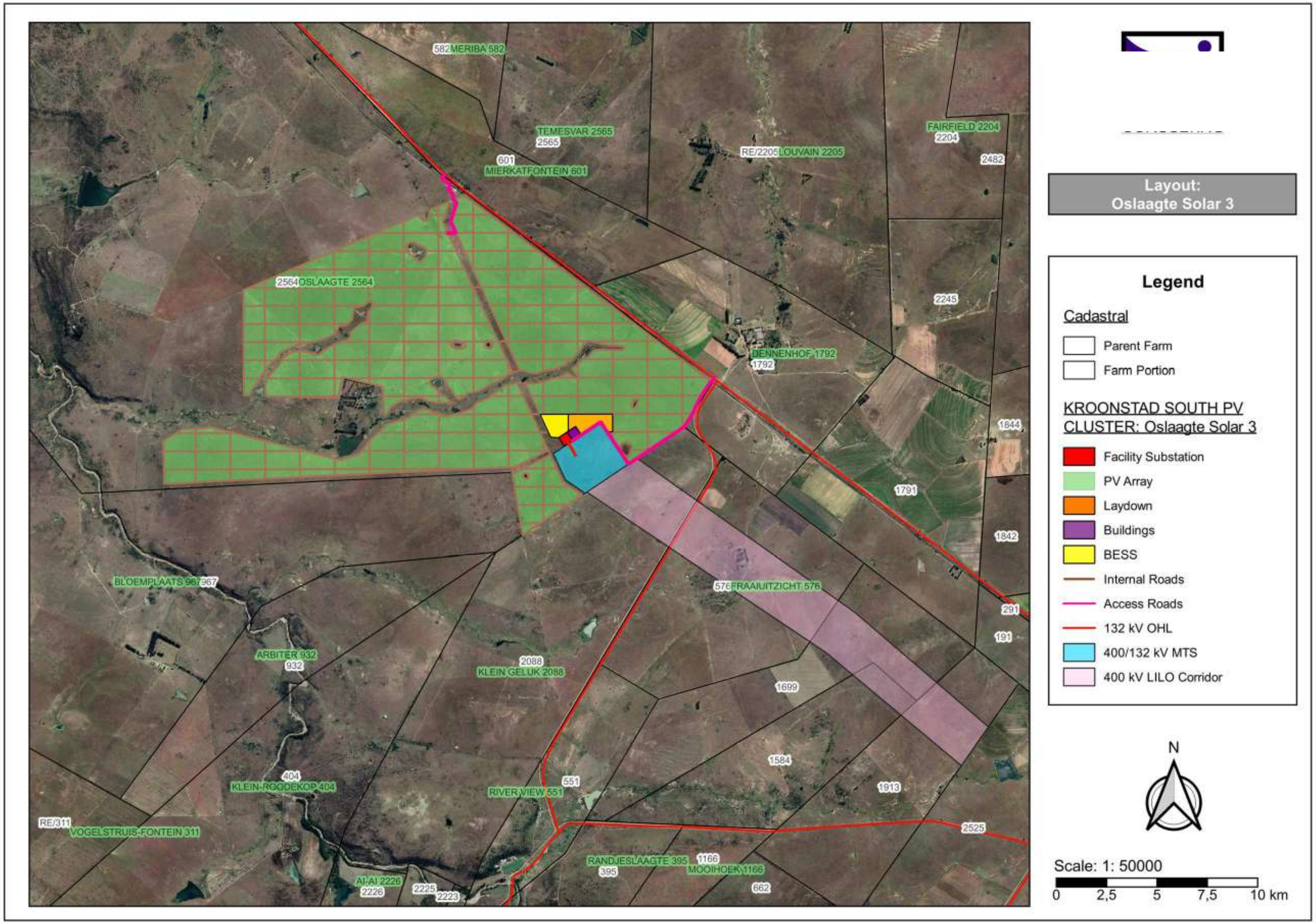


Figure 10: **Proposed Layout of the Solar PV Plant - PV Layout Alternative 1**

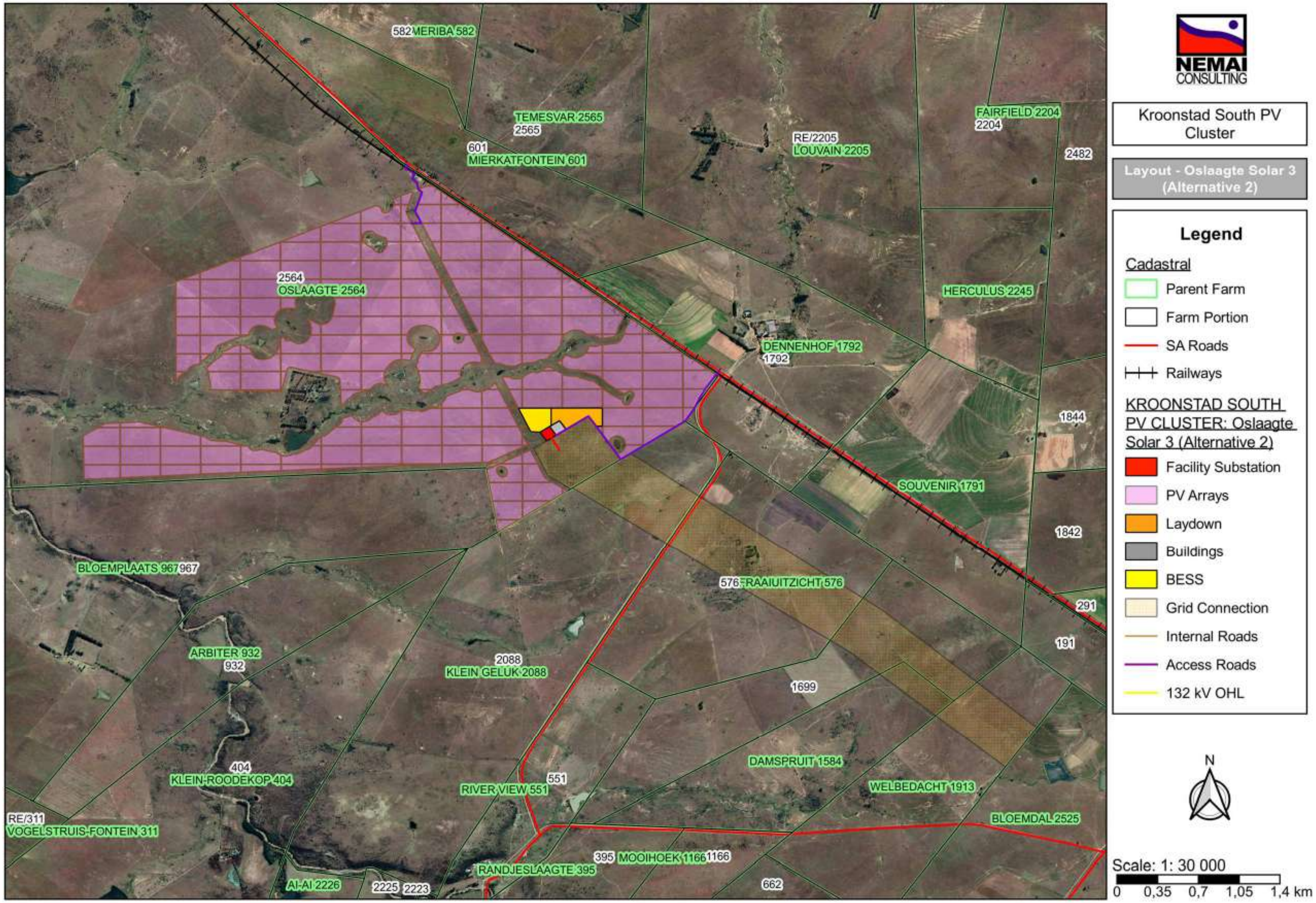


Figure 11: **Proposed Layout of the Solar PV Plant - PV Layout Alternative 2 (preferred)**

The following factors were considered in determining the layouts (amongst others):

- Requirements of the PV Plant;
- Understanding of sensitive features on the site (e.g., watercourses); and
- Existing servitudes and infrastructure.

9.3.6 *Components of the Proposed Solar PV Plant*

The Project consists of the following systems, sub-systems or components (amongst others):

- PV modules and mounting structures which will consist of either Monofacial or Bifacial PV panels, mounted on either fixed-tilt, single-axis tracking, and/or double-axis tracking systems.
- Inverters and transformers.
- Battery Energy Storage System (BESS) area up to 5ha.
- Operation and Maintenance buildings including a gate house and security building, control centre, offices, warehouses and workshops for storage and maintenance.
- Facility grid connection infrastructure, including:
  - 33kV cabling between the project components and the facility substation
  - A 132kV facility substation
  - 33kV or 132kV cabling or powerline between the facility substation and the proposed Main Transmission Substation or the Kroonstad Switching Station.
- Temporary construction laydown area up to 10ha.
- Permanent laydown area up to 1 ha (to be located within the area demarcated for the temporary construction laydown).
- Internal roads will be up to 6 m wide, to allow access to the Solar PV modules for operations and maintenance activities.
- Main access road is up to 8 m wide. The site is accessible via the R76.

The components of the proposed Solar PV Facility are discussed below. Reference Source: Solar Power Plant - Types, Components, Layout and Operation (https://www.electricaltechnology.org/).

9.3.6.1 Solar PV Panels/Modules

A PV panel is the most important component of a solar power plant. It is made up of small solar cells. This is a device that is used to convert solar photon energy into electrical energy.

Generally, silicon is used as a semiconductor material in solar cells. The typical rating of silicon solar cells is 0.5V and 6Amp. And it is equivalent to 3W power. The number of cells is connected in series or parallel and makes a module. The number of modules forms a solar panel.

According to the capacity of power plants, a number of plates are mounted and a group of panels is also known as a PV array.

9.3.6.2 Single Axis Trackers

The following information was sourced from Solar Basics: Single-Axis Tracking (https://www.powerflex.com/).

A solar tracking system adjusts the position of a solar panel along an axis. This is done to ensure a small angle of incidence or the angle that sunlight hits a solar panel. Since the energy output of a solar system increases as the angle of incidence decreases, keeping this angle as small as possible is ideal. Active trackers rely on powered machineries such as gears and motors to move solar panels, whereas passive trackers achieve motion via compressed fluid that shifts sides when heated by the sun, changing the tilt of the panel along with it. Some trackers keep panels aligned with the sun by moving them in the opposite direction of the earth's rotation, and others determine an optimal panel angle based on latitude and longitude data obtained through GPS.

In addition to varying methods of motion, solar trackers differ in terms of the number of axes on which they move. Single axis tracking systems tilt on one axis, tracking the sun as it moves from east to west during the day.

An example of PV modules mounted on a single axis tracker is shown in **Figure 12** below.

Figure 12: Example of PV Module mounted on Single Axis Tracker
(source: Single-ACES – Atlantic Clean Energy Supply – Official Site [https://atlanticces.com/])

The trackers are mounted on steel posts installed in the ground. Concrete bases are sometimes also used. The site would need to be cleared of all trees to prevent shading of the PV modules. The ground between the trackers is usually left grassed for large-scale projects.

9.3.6.3 Inverters

The following information was sourced from “A Guide to Solar Inverters: how they work and how to choose them” (https://solarmagazine.com/).

A solar inverter is really a converter. Inverters are installed to convert the DC electrical power into AC electrical power, which is used in the grid. The frequency of the AC electricity is synchronised to the grid, which in SA is 50Hz, but varies slightly. The purpose of the inverters is to maximise and control the conversion of power from the DC modules to low voltage AC (i.e., less than 1000V).

String inverters have multiple inputs for connecting the strings from the trackers. String inverters are normally installed on steel structures under the shade of the PV modules.

9.3.6.4 Low Voltage AC Cabling

AC cables are installed from the inverters to the distribution box located adjacent to the medium voltage transformers. These cables are installed underground in trenches.

9.3.6.5 Medium Voltage Step-Up Transformers

The purpose of medium voltage transformers is to step-up the low voltage to medium voltage. In order to distribute the combined electrical power from a block of tracker rows the voltage is required to be increased. Transformers will typically be in the order of 2.5MVA capacity and similar in appearance to the type as shown in **Figure 13** below.

Figure 13: Example of Medium Voltage Transformer
(source: https://www.ulaginoli.com/)

Transformers will typically be filled with oil for cooling the transformer windings. The cooling oil is circulated through radiator fins mounted on the side of the transformer. The oil remains in the transformer. Oil spills from transformers need to be contained by providing drip trays and special care taken to clean up the spill should it occur.

9.3.6.6 Medium Voltage AC Cabling

Medium voltage AC cabling from the transformers to the high voltage substation is buried in trenches underground. The cables are protected from accidental damage by placing brightly coloured orange danger tape in the trench and sometimes concrete slabs. Cable routes are indicated with concrete cables markers on the ground at bend points, road crossings etc.

9.3.6.7 High Voltage Substations

The medium voltage cables are connected to a medium voltage switchgear room located in a substation yard. High voltage transformers step the medium voltage up to high voltage.

Figure 14: **Example of High Voltage Substation**
(source: https://www.protogenenergy.com/)

A typical HV Substation will look like the substation shown in **Figure 14** above, with large ground mounted transformers and outdoor high voltage switchgear with overhead conductors and steel lattice structures. The yard is fenced off and only authorised personnel are allowed inside the high voltage yard (see example shown in **Figure 15** below).

Figure 15: Example of High Voltage Transformers
(source: https://www.electricityforum.com/)

9.3.6.8 Guardhouses, Operation, Maintenance and Visitor Centre Buildings

Guardhouses, Operation, Maintenance and Visitor Centre Buildings are required for the facility. Buildings will be single story.

The purpose of the buildings is to provide space for staff working on site for the operation and maintenance of the facilities, including storage space for spare parts, tools, etc. Computers will be installed for monitoring the electricity generation and reporting on the condition of the plant. Toilets, kitchens, water, wastewater, and electricity will be required for staff and visitors.

Sustainable building principals will be used including use of rainwater harvesting, energy efficient lighting, insulation, etc.

9.3.6.9 Roads

Existing roads are located on the site. These will serve as the entrance roads to the site. Existing access from main roads will need to be upgraded. The internal roads will vary from 6m to 8m wide and will be gravel, with the exception of paving close to the buildings for parking and access into the buildings. The entrance road will be up to 8m wide.

The basic layout consists of rows of single axis trackers, similar to that shown in **Figure 16** below.

Figure 16: **Example of Roads Between Trackers and Medium Voltage Substations**
(source: https://ecoinventos.com/)

9.3.6.10 Fencing, Security and Lighting

Fencing is required to secure the site. Due to the voltage of the DC wiring (up to 1500V) and high value of the plant the site must be secured. Details of the fencing is still to be finalised and may include electric fencing.

CCTV cameras and security lighting may be installed as part of the security for the plant.

9.3.6.11 Stormwater Infrastructure

The topography of the site is relatively flat, which simplifies the management of stormwater runoff as high velocities in surface drainage channels and pipes underground drainage systems need not be dealt with. Furthermore, surface stormwater drainage channels can be employed to advantage (easier to maintain than an underground pipe system).

9.4 Battery Energy Storage System

9.4.1 Types of Electrical Energy Storage Systems

Electrical Energy storage systems consist of Mechanical, Chemical, Electrical, Thermal and Electrochemical systems. **Figure 17** below summarizes the various Electrical Energy Storage systems. The Electrochemical/battery storage system was selected as the preferred solution to meet the requirements of the Project.

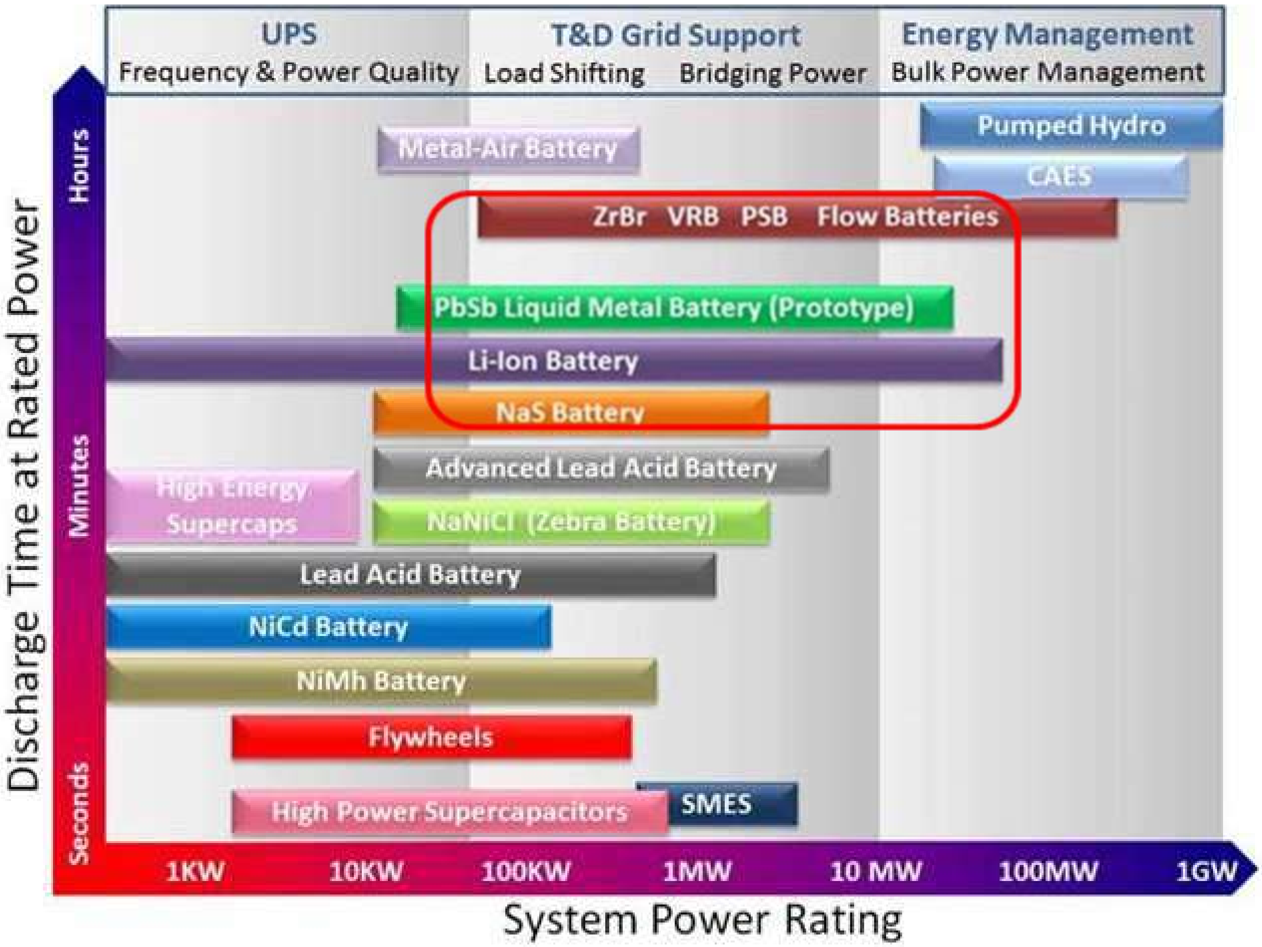


Figure 17: Grid Energy Storage Technologies and Applications
(Adapted from Climate Policy Initiative for the Energy Transitions Committee)

As per https://www.smart-energy.com/, “Batteries, the oldest, most common and widely accessible form of storage, are an electrochemical technology comprised of one or more cells with a positive terminal named a cathode and negative terminal or anode. Batteries encompass a range of chemistries. The best known and in widespread use in portable electronic devices and vehicles are lithium-ion and lead acid. Others solid battery types are nickel-cadmium and sodium-sulphur, while zinc-air is emerging. Another category is flow batteries with liquid electrolyte solutions, including vanadium redox and iron-chromium and zinc-bromine chemistries”.

9.4.2 *The Project's BESS Infrastructure*

The total capacity of the BESS is up to a maximum of 4 ha. The technology will be the commercially proven solid state battery systems comprising of the Lithium Ion technology.

As per https://www.smart-energy.com/, "This type of technology is widely used in mobile phones and electric vehicles. It is also predominantly used in large utility scale projects". The batteries generally arrive on site from the factory fully-assembled and pre-tested in containerised/modular enclosures.

The number of containers required will depend on the specific manufacturer. The approximate dimensions of each container will be up to a maximum of 12m long, 3m wide and 3m high. Level and fenced off platforms would be created for the battery storage areas of approximately 3 000m². The location of the battery energy storage facility will be adjacent to the solar power plant's on-site substation.

An example of similar utility scale BESS is shown in **Figure 18** below.

Figure 18: Example of BESS installation
(https://biiworld.com/)

The containers are environmentally friendly during their life-cycle. However, the Lithium in the technology is considered hazardous / dangerous goods. Used batteries will be removed by the suppliers. Batteries containing chemistries that when charged are a fire risk and at the end of their life need to be recycled. With regard to the fire risk, the battery storage area will have a non-flammable buffer area to prevent the spread of fire. The BESS will have electrical and fire protection measures in the form of battery temperature monitoring, circuit breakers, fire detection and fire suppression as per fire and electrical regulations.

9.5 Grid Connection

The electricity generated by the proposed Solar PV Plant will be transferred to the national Eskom grid via 132 kV powerlines from the facility substation to a new 400/132kV kV Main Transmission Substation (MTS). The proposed 400kV LILO powerlines will connect the MTS to the existing Eskom 400kV lines.

Examples of a 132 kV transmission line as well as a high voltage transmission line connecting to a substation are shown in **Figure 19** and **Figure 20** below, respectively.

Figure 19: Example of a 132 kV transmission line

Figure 20: Example of High Voltage Transmission Line Connecting to Substation

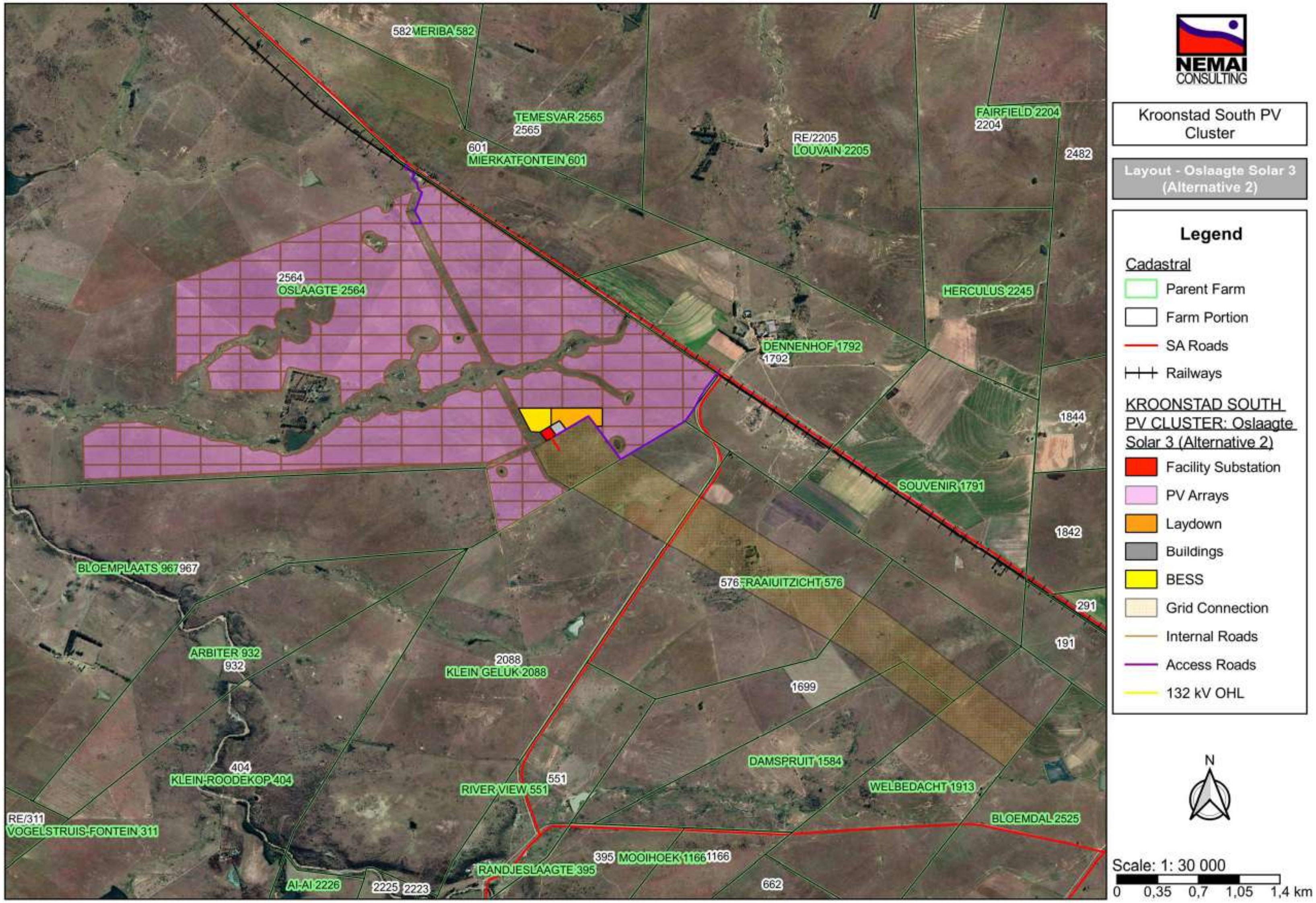


Figure 21: **Proposed Power Line Route (Orthophotograph)**

9.6 Implementation Programme

Key milestones during the Project's implementation programme include the following:

- Preferred Bidder Status: Q4 2023;
- Financial Close: Q2 2023;
- Notice to proceed (commencement of construction): Q4 2023; and
- Commercial Operation Date (COD): Q1 2025.

9.7 Project Life-Cycle

The project life-cycle for a typical Solar PV Plant includes the following primary activities (high level outline only):

- Feasibility phase - This phase includes confirming the feasibility of the Project by evaluating and addressing the following (amongst others) –
  - Solar resource assessment;
  - Site selection;
  - Project land allocation;
  - Project yield assessment;
  - Permitting and licensing;
  - Legal agreements;
  - Socio economic development;
  - Industrialisation and localisation;
  - Project cost determination;
  - Project financing; and
  - Risk analysis.
- Design phase - This phase includes the following (amongst others) –
  - Confirming key design features such as the type of PV module to be used, tilting angle, mounting and tracking systems, inverters, and module arrangement;
  - Confirming specifications for the components of the Solar PV Plant and BESS;
  - Preparing detailed designs (layout, civil, electrical);
  - Preparing construction plans;
  - Preparing the Project schedule; and
  - Preparing the commissioning plans.
- Construction phase – During the implementation of the Project, the following construction activities will be undertaken –
  - Pegging the footprint of the development;
  - Establishing access roads;
  - Preparing the site (fencing, clearing, levelling and grading, etc.);

- Establishing the site office;
- Establishing laydown areas and storage facilities;
- Transporting equipment to site;
- Undertaking civil, mechanical and electrical work; and
- Reinstating and rehabilitating working areas outside of permanent development footprint.

❑ Operational phase - Once the solar park is up and running the facility will be largely self-sufficient. Operational activities associated with the maintenance and control of the Solar PV Plant will include the following (amongst others) –

- Testing and commissioning the facility's components;
- Cleaning of PV modules;
- Controlling vegetation;
- Managing stormwater and waste;
- Conducting preventative and corrective maintenance; and
- Monitoring of the facility's performance.

❑ Decommissioning –

- PV panels are guaranteed to produce at least 80% of their rated power for 20 to 30 years. In practice, PV panels will perform satisfactorily well beyond this timeframe. At the end of the 20-30 year lifespan, two scenarios exist for the PV panels:

▪ The old, redundant panels can be disposed of (at a registered disposal facility designated for this purpose); or

▪ The panels can be recycled, by either using their components to fix or make new panels, or be donated for use elsewhere (e.g., for the electrification of rural schools and clinics).

- It is unlikely that the PV Park will be decommissioned after 30 years. Instead, the facility will continually be reconditioned as the PV panels are recycled and replaced with more advanced technology, as it becomes available.
- In the event that the facility must be decommissioned, the decommissioning phase will include measures for complying with the prevailing regulatory requirements, rehabilitation and managing environmental impacts in order to render the affected area suitable for a future desirable use.

9.8 Resources and Services required for Construction and Operation

This section briefly outlines the resources that will be required to execute the Project. Note that provision is made in the EMPr to manage impacts associated with aspects listed below, as relevant.

9.8.1 Raw Materials

Construction

Material required for construction purposes, including fencing and construction material (e.g., cement, sand, aggregate, etc.), will be sourced from suitable suppliers. The PV modules and other components of the facility will also be sourced from accredited suppliers.

Operation

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

9.8.2 Water

Construction

Four options will be considered, in order of priority:

1. Supply from the Local Municipality (LM) – the Applicant will approach the LM to enquire whether they can provide all or part of the total water requirements of the Project. Specific arrangements will be agreed with the LM in a Service Level Agreement (SLA), following the appointment of preferred bidder during the financial close period.
2. Supply from a Private Contractor, which may include extraction from any bulk water supply lines nearby to the site.
3. An existing borehole on site, subject to NWA requirements.
4. A new borehole on site, subject to NWA requirements.

Operation

Water use requirements for a Solar PV Plant during the operational phase depend 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 one of four options being considered, in order of priority:

1. Supply from the Local Municipality (LM) – the Applicant will approach the LM to enquire whether they can provide all or part of the total water requirements of the Project. Specific arrangements will be agreed with the LM in a Service Level Agreement (SLA), following the appointment of preferred bidder during the financial close period.
2. Supply from a Private Contractor, which may include extraction from any bulk water supply lines nearby to the site.
3. An existing borehole on site, subject to NWA requirements.
4. A new borehole on site, subject to NWA requirements.

9.8.3 Sanitation

Construction

Chemical toilets will be utilised during construction, and removed/ emptied by an appointed contractor for treatment at a licensed facility off site.

Operation

No effluent will be produced during operation of the facility, except for normal sewage from site & operations staff. This will be collected and treated as per normal standards using a septic or conservancy tank. In cases where the LM does not permit the use of sceptic tanks, sewage will be stored in conservancy tank and collected (honey-sucker) by a service provider (the LM/ Contractor) and treated at an approved facility off site.

9.8.4 Waste

Construction

During the construction phase, solid waste will mainly be in the form of construction material, excavated substrate and domestic solid waste. All waste will be disposed of in scavenger proof bins and temporarily placed in a central location for removal by an appointed contractor. Any other waste and excess material will be removed once construction is complete and disposed of at a registered waste facility. During the EIA, the applicant will request confirmation from the municipality that they have sufficient capacity at their registered landfills for the solid waste. According to the IDP (MLM, 2022), the Kroonstad landfill site does not meet minimum operational requirements due to lack of personnel and equipment. The Steynsrus and Viljoenskroon landfill sites are operational and will be considered for the Project.

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 (e.g., equipment, staff); and
- Drainage over contaminated areas (e.g., workshop, equipment storage areas).

Suitable measures will be implemented to manage all wastewater generated during the construction period.

Operation

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

9.8.5 Roads

Construction

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.

Operation

The Project site is accessible by the R76 which runs along the eastern boundary of the site.

9.8.6 Stormwater

Construction

Best environmental practices will be implemented during construction to manage stormwater. These measures are included in the EMPr.

Operation

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. A formal piped stormwater system is not envisaged for the wider site. Water will be managed on the surface and dispersed into natural drainage routes.

9.8.7 Electricity

Construction

Electricity supply during construction will be provided by either diesel generators or arranged with the LM or Eskom Distribution, via an 11kV or 22kV feeder line..

Operation

The electricity will be supplied by the 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 other times, electricity will be supplied from the power grid.

9.8.8 Laydown Areas

Construction

A laydown area will be required during the construction phase. The proposed temporary laydown area of approximately 10ha. There will be a smaller permanent laydown area (within the 10ha) used during operation.

9.8.9 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 request that such persons are sourced from local communities, as far as possible.

10 ALTERNATIVES

10.1 Introduction

Alternatives are the different ways in which the Project can be executed to ultimately achieve its objectives. Examples could include carrying out a different type of action, choosing an alternative location or adopting a different technology or design for a project.

The sub-sections to follow discuss the project alternatives considered during the EIA process. A comparative analysis of feasible alternatives from environmental (including specialist input) and technical perspectives is provided in **Section 14** below.

10.2 Site Alternatives

No site alternatives are proposed for this Project. Favourable location factors for the PV Site include suitable solar irradiation levels, short distance to grid connection point, flat topography, suitable site access and availability of land. Much of the surrounding properties are either heavily cultivated or highly sensitive, hence the property identified by the Applicant was guided by suitability as well as willingness of the landowner to enter into an agreement.

10.3 Layout / Design Alternatives

The extent of the site allows for the identification of layout/design alternatives to manage impacts to environmental sensitivity. Layout alternative 1 constitutes the initial layout contemplated during the Scoping Phase. Following the specialist studies, changes were made to the alternative 1 layout to avoid the drainage lines on the site and has been included during the EIA Phase as alternative 2. The layouts are discussed in **Section 14** below.

As explained in **Section 9.5** above, grid connection options are under consideration. However, the choice of grid connection will depend on cost implications, final design considerations, and the outcomes of negotiations and agreements with Eskom, therefore, the grid connection options are not put forward as formal alternatives in this EIA.

The preferred layout is identified in **Section 14** below.

10.4 Technology Alternatives

10.4.1 PV Technology

Solar PV technology consists of either monofacial or bifacial solar panels mounted on either a fixed-tilt, single-axis tracking, and/or double-axis tracking system. The following is noted in this regard:

A side view of an example of a tracker mounting structure is provided in **Figure 22** below.

A bifacial solar panel receives irradiation on both sides of the panel, which increases the yield, while monofacial solar panels that only receive power on one of its sides (see **Figure 22** below).

The choice of PV technology will be selected during the final design phase, and as such, is not presented as alternatives in this EIA. It should be noted that the choice of panel technology will not affect any of the impacts or the outcome of the EIA.

Figure 22: Monofacial (top) and bifacial (bottom) solar panels
(https://www.bluestemenergysolutions.com/bifacial-versus-monofacial-solar-panels-an-analysis/)

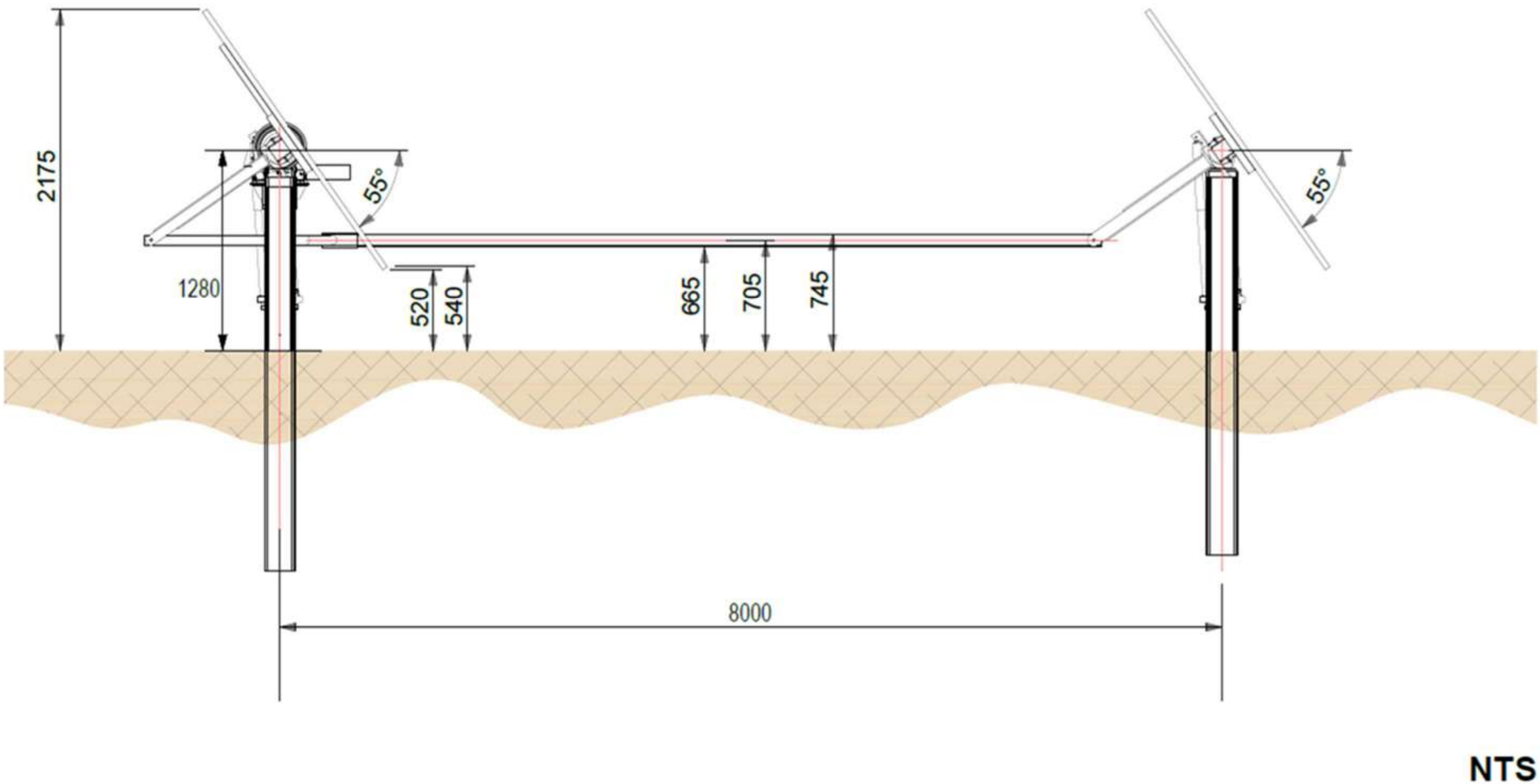


Figure 23: **Side view of proposed tracker mounting structure**

10.4.2 *BESS Technology*

The BESS can be broken into solid state and flow battery systems (refer to **Section 9.4** above).

A single battery technology, namely solid state, is anticipated to be implemented for the Project.

10.5 No-Go Option

As standard practice and to satisfy regulatory requirements, the option of not proceeding with the Project is included in the assessment of the alternatives.

The “no-go option” is evaluated in **Section 13.26** below to understand the implications of the project not proceeding.

11 PROFILE OF THE RECEIVING ENVIRONMENT

11.1 Introduction

This section provides a general description of the status quo of the receiving environment in the Project Area. This serves to provide the context within which the EIA was conducted. The study area includes the entire footprint of the Project, including the proposed Solar PV Plant and the power line.

Where necessary, the regional context of the environmental features is also explained, with an ensuing focus on the local surrounding environment. The reader is referred to **Section 12** below for more elaborate explanations of the specialist studies and their findings for specific environmental features.

This section allows for an appreciation of sensitive environmental features and possible receptors of the effects of the proposed Project. The potential impacts to the receiving environment are discussed in **Section 13** below.

11.2 Land Use and Land Cover

The Project is located approximately 20 km to the south east of Kroonstad's CBD. The areas affected by the proposed Project footprint are rural in nature. The Project's PV Site is vacant and was historically used for agricultural purposes. Grazing is the dominant land use in the Project area. Views of the Project's PV Site are provided in **Figure 24** and **Figure 25** below. An existing Eskom powerline servitudes running northwest-southeast and an existing Eskom powerline falls within the proposed LILO corridor.

The landcover associated with the Project includes natural grasslands, commercial annual rain-fed dry land croplands, fallow lands, and artificial dams (**Figure 26**). The site survey undertaken by the Agricultural specialist (Gouws, 2023) found that there is no cultivated land on the proposed PV site, and the entire site is used for cattle farming.

Figure 24: **South eastern view of PV Site**

Figure 25: **Construction along the R76**

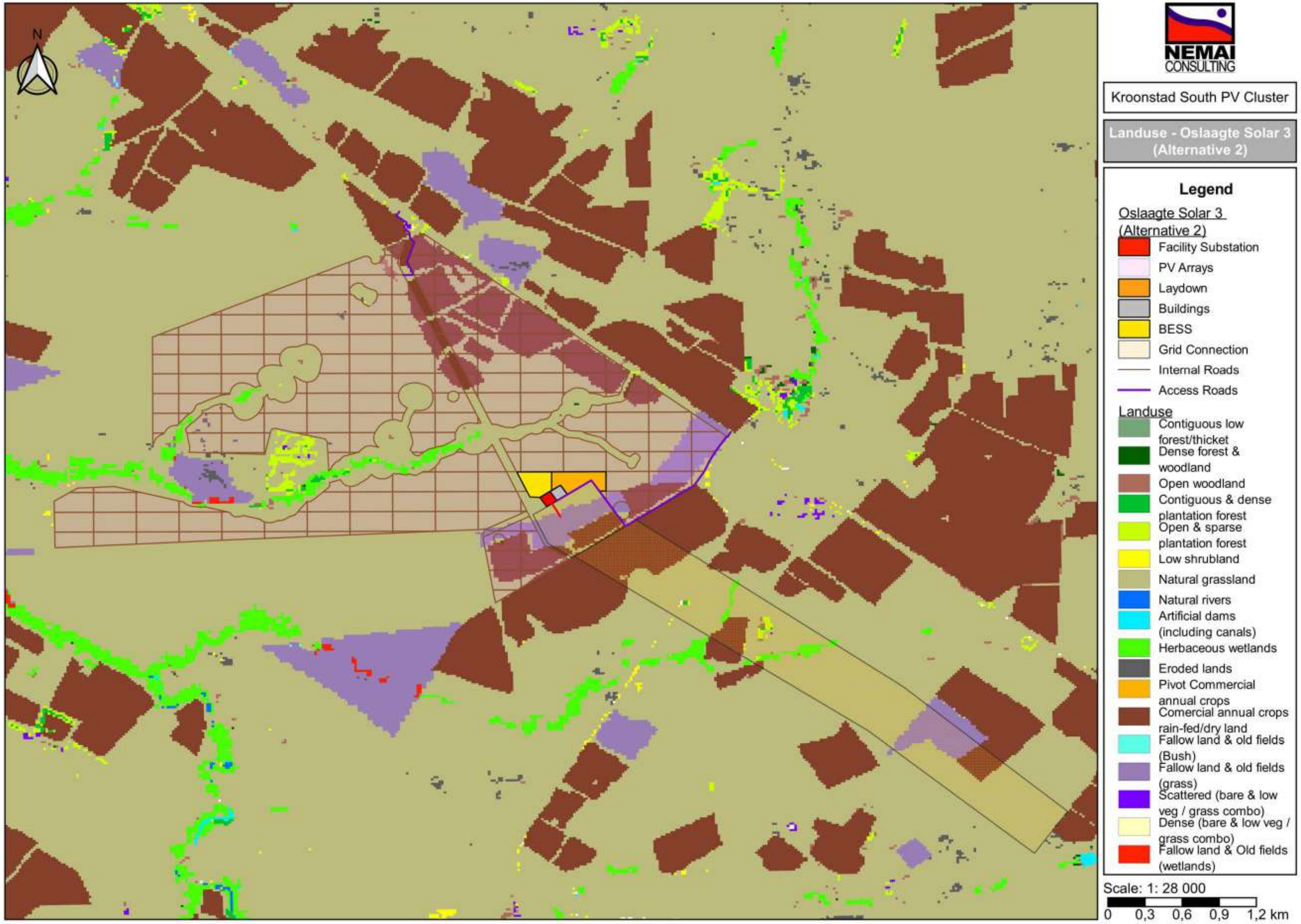


Figure 26: Land cover

11.3 Climate

The climate is considered to be a local steppe climate. There is little rainfall throughout the year. This climate is considered BSk according to the Köppen-Geiger climate classification.

The mean minimum and maximum temperatures over the year are shown in **Figure 27** below. The temperature averages 17.4 °C. January is the warmest month of the year. The temperature in January averages 22.6 °C. The lowest average temperatures in the year occur in July, when it is around 9.7 °C.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	22.6 °C (72.7) °F	21.9 °C (71.4) °F	20.5 °C (68.9) °F	16.9 °C (62.4) °F	13.3 °C (55.9) °F	9.9 °C (49.8) °F	9.7 °C (49.5) °F	13 °C (55.5) °F	17.3 °C (63.2) °F	20 °C (67.9) °F	21.2 °C (70.2) °F	22.2 °C (72) °F
Min. Temperature °C (°F)	16.7 °C (62.1) °F	16.3 °C (61.3) °F	14.7 °C (58.4) °F	11 °C (51.7) °F	6.7 °C (44) °F	3.1 °C (37.6) °F	2.6 °C (36.6) °F	5.4 °C (41.7) °F	9.4 °C (48.8) °F	12.5 °C (54.6) °F	14.2 °C (57.5) °F	16 °C (60.8) °F
Max. Temperature °C (°F)	28.9 °C (84) °F	27.9 °C (82.2) °F	26.8 °C (80.2) °F	23.4 °C (74) °F	20.5 °C (68.9) °F	17.5 °C (63.6) °F	17.7 °C (63.8) °F	21.2 °C (70.1) °F	25.4 °C (77.7) °F	27.6 °C (81.6) °F	28.5 °C (83.3) °F	28.8 °C (83.9) °F
Precipitation / Rainfall mm (in)	105 (4)	83 (3)	73 (2)	47 (1)	21 (0)	12 (0)	7 (0)	15 (0)	15 (0)	60 (2)	70 (2)	107 (4)
Humidity(%)	55%	57%	56%	56%	52%	51%	44%	37%	32%	38%	43%	51%
Rainy days (d)	10	9	8	5	2	1	1	2	2	6	8	10
avg. Sun hours (hours)	10.8	10.5	9.8	9.1	9.0	8.8	9.1	9.6	10.2	10.7	11.1	11.2

Figure 27: Average minimum and maximum temperatures in Kroonstad (Data: 1991 – 2021)
(Copyright © 2022 www. climate-data.org)

The greatest amount of precipitation occurs in December, with an average of 107 mm as shown in **Figure 28** below.

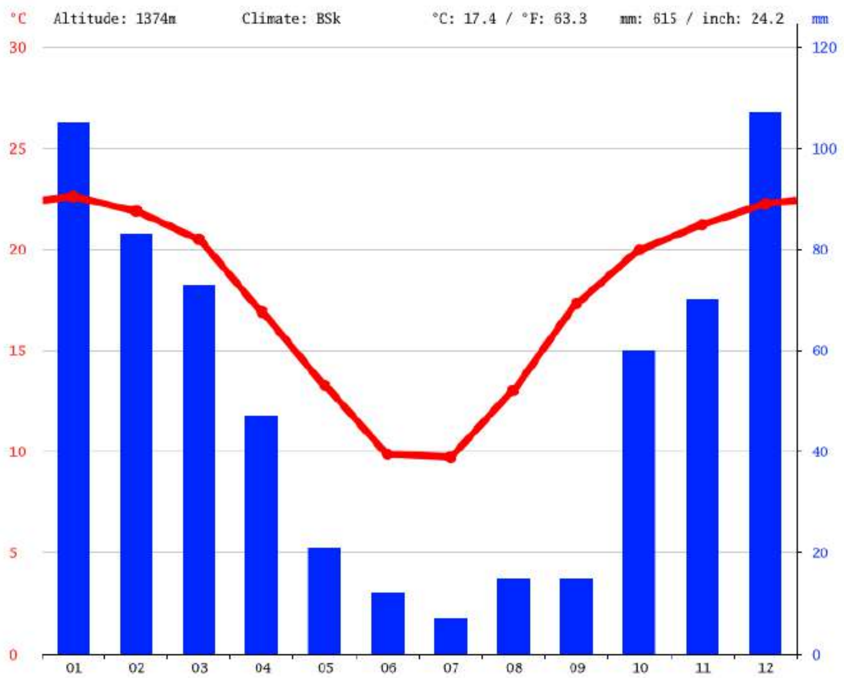


Figure 28: Average precipitation for the year
(Copyright © 2022 www. climate-data.org)

11.4 Geology and Soil

The Project Area is underlain by Sedimentary mudstones and sandstone mainly of the Adelaide Subgroup (Beaufort Group, Karoo Supergroup) as well as those of the Ecca Group (Karoo Supergroup) found in the extreme northern section of this grassland, giving rise to vertic, melanic and red soils (typical forms are Arcadia, Bonheim, Kroonstad, Valsrivier and Rensburg, as shown in **Figure 29** below.

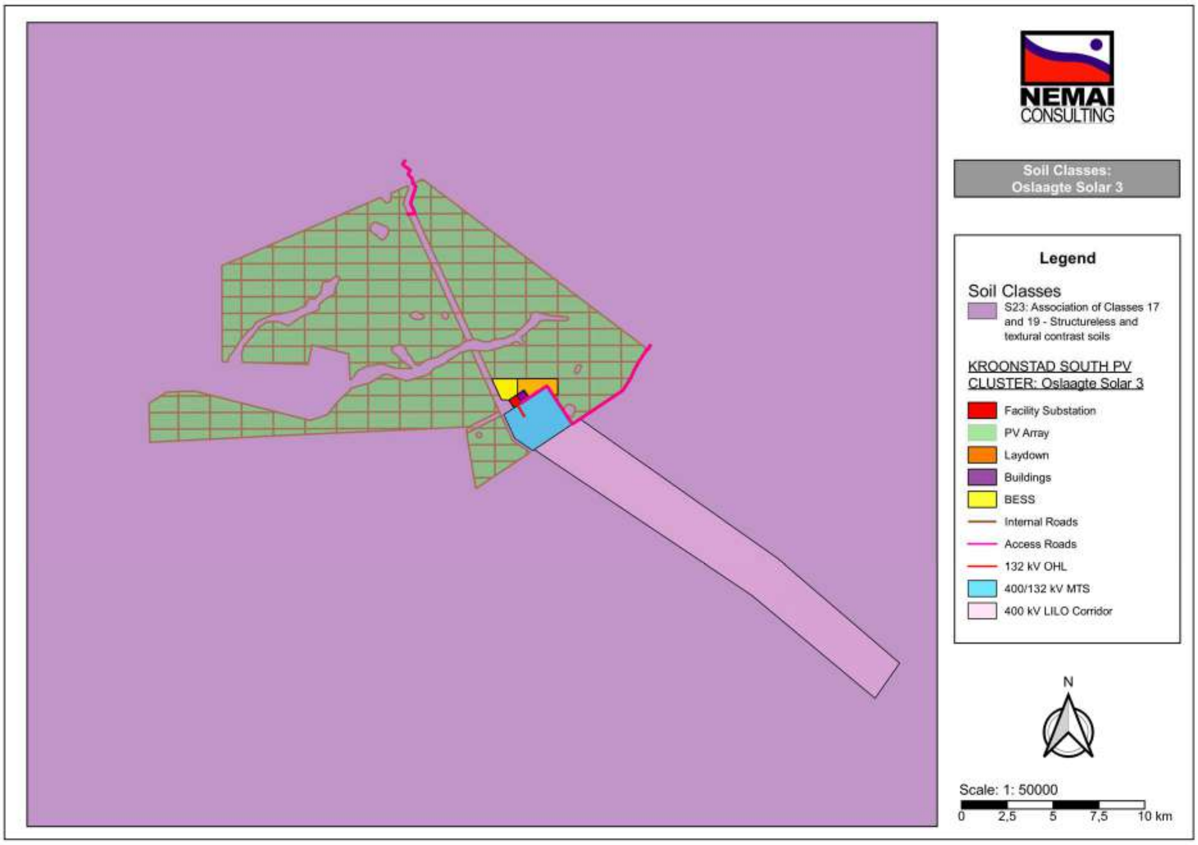


Figure 29: Soil description

The following is noted in the Agricultural Impact Assessment (Gouws, 2023) in terms of the properties of the soil encountered at the site (see **Figure 30** below):

- Clay migrates to above the bedrock where cutanic structures are formed. These seem to dissolve or fall apart when the protective topsoil is eroded. Dongas are often the result;
- The Gs/R is shallow greyish brown soils with scattered rock outcrops. These soils are sometimes cultivated but is low potential cropping land. The dominant soil forms that occur on this unit is Glenrosa;
- Sw/Oa and Duplex 300 soils are moderately deep greyish brown soils. The Swartland soils are highly erodible, but where the structured layer is deeper than 500mm, it is sometimes ploughed. The soil has a medium potential for crop production; and

- There are already gullies that have formed due to erosion. The farmer attempted to slow down flow speeds during high intensity rains by placing car tyres in gullies. High erosion susceptibility is one of the main reasons why the land use potential is low.

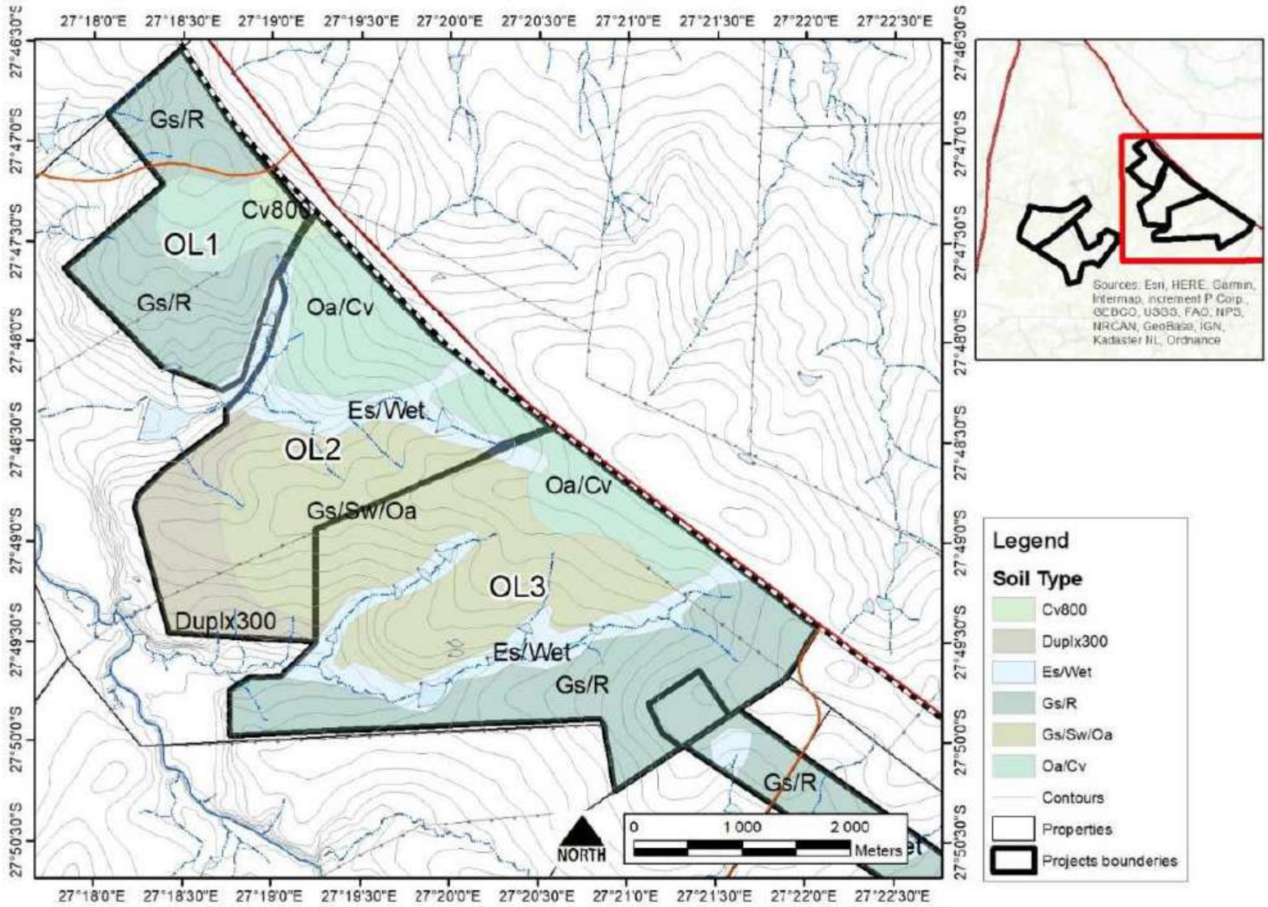


Figure 30: **Soil map (Gouws, 2023), refer to OL3 boundary**

11.5 Hydrogeology

Groundwater is an important source of rural water supply within the MLM and in the drier parts of the municipal area groundwater constitutes the main source of water for rural domestic supplies and stock watering (MLM, 2020).

11.6 Topography

In terms of the SOTER database (see **Figure 31** below), the landform encountered at most of the PV Site and power line route is characterised as a plain at a high level.

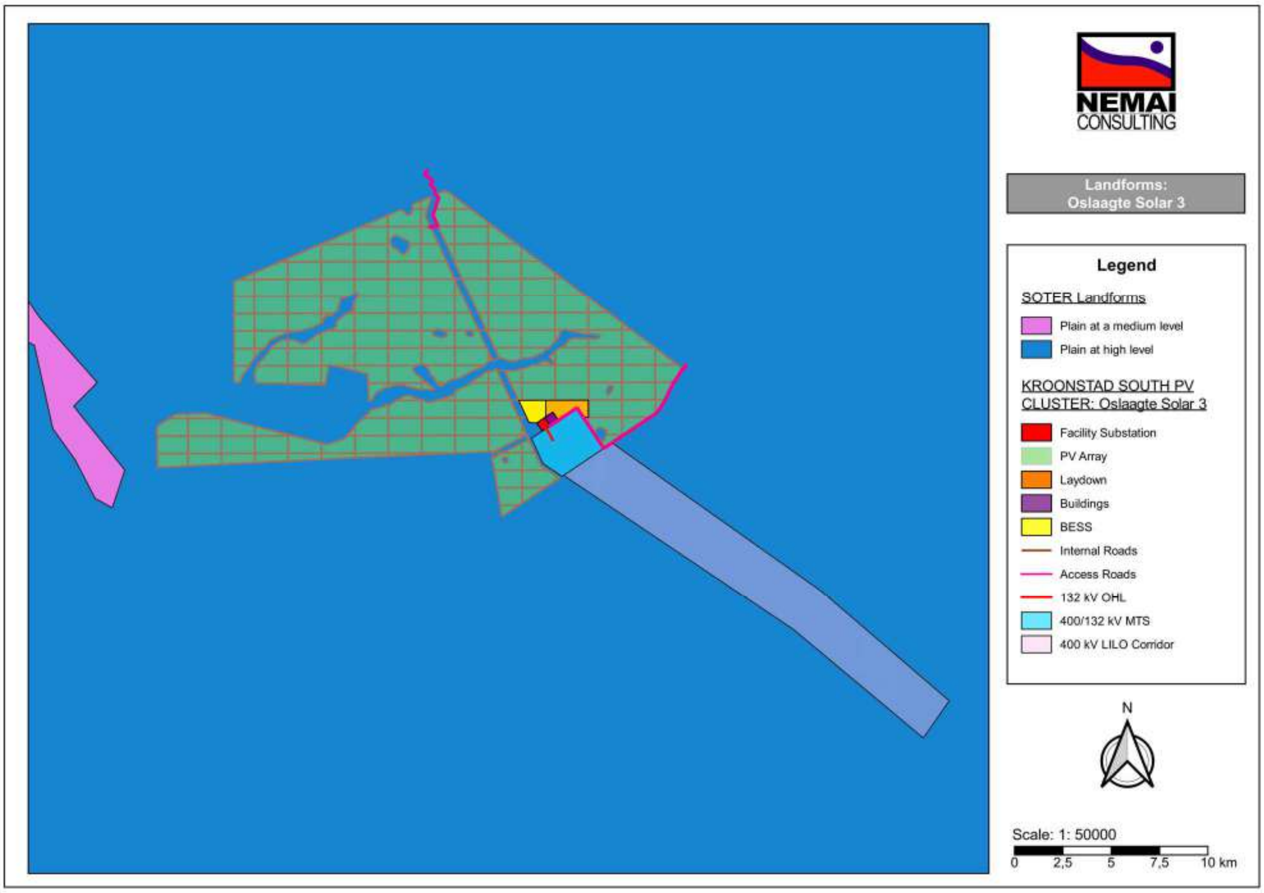


Figure 31: SOTER Landforms

The main topographical feature on the site is a drainage line that flows from east to west across the property. This drainage line has been excluded from the Alternative 2 layout.

According to the findings from the National Web Based Environmental Screening Tool, areas of medium to very high sensitivity in terms of the relative landscape (solar) theme occur at the PV Site (see **Figure 32** below).

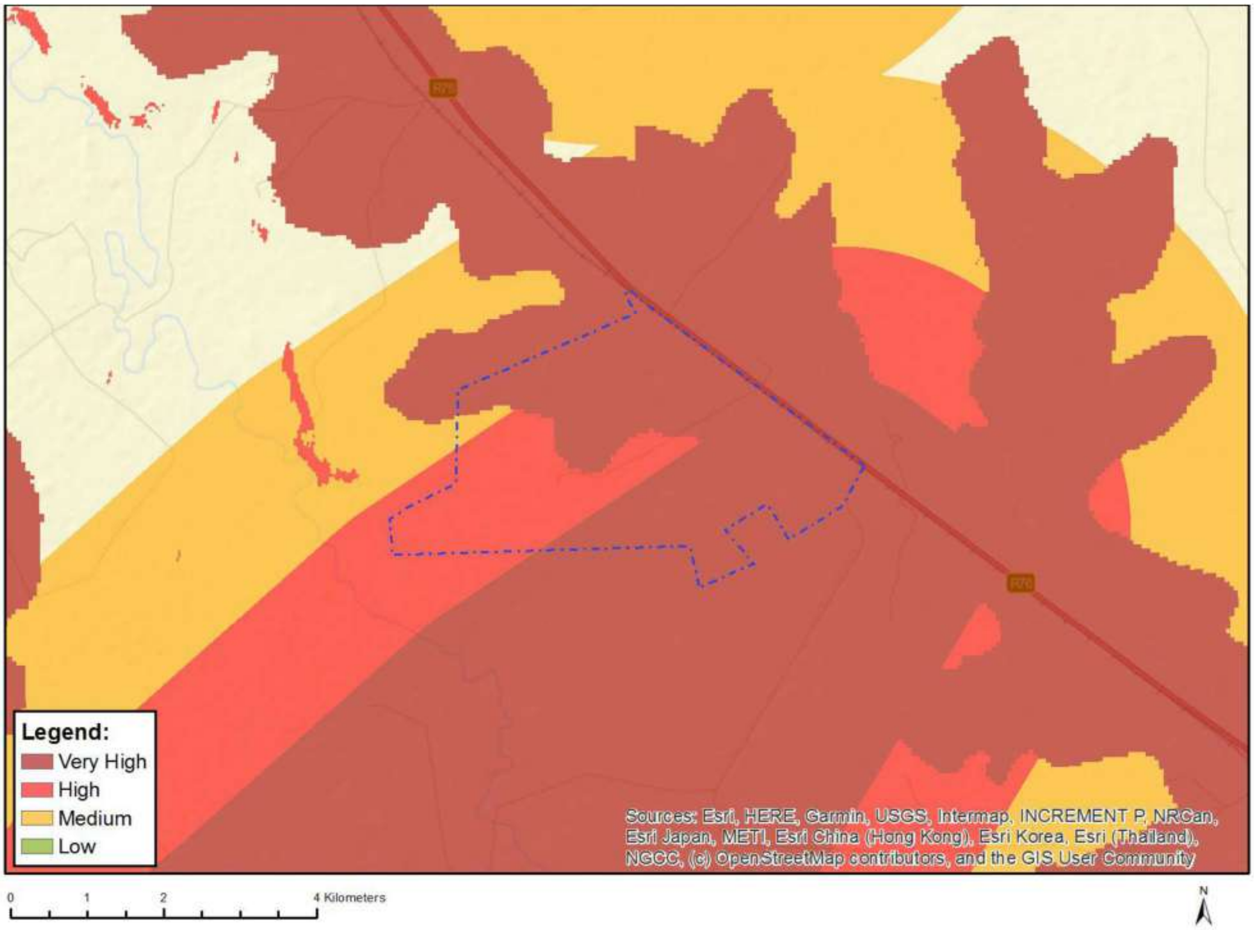


Figure 32: **Map of relative landscape (solar) theme sensitivity**

The findings of the Visual Impact Assessment that was undertaken for the Project are contained in **Section 12.10** below. From a desktop study of satellite imagery and available national data, potential sensitive receptors were identified within 15 km of the proposed development and are presented in **Figure 33** below. Homesteads, as well as transient receptors (people travelling along the R76) were identified as potential sensitive receptors to the proposed Project. The visibility rating was determined as moderate.

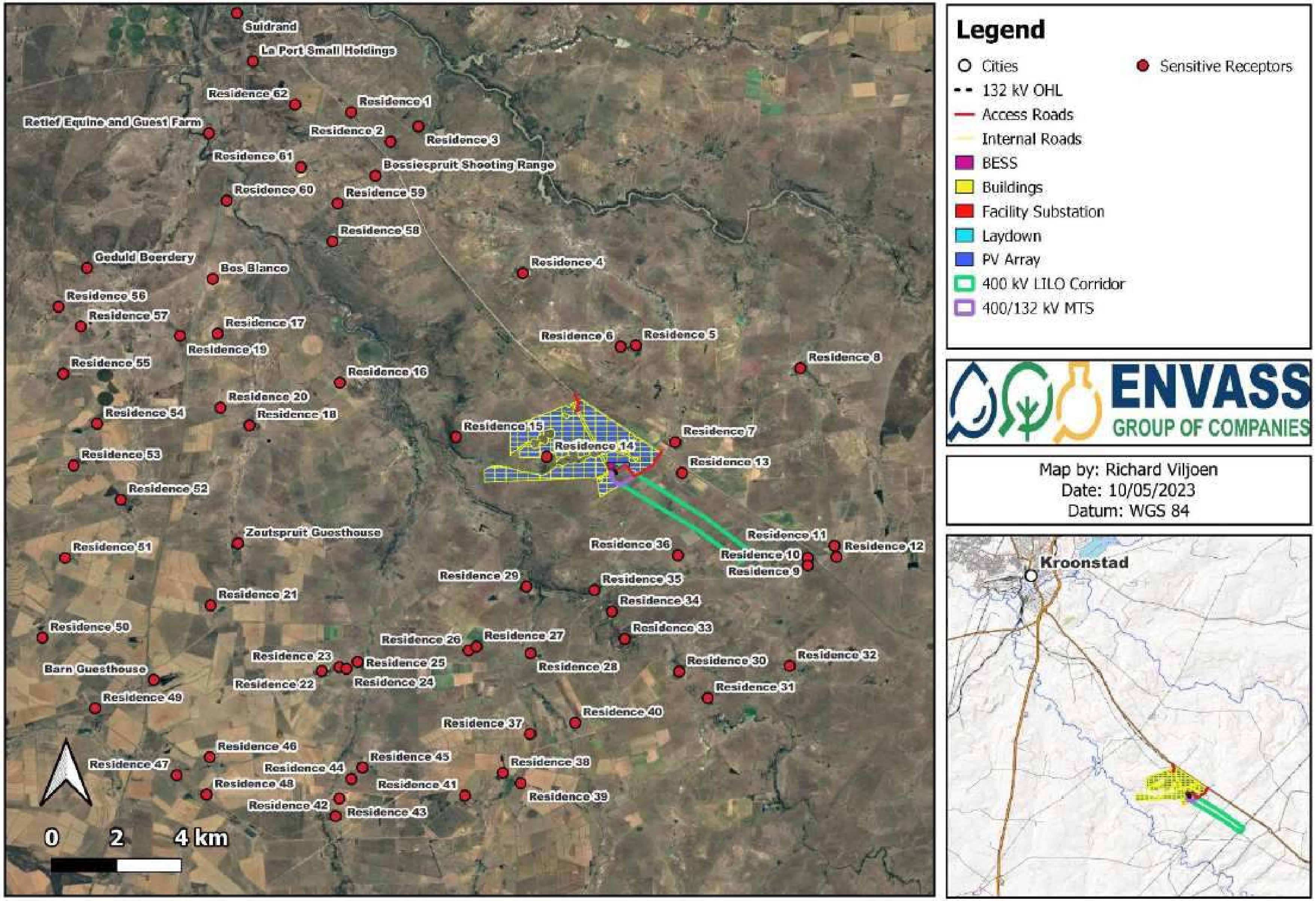


Figure 33: Sensitive receptors (Buys, 2023)

11.7 Surface Water

The information contained in the sub-sections to follow was extracted from the Wetland Delineation and Risk Assessment (van Rooyen, 2023). Refer to **Sections 12.4** and **13.12.2** below for a synopsis of the study and related impact assessment, respectively. The specialist report is contained in **Appendix E1**.

11.7.1 Quaternary Catchments and Water Management Areas

The Project Area is situated in the Vaal Water Management Area and within the C60F Quaternary Catchment (Blomspruit sub-catchment).

11.7.2 National Freshwater Ecosystem Priority Area Status

To better conserve aquatic ecosystems, SA has categorised its river and wetland systems according to set ecological criteria to identify Freshwater Ecosystem Priority Areas (FEPAs). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the NEM:BA biodiversity goals (Nel *et al*., 2011).

Figure 34 below shows the location of the Project Area is not situated within any river FEPA catchments (areas that achieve biodiversity targets for river ecosystems and fish species).

11.7.3 National Wetland Map 5

The National Wetland Map 5 spatial data was published in October 2019 (van Deventer *et al*., 2018) in collaboration with the South African National Biodiversity Institute (SANBI) with the specific aim of spatially representing the location, type and extent of wetlands in SA. The data represents a synthesis of a wide number of official watercourse data including rivers, inland wetlands and estuaries. Within the footprint of the study area, and within the 500 m regulated area, there is no HGM units according to the NBA 2018 NWM 5 spatial data.

11.7.4 Strategic Water Source Areas (SWSA's)

Strategic Water Source Areas (SWSA) are either (a) areas that supply an uneven (large quantity) amount of mean annual surface water runoff in relation to their size and are therefore considered to be nationally important or (b) have high groundwater recharge and where the groundwater forms nationally important resource or (c) areas that meat both criteria (a) and (b) (Nel *et al*., 2013; Le Maitre *et al*., 2018). Areas that supply these disproportionate amounts of water can be because of climatic conditions such as high rainfall, or physical properties (ability of the soils and underlying weathered material and rocks to store water as groundwater) (Le Maitre *et al*., 2018). In South Africa, 22 SWSA surface water and 37 SWSA groundwater areas has been identified to be strategically important at national level for water and economic security (Le Maitre *et al*., 2018). The study area is not situated within any of South Africa's three SWSA's.

11.7.5 Free State Biodiversity Conservation Plan

The Free State Conservation Plan classified areas within the province on the basis of its contribution to reach the conservation targets. These areas are classified as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) to ensure sustainability in the long term. The CBAs are classified as either ‘Irreplaceable’ (must be conserved), or ‘Important’.

The spatial dataset from Collins (2016) highlights that the proposed Oslaagte Solar 3 PV facility is not located within either CBA 1 or CBA 2 area. From the FS Biodiversity spatial data, majority of the PV site is located within areas classified as Other while small sections are located within an ESA 1. In addition, some of the PV site is in Degraded areas while majority of the proposed grid connection is in Other (see **Figure 37** below).

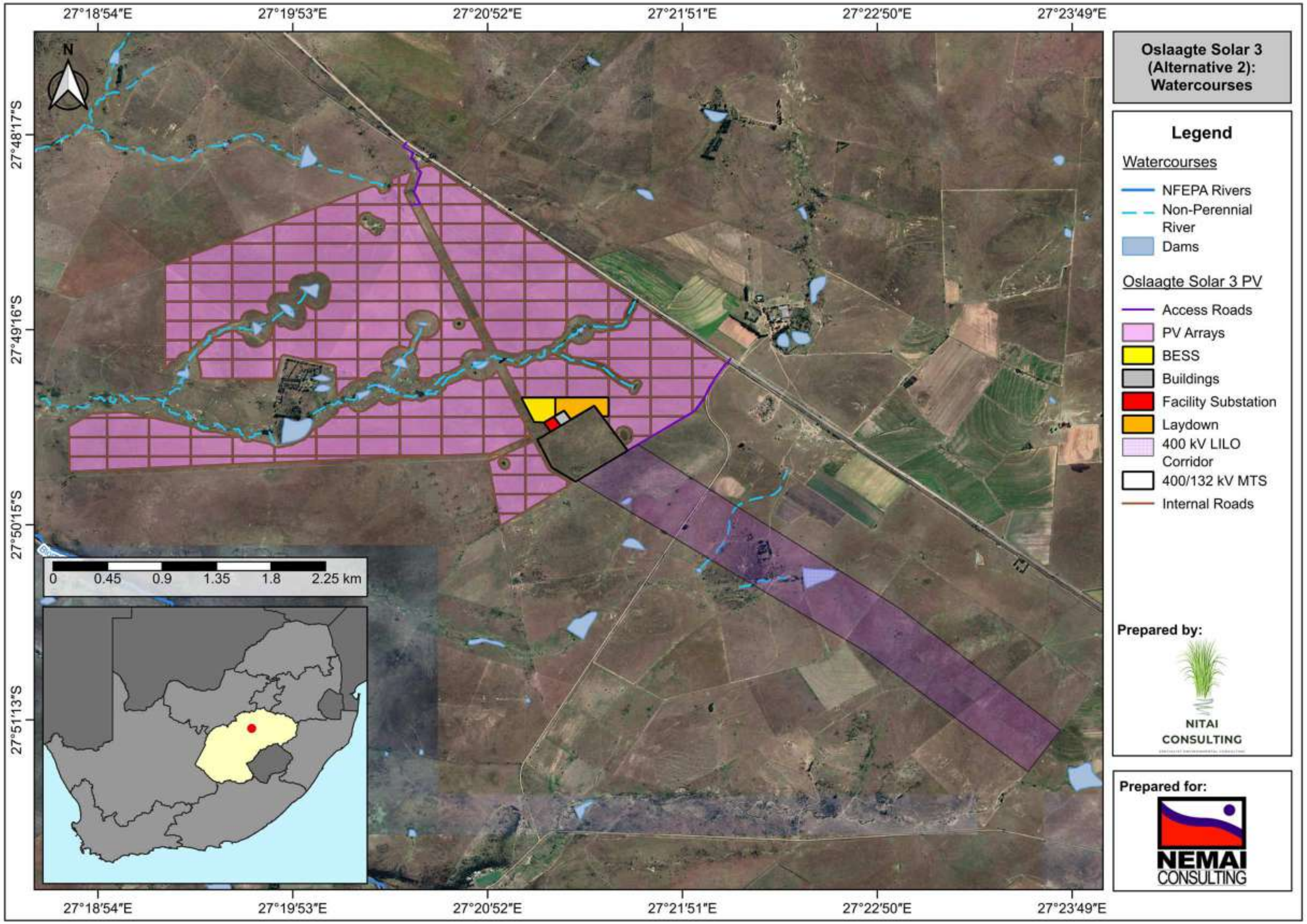


Figure 34: **NFEPA Rivers and Wetlands and NWM 5 in relation to Project Area (van Rooyen, 2023)**

11.8 Terrestrial Ecology

The information contained in the sub-sections to follow was extracted from the Terrestrial Biodiversity Compliance Statement (Human, 2023). Refer to **Sections 12.5** and **13.13** below for a synopsis of the study and related impact assessment, respectively. The specialist report is contained in **Appendix E2**.

11.8.1 Ecosystem Threat Status

The Ecosystem Threat Status is an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC). According to the spatial dataset, the proposed Project Area overlaps with a LC ecosystem (see **Figure 35** below).

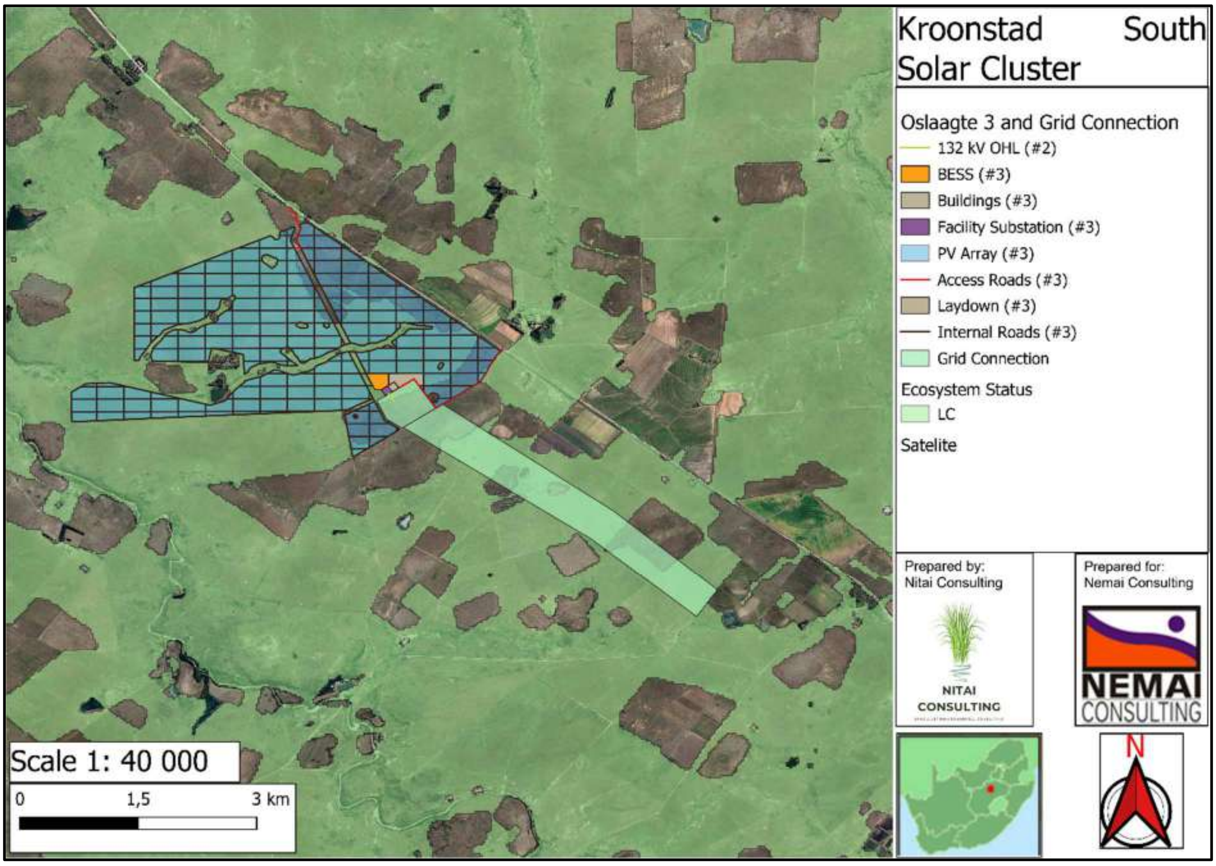


Figure 35: Ecosystem threat status associated with the Project Area (Human, 2023)

11.8.2 Protected Areas

According to the South Africa Protected Areas Database (SAPAD) (2022) and the South Africa Conservation Areas Database (SACAD) (2022), the main project area lies inside the 5 km buffer for Serendipidie Private Nature Reserve and is thus within any regulated area. There is an existing Eskom powerline traversing Serendipidie Nature reserve along which the proposed LILO powerlines will run adjacent and parallel. The area inside the buffer is current agricultural land and in various stages of disturbance. The project should not have any significant impacts on the nature reserve (see **Figure 36** below).

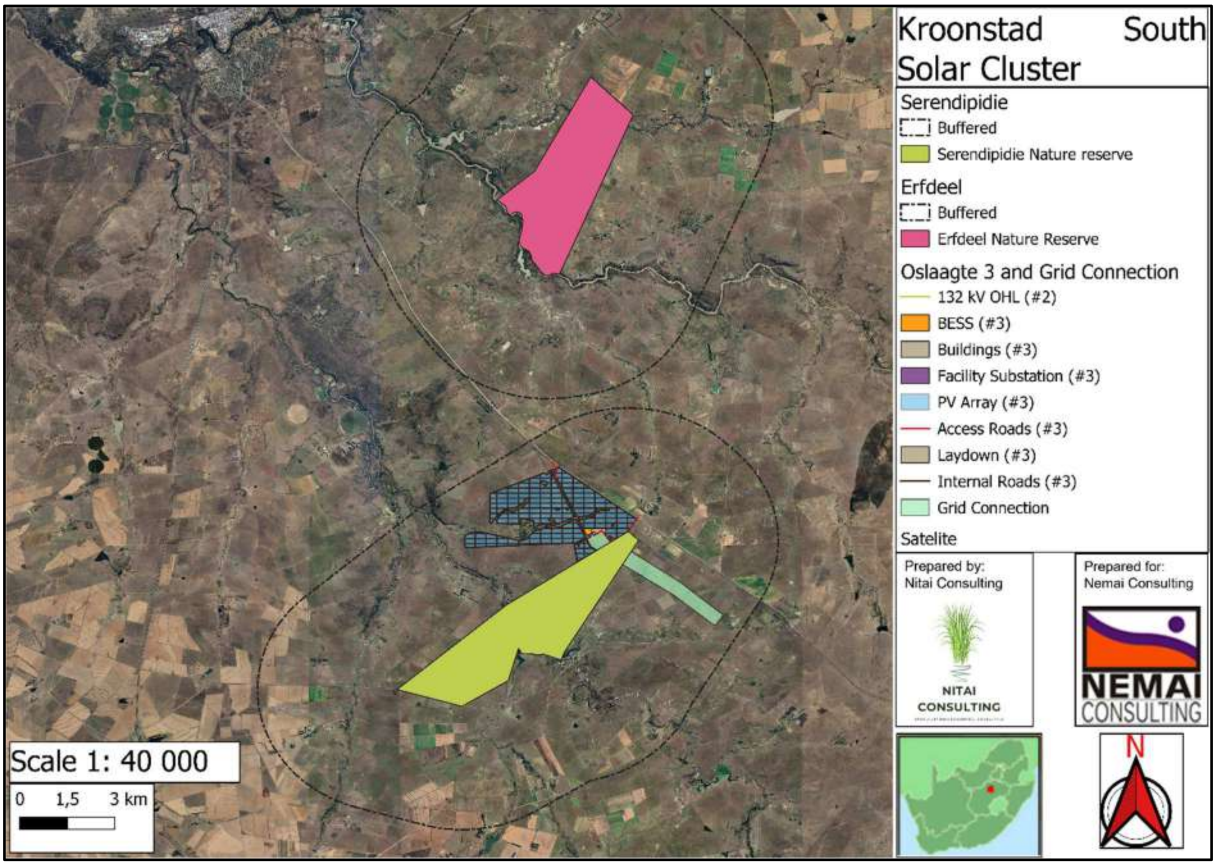


Figure 36: Project Area in relation to the nearest protected areas (Human, 2023)

11.8.3 Critical Biodiversity Areas and Ecological Support Areas

The key output of a systematic biodiversity plan is a map of biodiversity priority areas. The CBA map delineates CBAs, ESAs, ONAs, Protected Areas, and areas that have been irreversibly modified from their natural state.

Figure 37 below shows the Project Area superimposed on the Terrestrial CBA map. The Project Area overlaps with a “ESA1 and ESA 2” and “Degraded Area”.

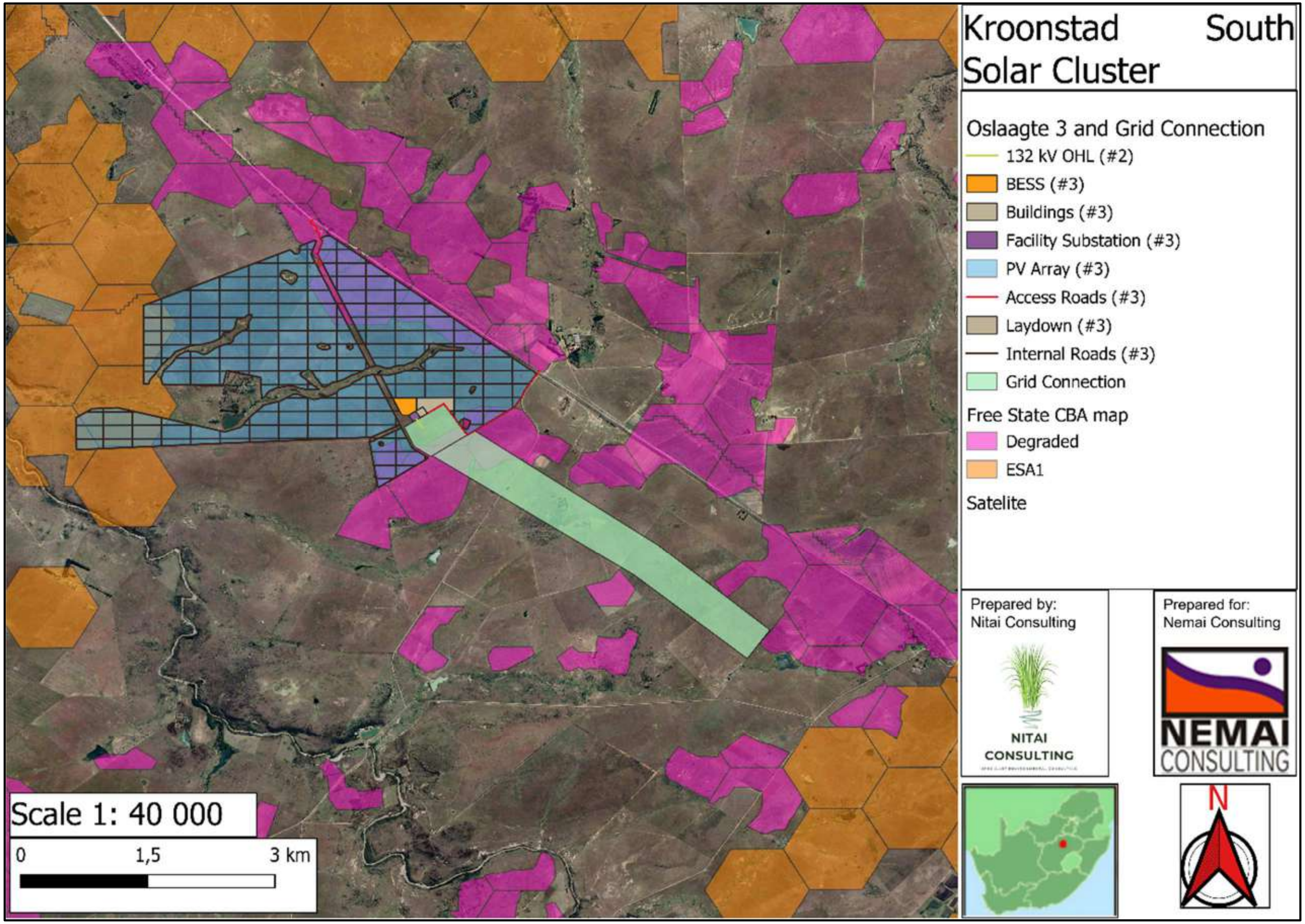


Figure 37: Project Area in relation to CBAs (Human, 2023)

11.8.4 National Protected Area Expansion Strategy

The National Protected Area Expansion Strategy 2017 (NPAES) presents the best opportunities for meeting the ecosystem-specific protected area targets and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. The project area does overlap with a priority focus area for expansion according to the 2016 NPAES dataset but is not under negotiation and the habitat is disturbed and degraded and does not contribute significantly to ecological corridors (see **Figure 38** below).

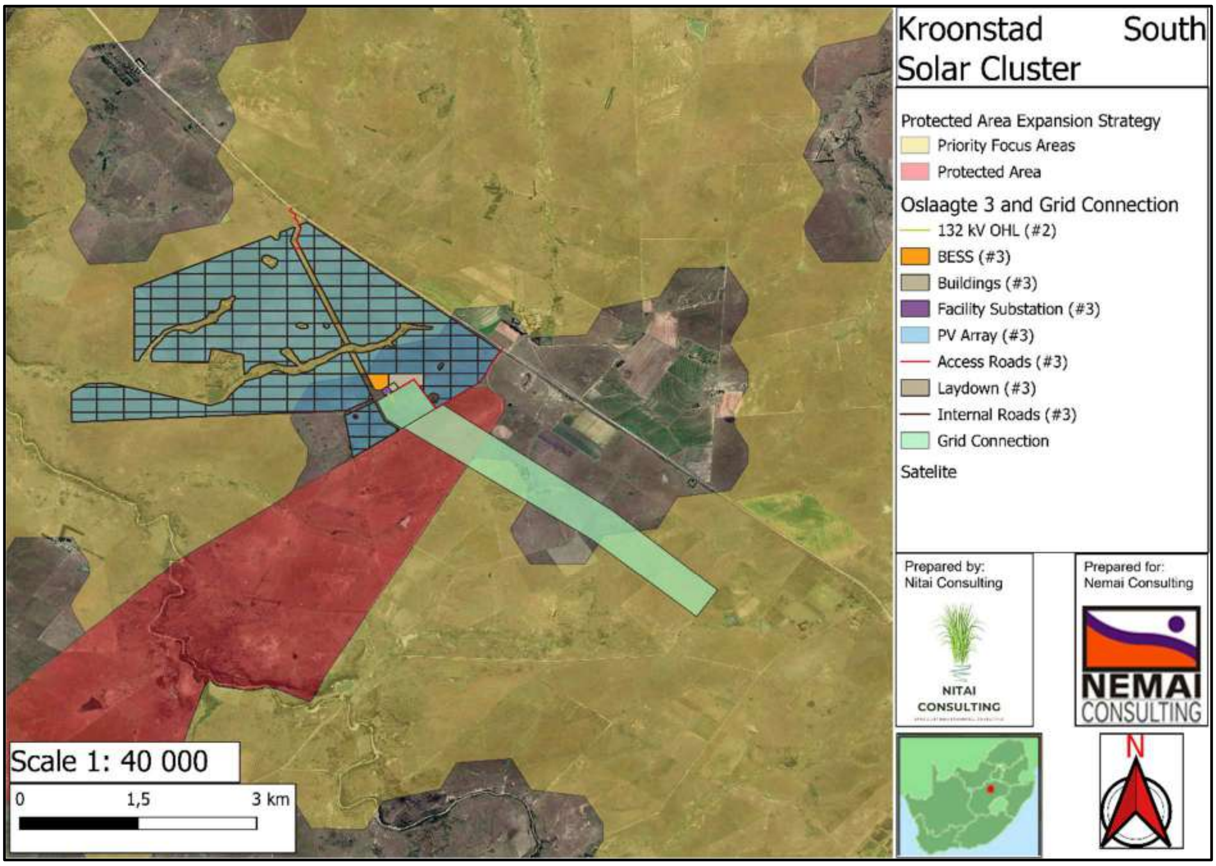


Figure 38: Project Area in relation to NPAES (Human, 2023)

11.8.5 Flora Assessment

This section is divided into a description of the vegetation type expected under natural conditions and the expected flora species in the Project Area.

11.8.5.1 Vegetation Type

The Project Area is situated within the Grassland biome. On a fine-scale vegetation type, the Project Area overlaps with the Central free Sate Grassland (see **Figure 39** below).

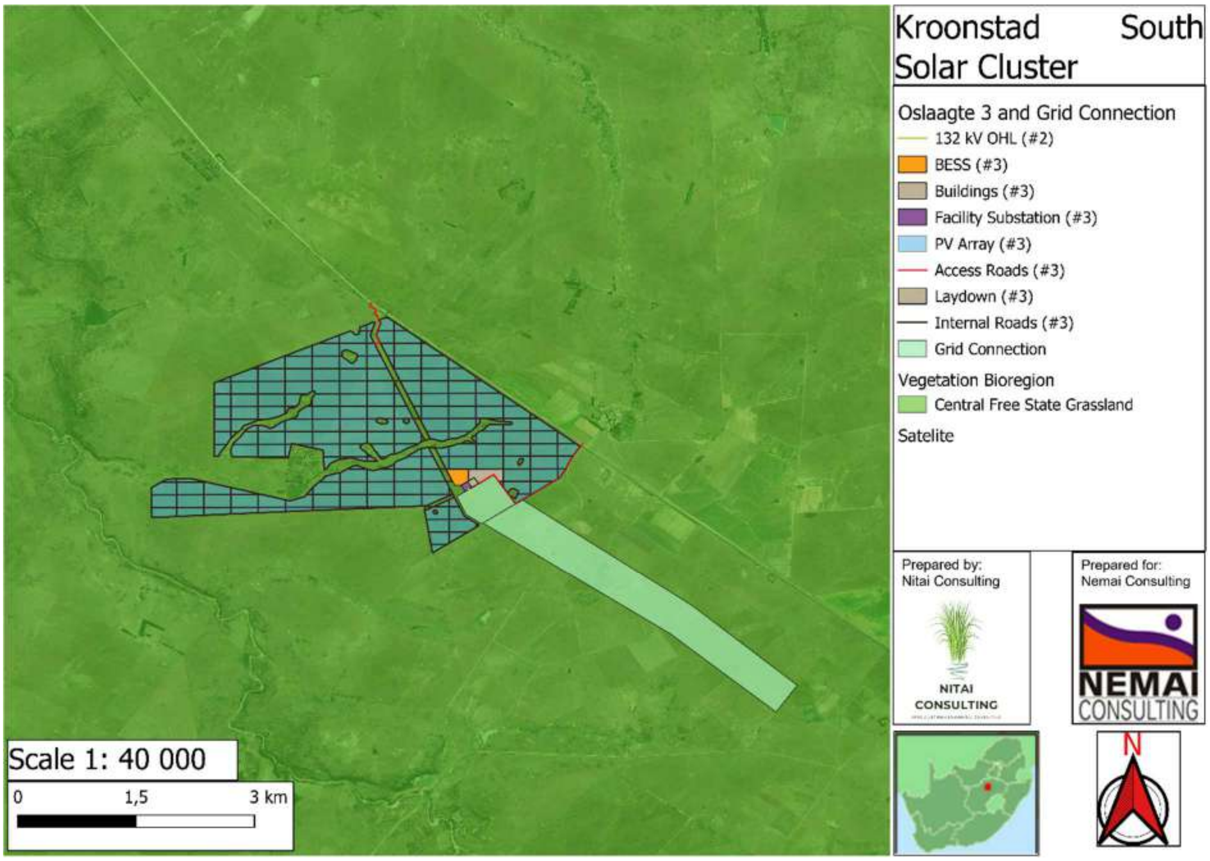


Figure 39: Vegetation type associated with the Project Area (Human, 2023)

The Central Free State Grassland is characterised as undulating plains supporting short grassland, in natural condition dominated by *Themeda triandra* while *Eragrostis curvula* and *E. chloromelas* become dominant in degraded habitats. Dwarf karoo bushes establish in severely degraded clayey bottomlands. Overgrazed and trampled low-lying areas with heavy clayey soils are prone to *Acacia karroo* encroachment.

Important Taxa (d = dominant):

- Graminoids: *Aristida adscensionis (d), A. congesta (d), Cynodon dactylon (d), Eragrostis chloromelas (d), E. curvula (d), E. plana (d), Panicum coloratum (d), Setaria sphacelata (d), Themeda triandra (d), Tragus koelerioides (d), Agrostis lachnantha, Andropogon appendiculatus, Aristida bipartita, A. canescens, Cymbopogon pospischilii, Cynodon transvaalensis, Digitaria argyrograpta, Elionurus muticus, Eragrostis lehmanniana, E. micrantha, E. obtusa, E. racemosa, E. trichophora, Heteropogon contortus, Microchloa caffra, Setaria incrassata, Sporobolus discosporus*.
- Herbs: *Berkheya onopordifolia var. onopordifolia, Chamaesyce inaequilatera, Conyza pinnata, Crabbea acaulis, Geigeria aspera var. aspera, Hermannia depressa, Hibiscus pusillus, Pseudognaphalium luteo-album, Salvia stenophylla, Selago densiflora, Sonchus dregeanus*.
- Geophytic Herbs: *Oxalis depressa, Raphionacme dyeri. Succulent Herb: Tripteris aghillana var. integrifolia*.

- Low Shrubs: *Felicia muricata (d), Anthospermum rigidum subsp. pumilum, Helichrysum dregeanum, Melolobium candicans, Pentzia globosa*.

The Central Free State Grassland is classified as LC, with 66% remaining of this ecosystem (Mucina & Rutherford, 2006). It has experienced low rates of natural habitat loss and biotic disruptions, placing this ecosystem at low risk of collapse and 2.3% is currently formally protected (DFFE, 2022).

11.8.5.2 Expected Flora Species

Based on the Plants of Southern Africa (BODATSA-POSA, 2019) database, only 41 plant species could potentially occur on the study site. None are regarded as threatened. The screening tool identifies no potential SCC species and rated the area "Low".

11.8.5.3 Field Survey

The project area was found in a heavily modified condition, mainly attributed to the agricultural practices and its associated impacts, resulting in the area being largely disturbed in some way. Grazing practices, old lands and piospheres have degraded the veld severely. These aspects further limit the functional capacity of the project area. Much of the development footprint is located within degraded areas or along roads or transformed areas and their associated servitudes, which are considered as low sensitivity. Species marked in blue are alien species but not classified as invasive. Species marked in green are alien invasive according to Nemba. Species marked in red are protected in Free State province. A total of 76 tree, shrub, herbaceous and graminoid plant species were recorded in the project area during the field assessment. The three species protected provincially are of least concern according to the Red List of Plants and the IUCN database. These species indicate disturbance in ecosystems and are commonly found throughout the country.

11.8.6 <u>Faunal Assessment</u>

11.8.6.1 Amphibians

Based on the International Union for Conservation of Nature (IUCN) Red List Spatial Data and AmphibianMap, 15 amphibian species are expected to occur within the area (see **Table 10** below). None are regarded as threatened or Species of Conservation Concern (SCC).

11.8.6.2 Reptiles

Based on the IUCN Red List Spatial Data and the ReptileMAP database, 20 reptile species are expected to occur within the area (see **Table 10** below). One species is considered a SCC, however, it is not likely to be found in the project area.

11.8.6.3 Mammals

The IUCN Red List Spatial Data lists 57 mammal species that could be expected to occur within the area. Five of these expected species are regarded as SCC (see **Table 11** below), and none of the mammal SCC are likely to be found resident within the project area.

Table 11: Total number of potential fauna species present, and corresponding SCC (Human, 2023)

Fauna type		Total potential number	Number of SCC
Avifauna		153	2
Mammals		57	5
Herpetofauna	Amphibians	15	0
	Reptiles	20	1

11.8.6.4 Field Survey

Mammal activity was low, due to the extent of disturbance in general with cattle grazing the area, as well as the poor habitat condition. The species present are most likely not resident due to the modified state of the area. No SCC were observed during the field survey.

11.8.7 Avifaunal Assessment

A separate Avifaunal Baseline and Impact Assessment (Husted, 2023) was undertaken for the Project. The information to follow was extracted from this study. Refer to **Sections 12.6** and **13.14** below for a synopsis of the study and related impact assessment, respectively. The specialist report is contained in **Appendix E3**.

Important Bird & Biodiversity Areas (IBAs) are the sites of international significance for the conservation of the world's birds and other conservation significant species as identified by BirdLife International. These sites are also all Key Biodiversity Areas; sites that contribute significantly to the global persistence of biodiversity (Birdlife South Africa, 2017).
The Project Area is not situated within any national or global Important Bird and Biodiversity Area (IBA) as designated by Birdlife. The closest IBA is the Willem Pretorius Game Reserve 39 km to the south (see **Figure 40** below).

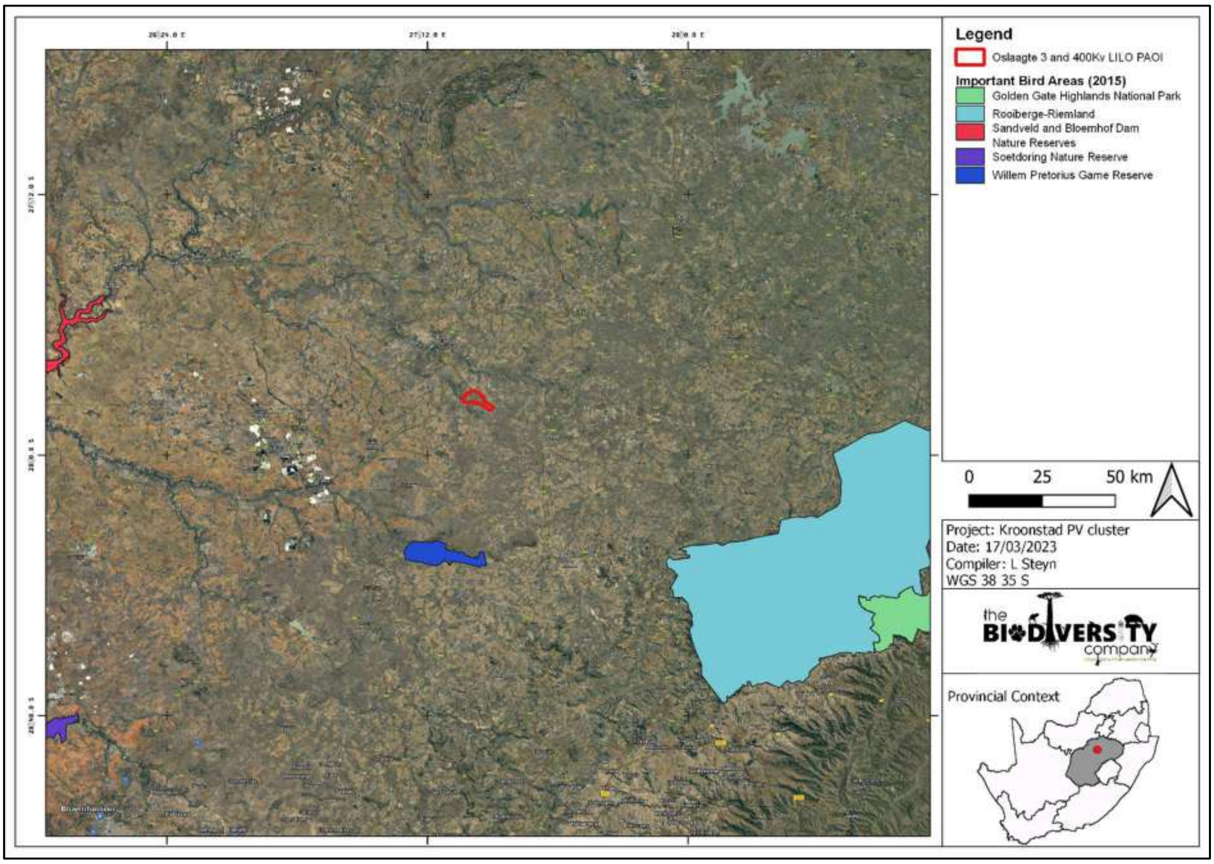


Figure 40: Project Area in relation to the nearest IBA (Husted, 2023)

The SABAP2 Data lists 280 avifauna species that could be expected to occur within the Project area. Seventeen (17) of these expected species are regarded as threatened. Three (3) of the species have a low likelihood of occurrence due to the expected lack of suitable habitat in the Project area, these species can however very likely still move over the Project area and can still be influenced by the development.

Two SCC were recorded during the survey period i.e., *Eupodotis caerulescens* (Blue Korhaan) and *Sagittarius serpentarius* (Secretarybird) observed.

11.9 Socio-Economic Environment

The following information was sourced from the municipal SDF (MLM, 2022).

- **Demographic Profile –**
  - The area of jurisdiction of the Moqhaka Local Municipality is situated in the southern part of the Fezile Dabi District, the latter comprising a total of 488 036 residents. As a consequence of a growth potential of - 0.45 % the past 10 years, the total residents in the Moqhaka Region is 160 532.
  - The Free State growth potential for the past 10 years was calculated at 0.14 %. The Moqhaka population presents 33 % of the Fezile Dabi District and comprises a total of 45 661 households; 31 % of the households in the district. The general tendency of

migration from rural to urban areas is also occurring in the area (82 % urban and 18 % rural), as is the case in the rest of the Free State Province.

- The majority of the rural population is active within the agricultural sector.
- A large portion of the population (27 %) is composed of the age category 15 years and younger. The specific age distribution implicates a future average to high population growth under normal conditions. A fairly low percentage (6.5 %) of the region's population is composed of the age category 65 years and older. Both tendencies emphasise that population growth could, under normal conditions, be expected in the region. The largest portion of the population (66.4 %) is composed of the age category of 15 years to 64 years.

❑ **Economic and Employment Profile –**

- The most recent unemployment statistics for the Moqhaka Region indicates the average unemployment as 35.2 %.
- Comparing the different Local Municipalities in the Fezile Dabi Region, it appears that the percentage of the population employed is the lowest for the Ngwathe Region (64.8 %) and the Moqhaka Region (64.8 %) while the Metsimaholo Region has the highest employment figure (67.9 %) followed by the Mafube Region (66.6 %).
- The impact of international trade and competition in agricultural products might result in an agricultural sector that is internationally less competitive. The latter implies a negative effect on economic growth leading to a possible loss in employment and further depopulation of the rural area.
- Mining remains one of the primary economic sectors within MLM through both De Beers and Lace Mine diamond within +- 15km from Kroonstad CBD.
- Manufacturing through locally based small enterprises in for example agriculture has been identified as critical in growing the national export base necessary to grow the economy. The Free State has identified areas within agriculture machinery to grow and strengthen the manufacturing sector within Moqhaka.

Further information regarding the social profile of the Project Area is provided in the Social Impact Assessment (Tanhuke & Chidley, 2023).

11.10 Agriculture

The entire site is used for cattle farming. The veld is in relatively good condition with a large percentage of palatable grass species. There is no cultivated land on the proposed PV site. The entire site is used for cattle farming.

Using the same guidelines as in AGIS (DALRRD), the land has low/moderate arable potential. There is a small portion of land that was not recognized as highly sensitive, but it is too small to be used for commercial crop production.

The findings from the Agricultural Impact Assessment that was undertaken for the Project are contained in **Section 12.7** below.

11.11 Air quality

Potential sources of air pollution in the region include the following:

- Fugitive dust emissions from agricultural activities;
- Vehicle exhaust emissions from vehicles traveling on paved and unpaved roads;
- Biomass burning (veld fires);
- Domestic fuel burning;
- Industrial operations;
- Waste treatment and disposal; and
- Other fugitive dust sources such as wind erosion from exposed areas.

11.12 Noise

In terms of 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.

11.13 Cultural Heritage & Palaeontological Features

11.13.1 Cultural Heritage

The information to follow was obtained from the Phase 1 Cultural Heritage Impact Assessment (Kitto, 2023) (contained in **Appendix E5**). Refer to **Sections 12.8** and **13.16** below for a synopsis of the study and a related impact assessment, respectively.

The Free State is rich in archaeological and historical resources and includes significant aspects such as Later Stone Age rock art, Battlefields and Iron Age stonewalled enclosures. The general region of the project area was one of many frontiers where San hunter-gatherers, Nguni and Sotho-Tswana agro-pastoralists, Dutch Voortrekkers and British Colonists all interacted.
Accordingly, the archaeological history of the area can broadly be divided into a Stone Age, Iron Age and Historic or Colonial Period. An overview of the general region is presented within the HIA (**Appendix E5**).

An assessment of available historical topographical maps was undertaken to establish a historic layering for the study area. As can be seen in **Figure 41**, the 1960s depicts two heritage features within the Oslaagte Solar 3 PV footprint – Alternative 1 and Alternative 2 layout (both are homesteads) and one historical farmstead just on/outside the western central boundary.

Furthermore, two heritage features within the MTS and LILO Corridor footprint. One shows structures of a historical farmstead and the other shows homesteads. There are also two homestead clusters located outside the LILO Corridor footprint.

Therefore, a total of six heritage features are depicted on the 1960 edition of the topographic map, four which are located within the combined footprints for the Oslaagte Solar 3 PV project and the LILO Connection corridor and three are located outside the respective footprints.

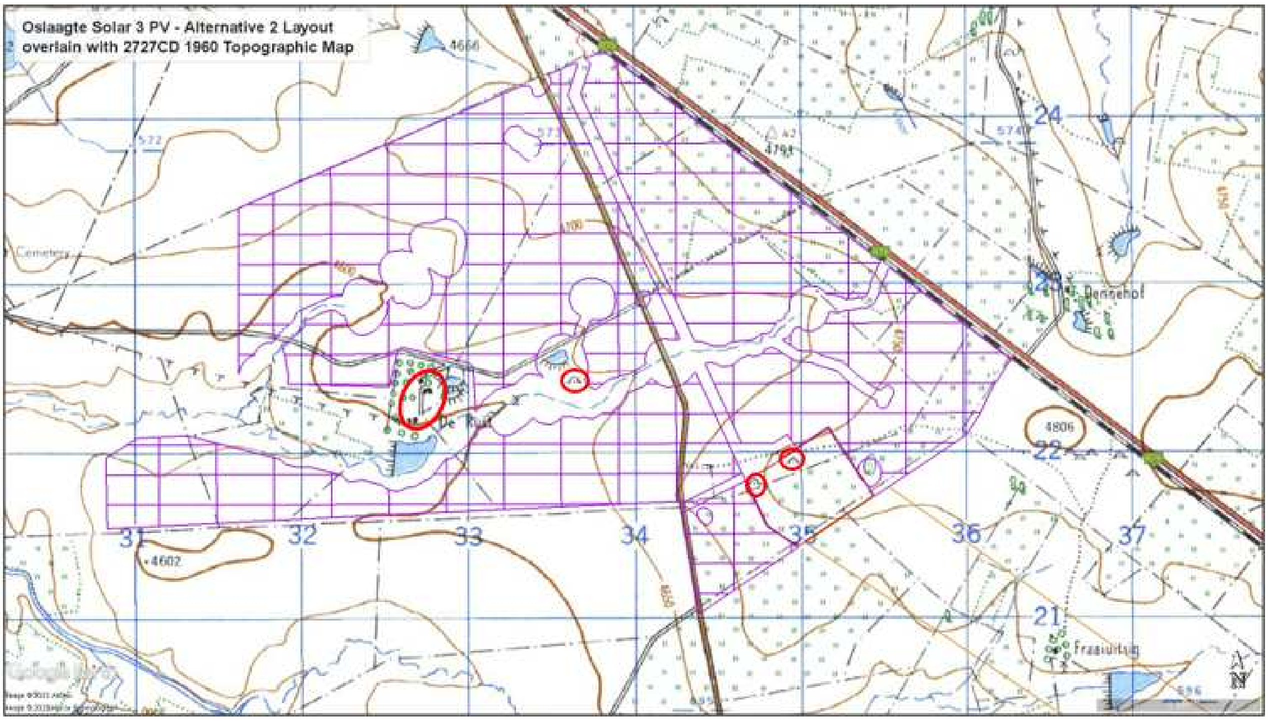


Figure 41: **Heritage features identified within the PV Project footprint and surrounds (red polygons) (Kitto, 2023)**

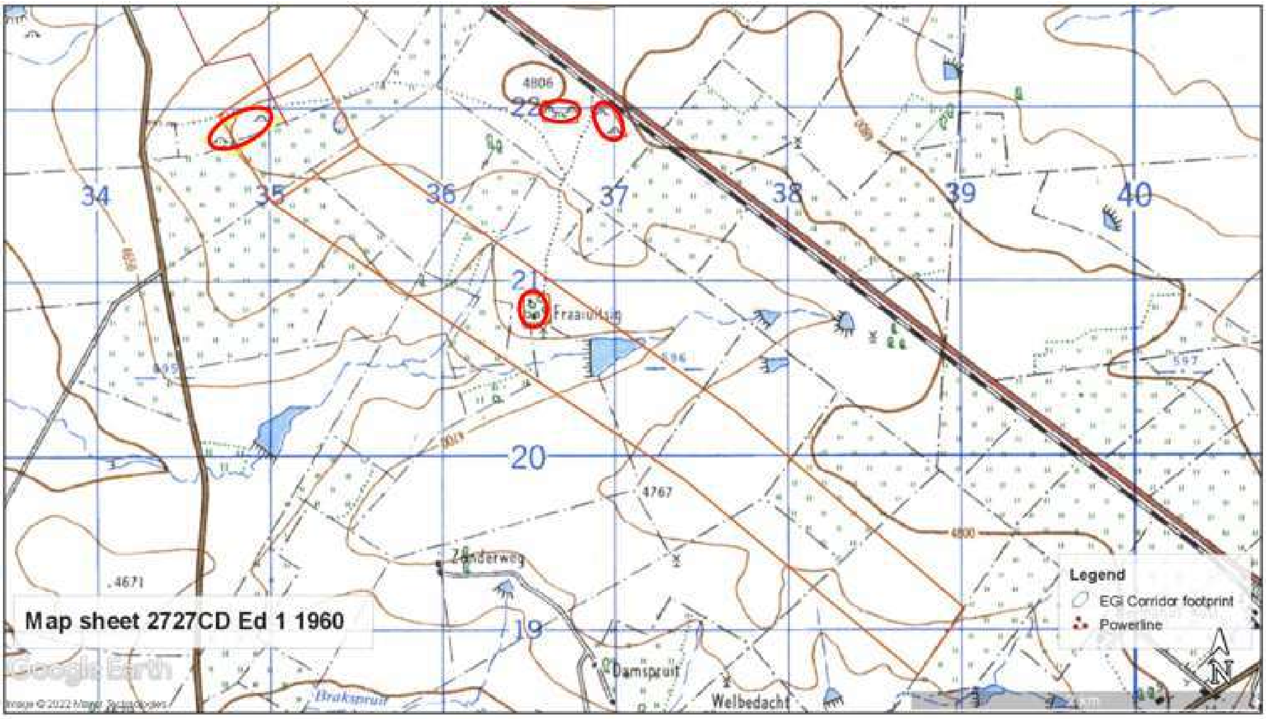


Figure 42: Heritage features identified in the LILO corridor and surrounds (red polygons) (Kitto, 2023)

11.13.2 Palaeontological Features

The information to follow was obtained from Palaeontological Impact Assessment (Butler, 2023) (contained in **Appendix E6**). Refer to **Sections 12.9** and **13.17** below for a synopsis of the study and a related impact assessment, respectively.

The proposed development is underlain by Quaternary alluvium (yellow, single bird figure) and Jurassic Dolerite (Jd, red) in the west, while the largest portion of the development is underlain by the Adelaide Subgroup (Pa, green) of the Beaufort Group (Karoo Supergroup). According to the PalaeoMap of SAHRIS, the Palaeontological Sensitivity of Quaternary alluvium is moderate (green), that of the dolerite is Zero (grey) as it is igneous in origin and thus unfossiliferous, while the Adelaide Subgroup has a Very High (red) Palaeontological Sensitivity (see **Figure 43** below).

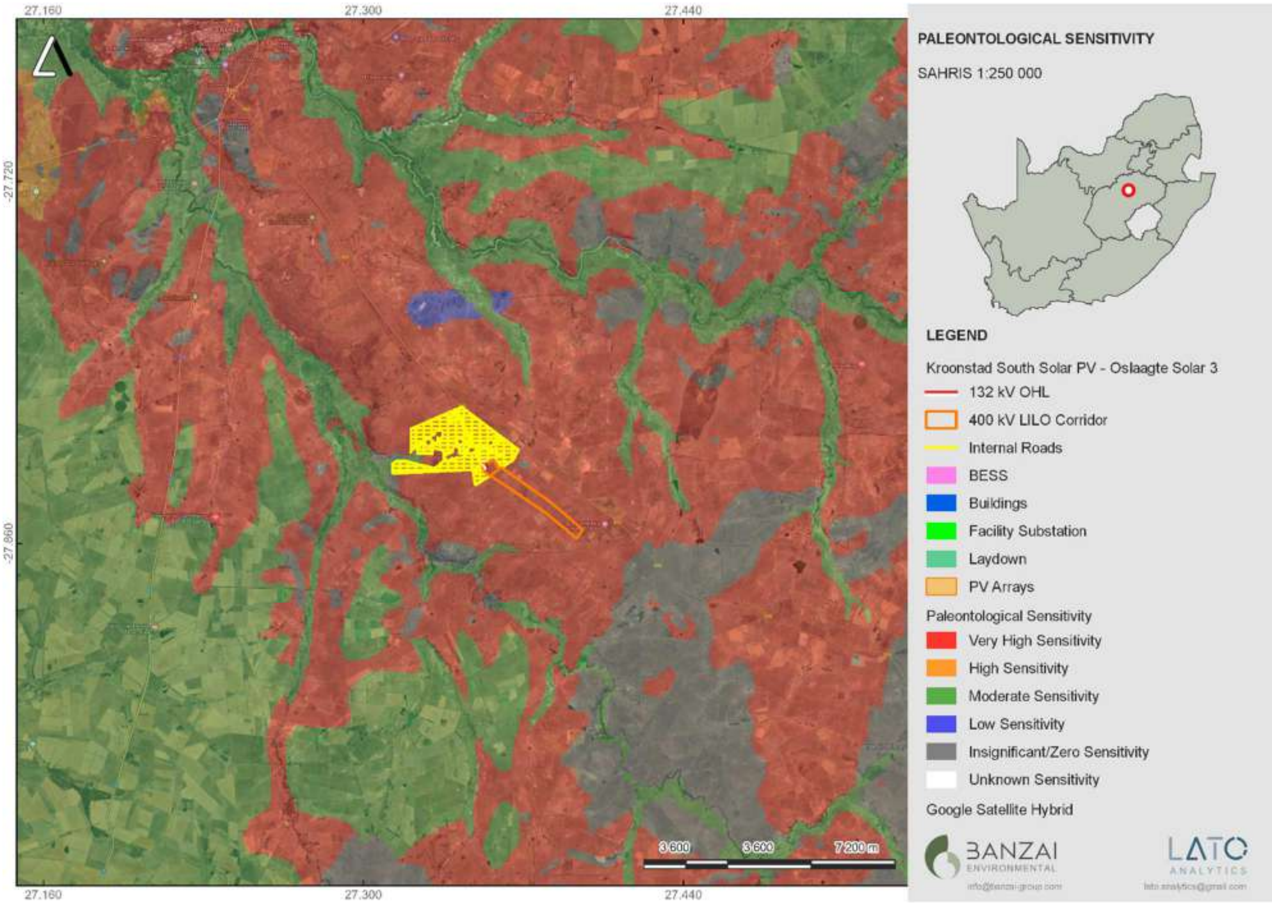


Figure 43: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences) indicating the proposed Oslaagte Solar 3 PV and power line near Kroonstad in the Free State (Butler, 2023)

Updated Geology (Council of Geosciences) indicates that the proposed development is entirely underlain by the Balfour Formation of the Adelaide Subgroup (Beaufort Group, Karoo Supergroup).

A site-specific field survey of the development footprint was conducted. No fossiliferous outcrops were identified during the site visit.

11.14 Planning

The following is noted from a planning perspective:

- The proposed power line follows existing powerlines for most of its route.
- The proposed PV Site and power line are located outside of the urban edge and should not impact on future urban expansion.
- In the event that the Solar PV Plant must be decommissioned, the decommissioning phase will include measures for complying with the prevailing regulatory requirements, rehabilitation and managing environmental impacts in order to render the affected area suitable for a future desirable use.

- Other renewable energy applications that have been made within a 30km radius of the PV Site, according to DFFE's REEA Database (refer to **Section 6.9** above). The nearest approved PV plant is located approximately 10km to the east of the Project Area.

11.15 Existing Structures and Infrastructure

The R76 runs along the eastern boundary of the PV Site (see **Figure 44** below) and is currently being upgraded (see **Figure 45** below).

An existing Eskom Patrysdraai Traction station is located to the north of the site, along with associated powerline servitudes running northwest-southeast (Oosthuizen Traction/Patrysdraai Traction 132kV) (**Figure 46**). The proposed grid connection 400kV LILO powerline corridor runs parallel to the existing Eskom Oosthuizen Traction/Patrysdraai Traction 132kV powerline running to the south east of the Project Area.

Figure 44: Eastern view of the PV Site

Figure 45: **Upgrade of the R76 (PV Site on left-hand side)**

The setbacks / conditions required by the custodians of infrastructure on the PV Site and along the power line route will need to be adhered to.

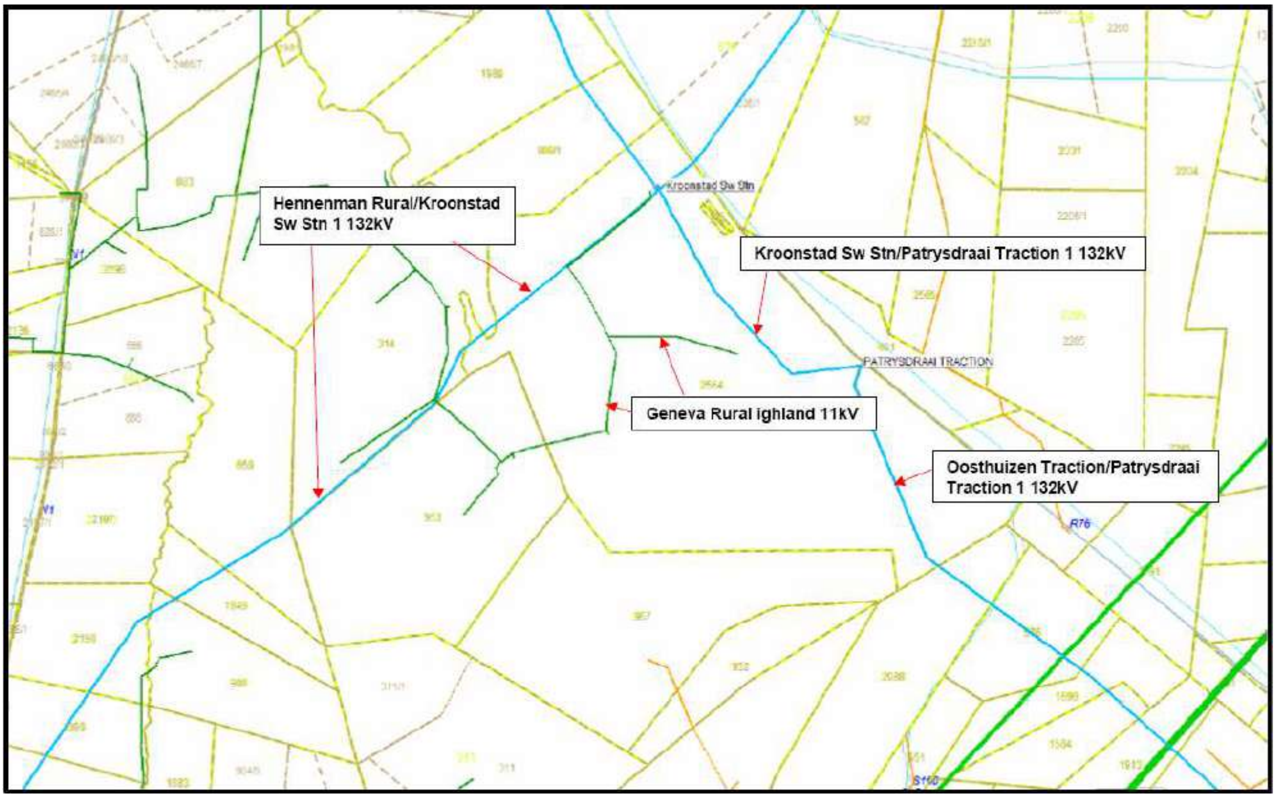


Figure 46: **Existing Eskom infrastructure affected by the Project (supplied by Eskom Land Development Asset Creation Free State Operation Unit)**

11.16 Transportation

The municipality has a comprehensive road network comprising a number of national, provincial and secondary roads, and several railway lines.

The transportation network in the Project Area is shown in **Figure 47** below. The R76 road and a railway line run along the eastern boundary of the PV Site.

According to the Free State Department of Police, Roads and Transport (FSDPRT) (Maree pers. comm., 2023), the primary road P23/1 (R76) and some tertiary roads will be affected by the proposed Project. A formal application to the FSDPRT will be undertaken by the developer during the next stage of the project development process.

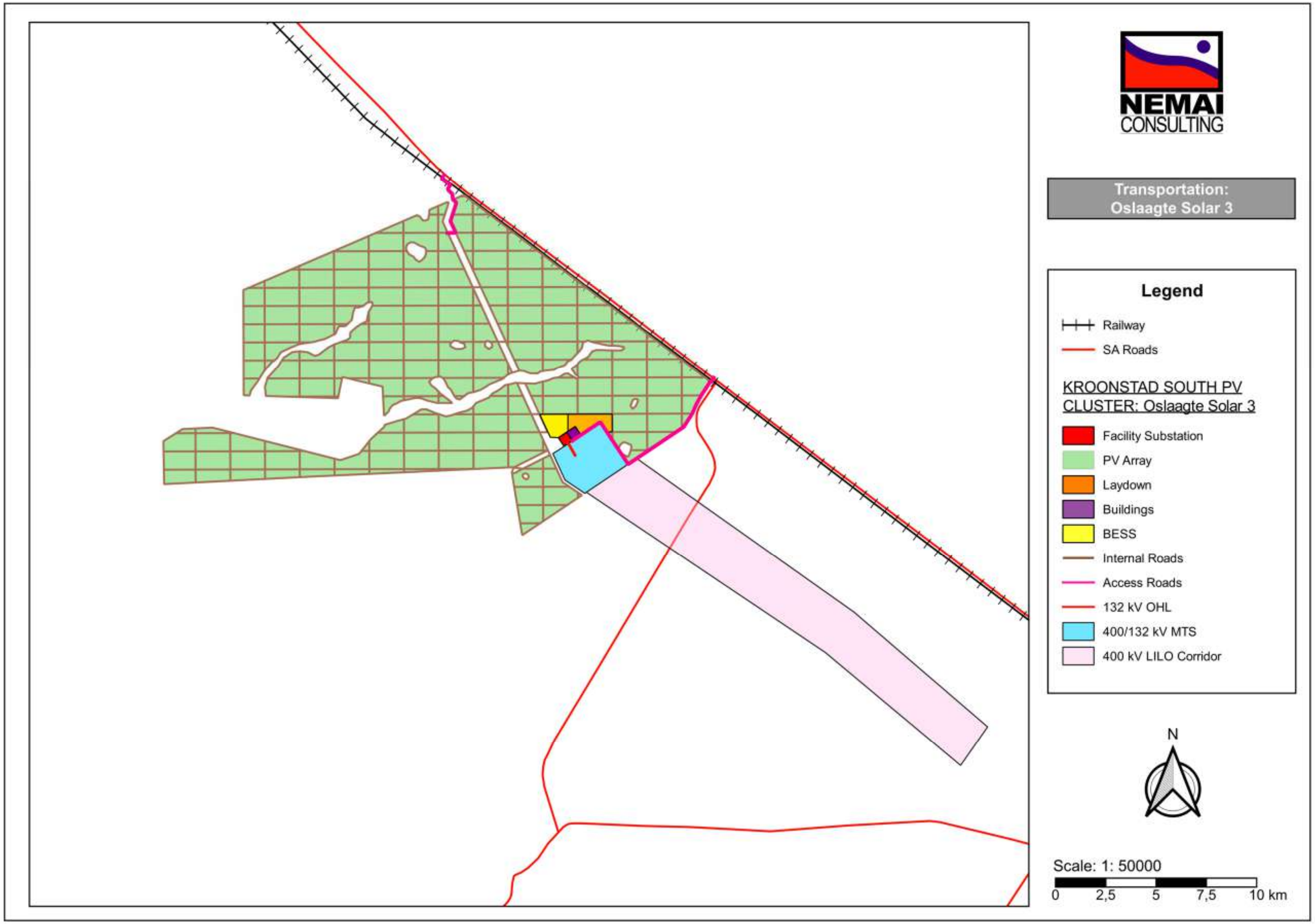


Figure 47: **Transportation network**

11.17 Health

According to the SDF (MLM, 2020), there is one district hospital, Boitumelo Hospital, provided for the entire Fezile Dabi District that is situated in Kroonstad and provides simultaneously in regional and district hospital services.

12 SUMMARY OF SPECIALIST STUDIES

12.1 Specialist Studies undertaken as part of the EIA

A crucial element of the Plan of Study for the EIA prepared during the Scoping phase was to provide the Terms of Reference for the requisite specialist studies triggered during Scoping. According to Münster (2005), a 'trigger' is "*a particular characteristic of either the receiving environment or the proposed project which indicates that there is likely to be an issue and/or potentially significant impact associated with that proposed development that may require specialist input*".

The requisite specialist studies 'triggered' by the findings of the Scoping process, aimed at addressing the key issues and compliance with legal obligations, include the following:

1. Wetland Delineation and Risk Assessment;
2. Terrestrial Biodiversity Compliance Statement, including a Sungazer Lizard site report;
3. Avifaunal Assessment;
4. Agricultural Impact Compliance Statement;
5. Phase 1 Cultural Heritage Impact Assessment;
6. Paleontological Impact Assessment;
7. Visual Impact Assessment;
8. Traffic Impact Assessment; and
9. Social Impact Assessment.

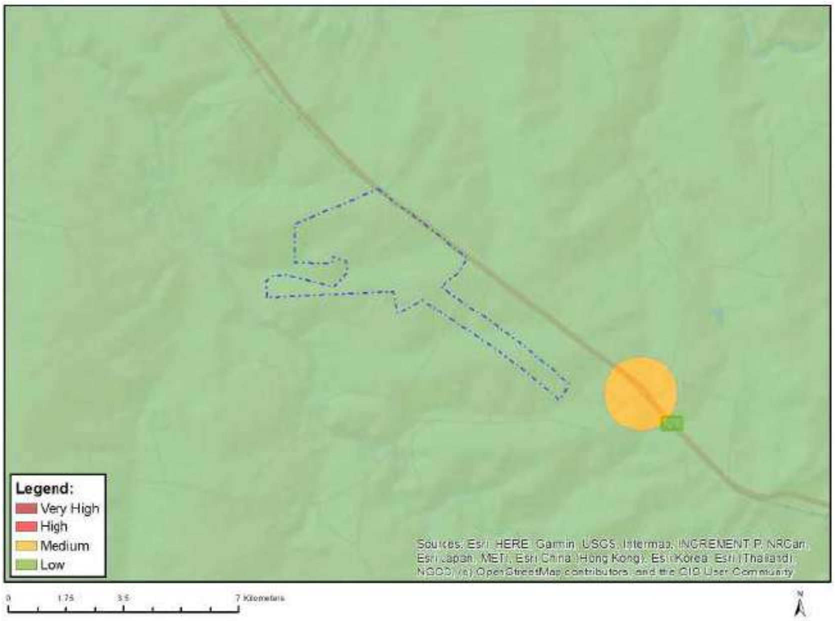
12.2 Excluded Specialist Studies identified during Environmental Screening

As mentioned in **Section 6.3** above, Screening Reports for the proposed PV Site and power line were compiled by means of the Screening Tool, which were appended to the Application Form. **Table 12** below lists the specialist studies that were identified in the Screening Report, but which were not deemed to be necessary.

Table 12: Specialist studies identified in the Screening Report that are deemed unnecessary

Specialist Study identified in Screening Report	Reason for not undertaking the Specialist Study
Civil Aviation Assessment	The proposed PV Site and powerline are located approximately 15 km from the Buitenzorg airfield south of Kroonstad. According to the findings from the Screening Tool, the PV Site has low sensitivity, and the powerline is low sensitivity in terms of the relative civil aviation theme. The Civil Aviation Authority was included in the Project notification. They will further be afforded the opportunity to review the draft EIA Report and to provide comments (See **Section 13.23** below). The low sensitivity of the site in terms of the RFI theme is confirmed.

Specialist Study identified in Screening Report	Reason for not undertaking the Specialist Study
	 Civil Aviation Theme Sensitivity PV site and LILO powerline
Defence Assessment	The map that was created by the Screening Tool showed that the Project Area has low sensitivity in terms of the relative defence theme. Upon interrogation of the surrounding environment, through the site visit, desktop review and satellite imagery, no evidence was found of any military or defence operations or installations. It was thus not deemed necessary to undertake this study. The low sensitivity of the site in terms of the defence theme is confirmed.  Defence Theme Sensitivity
Radio Frequency Interference (RFI) Assessment	The map that was created by the Screening Tool showed that the Project Area has a low sensitivity in terms of the relative RFI theme. The study was not undertaken given the remoteness of the proposed site. Furthermore, research (e.g. United States Federal Aviation Admiration, 2010) suggests that RFI from PV installations is low risk. PV systems equipment such as step-up transformers and electrical cables are not sources of electromagnetic

Specialist Study identified in Screening Report	Reason for not undertaking the Specialist Study
	interference because of their low frequency of operation and PV panels themselves do not emit EMI. The only component of a PV array that may be capable of emitting EMI is the inverter. Inverters, however, produce extremely low frequency EMI similar to electrical appliances and at a distance of 46 m from the inverters the EM field is at or below background levels. Standard engineering mitigations will be implemented to address RFI at the PV site, as necessary. The low sensitivity of the site in terms of the RFI theme is confirmed.  RFI Theme Sensitivity

12.3 Incorporating the Findings from Specialist Studies

The *Guideline for the review of specialist input in EIA processes* (Keatimilwe & Ashton, 2005) was used for including the findings of the specialist studies into the EIA Report. Key considerations included the following:

- Ensuring that the specialists have adequately addressed I&APs' issues and specific requirements prescribed by environmental authorities;
- Ensuring that the specialists' input is relevant, appropriate and unambiguous; and
- Verifying that information regarding the receiving ecological, social and economic environment has been accurately reflected and considered.

The information obtained from the respective specialist studies was incorporated into the EIA Report in the following manner:

- The assumptions and limitations identified in each study were included in **Section 7** above;
- The information was used to complete the description of the receiving environment (**Section 11**) in a more detailed and site-specific manner;
- A summary of each specialist study is contained in the sub-sections to follow (**Sections 12.3 – 12.12** below), focusing on the approach to each study, key findings and conclusions drawn;

- The specialists' impacts assessments, and the identified mitigation measures, were included in the overall project impact assessment contained in **Section 13** below;
- The evaluations performed by the specialists on the alternatives were included in **Section 14** below to identify the most favourable option;
- Specialist input was obtained to address comments made by I&APs that related to specific environmental features pertaining to each specialist discipline; and
- Salient recommendations made by the specialists were taken forward to the final EIA Conclusions in **Section 16** below.

Refer to **Appendix E** for declarations from the respective specialists.

12.4 Wetland Delineation and Risk Assessment

A summary of the Wetland Delineation and Risk Assessment (van Rooyen, 2023) follows. The specialist report is contained in **Appendix E1**.

12.4.1 Details of the Specialist

The details of the specialists that undertook the Wetland Delineation and Risk Assessment follow.

Organisation:	Nitai Consulting
Name:	Divan van Rooyen/Antoinette Bootsma
Qualifications:	M.Sc. in Environmental Sciences
No. of years' experience:	1 year/18years
Affiliation (if applicable):	SACNASP (Candidate Natural Scientist – Environmental Science (Registration No. 151272)); IAIA (Membership No. 7063); South African Aquatic Scientists (SASAqS – Membership No. SASAQS0101/ SACNASP Registration No. 400222-09.

12.4.2 Objectives of the Study

The objectives of this study included the following:

- To identify, delineate and classify wetlands within the Project Area;
- To assess the Present Ecological State (PES) of the identified wetlands;
- To assess the Wetland Ecosystem Services provided by the identified wetlands;
- To assess the Ecological Importance and Sensitivity (EIS) of the identified wetlands;
- To undertake a risk assessment for the proposed development; and
- To provide mitigation measures and recommendations for the identified risks.

12.4.3 Methodology

The assessment included the following tasks (amongst others):

- Identifying and mapping of wetlands. The National Wetland Classification Systems (NWCS) developed by SANBI was considered for this study.
- Delineating wetland areas in accordance with the guideline: A practical field procedure for identification and delineation of wetlands and riparian areas (DWAF, 2005).
- Determining the PES;
- Determining the EIS;
- Determining buffer requirements; and
- Undertaking a risk-based impact assessment.

12.4.4 Key Findings of the Study

A description of the surface water features in the Project Area is contained in **Section 11.7** above. Key findings from the study follow.

12.4.4.1 Watercourses

Several different HGM units were identified during the site visits to the study area. As such, the PV site encroaches into small sections of a CVB wetland in the eastern portion of the PV site. Furthermore, a Dep wetland is located in the southern portion of the PV site. In addition, two small Dep is located outside the western portion of the PV site near an agricultural dam while a small S wetland is located below the dam. The Alternative 2 layout has incorporated the presence of these wetlands and is therefore situated outside of these wetlands.

One perennial river (Blomspruit) was identified to the west of the proposed Oslaagte Solar 3 PV facility. In addition, several small non-perennial rivers were identified and is connected to the above-mentioned Blomspruit. Also, some of these non-perennial rivers were identified to be within the PV site. General photographs of these rivers are shown in Table 7 below. As a result, a freshwater sensitivity map was generated to highlight the Low, Medium and High sensitivities associated with the proposed development. The revised layout for Oslaagte Solar 3 PV has taken into account the several non-perennial channels draining into several agricultural dams before further draining into the Blomspruit.

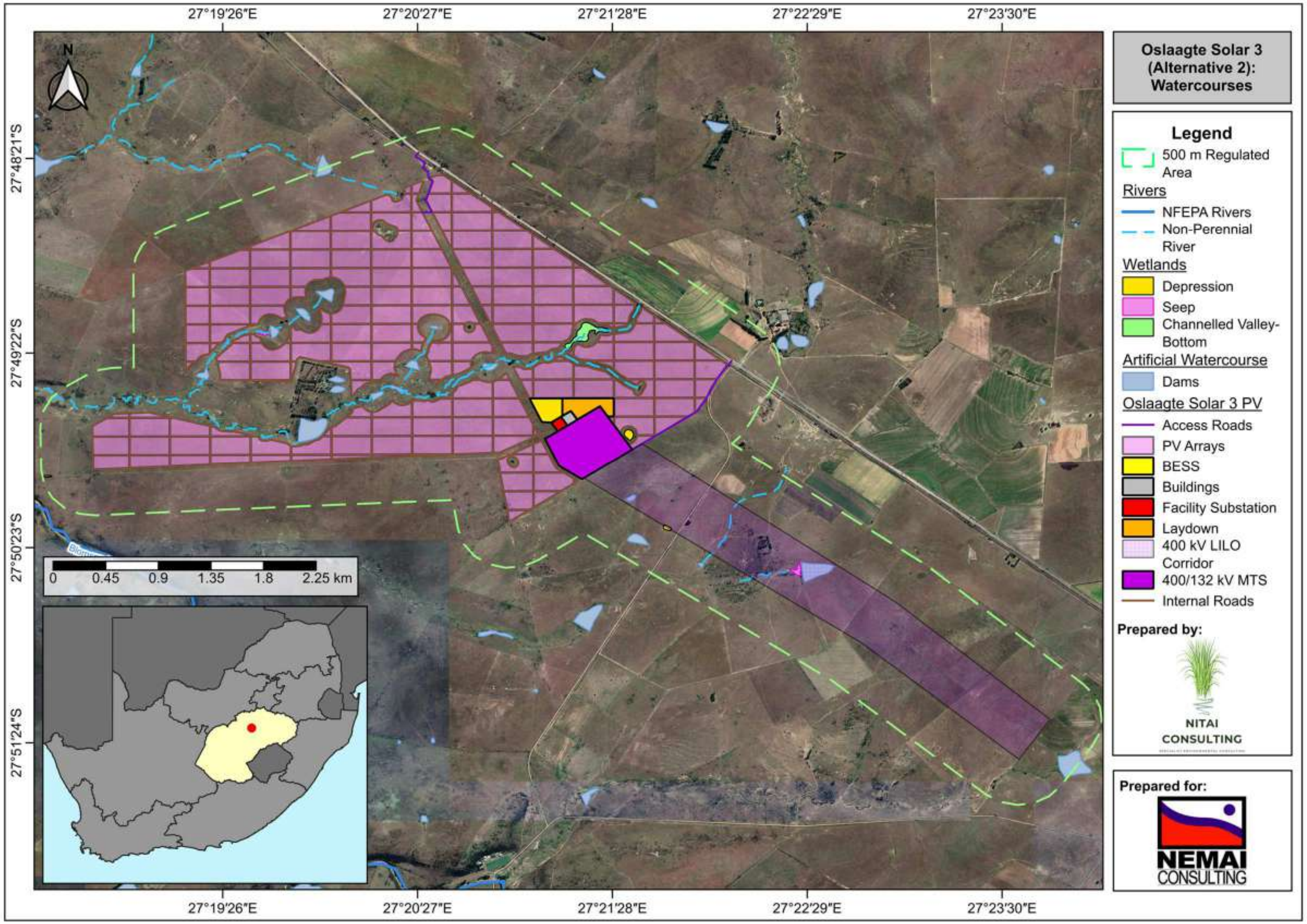


Figure 48: **Wetlands and rivers delineated within 500m of the Project Area (van Rooyen, 2023)**

12.4.4.2 Present Ecological State (PES)

The PES (Macfarlane *et al.*, 2020) has been determined for the three HGM units (Dep, S and CVB) verified on site during site visits to the study area. Present Ecological State was calculated for the Dep, S and CVB as D (Largely Modified), C (Moderately Modified) and D (Largely Modified), respectively. Water quality was not included in the PES calculations as water quality did not form part of the overall assessment (**Table 13)**.

Table 13: PES scores calculated for the three HGM units (van Rooyen, 2023)

HGM Unit	Hydrology	Geomorphology	Vegetation	Overall
Depression	D (Largely Modified) Impact Score: 5.1	C (Moderately Modified) Impact Score: 2.8	D (Largely Modified) Impact Score: 5.0	D (Largely Modified) Impact Score: 4.5
Channelled Valley-Bottom	D (Largely Modified) Impact Score: 5.8	D (Largely Modified) Impact Score: 4.9	C (Moderately Modified) Impact Score: 3.0	D (Largely Modified) Impact Score: 4.1
Seep	C (Moderately Modified) Impact Score: 2.4	C (Moderately Modified) Impact Score: 3.6	C (Moderately Modified) Impact Score: 3.0	C (Moderately Modified) Impact Score: 3.4

The PES has not been determined for the rivers and was only determined for the non-perennial riparian zone using the Riparian Vegetation Response Assessment Index (VEGRAI) (Kleynhans et al., 2007). In addition, the only intact riparian zone found on site was the riparian zone of the large non-perennial river to the east of the proposed footprint, therefore the VEGRAI was only determined for that watercourse. The VEGRAI for the non-perennial riparian zone was determined as a Category D (Largely Modified). The assessment considered the severe influences of cattle grazing. The high density of livestock in areas along the riparian zone has contributed to the change and loss of natural habitat. Therefore, the riparian zone ecosystem function has been modified due to existing disturbances.

Table 14: Riparian Vegetation Response Assessment Index score calculated for the non-perennial riparian zone (van Rooyen, 2023)

Level 3 Assessment					
Metric Group	Calculated Rating	Weighted Rating	Confidence	Rank	% Weight
Marginal	63.3	28.1	3.3	2.0	80.0
Non-marginal	40.0	22.2	3.3	1.0	100.0
	2.0				180.0
Level 3 VEGRAI (%)				**50.4**	
VEGRAI EC				**D**	
Average Confidence				3.3	

12.4.4.3 The Ecological Importance

Following the method of Rountree *et al*. (2013), the EIS was determined for the unnamed non-perennial river adjacent and to the east of the Oslaagte Solar 3 PV footprint (Table 10). The EIS for the non-perennial river was determined as 1.40 which translates to a Category C (**Moderate**). The score reflects the Ecological Importance and Sensitivity due to the riparian zone located within an ESA. In addition, the score also reflects the Hydrological/Functional Importance of the Riparian Zone in the role it plays in flood attenuation and sediment trapping for the downstream Blomspruit. The EIS determine for the CVB, D and S wetlands were C (**Moderate**), D (**Low/Marginal**), and C (**Moderate**) (**Table 15**). The EIS score for majority of the wetlands reflects the moderate importance due to the wetlands being in an ESA.

Table 15: Ecological Importance and Sensitivity of all watercourses verified on site (van Rooyen, 2023)

River	Ecological Importance and Sensitivity
Non-perennial River	**Moderate (1,40)** • Ecological Importance & Sensitivity: 2.0 • Hydrological/Functional Importance: 1.9 • Direct Human Benefits: 0.3
Channelled Valley-Bottom	**Moderate (1,85)** • Ecological Importance & Sensitivity: 2.3 • Hydrological/Functional Importance: 2.4 • Direct Human Benefits: 0.8
Depression	**Low/Marginal (0.94)** • Ecological Importance & Sensitivity: 1.4 • Hydrological/Functional Importance: 1.3 • Direct Human Benefits: 0.2
Seep	**Moderate (1,65)** • Ecological Importance & Sensitivity: 2.3 • Hydrological/Functional Importance: 2.1 • Direct Human Benefits: 0.5

12.4.4.4 Wetland Ecosystem Services

The Wetland Ecosystem Services (Kotze et al., 2020) was determined for the unnamed non-perennial river adjacent and east of the PV site (**Table 16**). The riparian zone is moderately important for food for livestock and cultivated foods since the area is being used for livestock grazing as well as game. In addition, the riparian zone is situated within an ESA that increases its importance in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. Moreover, the riparian zone is of low importance for harvestable resources and cultivated foods.

Additionally, Wetland Ecosystem Services were also determined for the wetlands on site (**Table 17**). The Dep is of Moderate importance for food for livestock while it has a low importance for sediment trapping and biodiversity maintenance. Furthermore, the S wetland is of low importance for stream regulation, flood attenuation, sediment trapping and harvestable sources. In addition, the S wetland is moderately-low important for food for livestock while moderately important for biodiversity maintenance. Finally, the CVB wetland is moderately important for flood attenuation, stream regulation, sediment trapping and biodiversity maintenance. The wetland further has moderately-low harvestable resources.

Table 16: Wetland Ecosystem Services calculated for the non-perennial river Riparian Zone (van Rooyen, 2023)

Ecosystem Services		Score	
		Non-perennial River Score	Importance
Regulating and Supporting Services	Flood attenuation	0.0	Very Low
	Stream flow regulation	0.0	Very Low
	Sediment trapping	0.3	Very Low
	Erosion control	0.4	Very Low
	Phosphate assimilation	0.1	Very Low
	Nitrate assimilation	0.0	Very Low
	Toxicant assimilation	0.0	Very Low
	Carbon storage	0.2	Very Low
	Biodiversity maintenance	0.2	Very Low
Provisioning services	Water for human use	0.0	Very Low
	Harvestable resources	0.5	Very Low
	Food for livestock	2.2	Moderate
	Cultivated foods	1.0	Low
Cultural Services	Tourism and Recreation	0.0	Very Low
	Education and Research	0.0	Very Low
	Cultural and Spiritual	0.0	Very Low

Table 17: Wetland Ecosystem Services calculated for the three HGM units (van Rooyen, 2023)

Ecosystem Services		Score					
		Depression Score	Importance	Seep Score	Importance	Channelled Valley-Bottom	Importance
Regulating and	Flood attenuation	0.0	Very Low	1.0	Low	2.2	Moderate
	Stream flow regulation	0.0	Very Low	1.2	Low	1.7	Moderate
	Sediment trapping	0.8	Low	0.9	Low	1.2	Low

	Erosion control	0.6	Very Low	0.7	Very Low	1.1	Low
	Phosphate assimilation	0.5	Very Low	0.3	Very Low	0.6	Very Low
	Nitrate assimilation	0.3	Very Low	0.4	Very Low	0.4	Very Low
	Toxicant assimilation	0.1	Very Low	0.1	Very Low	0.2	Very Low
	Carbon storage	0.0	Very Low	0.0	Very Low	0.0	Very Low
	Biodiversity maintenance	1.0	Low	2.2	Moderate	2.0	Moderate
Provisioning services	Water for human use	0.0	Very Low	0.0	Very Low	0.2	Very Low
	Harvestable resources	0.5	Very Low	0.8	Low	1.5	Moderately-Low
	Food for livestock	2.5	Moderately-High	1.6	Moderately-Low	0.9	Low
	Cultivated foods	0.0	Very Low	0.0	Very Low	0.0	Very Low
Cultural Services	Tourism and Recreation	0.0	Very Low	0.0	Very Low	0.0	Very Low
	Education and Research	0.0	Very Low	0.0	Very Low	0.0	Very Low
	Cultural and Spiritual	0.0	Very Low	0.0	Very Low	0.0	Very Low

Table 18: Importance Category ratings (van Rooyen, 2023)

Importance Category		Description
Very Low	0-0.79	The importance of services supplied is very low relative to that supplied by other wetlands.
Low	0.8 – 1.29	The importance of services supplied is low relative to that supplied by other wetlands.
Moderately-Low	1.3 – 1.69	The importance of services supplied is moderately-low relative to that supplied by other wetlands.
Moderate	1.7 – 2.29	The importance of services supplied is moderate relative to that supplied by other wetlands.
Moderately-High	2.3 – 2.69	The importance of services supplied is moderately-high relative to that supplied by other wetlands.
High	2.7 – 3.19	The importance of services supplied is high relative to that supplied by other wetlands.
Very High	3.2 - 4.0	The importance of services supplied is very high relative to that supplied by other wetlands.

12.4.4.5 Sensitivity and Buffer Analysis

The DFFE Screening Tool Report has identified that Aquatic Biodiversity Theme for the study area is Low sensitivity for the PV site (**Figure 49**). The very high sensitivity south of the PV site highlights the Blomspruit.

Figure 49: Aquatic Biodiversity Sensitivity Theme from the Department of Forestry, Fisheries & the Environment Screening Tool

Ground truthing the Alternative 1 layout with site visits during Fall (11 – 13 April 2023), the study area could be classified as Medium sensitivity due to the PV site encroaching into a few non-perennial rivers and one wetland (CVB). In addition, majority of the Alternative 1 layout was classified as Low sensitivity whereas the non-perennial rivers, wetlands and its associated buffer zones was classified as High and Medium sensitivity, respectively.

As a result, the PV site layout has been revised and the Alternative 2 layout (preferred layout) is outside of these non-perennial rivers, wetlands as well as their associated buffer zones (discussed below) (**Figure 50**). Therefore, the Alternative 2 layout has an overall Low sensitivity to freshwater features. Importantly, based on these sensitivity classifications, the Preferred Alternative for the proposed development is Alternative 2.

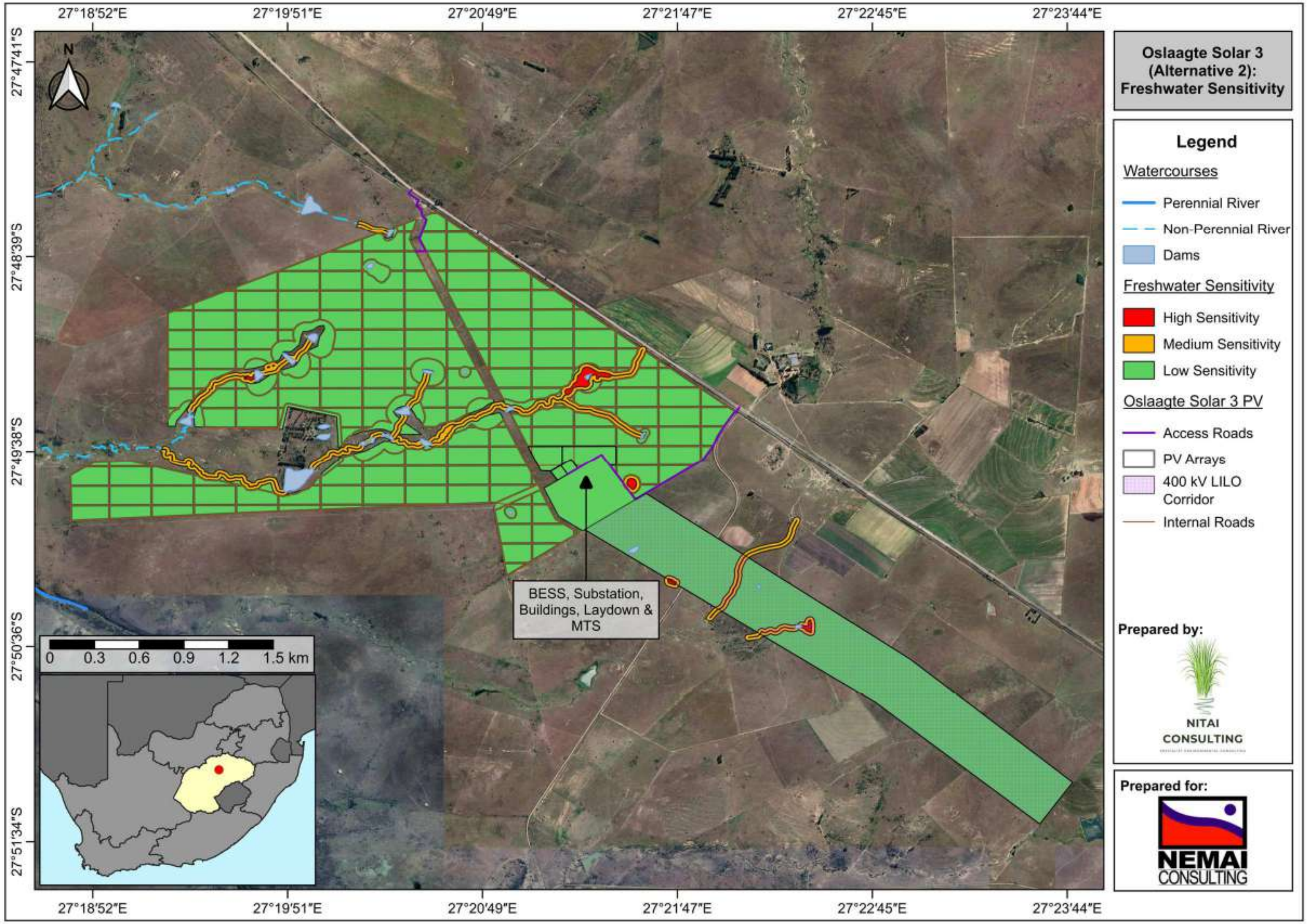


Figure 50: **Wetland sensitivity map (van Rooyen, 2023) (revised layout 2 with minimised encroachment into watercourses)**

Buffer zones for all non-perennial watercourses (rivers) were determined based on the current condition of these watercourses. The buffer zones determined for the rivers and drainage lines were based on the Macfarlane and Bredin (2017) guidelines. As such, the minimum buffer zones were determined as 32 m.

Between the two alternatives for Oslaagte Solar 3 PV Facility, Alternative 1 is encroaching the 32 m buffer zones of the non-perennial rivers as well as the buffer zone of the CVB wetland. Also, the layout not only encroaches into the buffer zones, but the non-perennial rivers and CVB wetland as well. Alternative 2 has made provision for the non-perennial rivers, wetlands and its associated 32 m buffer zones and therefore avoids these freshwater features.

12.4.5 Impact Assessment

Refer to **Section 13.12.2** below for the results from the impact assessment from this study.

12.4.6 Conclusions

The proposed Oslaagte Solar 3 PV facility is situated in the Moqhaka Local Municipality, near Kroonstad, Free State Province, South Africa. According to the spatial data, there are several non-perennial rivers flowing either through the PV site or adjacent the boundary of the PV site. Furthermore, the study area encroaches into majority of these non-perennial rivers. In addition, several agricultural dams are located within and near the study area. One wetland (Channelled Valley-Bottom) has been identified to be within the Alternative 1 layout. Moreover, the Alternative 1 layout encroaches into small sections of this wetland. Additionally, several other wetlands (Seeps and Depressions) were identified to be in close proximity (within 100 m) to the PV site as well as the grid connection. These findings were verified based on wetland soil (red-yellow mottling) characteristics and vegetation species.

Due to these freshwater sensitivities and the 32 m buffer zone around these features, the proponent has revised the layout for Oslaagte Solar 3 PV facility. Based on this revised layout, Alternative 2 has accommodated the presence of freshwater features and it subsequent 32 m buffer zone. Therefore, it is of the opinion that the proposed works will have a low impact on all associated freshwater features given that above-mentioned mitigation measures are followed and best practise pollution control. Importantly, based on the current condition of the surrounding habitat of the proposed Oslaagte Solar 3 PV facility and the mitigations provided above, the surrounding areas can be successfully rehabilitated back to its current condition.

The DFFE Screening Tool has identified the area as a Low sensitivity from an Aquatic Biodiversity Theme perspective. This was confirmed (if Alternative 2 layout is used) by the specialist. As such, the specialist recommends that the development of the PV facility with the use of Alternative 2 as layout may proceed with low impacts on the freshwater features.

12.5 Terrestrial Biodiversity Compliance Statement

A summary of the Terrestrial Biodiversity Compliance Statement (Human, 2023) follows. The specialist report is contained in **Appendix E2**.

12.5.1 Details of the Specialist

The details of the specialists that compiled the Terrestrial Biodiversity Compliance Statement follow.

Organisation:	Nitai Consulting
Name:	H.E. Human
Qualifications:	M-Tech Degree Nature Conservation
No. of years' experience:	13
Affiliation (if applicable):	SACNASP Professional Natural Scientist (Registration No.: (147031)

12.5.2 Objectives of the Study

The principal aim of this study was to adequately assess the current state of the terrestrial biodiversity in order to identify any significant and/or sensitive ecological receptors that may be impacted upon by the proposed Project.

The following tasks were completed in fulfilment of the terms of reference for this study:

- Description of the baseline receiving environment specific to the field of expertise (including the general surrounding area as well as the site-specific environment);
- Identification and description of any sensitive receptors in terms of relevant specialist disciplines (i.e., terrestrial biodiversity) that occur in the Project Area, and the manner in which these sensitive receptors may be affected by the activity;
- Identification of significant ecological, botanical and faunal features within the proposed Project Area;
- Identification of conservation significant habitats around the Project Area which might be impacted;
- Screening to identify any critical issues (potential fatal flaws) that may result in a rejection of the application;
- Provide a map to identify sensitive receptors in the Project Area, based on available maps and database information; and
- Presentation of recommend mitigation measures (outcomes to be included in the EMPr) that should be used to mitigate or minimise impacts from the activity, either on terrestrial habitat or ecology directly.

12.5.3 Methodology

The assessment included the following tasks (amongst others):

- Existing data layers were incorporated into GIS software to establish how the proposed Project might interact with any ecologically important features.
- A botanical assessment was undertaken, which encompassed an assessment of all the vegetation units and habitat types within the Project area. This focused on an ecological assessment of habitat types as well as identification of any Red Data species within known distribution of the Project area. The field work methodology included timed meanders, sensitivity analysis based on structural and species diversity, identification of protected floral species, and identification of floral red-data or red-listed species (SCC).
- A faunal assessment was undertaken, which included the following:
  - The faunal desktop assessment encompassed:
    - Compilation of expected species lists;
    - Identification of any Red Data or SCC potentially occurring in the area; and
    - Emphasis was placed on the probability of occurrence of species of provincial, national and international conservation importance.
  - The field survey component of the assessment utilised a variety of sampling techniques including, but not limited to, the following -
    - Visual observations;
    - Active hand-searches, used for species that shelter in or under particular micro-habitats;
    - Identification of tracks and signs; and
    - Utilisation of local knowledge.
  - Various field guides and texts were consulted for identification purposes in the field during the survey.

A field survey conducted to ground truth the floral, faunal, and habitat features of the project area. Sampling took place the 17th and 18th of April 2023.

12.5.4 Key Findings of the Study

A description of the terrestrial ecological features in the Project Area is contained in **Section 11.8** above. Key findings from the study follow.

12.5.4.1 Habitat Survey and Site Ecological Importance

The project area was found in a heavily modified condition, mainly attributed to the agricultural practices and its impacts associated, resulting in the area being largely disturbed in some way. Grazing practices, old lands and piospheres have degraded the veld severely. These aspects further limit the functional capacity of the project area. Much of the development footprint is located within degraded areas or along roads or transformed areas and their associated servitudes, which are considered as low sensitivity. Species marked in blue are alien species but not classified as invasive. Species marked in green are alien invasive according to Nemba. Species marked in red are protected in Free State province. A total of 76 tree, shrub, herbaceous and graminoid plant species were recorded in the project area during the field assessment. The three species protected provincially are of least concern according to the Red List of Plants and the IUCN database. These species indicate disturbance in ecosystems and are commonly found throughout the country.

Mammal activity was low, due to the extent of disturbance in general with cattle grazing the area, as well as the poor habitat condition. The species present are most likely not resident due to the modified state of the area. No SCC were observed during the field survey.

The main habitat types identified across the project area were initially identified and pre-delineated largely based on aerial satellite imagery. These habitat types were then refined based on the field coverage and data collected during the survey.

The degraded habitat has been modified from its natural state, and it represents habitat that has been historically impacted, and has not recovered. This habitat is largely limited to areas that have been impacted through effects from agricultural grazing practices and associated impacts, roads, and land use, as well as mismanagement and inadequate rehabilitation procedures. These habitats are not entirely transformed, but exist in a constant degraded state, as they cannot recover to a more natural state, due to the ongoing disturbances and impacts received.

Transformed habitat was present in the form of the existing roads, existing infrastructure, or any other areas devoid of vegetation, artificially. Due to the transformed nature of this habitat, it is regarded as having a low sensitivity.

The three delineated habitat types (**Figure 51**) have each been allocated a sensitivity category, or SEI, and this breakdown is presented in **Table 19** below. To identify and spatially present sensitive features in terms of the relevant specialist discipline, the sensitivities of each of the habitat types delineated within the project area are mapped in **Figure 60.**

Table 19: Site Ecological Importance assessment summary of the habitat types delineated within the project area (Human, 2023)

Habitat Type	Conservation Importance	Functional Integrity	Biodiversity importance	Receptor resilience	Site Ecological Importance
Transformed	Low (No confirmed or highly likely populations of SCC).	Medium (Mostly minor current negative ecological impacts with some major impacts).	Low	Medium (Will recover slowly (~ more than 10 years) to restore > 75% of the original species	Low

				composition and functionality of the receptor functionality)	
Degraded Grassland	Low (No confirmed or highly likely populations of SCC).	Medium (Mostly minor current negative ecological impacts with some major impacts).	Low	Medium (Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality)	Low

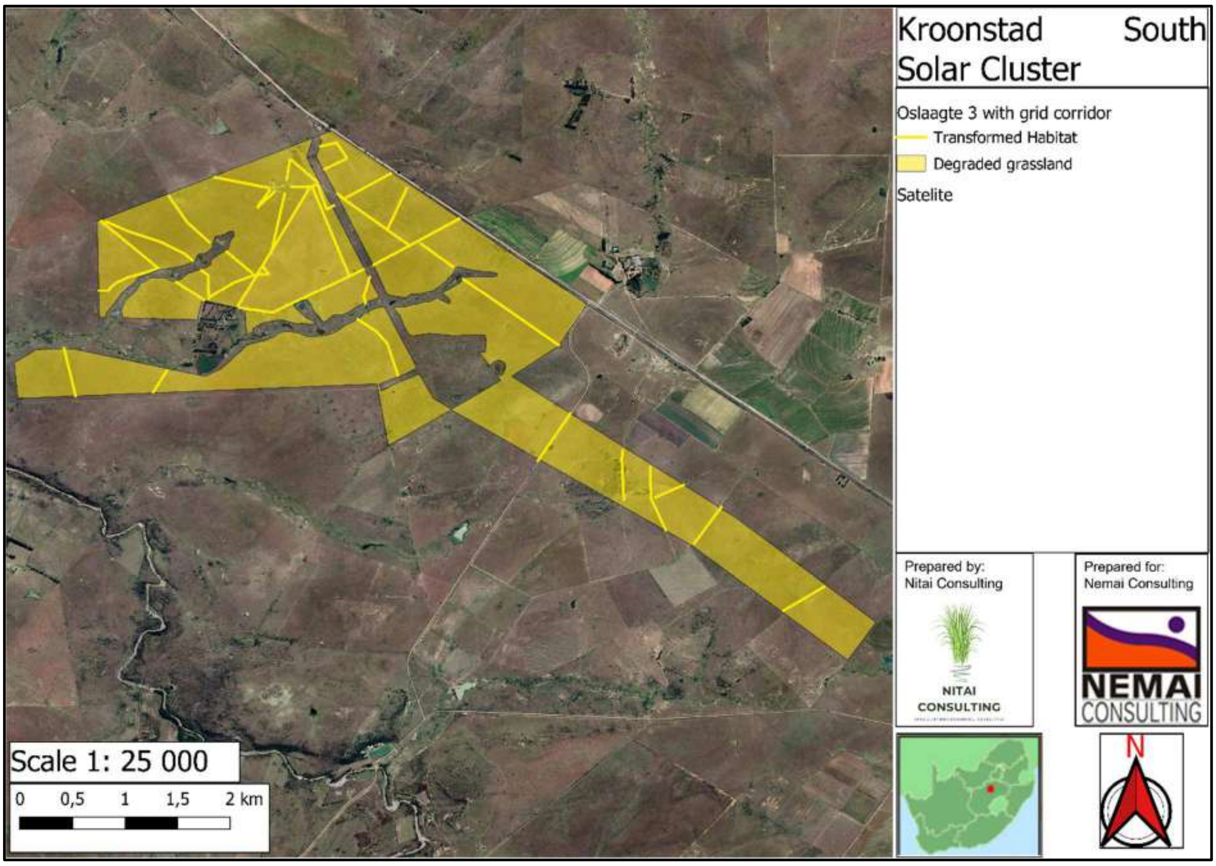
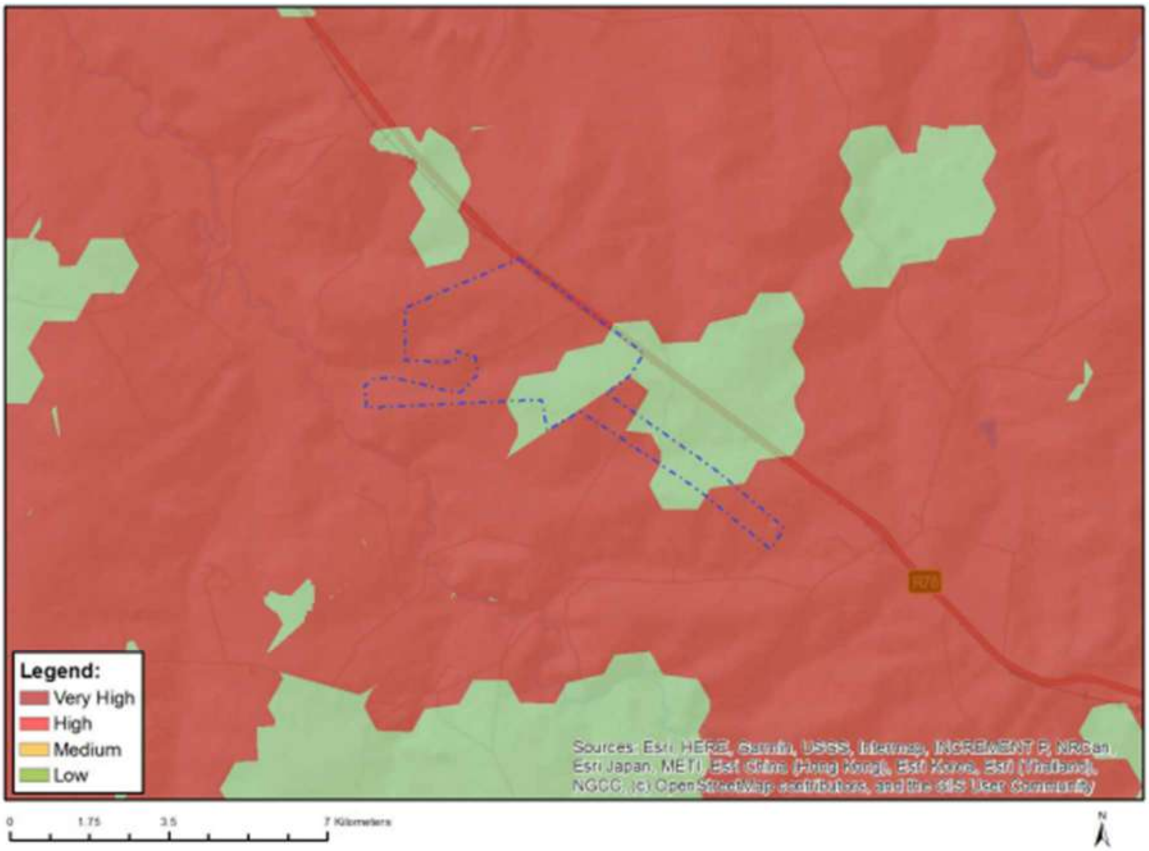


Figure 51: Delineated habitats (Human, 2023)

The terrestrial biodiversity theme sensitivity as indicated in the screening report (compiled by the National Web based Environmental Screening Tool) was derived to be ‘Very High’ due to the presence of an ESA 1, being part of the Protected Areas expansion Strategy as well as being in close proximity to Serendipidie Nature reserve (see **Figure 52** below). The completion of the terrestrial desktop and field studies disputes the ‘Very High’ sensitivity presented by the screening report. As discussed, the project area is largely modified, it is not under negotiation for the Priority focus Area and there is already an existing OHL running through the Nature reserve and as such is assigned a sensitivity rating of ‘Low’.

The screening report classified the animal theme sensitivity as ‘medium’. Following the field survey findings, the animal species themes may be re-classified as having ‘low’ sensitivity. As discussed, this is since there is limited suitable habitat available to support the regular occurrence of any faunal SCC within the project area.

The Screening toll classified the plant theme sensitivity as ‘low’. During the field surveys it was confirmed that the plant sensitivity is indeed ‘low’.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Very High	Ecological support area 1
Very High	Protected Areas Expansion Strategy
Very High	Serendipidie Private Nature Reserve

Figure 52: **Biodiversity sensitivity according to Screening Tool (Jacobs & Burger, 2022)**

12.5.4.2 Giant Girdled Lizard Walk-through Findings

As part of the scoping process of the proposed developments the Endangered Wildlife Trust (EWT) indicated that certain areas fall within the distribution of the Giant Girdled Lizard (*Smaug giganteus*) and requested a walk-through survey for presence or absence by a specialist specifically the farms Leeuspruit and Oslaagte in the proposed Kroonstad South development. These surveys were conducted on the 27th and 28th April 2023.

Smaug giganteus (formerly *Cordylus giganteus*) (**Figure 53**) is the largest of the girdled lizard family and inhabits parts of the grasslands of Northwest Province, northern Free State and Mpumalanga (Bates et al. 2014). They are a large diurnal terrestrial lizard and are endemic to South Africa (Van Wyk 2000). They generally self-excavate burrows and occur in small groups (Gibbons 2014) at approximately four burrows per hectare (Jacobsen et al. 1990) in Mpumalanga and four to six burrows per hectare in the Free State (Stolz & Blom 1981). Jacobsen et al. (1990) found density to be relatively low at six and a half individuals per hectare whilst Van Wyk's (1992) seminal study in the northeastern Free State found between nine and 11 individuals per hectare. Females give birth to one or two live young after a long gestation period. They feed almost exclusively on invertebrates and are themselves preyed upon by various meso carnivores.

Figure 53: **Smaug giganteus photographed east of the Project (Reilly, 2023)**

They are classified as vulnerable in the IUCN red list (Bates et al. 2014) and are under threat from the muthi trade, open cast mining and agriculture. Their threat status is directly aligned to the conservation status of South Africa's grasslands and habitat fragmentation is probably the single greatest factor in isolating populations that cannot disperse and may ultimately sink below effective population size and ultimately disappear.

Sensitivity is low and displayed in **Figure 54** and covers the properties Oslaagte 2564, Welbedacht 1913, Zonderweg 1699, Fraaiuitzicht 576, Damspruit 1584 and Klein Geluk 2088.

Current impacts include planted pastures and crop fields. Many historical grassland areas have differential anthropogenic histories of fire and overgrazing with some showing woody encroachment. No active or inactive burrows were found in the field survey and this development is likely to have minor impact on any girdled lizards that may be present.

Development of this proposed PV site would not require mitigation for girdled lizards. This is since this development alternative avoids all suitable habitat and sensitive areas for girdled lizards.

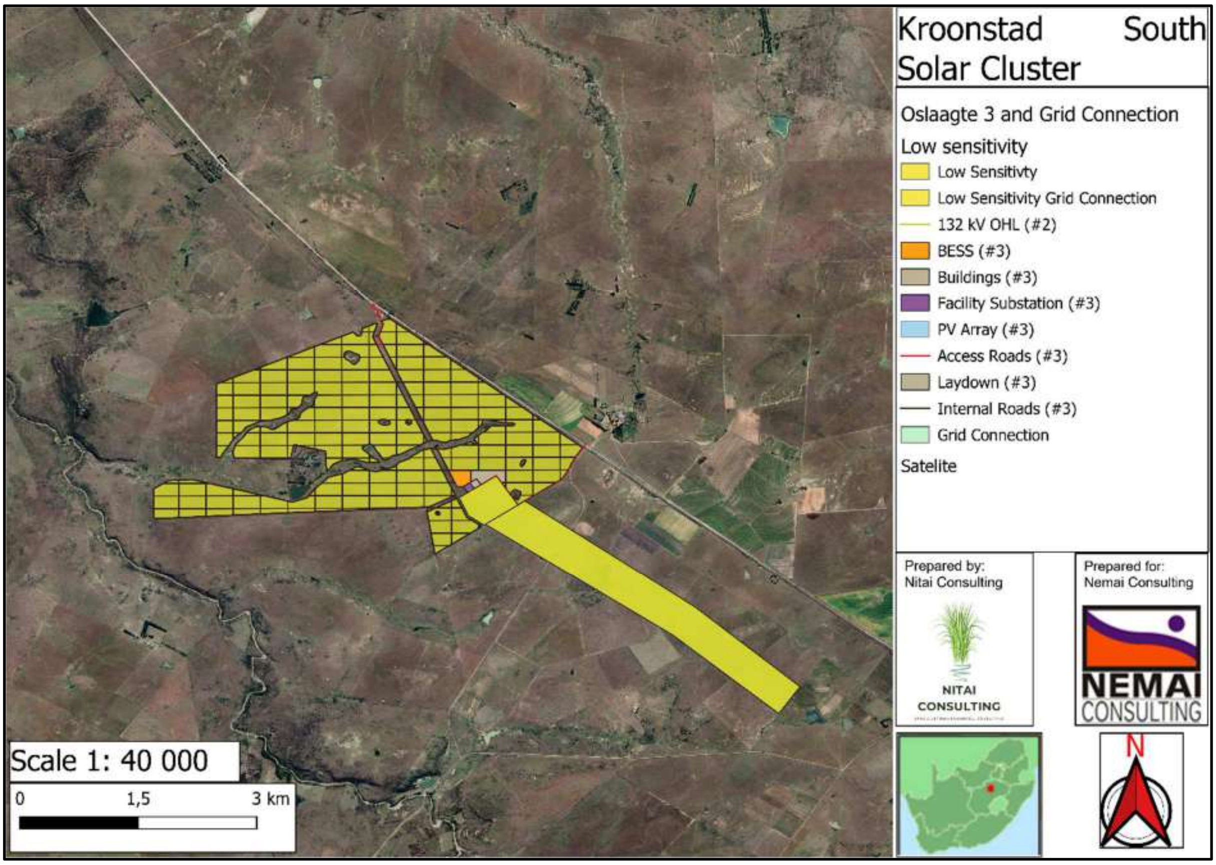


Figure 53: Sensitivity delineated for Oslaagte 3 properties (Reilly, 2023)

12.5.5 Impact Assessment

Refer to **Section 13.13** below for the results from the impact assessment from this study.

12.5.6 Conclusions

The area has experienced long-term and continuous disturbance, mostly due to the agricultural grazing practices and associated impacts. The project area is modified and as such is assigned a sensitivity rating of 'Low'.

The screening report classified both the animal and plant theme sensitivity as 'medium' and 'low'. Following the field survey findings, the plant species theme is confirmed as 'Low', but the animal theme may be re-classified as having 'Low' sensitivities. This is since there is limited suitable habitat available to support the regular occurrence of any faunal SCC within the project area.

Completion of the Terrestrial Biodiversity Assessment led to a dispute of 'Very High' classification for the terrestrial biodiversity theme sensitivity as allocated by the National Environmental Screening Tool and to a dispute of the 'medium' classification for the animal theme sensitivity as allocated by the National Environmental Screening Tool. The project area has instead been assigned a 'Low' sensitivity, because of the extent of environmental disturbance that has taken place, and the fact that limited SCC were observed and are unlikely to frequently occur within the project area.

The development of the project area is likely to result in negligible negative impacts, especially considering the extent of 'Low' sensitivity areas confirmed. Therefore, the specialist is of the opinion that the development of the project area may be favourably considered for environmental authorisation, provided that the mitigation measures and recommendations presented above be adhered to.
Consider the following guidelines when interpreting SEI in the context of any proposed development or disturbance activities:

- Very Low: Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.
- Low: Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.

12.6 Avifaunal Baseline and Impact Assessment

A summary of the Avifaunal Baseline and Impact Assessment (Husted, 2023) follows. The specialist report is contained in **Appendix E3**.

12.6.1 *Details of the Specialist*

The details of the specialists that undertook the Avifaunal Baseline and Impact Assessment follow.

Organisation:	The Biodiversity Company &	
Name:	A. Husted	L. Steyn
Qualifications:	MSc Aquatic Health	PhD Biodiversity and Conservation
Affiliation (if applicable):	SACNASP Professional Natural Scientist (Registration No.: 400213/11)	

12.6.2 *Objectives of the Study*

The objectives of this study include the following:

- Describe the baseline avifaunal community;
- Identify present or potentially occurring SCC;
- Undertake an avifaunal sensitivity assessment and prepare an avifaunal sensitivity map; and
- Assess impacts to avifauna associated with the Project and recommend suitable mitigation measures.

12.6.3 *Methodology*

The assessment included the following tasks (amongst others):

- Various sources were reviewed as part of the desktop assessment and for compiling the expected species list; and
- Fieldwork involved two, two-day field trips, the first being 19th to the 23rd of December 2022 and from the 6th to 10th of March 2023. Sampling consisted of standardized point counts as well as random diurnal incidental surveys.

Refer to Section 3 of the Specialist's report for a detailed breakdown of the methods used.

12.6.4 *Key Findings of the Study*

12.6.4.1 Habitat Types

Fine-scale habitats within the landscape are important in supporting a diverse avifauna community as they provide differing nesting, foraging and reproductive opportunities. During the field assessment three habitat units were identified from an avifauna perspective. They were Transformed-Degraded Grassland, Grassland and Water Resource (see **Figure 54** below).

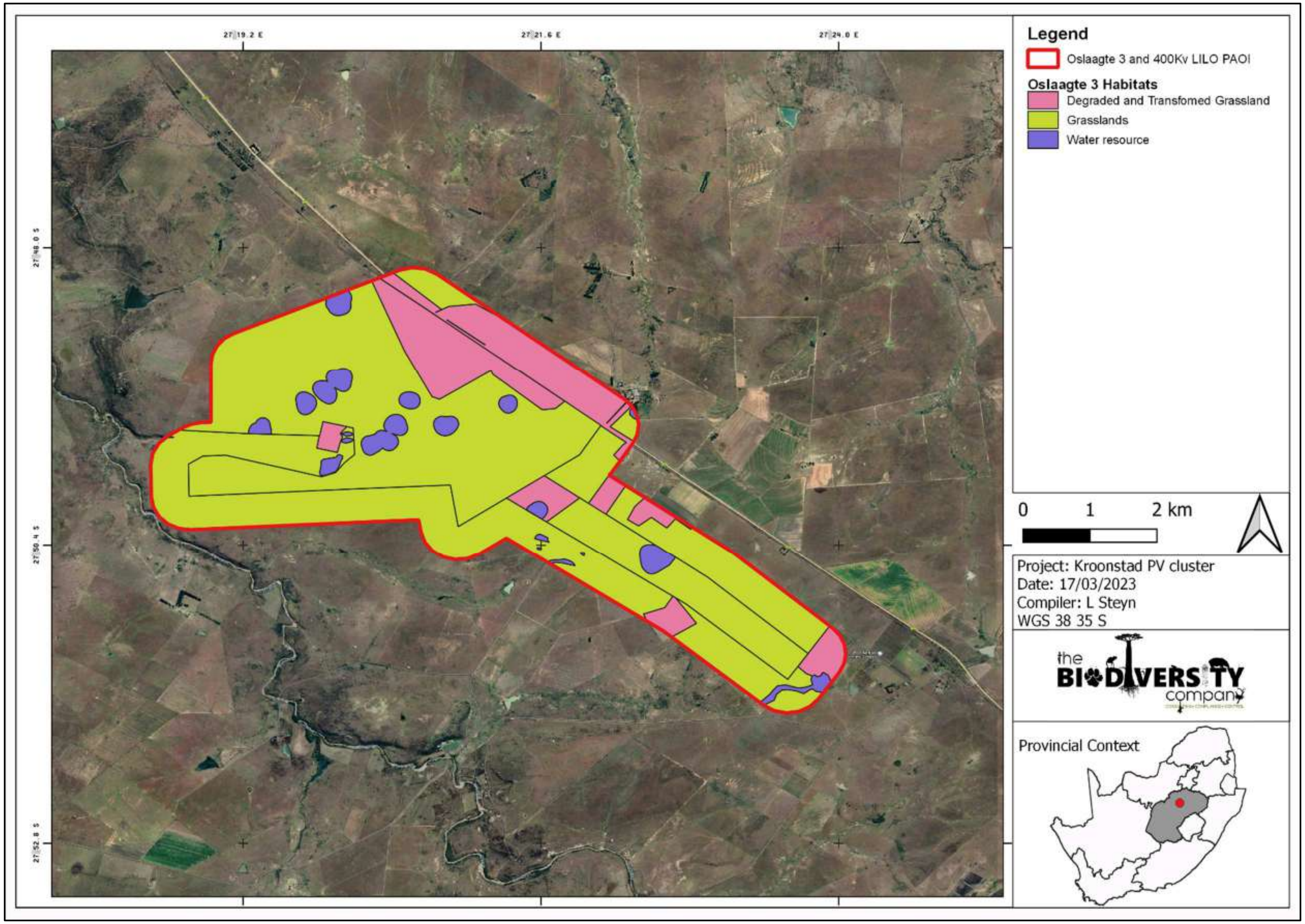


Figure 54: **Avifauna habitats identified in the Project Area (Husted, 2023)**

The majority of the PAOI comprised of grassland which is typically characterised by open grassland areas with scattered medium to large tree/shrubs clustered together. Some portions of this habitat consist of old agricultural fields that have recovered, the avifauna species compositions in these areas were the same resulting in the grouping of these habitats. Avifauna species found here included Ant-eating Chats, Northern Black Korhaan, and Zitting Cisticola.

The degraded-transformed grassland habitat was areas associated with housing, agriculture, some main roads where the edge of the road has been degraded, and areas where overgrazing has taken place. Some portions of this habitat type is still semi natural while others have been completely transformed. Avifauna species that were found here included Pied Crow, Cape Turtle Dove and Helmeted Guineafowl.

The water resources found in the PAOI consisted of wetlands, rivers, farm dams and pans. The habitat adjacent to these features were incorporated into this habitat classification as the avifauna species compositions here differed from that of the adjacent grasslands. Avifauna species found here included Yellow-billed Ducks, White-faced Whistling Ducks, Grey Heron and Little Grebe.

12.6.4.2 Species of Conservation Concern

During the first assessment performed in the spring (19th to the 23rd of December 2022) 93 species were recorded during the point counts and 17 during the incidental counts. Some species were observed both as incidental records and during the point counts. The total number of individual species accounts for approximately 33% of the total number of expected species.

Two SCC was recorded during the survey period i.e., *Eupodotis caerulescens* (Blue Korhaan) and *Sagittarius serpentarius* (Secretarybird) observed.

During the second assessment performed in the summer (6th to 10th of March 2023) 109 species were recorded during the point counts and 34 during the incidental counts.

Black-winged Pratincole (*Glareola nordmanni*) were observed during the second survey. These birds were observed on three occasions and 170 birds were observed.

Table 20: Summary of the avifauna species of conservation concern recorded within the proposed PAOI during the field survey (Husted, 2023)

Common Name	Scientific Name	Conservation Status (Regional, Global)	Relative abundance	Frequency (%)
Blue Korhaan	*Eupodotis caerulescens*	LC, NT	0,001	1,493
Secretarybird	*Sagittarius serpentarius*	VU, EN	0,001	1,493
Black-winged Pratincole	*Glareola nordmanni*	NT, NT	0,061	2,985

Key: Status: VU = Vulnerable; EN = Endangered; LC = Least Concern; NT = Near Threatened.

'Priority Species' are those avifauna that are particularly susceptible to energy developments, and although these priority species were developed for Wind Energy developments (Ralston Paton et al, 2017), the type of impact is congruent with Solar Energy Facilities (SEFs), i.e., collision, electrocution, and habitat loss. Even though the panels may not pose an extensive collision risk for larger avifauna species, power lines associated with the infrastructure, guidelines (anchor lines) and connection lines do pose a risk. The fence could also pose a collision risk for various species. Fifteen of the species observed during the first survey within the PAOI are regarded as priority species (**Table 21**), while 18 of the species observed within the PAOI during the second survey are regarded as priority species (**Table 22**).

Table 21: Summary of Priority Species recorded within and around the proposed PAOI – First Survey (Husted, 2023)

Common Name	Scientific Name	Collisions	Electrocutions	Habitats Loss
Black-headed Heron	*Ardea melanocephala*	x	x	
Black-winged Kite	*Elanus caeruleus*		x	
Blue Korhaan	*Eupodotis caerulescens*	x		x
Common Ostrich	*Struthio camelus*			x
Egyptian Goose	*Alopochen aegyptiaca*	x		
Greater Kestrel	*Falco rupicoloides*		x	
Grey Heron	*Ardea cinerea*	x	x	
Hamerkop	*Scopus umbretta*	x		
Northern Black Korhaan	*Afrotis afraoides*	x		x
Purple Heron	*Ardea purpurea*	x	x	
Red-billed Teal	*Anas erythrorhyncha*	x		
Secretarybird	*Sagittarius serpentarius*	x		
Spur-winged Goose	*Plectropterus gambensis*	x		
White-faced Whistling Duck	*Dendrocygna viduata*	x		
Yellow-billed Duck	*Anas undulata*	x		

Table 22: Summary of Priority Species recorded within and around the proposed PAOI – Second Survey (Husted, 2023)

Common Name	Scientific Name	Collisions	Electrocutions	Habitats Loss
African Sacred Ibis	*Threskiornis aethiopicus*		x	
Amur Falcon	*Falco amurensis*		x	
Black Sparrowhawk	*Accipiter melanoleucus*	x	x	
Black-headed Heron	*Ardea melanocephala*	x	x	
Black-winged Kite	*Elanus caeruleus*		x	
Black-winged Pratincole	*Glareola nordmanni*			x
Common (Steppe) Buzzard	*Buteo buteo*	x	x	

Common Ostrich	*Struthio camelus*			x
Egyptian Goose	*Alopochen aegyptiaca*	x		
Glossy Ibis	*Plegadis falcinellus*		x	
Greater Kestrel	*Falco rupicoloides*		x	
Grey Heron	*Ardea cinerea*	x	x	
Hamerkop	*Scopus umbretta*	x		
Northern Black Korhaan	*Afrotis afraoides*	x		x
Pale Chanting Goshawk	*Melierax canorus*		x	
South African Shelduck	*Tadorna cana*	x		
White-faced Whistling Duck	*Dendrocygna viduata*	x		
Yellow-billed Duck	*Anas undulata*	x		

Nests of seven species were observed of which five are priority species. A 100 m buffer was placed around the priority species nests. If the nests are in the development footprint then these nests must be regarded as no go buffers for the duration of the breeding season (January- April), if the nests can be found just outside of the development areas then these nests and their buffers must be treated as long term (for the duration of the development) no go areas.

12.6.4.3 Sensitivity Assessment

Desktop-based Sensitivity: Screening Tool

The terrestrial biodiversity theme sensitivity as indicated by the screening tool report for the PAOI was derived to be ‘Very High’ (**Figure 55**). The classification is due to the ESA1, ESA2, NPAES, and protected area status of the PAOI.

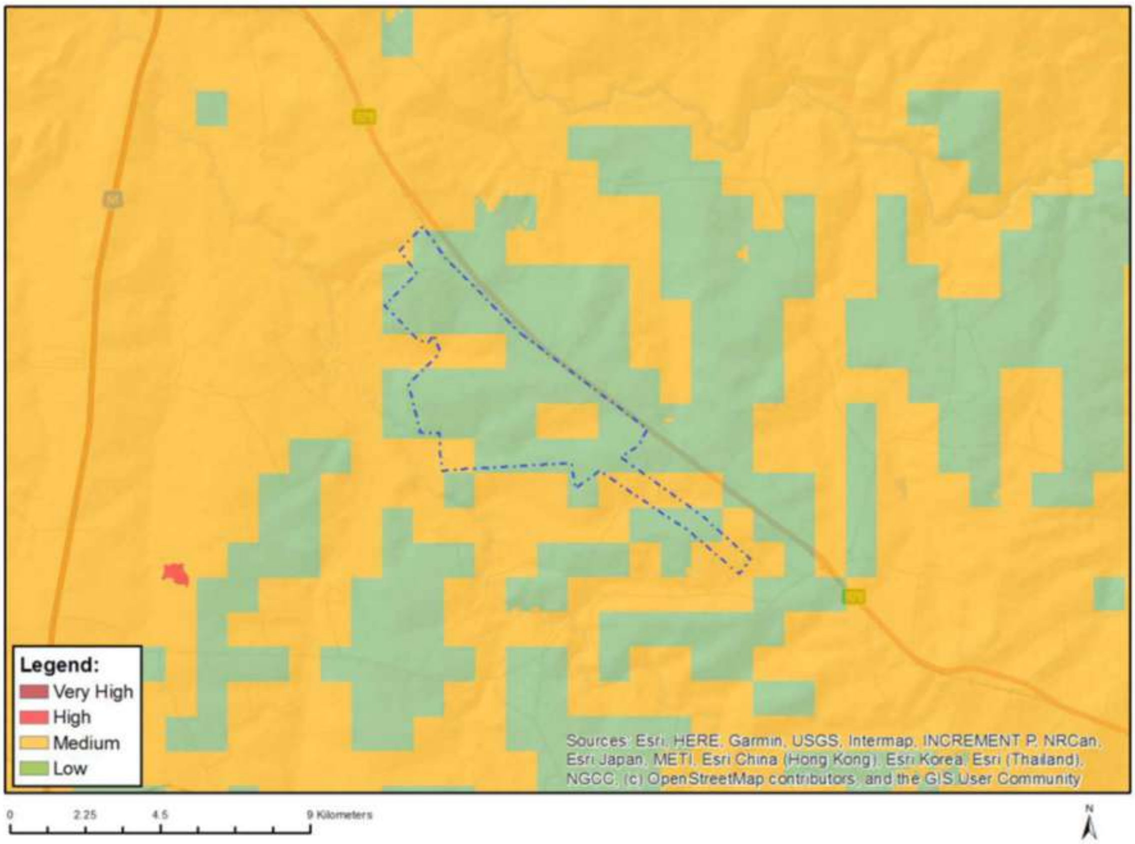
Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Very High	Ecological support area 1
Very High	Ecological support area 2
Very High	Protected Areas Expansion Strategy
Very High	Serendipidie Private Nature Reserve

Figure 55: Screening Tool Terrestrial Biodiversity Theme sensitivity map

The Animal Species Theme sensitivity, as indicated in the screening report, was derived to be ‘Medium’. The medium sensitivity was due to the likely presence of mammal and herpetofauna species.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Low	Subject to confirmation
Medium	Mammalia-Hydrictis maculicollis
Medium	Sensitive species 15

Figure 56: Screening Tool Animal Species Theme sensitivity map

Site-based Sensitivity Assessment

Based on the criteria provided in Section 3.1.5 of this report, all habitats within the assessment area of the proposed project were allocated a sensitivity or SEI category (**Table 23**). The SEI of the PAOI within an avifauna context was based on both, the field results and desktop information. The SEI of the habitat types delineated are illustrated in **Figure 63**. The water resources are where the Black-winged Pratincoles were observed, while in the grasslands the Secretary bird and Blue Korhaan were found. All the habitats also have a further potential to support additional SCCs.

Table 23: SEI Summary of habitat types delineated within field assessment area of PAOI (Husted, 2023)

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Grassland	High Confirmed or highly likely occurrence of CR, EN, VU species. Presence of Rare species	Medium Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity	**Medium**	Medium Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality	**Medium**
Transformed- Degraded Grassland	Low No confirmed or highly likely populations of SCC.	Low Almost no habitat connectivity but migrations still possible	**Low**	High Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition	**Very Low**
Water resources	. High Confirmed or highly likely occurrence of CR, EN, VU species. Presence of Rare species	Medium Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity	**Medium**	Low Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality	**High**

Table 24: Summary of the screening tool vs. specialist assigned sensitivities (Husted, 2023)

Screening Tool Theme	Screening Tool	Specialist	Tool Validated or Disputed by Specialist - Reasoning
Animal Theme	**Medium**	**Medium**	Validated – Three SCC were recorded, nests of these species were however not found they therefore utilize the area for foraging alone

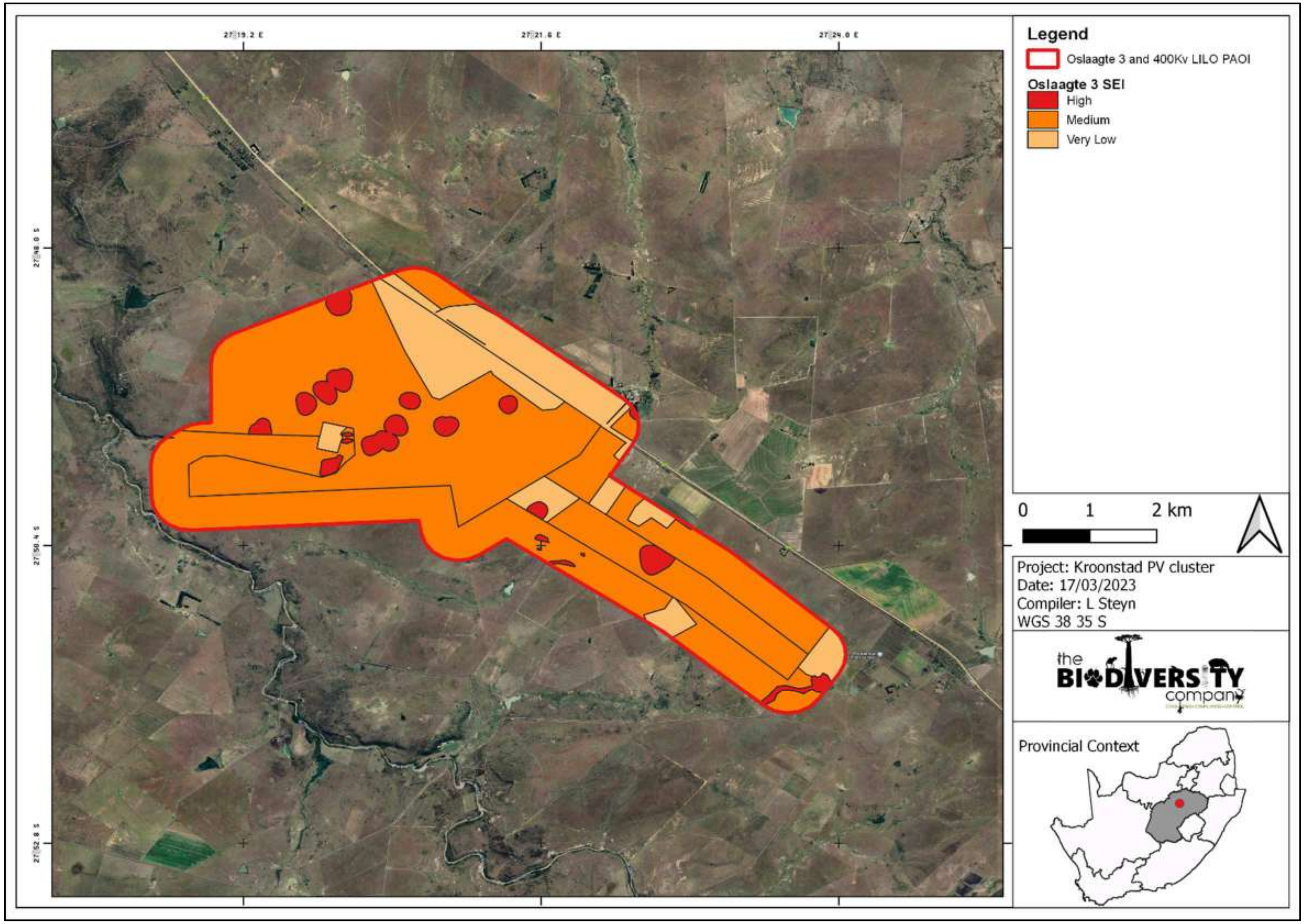


Figure 57: **Map illustrating the Site Ecological Importance of the proposed PAOI within an avifauna context (Husted, 2023)**

12.6.5 Impact Assessment

Refer to **Section 13.14** below for the results from the impact assessment from this study.

12.6.6 Conclusions

During the assessment three SCCs were observed, the Blue Korhaan (Eupodotis caerulescens; LC (Regional), NT (Global)); Secretarybird (Sagittarius serpentarius; VU, EN) and Black-winged Pratincole (Glareola nordmanni; NT, NT). The Black-winged Pratincoles were observed on three occasions and a total of 150 birds were recorded. Two Blue Korhaans and two Secretarybirds were observed. Fifteen and eighteen priority species respectively were recorded in the first and second survey. These species are at risk of either habitat loss, collisions or electrocutions. If the mitigations and recommendations are implemented these risks can be reduced to moderate. Nests of seven species were observed of which five are priority species. A 100 m buffer were placed around the priority species nests. If the nests are in the development footprint then these nests must be regarded as no go buffers for the duration of the breeding season (January- April), if the nests can be found just outside of the development areas then these nests and their buffers must be treated as long term (for the lifetime of the development) no go areas. Three habitats were delineated in the assessment namely, Grassland, Degraded-transformed grassland and Water Resources. All these habitats support a number of avifauna species with the grasslands being the most species rich. The Water Resources were given a high SEI rating based on the SCCs that are dependent on this habitat for both water and habitation. The overall impact of the project is regarded as acceptable should the mitigations and recommendations be implemented. The alternative design is the preferred layout.

The main expected impacts of the proposed PV facility and associated infrastructure will include the following:

- Habitat loss and fragmentation;
- Electrocutions; and
- Collisions.

Mitigation measures as described in this report can be implemented to reduce the significance of the risk to an acceptable residual risk level. Considering the above-mentioned information it is the opinion of the specialist that the project may be favourably considered, on condition that all the mitigation, monitoring and recommendations provided in this report and other specialist reports are implemented.

12.7 Agricultural Impact Assessment

A summary of the Agricultural Impact Assessment (Gouws, 2023) (contained in **Appendix E4**) follows.

12.7.1 *Details of the Specialist*

The details of the specialist that undertook the Agricultural Impact Assessment follow.

Organisation:	Index
Name:	Dr A. Gouws
Qualifications:	PhD Integrated Land Use Modelling
Affiliation (if applicable):	▪ Council of Natural Sciences.No:400036/93, Category: Agricultural sciences. ▪ Member of the Soil Science Society of South Africa

12.7.2 *Objectives of the Study*

The objectives of the Agricultural Impact Assessment include the following:

- Check the agricultural sensitivity of the overall site;
- Assess agricultural impacts of the proposed layout (development footprint);
- Assist with responding to any study-related comments that may be raised during the environmental assessment;
- Identify the preferred alternative in terms of the two power line route options; and
- Adhere to the Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Section 24(5) (a) and (h) and 44 of NEMA ("the Protocols") promulgated in GN No. 320 of 20 March 2020.

12.7.3 *Methodology*

The results of this study followed a site visit on 25 April 2023. Satellite images were used as backdrop and the present land uses digitised. A number of soil profiles were assessed by using a soil augur or soil probe.

Vegetation was simultaneously logged to determine veld condition. Grazing capacity was determined based on information from the Department of Agriculture, Land reform and Rural Development, (DALRRD) and then adapted to present veld conditions. Capability classification is calculated according to the guidelines published on the AGIS website.

Climate data was obtained from SA Weather and other on-line sources available on the internet.

12.7.4 *Key Findings of the Study*

12.7.4.1 Land Use Capability

Land capability classes are interpretive groupings of land with similar potential and limitations or similar hazards. Land capability involves consideration of difficulties in land use owing to physical land characteristics, climate and the risks of land damage from erosion and other causes.

The classic eight-class land capability system (Klingebiel & Montgomery, 1961) was adapted for use by the South African Department of Agriculture in their Agriculture Geographic Information System (AGIS).

Table 25 indicates the dominant soils in each soil unit as well as the grading used by Montgomery et al to determine soil potential or sensitivity towards agriculture.

Table 25: Capability description according to Montgomery *et al.* (Gouws, 2023)

Soil Type	Soil description	Capability (Montgomery)	Sensitivity	Flood hazard	Erosion susceptibility	Depth restriction	Texture restriction	Drainage restriction	Restriction to cultivation
Duplx300	Escourt, Swartland dominant. Shallow highly erodible soils.	v	Low	1	5	4	2	4	3
Es/Wet	Structured soils in watercourses and their headlands.	v	Very low	1	5	4	2	5	3
Gs/R	Glenrosa soils. Shallow and moderately deep soils on semi-weathered mudstone or shale.	iv	Moderate	1	4	3	2	4	2
Gs/Sw/Oa	Glenrosa, Swartland and Oakleaf are dominant. Shallow and moderately deep soils on semi-weathered mudstone or shale. Some deep yellowish brown high potential soils are present	iv	Moderate	1	3	3	2	4	2
Oa/Cv Cv800	Oakleaf and Clovelly soils are dominant. Shallow and moderately deep soils on semi-weathered mudstone or shale. Some portions have concretions at 400 – 600mm These soils are arable but has a moderate potential for crop production.	iv	Moderate	1	3	3	2	3	2

- According to Klingebiel et al, the soil capability is Class v and lower, mainly because of soil properties.
- Using the same criteria as AGIS, the farm is Class 7 (or Class iv or v according to Montgomery et al) or poorer, which has moderate/low sensitivity.
- A small portion of land in the north eastern corner consists of deep yellowish-brown soils (classified as Clovelly). This is arable but is too small to cultivate and is, therefore, low or medium sensitivity.
- In general, the site is grazing land with little potential for cultivation.
- According to the land capability classification, the soils have medium capability (or sensitivity as related to the Sensitivity Screening Tool).

12.7.4.2 Grazing Capacity

The land in its natural state is grassland with *Themeda triandra* the dominant species. Annual *Aristida* occurs in the lower laying portions and where the soils are shallow.

The grazing capacity according to DALRRD is estimated at 5-6 ha/large livestock unit (LSU). The carrying capacity for the PV site is approximately 165 LSU.

12.7.4.3 Agricultural Sensitivity – Screening Tool

According to the Screening Tool, the site in general has high sensitivity. The survey disagrees with the screening tool. There is no cultivated land on the proposed PV site. The entire site is used for cattle farming. Using the same guidelines as in AGIS (DALRRD), the land has low/moderate arable potential. There is a small portion of land that was not recognized as highly sensitive, but it is too small to be used for commercial crop production. A map of the soil and land capability was compiled of the site (see **Figure 58** below). This grading applies to all land that was previously cultivated, regardless of the land use potential. Grazing land is indicated as medium sensitivity.

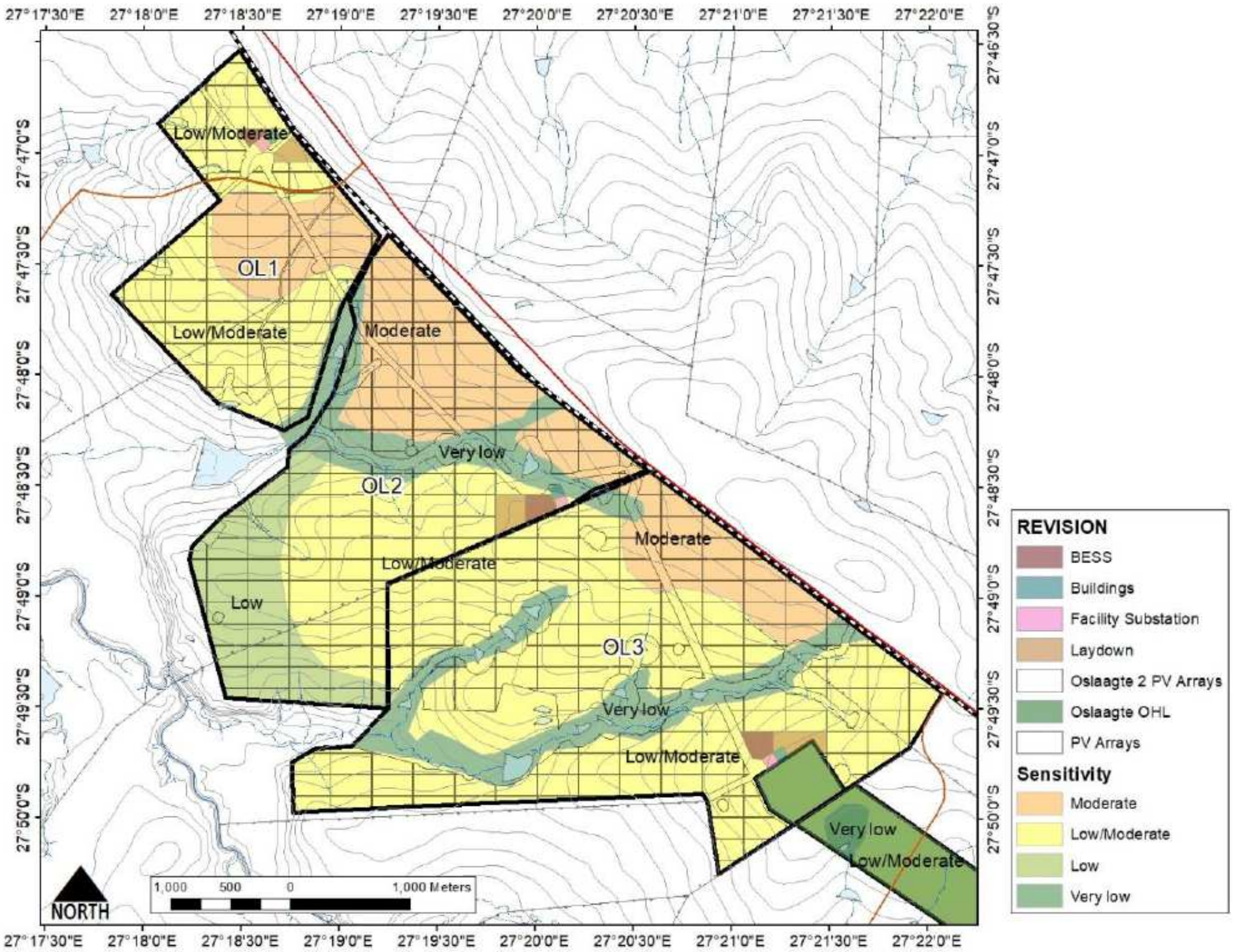


Figure 58: **Agricultural Site sensitivity compiled by Index following the site visit (refer to OL3 and grid connection) (Gouws, 2022)**

According to the land capability classification, the soils have medium capability (or sensitivity as related to the Sensitivity Screening Tool).

12.7.5 Impact Assessment

Refer to **Section 13.15** below for the results from the impact assessment from this study.

12.7.6 Conclusions

The Screening Tool incorrectly indicates that there is cultivated land.
It indicates no highly sensitive land that needs to be protected. This is correct.

The Screening Tool incorrectly indicates that there is cultivated land and also highly sensitive land that needs to be protected. According to the Protocols for agricultural impact assessment in terms of Notice No. 320 Government Gazette 43110 20 March 2020 of the proposed PV site, a compliance statement is required for inclusion into the Project Scoping Report.
The impacts of the development are as follows:

- Loss of high potential land

There will not be permanent loss of high potential land. According to the guidelines of various publications of DALRRD that deals with land capability, the land is not high potential.

- ❑ Loss of agricultural production

The impact of the project on agricultural production is low.

- ❑ Loss of Agricultural infrastructure

There is no agricultural infrastructure on the site.

- ❑ Loss of soil due to erosion

Severe erosion can be expected if the topsoil is removed. It is essential that the SWMP includes orderly runoff and that there are no or little bare surfaces that can be subject to erosion.
Mitigation is achieved by allowing grass to re-establish after construction.
Wetlands areas should not be disturbed and where eroded areas should be repaired.
Runoff from hard surfaces should be dealt with by a SWMP.

The conclusion is that there will be no permanent loss of high potential land and only limited loss of agricultural production from the cattle farming.
There were no gaps found in knowledge in the investigation. The recommendations made in this report is based on the findings during the investigation.
The PV site as well as the land on which the power lines will be placed, will take place on low/moderate potential land that has a low or moderate sensitivity related to agriculture.
It is the author's opinion that there is no reason to prevent the project from being implemented.
Further, any measures or projects that can help to relieve the country's electricity problems should be encouraged.
The alternative 2 layout is minor as far as agriculture is concerned because their placement is not on highly sensitive land; all supporting infrastructure is on low/moderate or moderately sensitive land. Because there is no difference on the two alternatives' impact on agriculture, there is no specified preferred layout alternative in terms of Agriculture.

12.8 Phase 1 Cultural Heritage Impact Assessment

A summary of the Phase 1 Cultural Heritage Impact Assessment (Kitto, 2023) (contained in **Appendix E5**) follows.

12.8.1 Details of the Specialist

The details of the specialist that undertook the Phase 1 Cultural Heritage Impact Assessment follow.

Organisation:	Nitai Consulting
Name:	Jennifer Kitto
Qualifications:	BA Archaeology and Social Anthropology; BA (Hons) Social Anthropology
No. of years' experience:	24
Affiliation (if applicable):	Association of Southern African Professional Archaeologists (ASAPA) - Technical member No.444

12.8.2 *Objectives of the Study*

The objectives of this study included the following:

- Evaluate the potential impacts of construction, operation and maintenance of the proposed development on archaeological, cultural and historical resources;
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance; and
- Provide guideline measures to manage any impacts that might occur during the proposed project's construction and implementation phases.

12.8.3 *Methodology*

The methodology employed during this study consisted of the following:

- A survey of the relevant literature was conducted with the aim of reviewing the previous research done and determining the potential of the area. In this regard, various anthropological, archaeological and historical sources were consulted;
- A survey of Heritage Impact Assessments for projects in the region by various heritage consultants was conducted with the aim of determining the heritage potential of the area;
- The Heritage Atlas Database, various SAHRA databases, the Environmental Potential Atlas, the Chief Surveyor General and the National Archives of SA were consulted. Database surveys produced a number of sites located in the larger region of the proposed development; and
- Aerial photographs, topocadastral and other maps were also studied.

12.8.4 *Key Findings of the Study*

12.8.4.1 Archaeological and Cultural Heritage Sensitivity - Screening Tool

The DFFE Environmental Screening Tool was accessed for information on the cultural-heritage sensitivity of the general region. This tool indicated that the Archaeological and Cultural Heritage Sensitivity of the general region is Low (see **Figure 59** below).

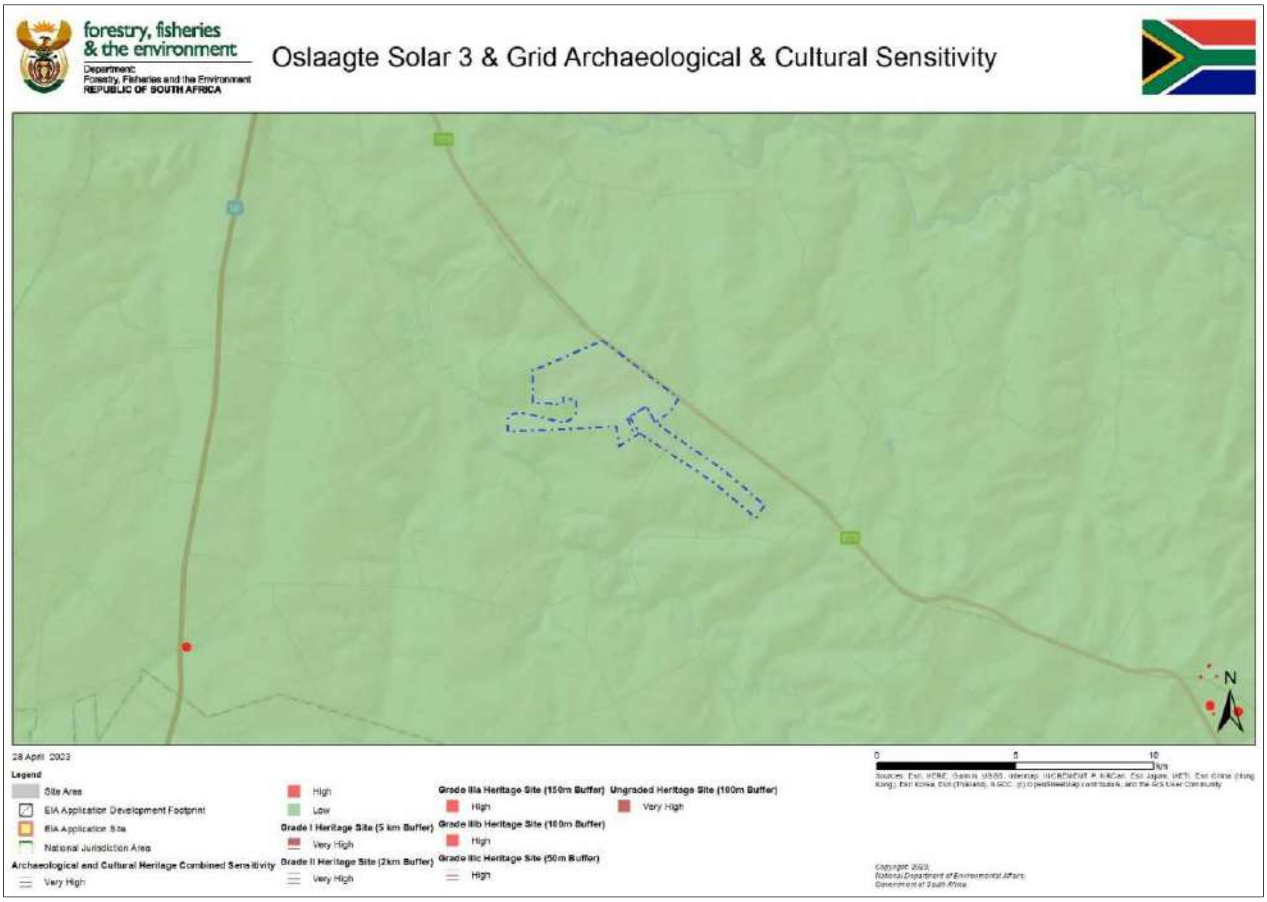


Figure 59: **Sensitivity for archaeological and cultural heritage themes in the Project Area according to Screening Tool (Kitto, 2023)**

12.8.4.2 Survey Results

The project area that will be impacted by the proposed Oslaagte Solar 3 PV project and MTS/LILO Corridor contains some areas that are currently disturbed by cattle and game farming activities and other animal activity (e.g., burrows and termite mounds).

The survey of the combined footprint for the Oslaagte Solar 3 PV project and the MTS/LILO Corridor identified a total of twelve heritage resources within or adjacent to the general footprint. These have been separated between the Oslaagte Solar 3 PV project and the MTS/LILO Corridor footprints.

Six heritage resources were identified within or adjacent to the general Oslaagte Solar 3 PV footprint. Four are located within and two outside or adjacent to the project footprint (Alternative 1). These include: a historical farmhouse with an outbuilding and a stone kraal (Os3-01), a railway culvert (Os3-04) and a disused road culvert (Os3-05), two areas with demolished structure remains (Os3-02 and Os3-06) and a possible grave (at Os3-02). One site could be the remains of a farm dam wall (Os3-03).

Six heritage resources were identified within or adjacent to the MTS/LILO Corridor footprint. Two of these sites are located outside the project footprint for both Alternative 1 and Alternative 2: a group of graves (LILO-06) and the remains of a homestead which may contain potential graves (LILO-03). The remaining four sites are located within the project footprint (Alternative 1 and Alternative 2). These included the remains of an historical farmstead (LILO-05), the remains of a stone wall (LILO-04, probably a kraal) and two potential graves (LILO-01, LILO-02,).

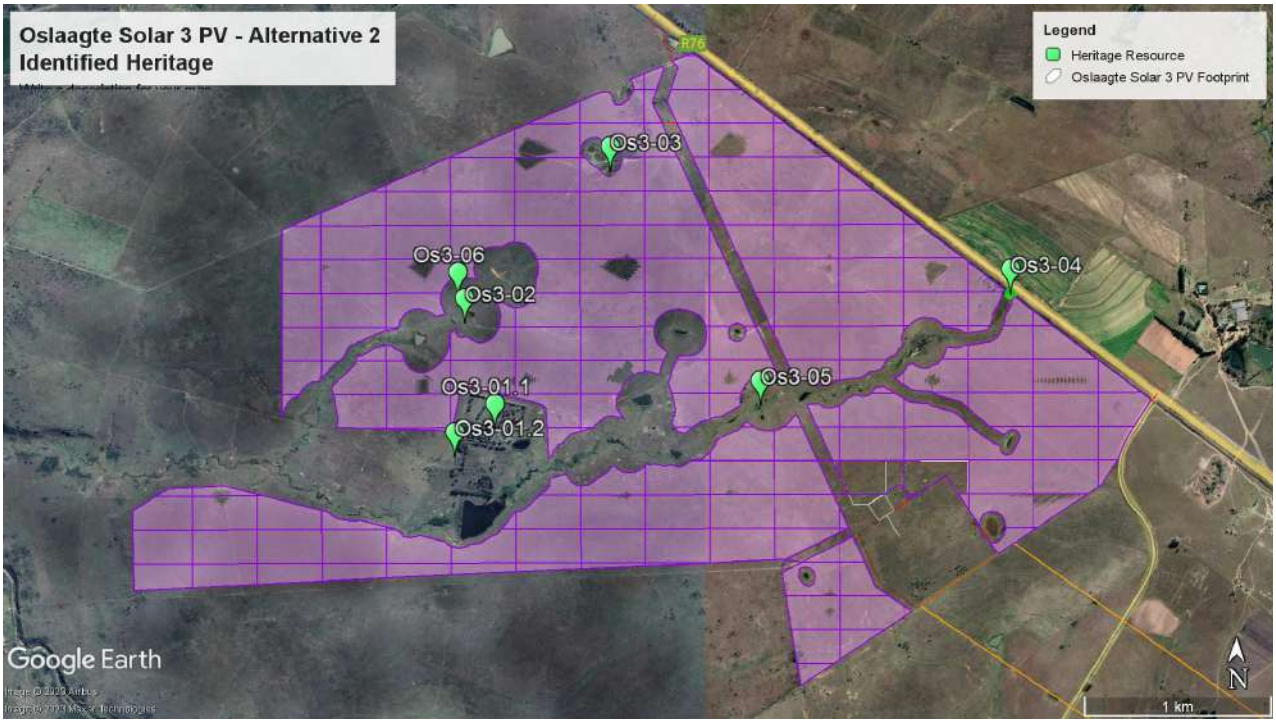


Figure 60: **Heritage resources identified during the survey (green icons), in relation to the Oslaagte Solar 3 PV Alternative 2 project layout (Kitto, 2023)**

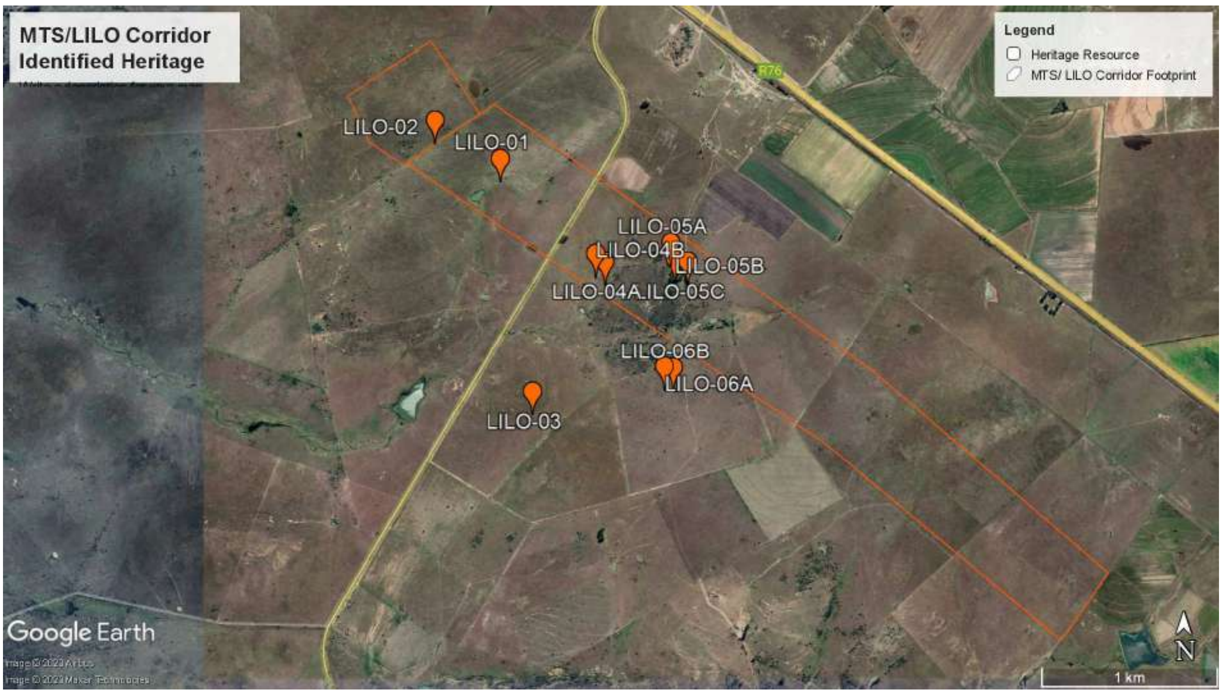


Figure 61: **Heritage resources identified during the site survey (orange icons), in relation to the MTS/LILO Corridor footprint (Kitto, 2023)**

12.8.5 Impact Assessment

Refer to **Section 13.16** below for the results from the impact assessment from this study.

12.8.6 Conclusions

The project area that will be impacted by the proposed Oslaagte Solar 3 PV project and MTS/LILO Corridor contains some areas that are currently disturbed by cattle and game farming activities and other animal activity (e.g., burrows and termite mounds).

The survey of the combined footprint for the Oslaagte Solar 3 PV project and the MTS/LILO Corridor identified a total of twelve heritage resources within or adjacent to the general footprint. These have been separated between the Oslaagte Solar 3 PV project and the MTS/LILO Corridor footprints.

Six heritage resources were identified within or adjacent to the general Oslaagte Solar 3 PV footprint. Four are located within and two outside or adjacent to the project footprint (Alternative 1). These include: a historical farmhouse with an outbuilding and a stone kraal (Os3-01), a railway culvert (Os3-04) and a disused road culvert (Os3-05), two areas with demolished structure remains (Os3-02 and Os3-06) and a possible grave (at Os3-02). One site could be the remains of a farm dam wall (Os3-03).

Six heritage resources were identified within or adjacent to the MTS/LILO Corridor footprint. Two of these sites are located outside the project footprint for both Alternative 1 and Alternative 2: a group of graves (LILO-06) and the remains of a homestead which may contain potential graves (LILO-03). The remaining four sites are located within the project footprint (Alternative 1 and Alternative 2). These included the remains of an historical farmstead (LILO-05), the remains of a stone wall (LILO-04, probably a kraal) and two potential graves (LILO-01, LILO-02,).

The recommendations below are provided to mitigate the potential impact of the proposed PV project on the identified heritage resources:

Historical Structures

- The sites with extant historical structures (Site Os3-01, Os3-04, Os3-05) must be avoided and a buffer of at least 30m must be implemented;
- The materials demarcating the 30m buffer must be highly visible and made of durable material to ensure that they are still in place during the operation of the PV site so that work crews are aware of the sites;
- If any impact is anticipated on these sites, a permit will be required for the alteration or destruction of any of these structures (from FS PHRA);
- If a permit is required, as above, then a photographic record of the structures should be undertaken by an architectural historian;

- The sites with remains of Historical structures (Os3-02, Os3-06, LILO-04, LILO-05) are also protected by section 34 of the NHRA and will require a permit from FSPHRA before any historical-archaeological materials or remains can be destroyed.

Informal Graveyard / Potential Graves

- A buffer of at least 30m must be placed around the informal graveyard at LILO-06 to ensure that during construction, the graves are not damaged by any indirect impacts
- The materials demarcating the 30m buffer must be highly visible and made of durable material to ensure that they are still in place during the operation of the PV site so that work crews are aware of the sites.
- If, for any reason, the identified graveyard (or potential graves) cannot be avoided, then a Phase 2 mitigation process can be considered. During this process, the family and relevant communities will have to be engaged with to obtain their permission and discuss to where the remains are to be moved. In addition, application will have to be made to SAHRA for the necessary permits.
- Sub-sections (4) and (5) of section 36 of the NHRA regarding the removal of graves must be adhered to. The exhumation and removal of graves is strongly discouraged as graves are highly significant to many people and there are many traditional, cultural and personal sensitivities concerning the removal of graves.

Palaeontology

- A separate palaeontological assessment is being undertaken as the project area falls into an area of Very High fossil sensitivity. The assessment will indicate if significant/sensitive fossils would be impacted by the proposed project and provide mitigation measures.

No fatal flaws were identified during this study, therefore, it is the considered opinion of the heritage specialist that the construction of the proposed Oslaagte Solar 3 PV project and MTS/LILO Corridor within the project footprints can proceed. There are no objections from a heritage perspective provided the recommendations and mitigation measures contained in this report and in the palaeontological assessment are implemented where necessary. It should be noted that the original layout for the Oslaagte Solar 3 PV footprint (Alternative 1) has been revised to exclude certain environmentally and heritage sensitive areas (Alternative 2). The Alternative 2 layout avoids the identified heritage resources that would be impacted by the Alternative 1 layout. Therefore, from a heritage perspective, Alternative 2 is the preferred layout. However, some of these heritage resources still could be subject to indirect impact, specifically during site clearance or construction activities, therefore the mitigation measures set out above and below will still apply.

12.9 Palaeontological Impact Assessment

A summary of the Palaeontological Impact Assessment (Butler, 2023) (contained in **Appendix E6**) follows.

12.9.1 *Details of the Specialist*

The details of the specialist that undertook the Palaeontological Impact Assessment follow.

Organisation:	Banzai Environmental
Name:	E. Butler
Qualifications:	MSc Zoology (specializing in Palaeontology)
Affiliation (if applicable):	Member of the Palaeontological Society of South Africa (PSSA)

12.9.2 *Objectives of the Study*

The general objectives of a Palaeontological Impact Assessment include the following:

- To identify the palaeontological importance of the rock formations in the footprint;
- To evaluate the palaeontological magnitude of the formations;
- To clarify the impact on fossil heritage; and
- To suggest how the developer might protect and lessen possible damage to fossil heritage.

12.9.3 *Methodology*

The following sources were reviewed as part of this study:

- Geological map 1:100 000, Geology of the Republic of South Africa (Visser 1984);
- Spatial data of the proposed development from the EAP;
- 1:250 000 Bloemfontein 2926 Geological map (1966) (Council of Geoscience, Pretoria);
- Updated geology produced by the Council of Geosciences, Pretoria; and
- Palaeontological Impact Assessment undertaken in the Bloemfontein area.

A site-specific field survey of the development footprint was conducted on 13 May 2023.

12.9.4 *Key Findings of the Study*

The proposed development is underlain by Quaternary alluvium and Jurassic Dolerite in the west, while the largest portion of the development is underlain by the Adelaide Subgroup of the Beaufort Group (Karoo Supergroup). According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) the Palaeontological Sensitivity of Quaternary alluvium is moderate (green), that of the dolerite is Zero (grey) as it is igneous in origin and thus unfossiliferous, while the Adelaide Subgroup has a Very High (red) Palaeontological Sensitivity (Almond and Pether, 2009; Almond et al., 2013). The Environmental Screening Tool indicates that the development has a very High Palaeontological Sensitivity. Updated Geology (Council of Geosciences) indicates that the proposed development is entirely underlain by the Balfour Formation of the Adelaide Subgroup (Beaufort Group, Karoo Supergroup). A site investigation was thus triggered for the Project.

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on 13 May 2023. No fossiliferous outcrops were identified during the site visit.

12.9.5 Impact Assessment

Refer to **Section 13.13** below for the results from the impact assessment from this study.

12.9.6 Conclusions

The proposed Oslaagte Solar 3 PV Facility is largely underlain by the Adelaide Subgroup (Beaufort Group, Karoo Supergroup) with a very small portion of Jurassic dolerite and Quaternary alluvium in the west of the development. According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) and the DFFE (Department of Forestry, Fisheries and the Environment) Screening Tool the Palaeontological Sensitivity of the Adelaide Subgroup is Very High (Almond and Pether, 2009; Almond et al., 2013). Updated Geology (Council of Geosciences) indicates that the proposed development is underlain by the Balfour Formation of the Adelaide Subgroup. Two Layout alternatives have been considered for this project. The first alternative is the original layout of the proposed development while the second alternative was determined after input of the different specialist studies. As the geology of the alternatives are the same there is no preference between the alternatives from a Palaeontological point of view.

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on the weekend of 13 May 2023. No fossiliferous outcrop was detected in the proposed development. This could be attributed to the lack of outcrops as well as the lush grassy vegetation in the area. Based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the development footprint is rare. This is in contrast with the High Sensitivity allocated to the development area by the SAHRIS Palaeosensitivity Map and DFFE Screening Tool. A medium Palaeontological Significance has been allocated for the construction phase of the PV development pre-mitigation and a low significance post mitigation. The construction phase will be the only development phase impacting Palaeontological Heritage and no significant impacts are expected to impact the Operational and Decommissioning phases. As the No-Go Alternative considers the option of ‘do nothing’ and maintaining the status quo, it will have a Neutral impact on the Palaeontological Heritage of the development. The Cumulative impacts of the development near Kroonstad is considered to be medium pre- mitigation and Low post mitigation and falls within the acceptable limits for the project. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. The construction of the development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.

12.10 Visual Impact Assessment

A summary of the Visual Impact Assessment (Buys, 2023) (contained in **Appendix E8**) follows.

12.10.1 *Details of the Specialist*

The details of the specialist that undertook the Visual Impact Assessment follow.

Organisation:	Environmental Assurance (Pty) Ltd	
Name:	Andre Buys	Richard Viljoen
Qualifications:	M.Sc. Environmental Science	M.Sc. Environmental Science
Affiliation (if applicable):	SACNASP (Pr. Sci. Nat.) 119183	-

12.10.2 *Objectives of the Study*

The scope of work for the Visual Impact Assessment included the following:

- Describing the existing visual characteristics of the proposed site and its environment;
- Viewshed and viewing distance determination using Geographic Information System (GIS) analysis up to 15 km from the proposed structures;
- Visual Exposure Analysis, comprising the following aspects;
- Identifying the preferred alternative in terms of the two powerline route options;
- Impact identification and ratings; and
- Mitigation of identified visual impacts.

12.10.3 *Methodology*

An initial desktop site assessment was conducted to determine suitable locations regarding the visual impact assessment. The result of the desktop study is the identification of areas or activities, which could possibly contribute to the deterioration of the visual characteristics of the area.

Site baseline characterisation (and subsequent fieldwork) occurred on the 25th and 26th of April 2023 for the visual assessment. The site baseline characterisation was conducted to undertake the visual assessment of the current characteristics of the receiving environment. The field survey included photographic evidence at the various viewpoints, which were used as a basis for determining the potential visual ability and visual impacts of the proposed development. Various viewpoints were identified based on the sensitivity and visual impact of the area.

The VIA was conducted following the methodology:

- Site visit and orientation.
- Describing the landscape character or visual baseline based on:
    - o Photographs of the project site and larger study area were taken during a field visit conducted on the 25th and 26th of April 2023.
- A review of available aerial photography and topographical maps, in relation to:
    - o Natural elements; and
    - o Human-made elements.
- Determining the area/s where the project will be visible from.
- Determining the visual resource value of the landscape in terms of:

o The topographical character of the site and its surroundings and potential occurrence of landform features of interest;
o The presence of water bodies within the study area;
o The general nature and level of disturbance of existing vegetation cover within the study area; and
o The nature and level of human disturbance and transformation evident.

• Determine the visual absorption capacity of the receiving visual landscape.
• Determining the receptor sensitivity to the proposed project.
• Determine the magnitude of the impact, by considering the proposed project in terms of aspects of VIA, namely:
o Visibility.
o Visual intrusion; and
o Visual exposure.
• Assessing the impact significance by relating the magnitude of the visual impact to its:
o Duration.
o Severity; and
o Geographical extent.
• To recommend mitigation measures to reduce the potential visual impacts of the project.

12.10.4 Key Findings of the Study

12.10.4.1 Landcover VAC

According to Oberholzer (2008), Visual Absorption Capacity (VAC) can be defined as an ‘estimation of the capacity of the landscape to absorb development without creating a significant change in visual character or producing a reduction in scenic quality’. VAC was determined by considering the nature and occurrence of vegetation cover, topographical characteristics, and human structures. A further major factor is the degree of visual contrast between the proposed new project and the existing elements in the landscape.

To account for the fact that visual impacts are expected to be more intrusive in landscapes with a lower VAC than in those with a higher VAC (regardless of the visual quality of the landscape), a weighting factor is incorporated into the impact magnitude determination.

Most of the vegetation cover is predominately dominated by grasses, shrubs and scattered trees, while the topographical characteristics (flat to gentle) which can conceivably result in a low VAC. The visual resource value of the study area has been determined to be moderate and the VAC of the study area has been rated as low. Therefore, a high (1.2) weighting factor in terms of VAC is applied during the impact assessment.

12.10.4.2 Visual Receptor Sensitivity and Incidences

Receptor sensitivity refers to the degree to which an activity will impact the receptors and depends on how many persons see the project, how frequently they are exposed to it and their perceptions regarding aesthetics. Receptors of the proposed project can be broadly categorised into two (2) main groups, namely:

• People who live or work in the area, and who will be frequently exposed to the project components (resident receptors) (**Figure 62**); and

• People who travel through the area and are only temporarily exposed to the project components (transient receptors).

Resident receptors located outside the proposed site include:

• Resident receptors would include the employees of the agricultural activities, residents and the local farming communities that are present outside the proposed project area.

Transient receptors located outside the proposed site include:

• The R76 is the main road located near the proposed site. The roads situated near the proposed site are predominately used for access to the surrounding areas, tourism attractions, residential areas, commercial areas and agricultural activities. The proposed project area may potentially be visible from the R76 while the visibility may be reduced due to vegetation obstructing the view from the roads at certain points. The visual receptor sensitivity and incidence can be classified as high, moderate or low.

Based on the receptor sensitivity assessment and the above criteria, a moderate weighting factor (1.0) in terms of this aspect is applied during the impact magnitude determination.

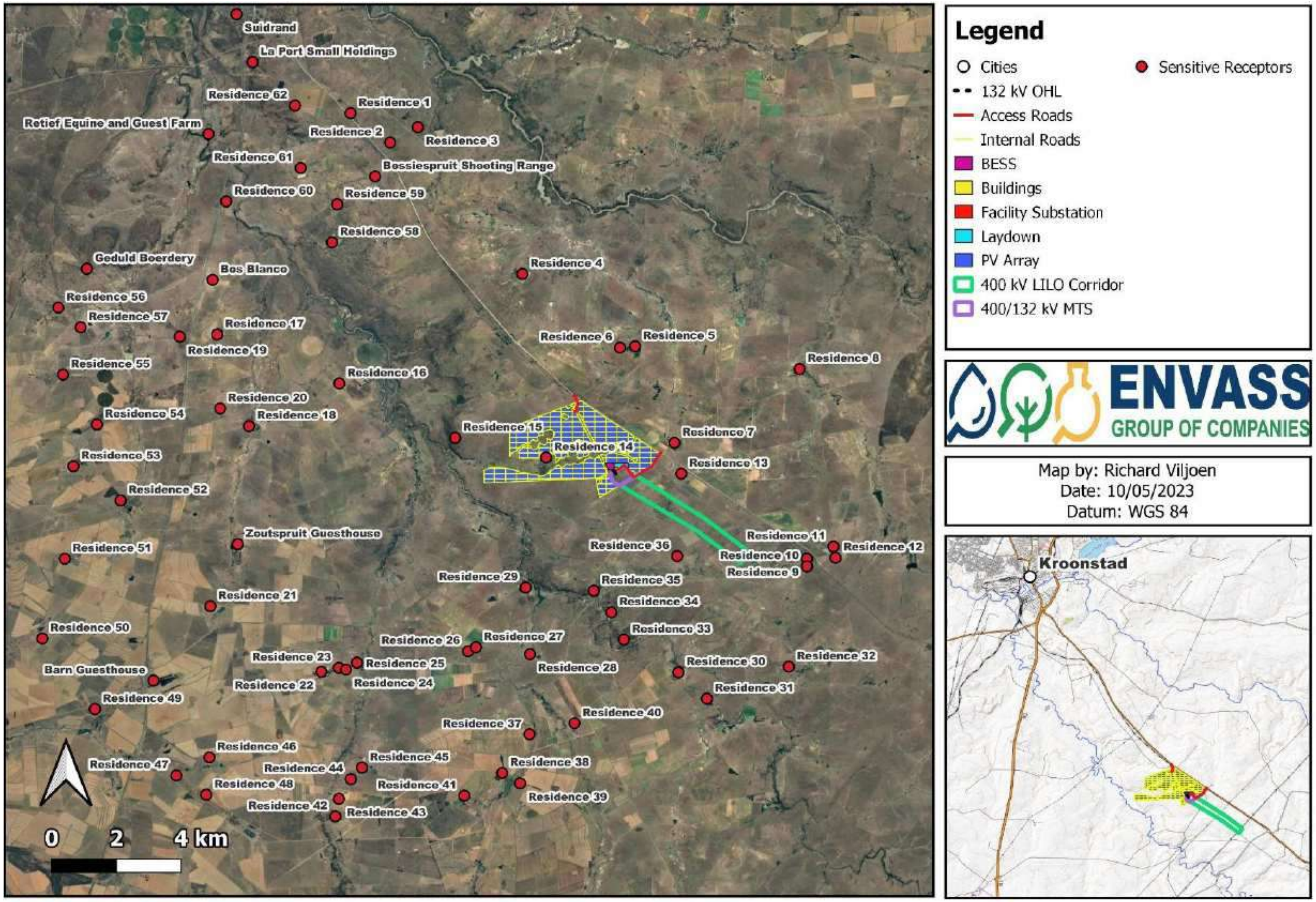


Figure 62: **Option A Visibility Count Distance Rank – showing the number of observer points that may be visible from within 15 km of the proposed site (Buys, 2023)**

12.10.4.3 Theoretical Visibility, Visual Intrusion, and Visual Exposure

Theoretical visibility was determined by conducting a Viewshed analysis and using Geographic Information System software with three-dimensional topographical modelling capabilities:

- The Digital Elevation Model (DEM) for the Viewshed analysis was acquired; and
- A 10 km area surrounding the site was used due the topography of the area.

The Viewshed was modelled on the above-mentioned DEM and the layout plan supplied by Nemai Consulting, using Esri ArcGIS for Desktop software, 3D Analyst Extension. A viewshed was modelled to account for the PV facility and its associated infrastructure, that will be constructed (**Figure 63**).

Visual intrusion deals with how well the project components fit into the ecological and cultural aesthetic of the landscape. An object will have a greater negative impact on scenes considered to have a high visual quality than on scenes of low quality.

Given that the study area has a low VAC (due to vegetation and the flat to gentle landscape) and moderate visual resource value, the proposed project will have a moderate (without mitigation measures) visual intrusion on surrounding sensitive receptors. Ensuring that vegetation is retained on the periphery of these areas, and wherever possible, lights be directed downwards as to avoid illuminating the sky and limit the reflection from the solar panels, the visual impact on the surrounding environment will be moderate depending on the proximity to the sensitive receptors.

The altered visual environment during the construction and operational phases will lead to moderate (without mitigation measures) levels of visual intrusion, with moderate levels of compatibility with the surrounding land uses as well as moderate visual contrast. The level of visual intrusion because of the proposed project, with specific mention of vegetation clearing, removal of topsoil and solar PV infrastructure, is considered to be moderate (without mitigation measures) during the construction and operational phases, in line with the low VAC. The perceived visual impacts associated with the construction and operational phases are moderately (without mitigation measures) intrusive to the receiving environment.

The visual impact of a development diminishes at an exponential rate as the distance between the observer and the object increases. The impact at 1 000 m would be 25% of the impact as viewed from 500 m. At 2 000 m it would be 10 % of the impact at 500 m. The inverse relationship of distance and visual impact has been an important component in visual analysis literature (Hull and Bishop, 1998).

For the purposes of this assessment, close-range views (equating to a high level of visual exposure) are views over a distance of 500 m or less, medium-range views (equating to a moderate level of visual exposure) are views of 500 m to 2 km, and long-range views are over distances greater than 2 km (low levels of visual exposure). Limited sensitive

receptors are located within 2 km of the site and are limited to people working in the area, residents and the number of farms surrounding the site.
For the purposes of this assessment, visual exposure in terms of all identified impacts has therefore been rated as low as the majority of the high sensitivity, sensitive receptors, are located more than 5 km from the project site.

Results of the visual impact assessment indicated that from a visual perspective, the proposed project and related activities are the main project components that are expected to result in a visual impact. Receptors located within 2km of the proposed site will have the moderate (without mitigation) visual impact. Within a 5 km radius of the proposed project, residential areas and farming communities will have a low (without mitigation) visual impact. Beyond the 5 km study area, there are some areas where the development is discernible. However, the visual impacts are generally of moderate to low magnitude and impact. Local low and high-level vegetation will provide limited screening; however, the proposed solar PV facility and associated infrastructure can conceivably be visible to the sensitive receptors located near the proposed project boundary. The visual impacts associated with the Project and associated infrastructure will occur once construction has been completed and will be long term in nature.

In terms of the potential cumulative impacts, the proposed site is surrounded by various commercial and agricultural activities. In addition, according to the REEA Database, there are three (3) renewable energy applications have been made for properties located near the project site. The majority of the proposed site currently grassland vegetation and land previously used for agricultural purposes. The clearance and subsequent development of the site will result in the alteration of this space. Consequently, the development of this site will add cumulatively to the loss of sense of place. While the result in a change in the sense of place for those areas that look onto the project site, the magnitude of the impact is likely to be low as the majority of the sensitive receptors are located more than 5km from the project site.

Based on the results of the impact assessment, the majority of the potential visual impacts were considered to be moderate before mitigation and with the successful implementation this can be reduced to low. With regards to the proposed activities, due to the terrain of the proposed boundary, vegetation, VAC, and current land uses, the proposed activities are expected to result in a moderate visual impact on the receiving environment. The proposed activities will have a long-term temporal visual impact, due to the very nature of the Project and associated infrastructure. The activity will have a localised visual impact over a long-term duration. The activity will be able to continue with the implementation of appropriate mitigation strategies during the construction, operational and decommissioning phases.

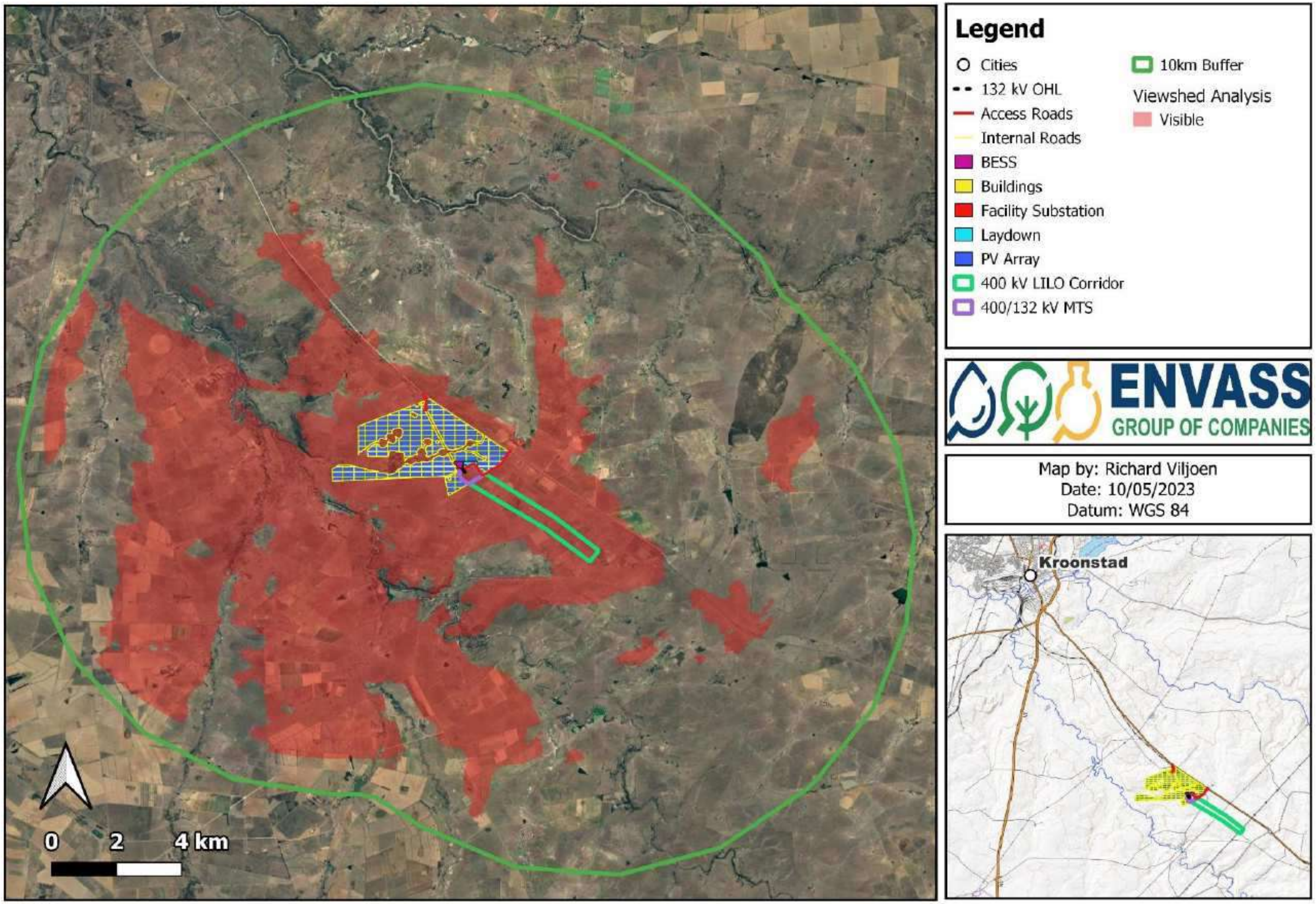


Figure 63: **Viewshed analysis for the proposed Oslaagte Solar 3 (Buys, 2023)**

12.10.5 Impact Assessment

Refer to **Section 13.18** below for the results from the impact assessment from this study.

12.10.6 Conclusions

From the impact assessment results obtained, potential visual impacts may be present within the construction, operational and decommissioning phases. From the assessment, the proposed activities can conceivably have a moderate (without mitigation) visual impact on the surroundings and the natural and topographical environment.

Impacts are likely to be largely localised and within 5 km of the proposed project boundary, while significant visual impacts with regards to the proposed activities are expected at the sensitive receptors located within 2km of the proposed project boundary. It should be mentioned that an estimation of the impact distance is difficult to determine in terms of the visual impact assessment as it does not incorporate distractive views in the form of vegetation or land use (infrastructure, buildings, etc.), however, with successful mitigating implementation the significance can be reduced.

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Cumulative visual impacts resulting from landscape modifications as a result of the proposed activities in conjunction with other activities are likely to be of moderate significance, however, it can be reduced with the successful implementation of the proposed mitigation measures.

The project site and surrounding area can be characterized by residential, commercial, tourism, and agricultural activities. According to the REEA Database, there are three (3) renewable energy applications have been made for properties located near the project site. The proposed site ranges from approximately 1397 to 1444 metres above mean sea level (mamsl). predominantly flat, with a few small hills and rocky outcrops scattered throughout the area. The landscape is characterized by open grasslands, and scattered trees, typical of the Highveld region of South Africa. The surrounding areas comprises with a mix of residential activities, agricultural, tourism and commercial activities. The vegetation in the area consists mainly of grasses, shrubs, and scattered trees.

Several potential risks to the receiving aesthetic and visual environment as a result of the proposed activities have been identified, relating to impacts on the visual character and sense of place, visual intrusion and visual exposure and visibility. The significance of these impacts may be reduced should appropriate and effective mitigation measures be implemented. The proposed Project and associated infrastructure can conceivably have a moderate impact on the visual environment, while secondary impacts, such as dust emission, solar glint and glare and lighting at night, will also manifest as visual disturbances from project initiation. The study area comprises of residential activities, agricultural and commercial activities which have had a visual impact on the natural environment. Therefore, the proposed project has been predicted to have a moderate impact before mitigation on the visual environment. After appropriate and effective mitigation measures the impact is rated as moderate to low.

The proposed activities should therefore have a moderate to low visual impact on the receiving environment and is thus not fatally flawed from a visual impact perspective. The alternative 2 layout is preferred for site design as it results in reduced visual impacts compared to alternative 1 layout. This is primarily due to the decreased size of the infrastructure in alternative 2 layout. Considering the project, it is the specialist's opinion that the proposed activities be allowed, provided that the findings within this report are considered along with the recommendations made towards the management of the proposed activity. All recommendations should be included in the Environmental Management Programme (EMPr) relevant to the proposed project.

12.11 Traffic Impact Assessment

A summary of the Traffic (Transport) Impact Assessment (Tanhuke & Chidley, 2023) (contained in **Appendix E7**) follows.

12.11.1 Details of the Specialist

The details of the specialist that undertook the Traffic Impact Assessment follow.

Organisation:	JG Afrika (Pty) Ltd	
Name:	A. Johnson	S Patandin
Qualifications:	PrTechEng, Master of Transport Studies	

12.11.2 Objectives of the Study

The key objectives of the Trafic Impact Assessment included the following:

- Assess activities related to traffic movement for the construction and operation (maintenance) phases of the facility.
- Recommend a preliminary route for the transportation of the components to the proposed site.
- Recommend a preliminary transportation route for the transportation of materials, equipment and people to site.
- Recommend alternative or secondary routes where possible.

General:
A specialist report prepared in terms of the Regulations must contain the following:
(a) details of-
(i) the specialist who prepared the report; and
(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;
(c) an indication of the scope of, and the purpose for which, the report was prepared;
(cA) an indication of the quality and age of base data used for the specialist report
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;
(d) the duration date and season of the site investigation and the relevance of the season to the outcome of the assessment;
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;
(g) an identification of any areas to be avoided, including buffers;

(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;
(k) any mitigation measures for inclusion in the EMPr;
(l) any conditions for inclusion in the environmental authorisation;
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;
(n) a reasoned opinion-

(i) whether the proposed activity, activities or portions thereof should be authorised; and (considering impacts and expected cumulative impacts).

(iA) regarding the acceptability of the proposed activity or activities, and

(ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;

(o) a description of any consultation process that was undertaken during the course of preparing the specialist report;
(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and
(q) any other information requested by the competent authority.
Specific:

- Extent of the transport study and study area;
- The proposed development;
- Trip generation for the facility during construction and operation;
- Traffic impact on external road network;
- Accessibility and turning requirements;
- National and local haulage routes;
- Assessment of internal roads and site access;
- Assessment of freight requirements and permitting needed for abnormal loads; and
- Traffic accommodation during construction.

12.11.3 Methodology

The report deals with the traffic impact on the surrounding road network in the vicinity of the site:

- during the construction of the access roads;
- construction of the facility; and
- operation and maintenance during the operational phase.

This transport study was informed by the following:
Site Visit and Project Assessment

- Overview of project background information including location maps, component specs and any possible resulting abnormal loads to be transported.

- Research of all available documentation and information relevant to the proposed facility; and
- Site visit to gain sound understanding of the project.

The transport study considered and assessed the following:
Traffic and Haul Route Assessment

- Estimation of trip generation;
- Discussion on potential traffic impacts;
- Assessment of possible haul routes; and
- Construction and operational (maintenance) vehicle trips.

Site layout, Access Points and Internal Roads Assessment per Site

- Description of the surrounding road network;
- Description of site layout;
- Assessment of the proposed access points; and
- Assessment of the proposed internal roads on site.

12.11.4 Key Findings of the Study

There are two viable options for the port of entry for imported components - the Richards Bay Port in KwaZulu Natal and the Port of Ngqura in the Eastern Cape.
The Richards Bay Port is located approximately 669km travel distance from the proposed site whilst the Port of Ngqura is located approximately 853km travel distance from the proposed site. The Richards Bay Port is the preferred port of entry, however, the Port of Ngqura can be used as an alternative should the Richards Bay Port not be available.
The preferred route from the Richards Bay Port follows the N2 to Durban, where vehicles will access the N3 to Harrismith and the N5 to Bethlehem. From Bethlehem, vehicle will travel on the R76 to access point the proposed site.
The alternative route from the Port of Ngqura will follow the N10 north to Cradock, where vehicles will take the R390 north, before turning west onto the R58 at Venterstad. Vehicles will access the N1 via the R701 to Bloemfontein and will continue on the N1 to Kroonstad. Vehicles will access the proposed site via the R76.

It is anticipated that elements manufactured within South Africa will be transported to the site from the Cape Town, Johannesburg and Pinetown/Durban areas. Components, such as PV panels, manufactured in Cape Town will be transported to site via road. Haulage vehicles will mainly travel on the national highway and the total distance to the proposed site is approximately 1 224km.
It is assumed that the inverter and support structure will be manufactured in the Johannesburg area and transported to site. The travel distance is around 207km. If the PV panels are manufactured in South Africa, they could possibly be manufactured in the Pinetown area, close to Durban and transported to site via road. Haulage vehicles will mainly travel on national and provincial roads and the total distance to the proposed site is approximately 507km.

The proposed main access points and access roads to the site will be located off the R76, as shown in **Figure 71**. The proposed access roads, shown in red, will link to the internal road network of the facility.
A railway line runs parallel to the R76 and connects Kroonstad in the north to Bethlehem in the southeast. The Client should note that application for wayleaves and permits should be made to the railway authority well in advance of construction commencing. Special safety measures e.g. access booms might be required to protect drivers of vehicles from oncoming railway traffic, especially in instances of poor visibility and increased traffic flow. Height clearances, of overhead power supply at the railway crossing need to physically be verified.

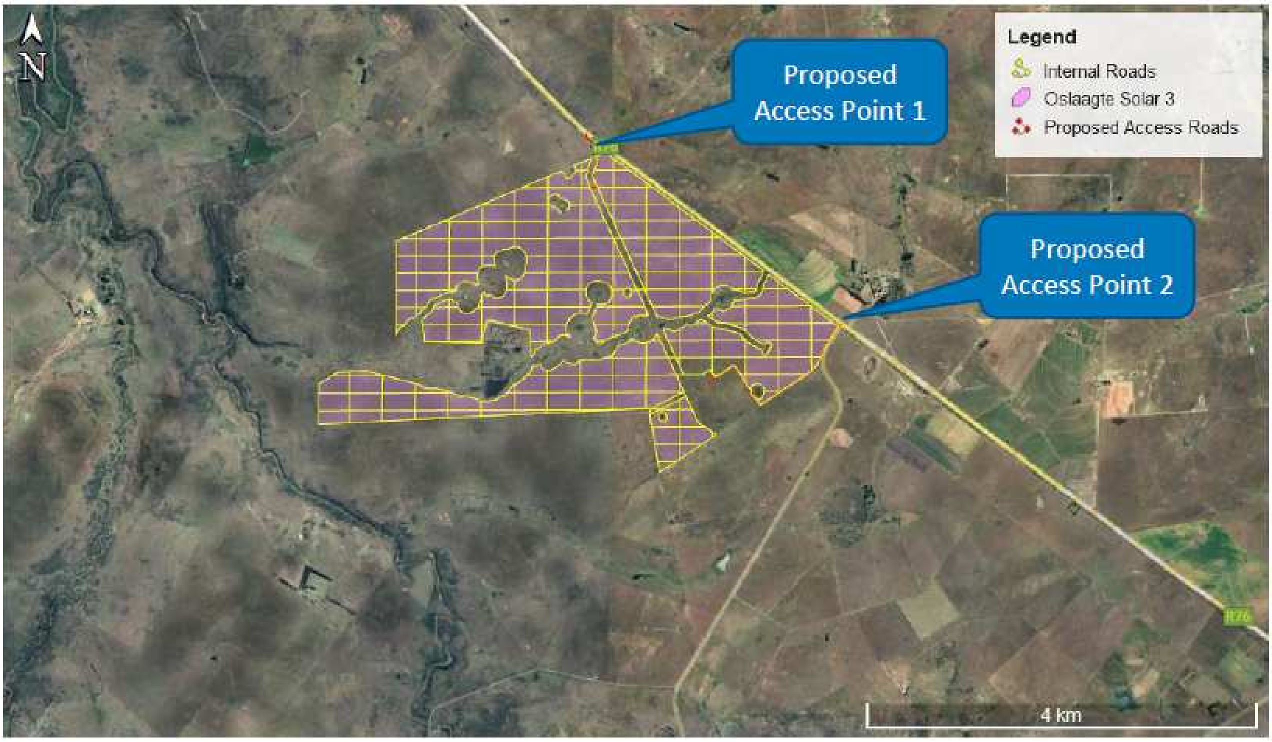


Figure 64: **Proposed Access Points (Johnson, 2023)**

The proposed access point 1 is deemed the preferred access point as proposed access point 2 is located on a public road.

A minimum required road width of 4 m needs to be maintained and all turning radii must conform with the specifications needed for the abnormal load vehicles and haulage vehicles. It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will hence need to be maintained during the additional loading of the construction phase and then reinstated after construction is completed. The gravel roads will require grading with a grader to obtain a flat even surface and the geometric design of these gravel roads needs to be confirmed at detailed design stage.

It is assumed that during the peak of the construction period, 300 employees will be active on site. Staff trips are assumed to be:

Table 26: Estimation of daily staff trips (Johnson, 2023)

Vehicle Type	Number of vehicles	Number of Employees
Car	10	10 (assuming single occupant)
Bakkie	20	30 (assuming 1.5 occupants)
Taxi – 15 seats	12	180
Bus – 80 seats	1	80
Total	**43**	**300**

The total estimated daily site trips, at the peak of construction, are shown in the table below.

Table 27: Estimation of daily staff trips (Johnson, 2023)

Activity	Number of trips
Component Delivery	39
Staff Trips	43
Construction Trips	250
Total	**332**

The impact on the surrounding road network and the general traffic is therefore deemed nominal, with mitigation, as the 332 trips will be distributed across a 9-hour working day. The majority of the trips will occur outside the peak hours.

The significance of the transport impact without mitigation measures during the construction phase can be rated as medium. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level.

During operation, it is assumed that approximately ten (10) full-time employees will be stationed on site and hence vehicle trips generated are low and will have a negligible impact on the external road network.

12.11.5 Impact Assessment

Refer to **Section 13.26** below for the results from the impact assessment from this study.

12.11.6 Conclusions

This report addressed key issues to be considered for the proposed Oslaagte Solar 3 facility.

- The preferred Port of Entry for imported components is Richards Bay.
- The proposed access point 1 is deemed the preferred access point as proposed access point 2 is located on a public road.

- Applications for wayleaves and permits for crossing the railway line, which runs parallel to the R76, should be made to the railway authority well in advance of construction commencing. Special safety measures e.g. access booms might be required to protect drivers of vehicles from oncoming railway traffic, especially in instances of poor visibility and increased traffic flow. Height clearances, of overhead power supply at the railway crossing need to physically be verified.
- It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will hence need to be maintained during the additional loading of the construction phase and then reinstated after construction is completed. The gravel roads will require grading with a grader to obtain a flat even surface and the geometric design of these gravel roads needs to be confirmed at detailed design stage.
- The construction phase traffic, although significant, will be temporary and can be mitigated to an acceptable level.
- During operation, it is expected that staff and security will periodically visit the facility. The traffic generated during this phase will be minimal and will not have an impact on the surrounding road network.
- The construction and decommissioning phases of a development is the only significant traffic generator and therefore noise and dust pollution will be higher during this phase. The duration of this phase is short term i.e., the impact of the traffic on the surrounding road network is temporary and solar facilities, when operational, do not add any significant traffic to the road network.

The potential mitigation measures mentioned in the construction phase are:

- Dust suppression
- Component delivery to/ removal from the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
- The use of mobile batch plants and quarries near the site would decrease the impact on the surrounding road network.
- Staff and general trips should occur outside of peak traffic periods.
- A “dry run” of the preferred route.
- Design and maintenance of internal roads.
- If required, any low hanging overhead lines (lower than 5.1m) e.g. Eskom and Telkom lines, along the proposed routes will have to be moved to accommodate the abnormal load vehicles.

The potential mitigation measures mentioned in the operational phase are:

- Staff and general (maintenance) trips should occur outside of peak traffic periods as far as possible.
- The provision of water storage tanks and/or boreholes.
- Water bowsers trips should occur outside of peak traffic periods as far as possible.
- Spread the cleaning of the panels over a week.
- Using a larger water bowser.

The construction and decommissioning phases of a development is the only significant traffic generator and therefore noise and dust pollution will be higher during this phase. The duration of this phase is short term i.e., the impact of the traffic on the surrounding road network is temporary and solar facilities, when operational, do not add any significant traffic to the road network.

The development is supported from a transport perspective provided that the recommendations and mitigations contained in this report are adhered to.

The impacts associated with the facility are acceptable with the implementation of the recommended mitigation measures and can therefore be authorised.

12.12 Social Impact Assessment

A summary of the Social Impact Assessment (Tanhuke & Chidley, 2023) (contained in **Appendix E7**) follows.

12.12.1 Details of the Specialist

The details of the specialist that undertook the Social Impact Assessment follow.

Organisation:	Nemai Consulting	
Name:	C. Chidley	C. Tanhuke
Qualifications:	BA (Economics); BSc Eng (Civil); MBA	BA Environmental Management (Geography)

12.12.2 Objectives of the Study

The key objectives of the Social Impact Assessment included the following:

- Describe the social baseline conditions that may be affected by the Project;
- Determine the specific local social impacts of the Project;
- Identify the potential social issues associated with the Project;
- Suggest suitable mitigation measures to address the identified impacts; and
- Make recommendations on preferred options from a social perspective.

12.12.3 Methodology

The Socio-Economic Impact Assessment sets out the socio-economic baseline of the study area; predicts social and economic impacts and makes recommendations for mitigation of negative social and economic impacts and measures which can be taken to enhance the positive social and economic impacts.

The baseline study is based on both primary and secondary data. Primary data was collected directly from engagements with community members, landowners and business owners.

The profile of the baseline conditions includes describing the current status quo of the community; including information on a number of social and economic issues such as:

- Demographic data.
- Socio-economic factors such as income and population data.
- Access to services.
- Institutional environment.
- Social Organization (Institutional Context); and
- Statutory and Regulatory Environment.

Secondary data was accessed through South African economic and social databases. Articles and internet searches were also used and are referenced in the text and in the reference sections of this report.

Further primary data was collected for the purposes of the study; these were collected using the following approaches:

- ❑ Rapid Rural Assessment: A survey was conducted to capture visual observations on the social dynamics, community proceedings, community resources and infrastructure.
- ❑ Stakeholder Consultations: Consultations with the affected communities carried out by members of the project team along each project component to discuss the proposed project and to gather their concerns and feedback on the project; and
- ❑ Key Informant Interviews: Informal discussions with the I&APs to help inform the baseline were conducted during site visits and as well as during the scoping phase. These included community members and authority members.

Secondary data was collected using different sources, these included Statistics South Africa Census data as well as a review of relevant municipal, district and other literature.

A GIS was used to conduct an analysis of the area. The use of GIS brings together the demographic and socio-economic data to enable a thorough analysis of the project area.

12.12.4 Key Findings of the Study

The project area is dominated by agriculture, being crop, livestock and game farming. The proposed site is currently grazing land, whilst game such as springbok, buffalo and lion are located on some of the adjacent farms. Crops such as maize, sunflower, potatoes and pumpkins are produced on farms in the area, with livestock being Bonsmara beef cattle, sheep and chicken. The hunting season is from May to August, which brings in tourists and makes the area busier than other times of the year.

The closest central business district is in Kroonstad. The town is located approximately 16.5km north of the project site. Surrounding rural areas and small towns rely on Kroonstad central for commercial, industrial and administrative services. The city center is easily accessible along the

R76 from the project site. Steynsrus is small farm town, located twenty kilometers south-east of the Oslaagte farm. Many of the people who work in the direct study area live in this town. Both towns are social receptors in close proximity to the study area.
The Zoutspruit Guesthouse is roughly two kilometers from the project site. The facility offers ecotourism activities such as hiking, outside entertainment, mountain biking and hospitality services. The project's impact on Zoutspruit is likely to contribute positively to the growth of sustainable tourism in this direct area. The guesthouse will have a very limited view of the solar panels, there being a small ridgeline between the guesthouse and the proposed solar farm.

A site visit was conducted on 16 and 17 January 2023. The purpose of the visit was to compile and collect primary data on the receiving social environment, and to understand the expectations of the local communities with reference to the proposed project.

A questionnaire was compiled and used as a technique to gather inputs and comments from the local communities.
Overall, attitudes towards the project were mixed, with differing expectations of proposed project. Opposition from some of the adjacent landowners was noted in which they expressed concern regarding increased crime rates, a failing political system, farm intrusion and existing poor service delivery. Moreover, concerns about the adjacent agricultural land depreciating in value due to long term solar facilities were a concern.
On the other hand, some of the residents expressed interest in the proposed project as it has the likelihood of creating opportunities in terms of jobs, skills development and increased economic stimulus in the area.

12.12.5 Impact Assessment

Refer to **Section 13.26** below for the results from the impact assessment from this study.

12.12.6 Conclusions

The project site has few social receptors surrounding the site, and the project has a low footprint on the social environment. The social and economic impacts of the project are expected to be positive in the sense that the local economy will be stimulated and broadened. The negative impacts are limited in nature and scope and can be successfully mitigated by changes to the layouts of the panels and management rules and practises. It is therefore found that the project, once the recommended mitigation measures have been implemented, has a nett positive impact on the social environment of the regional study area.

13 IMPACT ASSESSMENT

13.1 General

This section focuses on the pertinent environmental impacts that could potentially be caused during the pre-construction, construction and operational phases of the Project.

Note that an 'impact' refers to the change to the environment resulting from an environmental aspect (or activity), whether desirable or undesirable. An impact may be the direct or indirect consequence of an activity.

Potential impacts were identified as follows:

- Impacts associated with listed activities contained in the EIA Regulations' Listing Notices;
- Impacts identified during the Scoping phase;
- An appraisal of the Project's activities and components;
- An assessment of the receiving biophysical, social, economic and built environments;
- Findings from specialist studies;
- Issues highlighted by environmental authorities; and
- Comments received during public participation from IAPs.

13.2 Impacts associated with Listed Activities

As mentioned, the Project requires Environmental Authorisation for certain activities listed in the EIA Regulations, which serve as triggers for the EIA. The potential impacts associated with the key listed activities are broadly stated in **Table 28** below.

Table 28: Potential Impacts associated with the key listed activities

Listed Activities	Potential Impact Overview
GN No. R. 983 of 4 December 2014 (as amended) (Listing Notice 1)	
GN No. R.983 – Activity 11(i): 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; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more; excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is — (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	• Impacts associated with the footprint of the physical infrastructure (proposed power line). • Potential loss of sensitive environmental features (e.g. heritage resources, sensitive fauna and flora species, ecosystems, cultivated land) along the proposed power lines • Visual impact associated with the proposed power line. • Cumulative impacts associated with aligning the proposed power line alongside linear developments (including existing roads and power lines).

Listed Activities	Potential Impact Overview
GN No. R.983 – Activity no. 12(ii)(a - c): The development of - (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) <u>infrastructure or structures with a physical footprint of 100 square metres or more;</u> <u>where such development occurs</u> - (a) <u>within a watercourse</u>; (b) in front of a development setback; or (c) <u>if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse</u>; - 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; (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; (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; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	• Impacts associated with the footprint of the physical infrastructure within 32 m of watercourses. • Adverse effects to resource quality (i.e. flow, in-stream and riparian habitat, aquatic biota and water quality) associated with working in-stream and alongside watercourses. • Loss of wetland vegetation within construction domain. • Destabilisation of affected watercourses. • Reduction in water quality of receiving watercourses due to improper management of storm water, hazardous material and sanitation. • Altering the drainage of the site.
GN No. R.983 – Activity no. 19: *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 -* *(a) will occur behind a development setback;* *(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;* *(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;* *(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or* *(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.*	• Construction activities (including bulk earthworks) to be undertaken within 32 m of watercourses. • Adverse effects to resource quality (i.e. flow, in-stream and riparian habitat, aquatic biota and water quality) associated with working in-stream and alongside the watercourse. • Destabilisation of affected watercourses.
GN No. R.983 – Activity 24(ii): *The development of a road -* *(i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or* *(ii) <u>with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;</u>* *<u>but excluding a road</u> -* *(a) which is identified and included in activity 27 in Listing Notice 2 of 2014;* *(b) where the entire road falls within an urban area; or* *(c) which is 1 kilometre or shorter.*	• Clearance of indigenous vegetation. • Soil destabilisation and subsequent erosion. • Proliferation of alien and invasive species.
GN No. R.983 – Activity 27: *The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for-* *(i) the undertaking of a linear activity; or*	• Clearance of large areas of indigenous vegetation associated with the construction footprint of the PV Site and associated infrastructure.

Listed Activities	Potential Impact Overview
(ii) maintenance purposes undertaken in accordance with a maintenance management plan.	• Potential loss of sensitive environmental features (e.g. sensitive fauna and flora species). • Visual impacts. • Soil destabilisation and subsequent erosion. • Proliferation of alien and invasive species.
GN No. R.983 – Activity no. 28(ii): Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) <u>will occur outside an urban area, where the total land to be developed is bigger than 1 hectare</u>; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	• Clearance of large areas associated with the construction footprint of the PV Site and associated infrastructure. • Loss of agricultural land. • Socio-economic impacts associated with construction activities.
GN No. R.983 – Activity 56 *The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre—* *(i) where the existing reserve is wider than 13,5 meters; or* *(ii) where no reserve exists, where the existing road is wider than 8 metres;* *excluding where widening or lengthening occur inside urban areas*	• Clearance of indigenous vegetation. • Soil destabilisation and subsequent erosion. • Proliferation of alien and invasive species.
GN No. R. 984 of 4 December 2014 (as amended) (Listing Notice 2)	
GN No. R.984 – Activity no. 1: *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.*	• Impacts associated with generating electricity from the Solar PV Plant. • Impacts associated with the footprint of the physical infrastructure. • Impacts to land use. • Potential loss of sensitive environmental features (e.g. heritage resources, sensitive fauna and flora species). • Visual impacts. • Soil destabilisation and subsequent erosion. • Proliferation of alien and invasive species. • Socio-economic impacts. • Traffic impacts.
GN No. R.984 – Activity 9: *The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex*	• Impacts associated with the footprint of the physical infrastructure. • Potential loss of sensitive environmental features (e.g. sensitive fauna and flora species). • Visual impacts. • Soil destabilisation and subsequent erosion. • Proliferation of alien and invasive species. • Socio-economic impacts.
GN No. R.984 – Activity no. 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.*	• Clearance of large areas of indigenous vegetation associated with the construction footprint of the PV Site and associated infrastructure. • Potential loss of sensitive environmental features (e.g. sensitive fauna and flora species). • Visual impacts. • Soil destabilisation and subsequent erosion. • Proliferation of alien and invasive species.

Listed Activities	Potential Impact Overview
	• Socio-economic impacts associated with construction activities.
GN No. R. 985 of 4 December 2014 (as amended) (Listing Notice 3)	
GN No. R.985 – Activity no. 4 - (b)(i)(bb)(gg): The development of a road wider than 4 metres with a reserve less than 13,5 metres. b. Free State i. Outside urban areas: (bb) National Protected Area Expansion Strategy Focus areas.	Impacts associated with building an access road within NPAES Focus area.
GN No. R.985 – Activity no. 12 - (b)(iii)(iv): The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. b. Free State iv. Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland.	The clearance of large tracts of indigenous vegetation and potential loss of sensitive fauna and flora species within 100 m from the edge of a watercourse.
GN No. R.985 – Activity no. 14(ii)(a) & (c) - (b)(i)(aa)(bb)(ff) and (gg): The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. b. Free State i. Outside urban areas: (bb) National Protected Area Expansion Strategy Focus areas; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (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..	• Impacts to biodiversity within ESA as a result of the development of infrastructure within 32 m from watercourses, including access roads, stormwater system and associated infrastructure and structures. • Effects to resource quality (i.e. flow, in-stream and riparian habitat, aquatic biota and water quality) associated with working in-stream and alongside the watercourses within ESA.
GN No. R.985 – Activity 18(b)(i)(bb)(gg) and (hh): The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. b. Free State i. Outside Urban Areas: (bb) National Protected Area Expansion Strategy Focus areas; (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. (hh) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland;	• Impacts to biodiversity as a result of the development of roads within 100 m from watercourses. • Effects to resource quality (i.e. flow, in-stream and riparian habitat, aquatic biota and water quality) associated with working in-stream and alongside the watercourses.

13.3 Comments Raised by Organs of State and I&APs

The comments raised by authorities (both regulatory and commenting) and I&APs to date during the execution of the EIA are captured and addressed in the CRR (refer to **Appendix G**).

The consolidated comments raised by authorities and I&APs have been succinctly grouped into the following main categories (*note: please refer to the Comments and Response Report for a comprehensive and accurate representation of the issues raised*):

- Land use –
  - Servitude restrictions.
- Water use –
  - Application in terms of the NWA for water uses if applicable.
- Socio-economic impacts –
  - Safety of the Agricultural Community.
- Ecology –
  - Ground-thruthing of Sungazer lizard presence/absence.
  - Compliance with BirdLife SA Guideline.
- Agriculture –
  - Fire hazards potential risk to surrounding agriculture.
- Existing infrastructure –
  - Impacts to existing infrastructure (power lines, telephone lines, roads, railway lines, pipelines, etc.).
- Civil Aviation –
  - Compliance with the procedures of the South African Civil Aviation Authority (SACAA).
- Technical information –
  - Technical details and layout for the proposed facility.
- EIA Process –
  - Confirm listed activities triggered and assess related impacts.
  - Details of project components.
  - Sufficiently detailed layout and sensitivity maps.
  - Need for amended application form.
  - Specialist studies –
- Requirements for terms of reference.
- Include limitations and methodologies.
- Understanding of ‘no-go’ areas.
- Address contradicting recommendations.
- Detailed/practical mitigation measures.
- Assessment of cumulative impacts.
- Reporting on identified Environmental Themes and adherence to Screening Tool.
  - Cumulative impact assessment to consider other similar projects within a 30km radius of the proposed development site.

- Assessment of alternatives.
- Requirements for the EMPr.

- Public participation –
  - Written consent from landowner.
  - Compliance with regulated requirements.
  - Recording and addressing comments from registered I&APs and organs of state.

These issues received further attention during the investigations in the EIA phase, including the environmental specialist studies.

13.4 Project Activities

In order to understand the impacts related to the Project it is necessary to unpack the activities associated with the project life-cycle, as done in the sub-sections to follow.

13.4.1 Project Phase: Pre-construction

Some of the main Project activities, as well as high-level environmental activities, to be undertaken in the pre-construction phase are listed in **Table 29** below.

Table 29: Simplified List of Activities associated with Pre-Construction Phase

Project Phase: Pre-construction
Project Activities
• Negotiations and agreements with the affected landowner, stakeholders and authorities
• Lease Agreement
• Registration of power line servitude
• Detailed engineering design
• Detailed geotechnical investigations, including geophysical investigations
• Survey and mark development
• Procurement process for Contractor
• Review Contractor's method statements (as relevant)
• Establish new access roads and undertake selective improvements to existing access roads to facilitate the delivery of construction plant and materials
• Arrangements for accommodation of construction workers (off site)
• The building of a site office and ablution facilities
• Confirmation of the location and condition of all structures and infrastructure on the PV Site
• Determining and documenting the conditions of the roads to be used during construction
• Fencing off PV Site
High Level Environmental Activities
• Diligent compliance monitoring of the EMPr, Environmental Authorisation and other relevant environmental legislation
• Pre-construction environmental survey
• Develop Environmental Monitoring Programme (air quality, water quality, noise, traffic, social)

Project Phase: Pre-construction
• Barricading of sensitive environmental features (e.g. watercourse buffer)
• Obtain permits for impacts to SCC, if avoidance is not possible (if required)
• Obtain permits if heritage resources are to be impacted on and for the relocation of graves (if required)
• On-going consultation with I&APs
• Other activities as per EMPr

13.4.2 *Project Phase: Construction*

Some of the main Project activities, as well as high-level environmental activities, to be undertaken in the construction phase are listed in **Table 30** below.

Table 30: Simplified List of Activities associated with Construction Phase

Project Phase: Construction
Project Activities
• Site establishment
• Relocation of existing structures and infrastructure
• Prepare access roads
• Establish construction laydown area
• Bulk fuel storage
• Delivery of construction material
• Transportation of equipment, materials and personnel
• Storage and handling of material
• Construction employment
• Site clearing (as necessary)
• Excavation
• Concrete Works
• Mechanical and Electrical Works
• Electrical supply
• Material delivery and offloading
• Construction of PV Plant infrastructure
• Stockpiling
• Stringing of transmission lines
• Waste and wastewater management
High Level Environmental Activities
• Diligent compliance monitoring of the EMPr, Environmental Authorisation and other relevant environmental legislation
• Implement Environmental Monitoring Programme (air quality, water quality, noise, traffic, social)
• Reinstatement and rehabilitation of construction domain (as necessary)
• On-going consultation with I&APs
• Other activities as per EMPr

13.4.3 *Project Phase: Operation*

Some of the main Project activities, as well as high-level environmental activities, to be undertaken in the operational phase are listed in **Table 31** below.

Table 31: Simplified List of Activities associated with Operational Phase

Project Phase: Operation
Project Activities
• Testing and commissioning the facility's components
• Cleaning of PV modules
• Servitude access arrangements and requirements
• Routine maintenance inspections of power lines and servitudes
• Controlling vegetation
• Managing stormwater and waste
• Conducting preventative and corrective maintenance
• On-going consultation with directly affected parties
• Monitoring of the facility's performance
High Level Environmental Activities
• On-going consultation with I&APs
• Other activities as per EMPr for Operational Phase

13.5 Environmental Aspects

Environmental aspects are regarded as those components of an organisation's activities, products and services that are likely to interact with the environment and cause an impact.

The environmental aspects that have been identified for the proposed Project, which are linked to the project activities, are provided in **Table 32** below. Note that only high level aspects are provided.

Table 32: Environmental Aspects associated with Project Life-Cycle

Project Phase: Pre-construction
Environmental Aspects
• Inadequate consultation with landowner and other relevant stakeholders
• Inadequate rehabilitation of current eroded areas
• Inadequate environmental and compliance monitoring
• Poor construction site planning and layout
• Site-specific environmental issues not fully understood
• Land occupancy by temporary buildings, provisional on-site facilities and storage areas
• Inaccurate pre-construction environmental survey
• Absence of relevant permits (e.g. for protected trees, heritage resources) where applicable
• Lack of barricading of sensitive environmental features (e.g., watercourse buffer)
• Poor waste management
• Absence of ablution facilities

Project Phase: Construction
Environmental Aspects
• Inadequate consultation with landowner

Project Phase: Construction
• Inadequate environmental and compliance monitoring
• Lack of environmental awareness creation
• Indiscriminate site clearing
• Poor site establishment
• Poor management of access and use of access roads
• Disruptions to traffic
• Poor transportation practices
• Poor fencing arrangements
• Erosion
• Disruptions to existing services
• Disturbance of topsoil
• Poor management of excavations
• Inadequate storage and handling of material
• Inadequate storage and handling of hazardous material
• Poor maintenance of equipment and plant
• Poor management of labour force
• Pollution from ablution facilities
• Inadequate management of construction camp
• Poor waste management practices – hazardous and general solid, liquid
• Wastage of water
• Poor management of pollution generation potential
• Damage to significant flora (if encountered)
• Damage to significant fauna (if encountered)
• Impact to resource quality of wetland in central part of PV site
• Inadequate stormwater management
• Disruptions to agricultural activities at UFS Paradys Experimental Farm
• Damage to cultural heritage and palaeontological features (if encountered)
• Poor reinstatement and rehabilitation

Project Phase: Operation
Environmental Aspects
• Inadequate environmental and compliance monitoring
• Inadequate management of access, routine maintenance and maintenance works
• Inadequate management of vegetation
• Inadequate stormwater management
• Pollution caused by cleaning of panels
• Impacts caused by fire, explosion or leaks associated with BESS
• Pollution caused by dangerous good (e.g. transformer oils) associated with substation
• Inadequate management of light pollution
• Failure to comply with health, safety and environmental specifications

13.6 Potentially Significant Environmental Impacts

Environmental impacts are the change to the environment resulting from an environmental aspect, whether desirable or undesirable.

Note that it is not the intention of the impact assessment to evaluate all potential environmental impacts associated by the Project's environmental aspects, but rather to focus on the potentially significant direct, indirect and cumulative impacts identified during the Scoping phase and any additional issues uncovered during the EIA phase.

The potentially significant environmental impacts associated with the Project, as listed in **Table 33** below, were identified through an appraisal of the following:

- ❑ Project-related components and infrastructure (see **Section 9**);
- ❑ Operation of the PV Plant and power line;
- ❑ Activities associated with the project life-cycle (i.e. pre-construction, construction and operation);
- ❑ Nature and profile of the receiving environment and potential sensitive environmental features and attributes (see **Section 11**);
- ❑ Findings from specialist studies (see **Section 12**);
- ❑ Understanding of direct and indirect effects of the Project as a whole (see **Section 13**);
- ❑ Comments received during public participation (see **Section 15**); and
- ❑ Legal and policy context (see **Section 5**).

It is noted that the potentially significant environmental impacts listed in **Table 33** were evaluated as part of the specialist studies and suitable mitigation measures were identified where it was found that these impacts could possible occur. These impacts are assessed in **Sections 13.9 – 13.28** below.

Table 33: Potentially Significant Environmental Impacts associated with the Project

Environmental Factor	Construction Phase Potential Issues / Impacts	Operational Phase Potential Issues / Impacts
Land Use	▪ Sterilisation of land for other land use types. ▪ Setbacks / conditions associated with surrounding land and infrastructure.	▪ Sterilisation of land for other land use types up to the decommissioning of the Project (if applicable). ▪ Servitude restrictions associated with proposed power line (grid connection).
Geology	▪ Suitability of geological conditions to support the Solar PV Plant.	▪ Suitability of geological conditions to support the Solar PV Plant.
Geohydrology	▪ Groundwater pollution due to spillages and poor construction practices. ▪ Utilisation of boreholes, if required.	▪ Groundwater pollution due to poor operation and maintenance practices. ▪ Utilisation of boreholes, if required.
Topography	▪ Visual impacts. ▪ Erosion of areas cleared for construction purposes. ▪ Crossing topographic features (watercourses).	▪ Crossing topographic features (watercourses). ▪ Visual impact caused by proposed Project infrastructure and landscape transformation. ▪ Glint and glare from solar panels.

Environmental Factor	Construction Phase Potential Issues / Impacts	Operational Phase Potential Issues / Impacts
Soil	▪ Soil erosion due to clearance and inadequate stormwater management. ▪ Soil compaction. ▪ Soil contamination due to spillages and poor construction practices. ▪ Loss of topsoil.	▪ Soil erosion due to inadequate stormwater management. ▪ Soil contamination due to poor operation and maintenance practices.
Surface Water	▪ Alteration of drainage over the PV Site. ▪ Surface water pollution due to spillages and poor construction practices. ▪ Encroachment of construction activities into watercourses and their buffer zones. ▪ Impacts where access roads and ancillary infrastructure cross / are in close proximity to watercourses (e.g., sedimentation, loss of vegetation, destabilisation of watercourse structure).	▪ Sedimentation through silt-laden runoff, caused by inadequate stormwater management. ▪ Water resources could be contaminated through inadequate storage and handling of hazardous materials, leaks from the BESS and poor management of waste and wastewater. ▪ Water use requirements of the Project need to be satisfied.
Flora & Fauna	▪ Habitat loss / fragmentation. ▪ Potential loss, disturbance or displacement of protected fauna and flora species. ▪ Human - animal conflicts. ▪ Noise and vibration impacts to fauna. ▪ Nights lights may affect nocturnal faunal species. ▪ Illegal harvesting and poaching of faunal and floral species by construction workers. ▪ Pollution of the biophysical environment from poor construction practices. ▪ Proliferation of invasive alien species in disturbed areas.	▪ Habitat fragmentation (e.g., barriers to animal movement). ▪ Shading out of plants by solar panels. ▪ Reflection of sunlight from the solar panels could adversely affect birds. ▪ Risk to birds from collision with infrastructure and from electrocution. ▪ Electrical faulting from birds. ▪ Chemical pollution associated with cleaning the PV panels. ▪ Proliferation of invasive alien species in disturbed areas.
Socio-economic Environment	▪ Influx of people seeking employment and associated impacts (e.g., foreign workforce, cultural conflicts, squatting, demographic changes). ▪ Safety and security. ▪ Use of local road network. ▪ Nuisance from dust and noise. ▪ Consideration of local labourers and suppliers in area – stimulation of local economy (positive impact). ▪ Transfer of skills (positive impact).	▪ Direct and indirect economic opportunities as a result of the Project. ▪ Threats to human and animal health from electromagnetic field (power line and on-site substation).
Air Quality	▪ Dust from the use of dirt roads by construction vehicles. ▪ Dust from bare areas that have been cleared for construction purposes. ▪ Emissions from construction equipment and machinery. ▪ Tailpipe emissions from construction vehicles.	▪ The efficiency of the solar plant could be reduced if the modules are soiled (covered) by particulates/dust. ▪ Impacts to air quality caused by the operation and maintenance of the facility include dust from the use of dirt roads and tailpipe emissions from vehicles.
Noise	▪ Localised increases in noise may be caused by construction activities.	N/A
Agriculture	▪ Loss of fertile soil through land clearance. ▪ Soil erosion. ▪ Loss of topsoil. ▪ Risk of harm to livestock from construction activities.	▪ Loss of possible future agricultural land use due to direct occupation by the development footprint. ▪ Soil erosion due to inadequate stormwater management.
Historical and Cultural Features	▪ Possible direct impacts on below-ground archaeological deposits and fossils as a result of ground disturbance.	Possible impacts to the cultural landscape as a result of the introduction of incompatible structures and infrastructure to the rural landscape.
Existing Structures & Infrastructure	▪ Setbacks / conditions associated with surrounding land and infrastructure. ▪ Crossing of existing infrastructure by power line.	▪ Setbacks / conditions associated with surrounding land and infrastructure. ▪ Disturbances to infrastructure traversed by power line during maintenance activities.

Environmental Factor	Construction Phase Potential Issues / Impacts	Operational Phase Potential Issues / Impacts
Transportation	▪ Increase in traffic on the local road network. ▪ Transportation of materials and construction personnel to site. ▪ Impacts to road conditions. ▪ Speeding and reckless driving by construction personnel. ▪ Construction vehicles accessing and leaving the sites via N6 national road. ▪ Use of oversized vehicles/abnormal loads, as required. ▪ Risks to other road users.	▪ Transportation of maintenance materials, as well as operational and maintenance personnel, to site. ▪ Safe access, taking into consideration the high speed environment along the N6. ▪ Sun glare off PV panels.
Aesthetics	▪ Landscape transformation. ▪ Visual impacts associated with construction activities.	▪ Landscape transformation. ▪ Inadequate reinstatement and rehabilitation of construction footprint. ▪ Light pollution. ▪ High visibility of power lines to visual receptors.
Health	▪ Hazards related to construction work. ▪ Increased levels of dust and particulate matter. ▪ Increased levels of noise. ▪ Water (surface and ground) contamination. ▪ Poor water and sanitation. ▪ Communicable diseases. ▪ Psychosocial disorder (e.g. social disruptions). ▪ Safety and security. ▪ Lack of suitable health services.	▪ Hazards related to operation and maintenance work. ▪ Fire and explosion risks during BESS operation.

The cumulative impacts are discussed in **Section 13.28** below.

The findings of the specialists are of particular importance in terms of understanding the impacts of the Project and managing these during the project life-cycle, as these studies focused on the significant environmental issues identified during the execution of the EIA. As can be seen from the various impact assessments performed by the specialists, there are a host of cross-cutting impacts that are addressed in a number of these studies. The mitigation measures proposed by the specialists for these similar types of impacts are regarded as complementary and they are aligned with best practices and principles.

13.7 Impact Assessment Methodology

The impacts and the proposed management thereof are first discussed in **Section 13.9** to **Section 13.26** below on a qualitative level and thereafter quantitatively assessed by evaluating the nature, extent, magnitude, duration, probability and ultimately the significance of the impacts (refer to methodology provided in **Table 34** below). Where applicable, the impact assessments and significance ratings provided by the respective specialists are included.

The assessment considers impacts before and after mitigation, where in the latter instance the residual impact following the application of the mitigation measures is determined.

In the case of the specialist studies, some of the impact assessment methodologies deviated from the approach shown in **Table 34** below. However, the quantitative basis for these specialist evaluations of the impacts to specific environmental features still satisfied the intention of the EIA.

Table 34: Quantitative Impact Assessment Methodology

Nature (/Status) The project could have a positive, negative or neutral impact on the environment.
Extent • Local - extend to the site and its immediate surroundings. • Regional - impact on the region but within the province. • National - impact on an interprovincial scale. • International - impact outside of SA.
Magnitude Degree to which impact may cause irreplaceable loss of resources. • Low - natural and social functions and processes are not affected or minimally affected. • Medium - affected environment is notably altered; natural and social functions and processes continue albeit in a modified way. • High - natural or social functions or processes could be substantially affected or altered to the extent that they could temporarily or permanently cease.
Duration • Short term - 0-5 years. • Medium term - 5-11 years. • Long term - impact ceases after the operational life cycle of the activity either because of natural processes or by human intervention. • Permanent - mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.
Probability • Almost certain - the event is expected to occur in most circumstances. • Likely - the event will probably occur in most circumstances. • Moderate - the event should occur at some time. • Unlikely - the event could occur at some time. • Rare/Remote - the event may occur only in exceptional circumstances.
Significance Provides an overall impression of an impact's importance, and the degree to which it can be mitigated. The range for significance ratings is as follows- 0 – Impact will not affect the environment. No mitigation necessary. 1 – No impact after mitigation. 2 – Residual impact after mitigation. 3 – Impact cannot be mitigated.

13.8 Impact Mitigation

13.8.1 Mitigation Hierarchy

Impacts are to be managed by assigning suitable mitigation measures, where the objectives 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 should strive to abide by the following hierarchy – (1) prevent; (2) reduce; (3) rehabilitate (or remediate); and/or (4) compensate for the environmental impacts.

The proposed mitigation of the impacts associated with the Project includes specific measures identified by the technical team (including engineering solutions) and environmental specialists, stipulations of environmental authorities and environmental best practices.

Note that the mitigation measures in the subsequent sections are not intended to be exhaustive, but rather focus on the potentially significant impacts identified.

The EMPr's (contained in **Appendix H**) provide a comprehensive list of mitigation measures for specific elements of the Project and the receiving environment, which extends beyond the impacts evaluated in the body of the EIA Report.

13.8.2 EMPr Framework

An EMPr represents a detailed plan of action prepared to ensure that recommendations for enhancing positive impacts and/or limiting or preventing negative environmental impacts are implemented during the life-cycle of a project.

The content of an EMPr must either contain the information set out in Appendix 4 of the EIA Regulations or must be a generic EMPr relevant to an application as identified and gazetted by the Minister in a Government Notice. Once the Minister has identified, through a Government Notice, that a generic EMPr is relevant to an application for Environmental Authorisation, that generic EMPr must be applied by all parties involved in the EA process, including, but not limited to, the Applicant and the Competent Authority.

In accordance with the above, the following EMPr's were developed for the Project:

- Generic EMPr for the development and expansion for overhead electricity transmission and distribution infrastructure (contained in **Appendix H2**);
- Generic EMPr for the development and expansion of substation infrastructure for the transmission and distribution of electricity (contained in **Appendix H3**); and
- Normal EMPr for the Solar PV Plant (contained in **Appendix H1**).

All liability for the implementation of the EMPr (as well as the EIA findings and Environmental Authorisation, if granted) lies with the Applicant.

The following considerations and assumptions accompany the compilation of the EMPr for the Solar PV Plant:

- The EMPr is guided by the following principles, based on Lochner (2005) -

- **Continuous improvement -** The Applicant should be committed to review and to continually improve environmental management, with the objective of improving overall environmental performance;
- **Broad level of commitment** - A broad level of commitment is required from all levels of management as well as the workforce in order for the implementation of the EMPr to be successful and effective; and
- **Flexible and responsive** - The implementation of the EMPr needs to be responsive to new and changing circumstances. The EMPr report is a dynamic "living" document that will need to be updated regularly throughout the duration of the project life-cycle.

- ❑ Compliance with the EMPr must be audited in terms of Regulation 34 of the EIA Regulations.
- ❑ The EMPr provides the framework for the overarching environmental management requirements for the project life-cycle. Following detailed design and planning, the EMPr may need to be revised to render the management actions more explicit and accurate to the final project specifications. Any amendments to the EMPr must be undertaken in accordance with Regulations 35 – 37 of the EIA Regulations.
- ❑ The EMPr will be linked to the project's overall Environmental Management System (EMS) (if applicable), where the EMS constitutes an iterative process that aims achieve continuous improvement and enhanced environmental performance.
- ❑ Although every effort has been made to ensure that the scope and level of detail of the EMPr are tailored to the level of environmental risk (i.e., type and scale of activity and the sensitivity of the affected environment) and the project- and site-specific conditions, certain of the environmental management requirements within the EMPr may be regarded as generic to make provision for activities that may take place as part of the overall Project.

13.9 Land Use

13.9.1 Impact Description

Land is required for constructing the proposed infrastructure associated with the Solar PV Plant. In addition, a servitude will be required for the proposed power line (grid connection).

The areas affected by the proposed Project footprint are rural in nature. The Project's PV Site is vacant and was historically used for agricultural purposes. The landowner has signed an Option to Lease Agreement with the Applicant. The land use at the site earmarked for the proposed Solar PV Plant will change to accommodate the proposed development. Following decommissioning, the land can be rehabilitated to a desired end state.

To minimise impacts to the receiving environment and current land uses, the Project's power line route follows parallel to existing Eskom powerline servitudes.

13.9.2 *Impact Assessment*

Environmental Feature	Land Use
Relevant Alternatives & Activities	**All physical infrastructure and ancillary structures that form part of the Project**
Project life-cycle	**Construction & operational phases**
Potential Aspects & Impacts	**Proposed Management Objectives / Mitigation Measures**
• Change of land use at site earmarked for Solar PV Plant.	• Remove the minimum amount of vegetation required during construction to build hardstanding areas, powerline towers, and PV module structures and roads. • Rehabilitate areas impacted on during construction.

	+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	medium	short-term	almost certain	2
After Mitigation	-	local	medium	short-term	moderate	1

13.10 Soils

13.10.1 *Impact Description*

According to Gouws (2023), the soil at the PV Site is highly erodible. During the construction phase areas will be cleared of vegetation, which may lead to soil erosion. Erosion could also take place in the absence of suitable stormwater management. The EMPr includes suitable storm water management measures to prevent the occurrence of erosion.

Soil may be polluted by poor storage or handling of material, spillages and inadequate housekeeping practices. Specific mitigation measures are contained in the EMPr, where the primary objective is the effective and safe management of materials on site, in order to minimise the impact of these materials on the biophysical environment. The same objective applies to the correct management and handling of hazardous substances (e.g. fuel, transformer oil, batteries).

13.10.2 *Impact Assessment*

Environmental Feature	Soils
Relevant Alternatives & Activities	**Construction and operational activities**
Project life-cycle	**Construction & operational phases**
Potential Aspects & Impacts	**Proposed Management Objectives / Mitigation Measures**
• Soil erosion. • Soil compaction. • Soil pollution.	• Consider findings from geotechnical investigations during Project design phase and incorporate mitigation measures (as relevant). • Stabilisation of cleared areas to prevent and control erosion. • Manage drainage from sites to minimise erosion. • Reinstate and rehabilitate disturbed areas to prevent future erosion. • See mitigation measures regarding hazardous substances & waste.

	+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	medium-high	short-term	likely	3
After Mitigation	-	local	low	short-term	unlikely	1

13.11 Geohydrology

13.11.1 Impact Description

Groundwater may be impacted by the Project as follows:

- Possible influence on groundwater flow as a result of trenching and building of infrastructure and structures associated with the development footprint during construction;
- Use of groundwater during construction and operational phases; and
- Potential contamination of groundwater during construction and operational phases as a result of inadequate management of wastewater and spillages of dangerous goods.

13.11.2 Impact Assessment

Environmental Feature	**Geohydrology**
Relevant Alternatives & Activities	**Construction and operational activities**
Project life-cycle	**Construction & operational phases**
Potential Aspects & Impacts	**Proposed Management Objectives / Mitigation Measures**
• Groundwater pollution. • Groundwater use. • Impacts to groundwater flow.	• Consider findings from geotechnical investigations during Project design phase and incorporate mitigation measures (as relevant). • Provide suitable protection of groundwater during excavations. • All storage tanks containing hazardous materials must be placed in bunded containment areas with impermeable surfaces. The bunded area must be able to contain 110% of the total volume of the stored hazardous material. • Provide sufficient and suitable sanitation facilities during construction and operational phases, which shall conform to all relevant health and safety standards and codes. • Reduce sediment loads in water from dewatering operations. All dewatering shall be done through temporary sediment traps (e.g. constructed out of geo-textiles and hay bales). • If any groundwater is to be used during the construction and operational phases, it will need to comply with the provisions of the NWA.

	+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	medium-high	long-term	likely	3
After Mitigation	-	local	low	long-term	unlikely	1

13.12 Surface Water

13.12.1 Hydrology

13.12.1.1 Impact Description

The study area for Alternative 2 does not contain any wetlands or perennial drainage lines. However, several non-perennial rivers and a wetland are found within the Alternative 1 layout of the study area and the LILO. The study not only encroaches into the 32 m buffer zone of the non-perennial rivers, but the rivers themselves for Alternative 1 only.

Based on the presence of the aforementioned non-perennial rivers within the PV site, the proponent has revised the layout for Oslaagte Solar 1 PV in order to accommodate these freshwater sensitive features. The Project footprint is situated outside the delineated non-perennial rivers as well as its buffer zones in the Alternative 2 layout.

The potential impacts on associated watercourses due to construction and operational activities include sediment pollution, damage to the morphology and hydrology of these watercourses. However, since the Alternative 2 layout is outside of these sensitive features as well as its buffer zone, the development will therefore not likely have an impact on the non-perennial rivers.

13.12.1.2 Impact Assessment

Impacts to hydrological function

Nature: Changes to flood regimes of the watercourse through, for example, flood suppression, unseasonal flooding or the loss of flood attenuation capacity.				
ACTIVITY: Sources include the compaction of soil, vegetation removal, redirecting surface water, changes to the surface water characteristics or through construction of roads.				
	Alternative 1		**Alternative 2**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Construction Phase				
Probability	Moderate (3)	Unlikely (2)	Unlikely (2)	Unlikely (2)
Duration	Medium (3)	Short term (2)	Short term (2)	Short term (2)
Extent	Regional (3)	Local (2)	Regional (3)	Local (2)
Magnitude	Moderate (6)	Low (4)	Low (4)	Minor (2)
Significance	**36 (Low to Moderate)**	**16 (Low)**	**18 (Low)**	**12 (Low)**
Status (positive or negative)	Negative	Negative	Negative	Negative
Operational Phase				
Probability	Moderate (3)	Unlikely (2)	Minor (1)	Rare (1)
Duration	Medium term (3)	Short term (2)	Short term (2)	Short term (2)
Extent	Regional (3)	Local (2)	Local (2)	Local (2)
Magnitude	Moderate (6)	Low (4)	Minor (2)	Minor (2)

Significance	**36 (Low to Moderate)**	**16 (Low)**	**12 (Low)**	**6 (Low)**
Status (positive or negative)	Negative	Negative	Negative	Positive
Reversibility	Low	Moderate	Moderate	High
Irreplaceable loss of resources?	High	Low	Low	Low
Can impacts be mitigated?	Yes		Yes	

Mitigation:

- The entire footprint should avoid the delineated boundaries of watercourses as well as its buffer zones;
- The area is still likely prone to erosion around these areas should poor stormwater management be implemented. As such, a comprehensive stormwater management plan is required for the project;
- Effective stormwater and erosion management plans should be in place during both the construction and operational phases. This should also be monitored as part of the EMPr;
- Appropriate stormwater structures should be in place to control run-off and minimize erosion;
- All stormwater runoff from the panels should enter the systems through diffuse channels fitted with flow attention/energy dissipation structures;
- Stormwater runoff and runoff from the cleaning of panels would be increased and therefore increases the erosion potential in the surrounding areas;
- Panels should be fitted with stormwater gutters to control the runoff in an ecologically sensitive manner to prevent erosion;
- With regards to the powerline and road construction, the recommended buffer zones must be strictly adhered to during the construction phase with the exception when activities and structures required to traverse the watercourse. Pylons should be constructed outside the delineated watercourses;
- All areas where vegetation was cleared should be re-vegetated in order to limit the erosion potential;
- Sedimentation and erosion protection measures (such as sand bags, silt traps and fences) should be installed prior to construction;
- Roads crossing low-lying areas/potentially wet areas require permeable paving in order to lower the risk of habitat damage and possible erosion;
- Inspect all pylons, road network and influences areas 1 month following the conclusion of the construction activities as well as after the first rainfall event. Routing monitoring should take place for the duration of the project. Should erosion develop, then eroded areas should be immediately addresses through appropriate measures;
- All roads traversing delineated low-lying areas should be kept to a minimum to ensure hydrological connectivity;
- Construction of watercourse crossings (if needed) must take place from existing disturbed areas;
- Prevent uncontrolled access of vehicles through the watercourse which can impact the hydrology and alluvial soil structure; and,
- All no-go areas should be clearly demarcated prior to commencement of construction activities.

Cumulative impacts: Low to moderate and could possibly include edge effects to remaining natural vegetation as the footprint activities may result in vegetation clearing. This could lead to increase in sedimentation as well as introduction of alien and invasive species.

Residual Risks: Expected to be low given that all structures are situated outside the delineated sensitive areas and that stormwater is managed effectively.

Impacts to sediment

Nature: Change in sedimentation patterns, changes in sediment in watercourses and sub-catchment due to the removal of soil.				
ACTIVITY: Construction activities and maintenance of solar plant would result in earthworks as well as causing soil and vegetation disturbances. Loss of topsoil, sedimentation in rivers that would cause an increase in turbidity. Other potential impacts include; earthworks, clearing of vegetation would result in bare soil that could be washed into the river, erosion, disturbance of slopes through road works next to watercourses.				
	Alternative 1		**Alternative 2**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Construction Phase				
Probability	Likely (4)	Moderate (3)	Unlikely (2)	Unlikely (2)
Duration	Medium term (3)	Short term (2)	Short term (2)	Short term (2)
Extent	Local (2)	Local (2)	Local (2)	Local (2)
Magnitude	Moderate (6)	Low (4)	Low (4)	Minor (2)
Significance	**44 (Moderate)**	**24 (Low to Moderate)**	**16 (Low)**	**12 (Low)**
Status (positive or negative)	Negative	Negative	Negative	Negative
Operational Phase				
Probability	Moderate (3)	Unlikely (2)	Unlikely (2)	Rare (1)
Duration	Medium term (3)	Short term (2)	Short term (2)	Short term (2)
Extent	Local (2)	Local (2)	Local (2)	Local (2)
Magnitude	Moderate (6)	Low (4)	Low (4)	Minor (2)
Significance	**33 (Low to Moderate)**	**16 (Low)**	**16 (Low)**	**6 (Low)**
Status (positive or negative)	Negative	Negative	Negative	Positive
Reversibility	Low	Moderate	Moderate	High
Irreplaceable loss of resources?	High	Low	Low	Low
Can impacts be mitigated?	Yes		Yes	

Mitigation:

- Install sediment traps;
- Remove topsoil and keep topsoil stockpiles free of any weeds to keep topsoil viable for rehabilitation;
- All stockpiles should be safeguarded against rain wash;
- Ensure that stockpiles are covered during windy conditions
- Remove only vegetation in areas essential for construction;
- Excess water flow should be managed efficiently to avoid any impacts on rivers;
- Protect all areas susceptible to erosion through installing erosion berms that can prevent gully formation and siltation of watercourses;
- All soil and topsoil removed should not be stockpiled within any watercourse and should take place outside delineated watercourses. All stockpiles should be protected from erosion and stored on flat surfaces;
- Avoid using chemicals for cleaning of solar panels to lower the risk of polluting soils, and in times of flow will pollute surface runoff from contaminated soils;

- Monitor sediment pollution;   - Construction activities should take place in low flow period (as much as possible). This will lower the risk of erosion, sedimentation and polluting downstream water resources;   - All stationary vehicles should be equipped with drip trays;   - Avoid parking of vehicles close to any watercourses;   - No dumping of waste or any other materials near delineated and buffered areas; and   - All areas affected by construction activities should be rehabilitated upon completion of the construction phase. Areas where vegetation was removed, should be reseeded with indigenous grasses as per recommendations from Terrestrial Report.
Cumulative impacts: Low to moderate and could possibly include edge effects to remaining natural vegetation as the footprint activities may result in vegetation clearing. This could lead to increase in sedimentation as well as introduction of alien and invasive species.
Residual Risks: Expected to be low given that all structures are situated outside the delineated sensitive areas and that stormwater is managed effectively.

Introduction and spread of alien and invasive species within watercourses

Nature: Introduction and spread of alien and invasive species.				
ACTIVITY: The removal and movement of soil and vegetation could result in opportunistic invasions after such disturbances as well as the introduction of seed in building materials and on vehicles. In addition, invasions of alien vegetation species can have an impact on hydrology through reducing the water quantity entering a watercourse and it can outcompete natural vegetation and therefore decrease natural biodiversity.				
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Construction Phase				
Probability	Unlikely (2)	Rare (1)	Unlikely (2)	Rare (2)
Duration	Short term (2)	Short term (2)	Short term (3)	Short term (2)
Extent	Local (2)	Local (2)	Local (2)	Local (2)
Magnitude	Low (4)	Low (4)	Low (4)	Low (4)
Significance	**16 (Low)**	**8 (Low)**	**16 (Low)**	**8 (Low)**
Status (positive or negative)	Negative	Negative	Negative	Negative
Operational Phase				
Probability	Rare (1)	Rare (1)	Rare (1)	Rare (1)
Duration	Short term (2)	Short term (2)	Short term (2)	Short term (2)
Extent	Local (2)	Site-only (1)	Local (2)	Site-only (1)
Magnitude	Low (4)	Minor (2)	Low (4)	Minor (2)
Significance	**8 (Low)**	**5 (Low)**	**8 (Low)**	**5 (Low)**
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Low	Moderate	Moderate	Moderate
Irreplaceable loss of resources?	Low	Low	Low	Low
Can impacts be mitigated?	Yes		Yes	

Mitigation: • Monitor for early detection, to find species when they first appear on site. This should be as per the frequency specified in the management plan and should be conducted by an experienced person. Early detection should provide a list of species and locations where they have been detected. Summer (vegetation maximum growth period) is usually the most appropriate time, but monitoring can be adaptable, depending on local conditions – this must be specified in the management plan; • Monitor for the effect of management actions on target species, which provides information on the effectiveness of management actions. Such monitoring depends on the management actions taking place. It should take place after each management action; and, • Monitor for the effect of management actions on non-target species and habitats.
Cumulative impacts: Limited alien and Invasive plant species were observed on site, cumulative impacts can be Low to Moderate. As such, continuous monitoring should be implemented during the different phases of development and rehabilitation as well as a period after rehabilitation is completed.
Residual Risks: Expected to be limited given that an Alien and Invasive Plant Management Plant forms part of the operational processes of the PV facility.

Activities causing pollution

Nature: Surface water, groundwater and sediment pollution.				
ACTIVITY: Accidental spillages of wet concrete, chemical hazardous substances, oil and diesel spillages may result in surface water, groundwater and sediment pollution.				
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Construction Phase				
Probability	Likely (4)	Unlikely (2)	Unlikely (2)	Unlikely (2)
Duration	Medium term (3)	Medium term (3)	Medium term (3)	Short term (2)
Extent	Local (2)	Local (2)	Local (2)	Local (2)
Magnitude	Moderate (6)	Moderate (6)	Low (4)	Low (4)
Significance	**44 (Moderate)**	**22 (Low to Moderate)**	**18 (Low)**	**16 (Low)**
Status (positive or negative)	Negative	Negative	Negative	Negative
Operational Phase				
Probability	Likely (4)	Unlikely (2)	Unlikely (2)	Unlikely (2)
Duration	Short term (2)	Short term (2)	Short term (2)	Short term (2)
Extent	Local (2)	Local (2)	Local (2)	Local (2)
Magnitude	Moderate (6)	Low (4)	Low (4)	Minor (2)
Significance	**40 (Moderate)**	**16 (Low)**	**16 (Low)**	**12 (Low)**
Status (positive or negative)	Negative	Negative	Negative	Negative

Reversibility	Low	Moderate	Moderate	Moderate
Irreplaceable loss of resources?	High	Low	Low	Low
Can impacts be mitigated?	Yes		Yes	

Mitigation:

- The development footprint should remain outside the delineated rivers, riparian and buffer zones;
- Concrete mixing should be done outside the buffer zones and should be done on an impermeable surface;
- All stationary vehicles should be equipped with drip trays;
- No servicing of vehicles or construction equipment should take place near delineated or buffer areas and should be done on an impermeable surface area;
- No washing of construction equipment is allowed in any watercourse;
- All hazardous substances should be safely stored on an impermeable surface within the construction site camp;
- No ablution facilities should be located within 50 m of watercourses and should be outside the 1:100 year flood line;
- Construction camp, storage of construction equipment and materials, and chemicals should be located outside the 1: 100 year flood line;
- No dumping of waste near or within delineated watercourses and should be adequately stored and removed from site by waste facility;
- All waste and refuse should be removed from site and disposed in adequate storage containers before being disposed at a registered landfill site;
- All accidental spillages should be rehabilitated immediately and contaminated soil should be adequately disposed off;
- No vehicle or construction machinery are allowed within the watercourse; and,
- Only use clean water in the washing of the solar panels.

Cumulative impacts: Impacted water quality will not only affect local water quality but regional water quality as well. This is considered as a significant cumulative impact.

Residual Risks: Since pollution can be controlled and to a large extent be prevented, the impact of spillages will have a significant residual impact on local watercourses and as such should be considered a significant residual risk.

13.13 Terrestrial Ecology

The findings from the Terrestrial Biodiversity Compliance Statement (Human, 2023) follow. The specialist report is contained in **Appendix E2**.

13.13.1 Impact Description

The project area was found in a heavily modified condition, mainly attributed to the agricultural practices and its impacts associated, resulting in the area being largely disturbed in some way. Grazing practices, old lands and piospheres have degraded the veld severely. These aspects further limit the functional capacity of the project area. Much of the development footprint is located within degraded areas or along roads or transformed areas and their associated servitudes, which are considered as low sensitivity. No SCC were observed during the field survey.

The focus of the mitigation measures is to reduce the significance of the expected impacts associated with the development and thereby to:

- Prevent the further loss and fragmentation of vegetation communities within the CBA and ESA areas in the vicinity of the project area;
- Reduce the negative fragmentation effects of the development and enable the safe movement of faunal species; and
- Prevent the direct and indirect loss and disturbance of floral and faunal species and communities (including any potential Species of Conservation Concern nearby).

13.13.2 Impact Assessment

According to the Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity (GN No. 320 of 20 March 2020), a Terrestrial Biodiversity Compliance Statement was prepared for the Project as the desktop assessment and field survey confirmed that the Project Area is of a 'Low' sensitivity. This compliance statement does not include a quantitative assessment of the potential impacts to terrestrial biodiversity, however, it provides impact management actions that are outlined below.

The following mitigation measures are recommended to address potential impacts:

13.13.2.1 Vegetation and habitats

- Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible. All activities must be restricted within the low/medium sensitivity areas. No further loss of high sensitivity areas should be permitted. It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon.
- Existing access routes, especially roads must be made use of
- All laydown, chemical toilets etc. should be restricted to medium/low sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction phase has been concluded. No permanent construction phase structures should be permitted. Construction buildings should preferably be prefabricated or constructed of re-usable/recyclable materials. No storage of vehicles or equipment will be allowed outside of the designated project areas.
- Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species. All livestock must always be kept out of the project area, especially areas that have been recently revegetated.

- A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment. Construction activities and vehicles could cause spillages of lubricants, fuels and waste material potentially negatively affecting the functioning of the ecosystem. All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the project area.
- It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.
- Any individual of the protected plants that are present needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. High visibility flags must be placed near any threatened/protected plants in order to avoid any damage or destruction of these specimens.
- Infrastructure, development areas and routes where protected plants cannot be avoided, these plants mainly being succulents should be removed from the soil and relocated/ re-planted in similar habitats where they should be able to resprout and flourish again.
- A fire management plan needs to be complied and implemented to restrict the impact fire might have on the surrounding areas.
- Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals.
- Restrict impact to development footprint only and limit disturbance in surrounding areas.
- Prior to commencement of construction, compile a Rehabilitation Plan including monitoring specifications, to be included into the EMPr during final approval.
- Prior to commencement of construction, compile an Alien Plant Management Plan, to be included into the EMPr during final approval.
- Prior to commencement of construction, compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control, including monitoring specifications.
- Undertake regular monitoring to detect alien invasions early so that they can be controlled.
- Prior to commencement of construction, compile and implement a stormwater management plan including monitoring specifications.
- Monitor surfaces for erosion, repair and/or upgrade, where necessary.
- Prior to decommissioning commencing, compile a Rehabilitation Plan in compliance with the regulatory requirements at the time of decommissioning.

13.13.2.2 Fauna

- A qualified environmental control officer must be on site when construction begins. A site walk through is recommended by a suitably qualified ecologist prior to any construction activities, preferably during the wet season. Should animals not move out of the area on their own relevant specialists must be contacted to advise on how the species can be relocated. In situations where the threatened and protected plants must be removed, the proponent may only do so after the required permission/permits have been obtained in accordance with national and provincial legislation. In the abovementioned situation the development of a search, rescue and recovery program is suggested for the protection of these species.
- Outside lighting should be designed and limited to minimize impacts on fauna. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible.
- Try incorporating motion detection lights as much as possible to reduce the duration of illumination. Heights of light columns to be minimised to reduce light spill. Baffles, hoods or louvres to also be used to reduce light spill.
- All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits (30km/h) must still be enforced to ensure that road killings and erosion is limited.
- The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments,
    - Signs must be put up to enforce this.
- No trapping, killing, or poisoning of any wildlife is to be allowed
    - Signs must be put up to enforce this;
- Outside lighting should be designed and limited to minimize impacts on fauna. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible.
- All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits (30km/h) must still be enforced to ensure that road killings and erosion is limited.
- All areas to be developed must be walked through prior to any activity to ensure no nests or fauna species are found in the area. Should any Species of Conservation Concern not move out of the area, or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken
- Any holes/deep excavations must be dug and planted in a progressive manner and shouldn't be left open overnight;
    - Should the holes be left open overnight they must be covered temporarily to ensure no small fauna species fall in.

- Ensure that cables and connections are insulated successfully to reduce electrocution risk
- Any exposed parts must be covered (insulated) to reduce electrocution risk.
- Heat generated from the substations must be monitored to ensure it does not negatively affect the local fauna
- Use environmentally friendly cleaning and dust suppressant products
- Fencing mitigations:
    - Wildlife-permeable fencing with holes large enough for mongoose and other smaller mammals should be installed every 50 m along the fence (with a size of 30 x 20 cm), the holes must not be placed in the fence where it is next to a major road as this will increase road killings in the area.

13.13.2.3 Alien Species

- Compilation of and implementation of an alien vegetation management plan.
- The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprint of the roads must be kept to prescribed widths.
- Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site.
- A pest control plan must be put in place and implemented; it is imperative that poisons not be used.

13.13.2.4 Dust

- Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces.
    - No non environmentally friendly suppressants may be used as this could result in pollution of water sources

13.13.2.5 Waste Management

- Waste management must be a priority and all waste must be collected and stored effectively
- Litter, spills, fuels, chemicals and human waste in and around the project area
- A minimum of one toilet must be provided per 10 persons. Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area
- The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility
- Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regard to waste management. Under no circumstances may domestic waste be burned on site.

- Refuse bins will be emptied and secured. Temporary storage of domestic waste shall be in covered waste skips. Maximum domestic waste storage period will be 10 days.

13.13.2.6 Environmental Awareness Training

The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility. All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of protected species, their identification, conservation status and importance, biology, habitat requirements and management requirements as within the Environmental Authorisation and EMPr. The avoidance and protection of the wetland areas must be included into a site induction. Contractors and employees must all undergo the induction and made aware of the “no-go” to be avoided.

13.13.2.7 Erosion

- Speed limits must be put in place to reduce erosion.
  - Reducing the dust generated by the listed activities above, especially the earth moving machinery, through wetting the soil surface and putting up signs to enforce speed limit as well as speed bumps built to force slow speeds;
  - Signs must be put up to enforce this.
- Where possible, existing access routes and walking paths must be made use of.
- Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events and strong winds.
- A stormwater management plan must be compiled and implemented.

13.14 Avifauna

A separate Avifaunal Baseline and Impact Assessment (Buys, 2023) was undertaken and the findings from this study follow. The specialist report is contained in **Appendix E3**.

13.14.1 Impact Description

In consideration that there are anthropogenic activities and influences present within the landscape, there are currently several negative impacts to biodiversity, including avifauna. These include:

- Historic land modification largely in the form of road and powerline infrastructure, and the associated land clearing and edge effects;
- Livestock grazing;
- Minor and major gravel roads (and associated vehicle traffic and the possibility of wildlife road mortalities);
- Invasive Alien Plant infestations; and
- Fences and the associated infrastructure.

During the construction phase vegetation clearing for the associated infrastructure will lead to direct habitat loss. Vegetation clearing will create a disturbance and will therefore potentially lead to the displacement of avifaunal species. The operation of construction machinery on site will generate noise pollution. Increased human presence can lead to poaching and the increase in vehicle traffic and heavy machinery will potentially lead to roadkill.

The principal impacts of the operational phase are electrocution, collisions, fencing, chemical pollution due to chemical cleaning of the PV panels and habitat loss. Solar panels have been implicated as a potential risk for bird collisions. Collisions are thought to arise when birds (particularly waterbirds) mistake the panels for waterbodies, known as the “lake effect” (Lovich & Ennen, 2011), or when migrating or dispersing birds become disorientated by the polarised light reflected by the panels. This “lake-effect” hypothesis has not been substantiated or refuted to date (Visser et al, 2019). It can however be said that the combination of power lines, fencing and large infrastructure will influence avifauna species. Visser et al (2019) performed a study at a utility-scale PV SEF in the Northern Cape and found that most of the species affected by the facility were passerine species. This is due to collisions with solar panels from underneath. During a predator attack while foraging under the panels, individuals may alight and then collide with the panel. Larger species were said to be more influenced by the facilities when they were found foraging close by and were disturbed by predators which resulted in collisions with infrastructure.

Large passerines are particularly susceptible to electrocution because owing to their relatively large bodies, they are able to touch conductors and ground/earth wires or earthed devices simultaneously. The chances of electrocution are increased when feathers are wet, during periods of high humidity or during defecation. Prevailing wind direction also influences the rate of electrocution casualties.

Fencing of the PV site can influence birds in six ways (BirdLife South Africa, 2015):

- Snagging – occurs when a body part is impaled on one or more barbs or razor points of a fence;
- Snaring – when a bird's foot/leg becomes trapped between two overlapping wires;
- Impact injuries – birds flying into a fence, the impact may kill or injure the bird;
- Snarling – when birds try and push through a mesh or wire stands, ultimately becoming trapped (uncommon);
- Electrocution – electrified fence can kill or severely injure birds; and
- Barrier effect – fences may limit flightless birds including moulting waterfowl from resources.

Chemical pollution from PV cleaning, if not environmentally friendly will result in either acute or chronic affects. Should this chemical penetrate into the surrounding environment, it would impact populations on a larger scale and not just species found in and around the PV footprint.

13.14.2 Impact Assessment

Construction Phase

a) Habitat destruction within the project footprint

Habitat destruction of the proposed development is inevitable. For the original design pre-mitigation the significance of the impact is a Negative High Impact but with the implementation of mitigation measures can be reduced to a Negative Moderately High Impact. With the alternative design, the pre-mitigation impact will be high, but the post mitigation as the sensitive areas are successfully avoided will be lowered to Moderate.

Prior to mitigation (original Design)					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
5	3	4	4	5	
Permanent	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Great / harmful/ ecosystem structure and function largely altered	Ecology highly sensitive /important	Definite	**High**
Post mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
4	2	4	4	4	
Life of operation or less than 20	Development specific/ within the site	Great / harmful/ ecosystem	Ecology highly	Highly likely	**Moderately High**

years: Long Term	boundary / < 100 ha impacted / Linear features affected < 100m	structure and function largely altered	sensitive /important		

Prior to mitigation (Alternative Design)					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
5	3	4	4	5	
Permanent	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Great / harmful/ ecosystem structure and function largely altered	Ecology highly sensitive /important	Definite	**High**
Post mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
4	2	4	3	4	
Life of operation or less than 20 years: Long Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Great / harmful/ ecosystem structure and function largely altered	Significant / ecosystem structure and function moderately altered	Highly likely	**Moderate**

Mitigation Actions:

- Solar panels must be mounted on pile driven or screw foundations, such as post support spikes, rather than heavy foundations, such as trench-fill or mass concrete foundations, to reduce the negative effects on natural soil functioning, such as its filtering and buffering characteristics, while maintaining habitats for both fossorial and epigeic biodiversity (Bennun et al, 2021). If concrete foundations are used that would increase the impact of the project as there would be direct impacts to soil permeability and characteristics, thereby influencing inhabitant fauna. In addition, stormwater runoff and runoff from cleaning the panels would be increased, increasing erosion in the surrounding areas;

- Indigenous vegetation to be maintained under the solar panels to ensure biodiversity is maintained and to prevent soil erosion (Beatty et al, 2017; Sinha et al, 2018). The photographs below are sourced from these documents;


- Vegetation clearing to commence only after the necessary permits have been obtained; and
- Environmental Officer (EO) to provide supervision and oversight of vegetation clearing activities.

b) Destruction, degradation and fragmentation of surrounding habitats

Construction activities can lead to destruction of surrounding habitats. Pre-mitigation this impact has a Negative Moderately High significance, but with the implementation of mitigation measures the significance can be reduced to a Negative Low impact.

Prior to mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
4	3	3	4	4	
Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Significant / ecosystem structure and function moderately altered	Ecology highly sensitive /important	Highly likely	**Moderately High**
Post mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
3	2	2	2	3	
				Likely	**Low**

One year to five years: Medium Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Small / ecosystem structure and function largely unchanged	Ecology with limited sensitivity/importance		

Mitigation Actions:

- Pre-construction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, remaining within demarcated construction areas etc.;
- All solid waste must be managed in accordance with a Solid Waste Management Plan. Recycling is encouraged;
- All construction activities and roads to be within the clearly defined and demarcated areas;
- Temporary laydown areas should be clearly demarcated and rehabilitated with indigenous vegetation subsequent to end of use;
- Appropriate dust control measures to be implemented;
- Suitable sanitary facilities to be provided for construction staff as per the guidelines in Health and Safety Act;
- Cement mixed on site must be mixed in a bunded area or on a removable surface such as thick plastic sheeting at least 50 m away from any wetlands or water resources; and
- All hazardous materials, if any, should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner.

c) Displacement/emigration of avifauna community (including SCC) due to noise pollution

Noise pollution generated from construction activities will lead to the displacement/emigration of the local avifauna community including the proximal surrounding area. This will include SCC that occur or are likely to occur within the area. Pre-mitigation this impact has a Negative Moderately High significance, but with the implementation of mitigation measures the significance can be reduced to a Negative Low impact.

Prior to mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
4	3	4	4	4	

Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Great / harmful/ ecosystem structure and function largely altered	Ecology highly sensitive /important	Highly likely	**Moderately High**
Post mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
3	2	2	2	3	
One year to five years: Medium Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Small / ecosystem structure and function largely unchanged	Ecology with limited sensitivity/importance	Likely	**Low**

Mitigation Actions:

- No construction activity is to occur at night, as nocturnal species are highly dependent on sound and/or vocalisations for behavioural processes;
- All vehicles speed must be restricted to 20 km/h, to reduce the noise emitted by them; and
- If generators are to be used these must be soundproofed.

d) Direct mortality from persecution or poaching of avifauna species and collection of eggs

There is the possibility of construction staff poaching avifauna species and collecting eggs from the project footprint and proximal surrounding area. There is also the possibility of persecution of species that are deemed as negative in folklore. This impact was determined to have a Negative Moderately High Impact significance but can be reduced to a Negative Low Impact significance with the implementation of mitigation actions.

Prior to mitigation					
	Spatial Scope				Significance

Duration of Impact		Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	
4	3	4	4	4	
Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Great / harmful/ ecosystem structure and function largely altered	Ecology highly sensitive /important	Highly likely	**Moderately High**
Post mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
2	2	2	4	3	
One month to one year: Short Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Small / ecosystem structure and function largely unchanged	Ecology highly sensitive /important	Likely	**Low**

Mitigation Actions:

- All personnel should undergo environmental awareness training that includes educating on not poaching/persecuting species and collecting eggs;
- Prior to commencing work each day, two individuals should traverse the working area in order to disturb any avifauna and so they have a chance to vacate the area; and
- Any avifauna threatened by the construction activities that does not vacate the area should be removed safely by an appropriately qualified environmental officer or removal specialist.

e) Direct mortality from increased vehicle and heavy machinery traffic

The increased vehicle and heavy machinery traffic associated with construction activities will lead to roadkill. This impact was determined to have a Negative Moderately High Impact significance but can be reduced to a Negative Low Impact significance with the implementation of mitigation actions.

Prior to mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
4	3	4	4	4	
				Highly likely	

Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Great / harmful/ ecosystem structure and function largely altered	Ecology highly sensitive /important		**Moderately High**

Post mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
2	2	2	2	1	
One month to one year: Short Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Small / ecosystem structure and function largely unchanged	Ecology with limited sensitivity/importance	Highly unlikely	**Absent**

Mitigation Actions:

- All personnel should undergo environmental induction with regards to awareness about speed limits and roadkill; and
- All construction vehicles should adhere to a speed limit of maximum 20 km/h to avoid collisions. Appropriate speed control measures and signs must be erected.

Operational Phase

a) Collisions with infrastructure associated with the PV Facility and powerlines

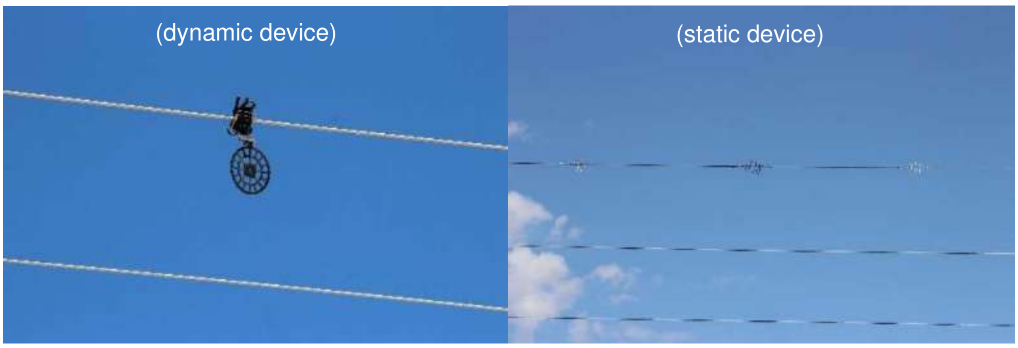
The proposed project comprises of components that pose a collision risk to avifauna species. This includes collisions with PV panels, connection infrastructure, powerlines and fences. This impact was determined to have a Negative High significance but can be reduced to a Negative Moderate significance with the implementation of appropriate mitigation measures.

Prior to mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
5	4	4	4	4	
Permanent	Regional within 5 km of the site boundary / < 2000ha impacted	Great / harmful/ ecosystem structure and	Ecology highly sensitive /important	Highly likely	**High**

	/ Linear features affected < 3000m	function largely altered			
Post mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
4	3	3	4	4	
Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Significant / ecosystem structure and function moderately altered	Ecology highly sensitive /important	Highly likely	**Moderately High**

Mitigation Actions:

- The design of the proposed solar plant must be of a type or similar structure as endorsed by the Eskom-Endangered Wildlife Trust (EWT) Strategic Partnership on Birds and Energy, considering the mitigation guidelines recommended by Birdlife South Africa;
- Non-polarising white tape can be used around and/or across panels to minimise reflection (Bennun et al, 2021). This is especially pertinent to waders and aquatic species that may recognise the panel array as water bodies (lake effect as described above) and collide with the panels, causing mortality;
- The air space used by the gridlines must be minimised by burying them where possible;
- Overhead cables/lines across water resource areas must be fitted with industry standard bird flight diverters in order to make the lines as visible as possible to collision-susceptible species. Shaw et al (2021) demonstrated that large avifauna species mortality was reduced by 51% (95% CI: 23–68%). Recommended bird diverters such as flapping devices (dynamic device) and thickened wire spirals (static device) that increase the visibility of the lines should be fitted 5 m apart. The Inotec BFD88 bird diverter is highly recommended due to its visibility under low light conditions when most species move from roosting to feeding sites;



- Fencing mitigations:
    - Top 2 strands must be smooth wire;
    - Routinely retention loose wires;
    - Minimum distance between wires is 300 mm; and
    - Place markers on fences.

b) Electrocution due to infrastructure associated with the PV Facility

This impact was determined to have a Negative Moderately High significance but can be reduced to a Negative Moderate significance with the implementation of appropriate mitigation measures.

Prior to mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
4	3	3	4	4	
Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Significant / ecosystem structure and function moderately altered	Ecology highly sensitive /important	Highly likely	**Moderately High**
Post mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
4	3	3	4	2	
Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted /	Significant / ecosystem structure and function moderately altered	Ecology highly sensitive /important	Possible	**Moderate**

	Linear features affected < 1000m				

Mitigation Actions:

- The design of the proposed solar plant and grid lines must be of a type or similar structure as endorsed by the Eskom-EWT Strategic Partnership on Birds and Energy, considering the mitigation guidelines recommended by Birdlife South Africa;
- Insulation where energised parts and/or grounded parts are covered with materials appropriate for providing incidental contact protection to birds. It is best to use suspended insulators and vertical disconnectors, if upright insulators or horizontal disconnectors are present, these should be covered; and
- Perch discouragers can be used such as perch guards or spikes. Considerable success achieved by providing artificial bird safe perches, which are placed at a safe distance from the energised parts (Prinsen *et al,* 2012).

c) Direct mortality from roadkills, persecution or poaching of avifauna species and collection of eggs

There is the possibility of operational staff poaching avifauna species and collecting eggs from the project footprint and proximal surrounding area. There is also the possibility of persecution of species that are deemed as negative in folklore. This impact was determined to have a Negative Moderate Impact significance but can be reduced to a Negative Low Impact significance with the implementation of mitigation actions.

Prior to mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
4	3	3	4	3	
Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Significant / ecosystem structure and function moderately altered	Ecology highly sensitive /important	Likely	**Moderate**
Post mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
3	2	2	2	2	
One year to five years: Medium Term	Development specific/ within the site boundary / < 100 ha	Small / ecosystem structure and function	Ecology with limited sensitivity/importance	Possible	**Low**

	impacted / Linear features affected < 100m	largely unchanged			

Mitigation Actions:

- All personnel should undergo environmental awareness training that includes educating on not poaching/persecuting avifauna species and collecting eggs.
- Signs must be put up to enforce this, should someone be caught a R1000 fine must be enforced;
- All personnel should undergo environmental induction with regards to awareness about speed limits and roadkill; and
- All vehicles should adhere to a speed limit of maximum 20 km/h to avoid collisions. Appropriate speed control measures and signs must be erected.

d) Pollution of water sources and surrounding habitat due to cleaning products of the PV panels

It is likely that the panels will be cleaned with chemicals in addition to water to ensure they function optimally. This impact was determined to have a Negative Moderate Impact significance but can be reduced to a Negative Low Impact significance with the implementation of mitigation actions.

Prior to mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
4	3	3	4	3	
Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Significant / ecosystem structure and function moderately altered	Ecology highly sensitive /important	Likely	**Moderate**
Post mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
2	2	2	2	3	
One month to one year: Short Term	Development specific/ within the site boundary / < 100 ha impacted / Linear	Small / ecosystem structure and function largely unchanged	Ecology with limited sensitivity/importance	Likely	**Low**

	features affected < 100m				

Mitigation Actions:

- Only environmentally friendly chemicals are to be used for cleaning of the panels.

e) Heat radiation from the BESS and PV panels

Heat radiation from the infrastructure can result in an overall increase of temperature in the surrounding area, it can also lead to veld fires. This impact was determined to have a Negative Moderate Impact significance but can be reduced to a Negative Low Impact significance with the implementation of mitigation actions.

Prior to mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
4	3	3	4	3	
Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Significant / ecosystem structure and function moderately altered	Ecology highly sensitive /important	Likely	**Moderate**
Post mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
2	2	2	2	3	
One month to one year: Short Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Small / ecosystem structure and function largely unchanged	Ecology with limited sensitivity/importance	Likely	**Low**

Mitigation Actions:

- The BESS must be enclosed in a structure with a non-reflective surface;
- A fire management plan needs to be put in place; and
- Grass must be kept under the panels to ensure that additional reflection is not taking place from the surface below the panels.

f) Encroachment of Invasive Alien Plants into disturbed areas

Invasive Alien Plants (IAPs) tend to encroach into disturbed areas and outcompete/displace indigenous vegetation. This will lead to a shift in the vegetation composition and structure, and consequently will cause a negative shift in the wellbeing of the avifauna community. This impact was determined to have a Negative Moderate significance but can be reduced to a Negative Low Impact significance with the implementation of mitigation actions.

Prior to mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
4	3	3	4	3	
Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Significant / ecosystem structure and function moderately altered	Ecology highly sensitive /important	Likely	**Moderate**
Post mitigation					
Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
2	2	2	2	3	
One month to one year: Short Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Small / ecosystem structure and function largely unchanged	Ecology with limited sensitivity/importance	Likely	**Low**

Mitigation Actions:

- An IAP Management Plan must be written and implemented for the development. The developer must contract a specialist to develop the plan and the developer is responsible for its implementation;
- Regular monitoring for IAP encroachment during the operation phase must be undertaken to ensure that no alien invasion problems have developed as result of the disturbance. This should be every 3 months during the first two years of the operation phase and every six months for the life of the project; and
- All IAP species must be removed/controlled using the appropriate techniques as indicated in the IAP management plan.

13.15 Agriculture

The findings from the Agricultural Compliance Statement (Gouws, 2023) follow. The specialist report is contained in **Appendix E4**.

13.15.1 Impact Description

Loss of High Potential Land
Only small pieces of high potential or sensitive soils were found; therefore, there will not be a loss of high potential land. According to the guidelines of various publications of DALRRD that deals with land capability and crop yield, the land is not high potential.
These soils are also not fertile because they have not been cultivated during which fertilised would have been added. Their change in land use will, therefore, also not lead to the loss of fertile soils.
Further, the PV infrastructure does not alter the soil properties or land conditions, and once removed after the project life, it can be utilised for grazing once again.
The impact is low, temporary and totally reversable.

Loss of Agricultural Production
The site is used for cattle farming. These animals can be moved to another part of the farm without any impact on farming income. It is also possible to utilise the grazing below the panels with sheep. The grazing opportunity that the farm provides cannot be replaced or mitigated on a national level. Our national electricity problems far outweigh the loss of income that the farm will sacrifice.

- The impact is low on a regional or national scale.
- The loss is temporary and will be for the medium term.
- There will be no loss of labour opportunities. The labourer that tends the livestock can be employed elsewhere on the farm or by the PV project.

Loss of Agricultural Infrastructure
There is little farming infrastructure on the site but for watering facilities and fences.

- In conclusion, no agricultural infrastructure will be lost.
- There is no impact.

Loss of Soil Due to Erosion
The soil is very erodible because of the strongly developed structure of the B2 horizon.
Nevertheless, the PV projects creates areas that are cleared of vegetation, and that could be subject to erosion. Runoff from hard surfaces should be dealt with by a Stormwater Management Plan (SMP). This is an engineering function and is normally addressed as part of the project design.

- Severe erosion can be expected if the topsoil is removed, especially where the slope is high. It is essential that the stormwater management plan includes orderly runoff and that there are no or little bare surfaces that can be subject to erosion.
- Mitigation is achieved by allowing grass to re-establish after construction and by guidelines in the SMP.

- All stormwater runoff structures should be grassed and flow retarding structures should be placed where runoff speeds become too high.
- Wetlands areas should not be disturbed and where eroded areas should be repaired.

13.15.2 Impact Assessment

The impact ratings shown in **Table 34** below were applied in determining the agricultural impacts (see **Table 35** below).

According to the Protocol for the specialist assessment and minimum report content requirements for environmental impacts on Agriculture (GN No. 320 of 20 March 2020), a Compliance Statement was prepared for the Project. This compliance statement does not include a quantitative assessment of the potential impacts to Agriculture.

The impacts of the development are as follows:

- Loss of high potential land

There will not be permanent loss of high potential land. According to the guidelines of various publications of DALRRD that deals with land capability, the land is not high potential.

- Loss of agricultural production

The impact of the project on agricultural production is low.

- Loss of Agricultural infrastructure

There is no agricultural infrastructure on the site.

- Loss of soil due to erosion

Severe erosion can be expected if the topsoil is removed. It is essential that the SWMP includes orderly runoff and that there are no or little bare surfaces that can be subject to erosion.
Mitigation is achieved by allowing grass to re-establish after construction.
Wetlands areas should not be disturbed and where eroded areas should be repaired.
Runoff from hard surfaces should be dealt with by a SWMP.

13.16 Cultural Heritage

The findings from the Phase 1 Cultural Heritage Impact Assessment (Kitto, 2023) follow. The specialist report is contained in **Appendix E5**.

13.16.1 Impact Description

Potential heritage impacts include the following:

- Direct or physical impacts, implying alteration or destruction of heritage features within the project boundaries; and
- Cumulative impacts that are combinations of the above.

The impact significance of the project on graves and cemeteries is Medium (before mitigation) and Low (after mitigation) as three potential graves (Os3-02, LILO-01, LILO-02) were identified within the combined Oslaagte Solar 3 PV (Alternative 1 and Alternative 2) and MTS/LILO Corridor footprints. One definite gravesite (LILO-06) is situated outside the MTS/LILO corridor footprint. Implementation of the mitigation measures required will retain the impact as low.

The impact significance of the proposed project on protected historical structures is Medium (before mitigation) as three extant historical structure sites (Os3-01, Os3-04, Os3-05), were identified within or adjacent to the Oslaagte Solar 3 PV footprint (Alternative 1). Two sites containing historical structure remains (Os3-02 and Os3-06), were identified also situated within the Solar PV footprint (Alternative 1) and two sites containing historical structure remains (LILO-05 and LILO-04) were identified within the MTS/LILO Corridor footprint. The heritage resource sites identified within the PV footprint area are all avoided by the Alternative 2 layout. There is no difference in impact between the Alternative 1 and Alternative 2 layouts for the LILO Corridor.

13.16.2 Impact Assessment

The assessment of the Project's cultural heritage impacts are provided in **Table 35** below.

Table 35: Assessment of cultural heritage impacts – construction and operational phases (Kitto, 2023)

Environmental Feature	Heritage resources – Historical structures
Project life-cycle	Planning, Construction and Operation
Potential Impact	Proposed Management Objectives / Mitigation Measures
Possible damage to or destruction of extant historical structures (Site Os3-01, Os3-05)	• A buffer of at least 30m must be placed around these sites (Site Os3-01, Os3-05) to ensure that during construction, no indirect impact occurs. • The materials demarcating the 30m buffer must be highly visible and made of durable material to ensure that they are still in place during the operation of the PV site so that work crews are aware of the sites.

	• If any impact is anticipated, then a permit will be required for the alteration or destruction of these structures (from FS PHRA) • If a permit is required, then a photographic record of the structures should be undertaken by an architectural historian					
Possible damage to or destruction of remains of historical structures (Os3-02, Os3-06; LILO-04, LILO-05)	• A buffer of at least 30m must be placed around these sites to ensure that during construction, no historical-archaeological material is damaged • If any impact on these sites is anticipated, a permit will be required for the destruction/clearance of the area (from FS PHRA or SAHRA)					
Alternative 1	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Medium	Permanent	Moderate	2
After Mitigation	Positive	Local	Low	Long- term	Unlikely	1
Significance of Impact and Preferred Alternatives	Site Os3-01 has medium significance as the structures are extant and can be recorded. Since the site is situated immediately adjacent to the Alternative 1 footprint layout, it is recommended that a buffer of at least 30m is implemented to avoid any indirect impact. Both site Os3-01 and Os3-05 are older than 60 years and protected by s34 of the NHRA, as well as LILO 04 and LILO 05.					
Alternative 2	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Medium	Permanent	Unlikely	2
After Mitigation	Positive	Local	Low	Long- term	Remote	1
Significance of Impact and Preferred Alternatives	Site Os3-01 has medium significance as the structures are extant and can be recorded. Even though the site is avoided by the Alternative 2 layout, the 30m buffer should still be demarcated to avoid any indirect impact. Both site Os3-01 and Os3-05 are older than 60 years and protected by s34 of the NHRA, as well as LILO 04 and LILO 05.					

Environmental Feature	Heritage resources – Graves and burial grounds
Project life cycle	Planning, Construction and Operation
Potential Impact	Proposed Management Objectives / Mitigation Measures
Possible damage to or destruction of identified historical graves (LILO-06)	• A buffer of at least 30m must be placed around the graveyards at LILO-06 to protect them from any indirect impact • The materials demarcating the 30m buffer must be highly visible and made of durable material to ensure that they are still in place during the operation of the PV site so that work crews are aware of the sites. • If, for any reason, the graves cannot be avoided, then a Phase 2 mitigation process can be considered. During this process, the family and relevant communities will have to be engaged with to obtain their permission and discuss to where the remains should be moved. In addition, application will have to be made to SAHRA for the necessary permits. • Sub-sections (4) and (5) of section 36 of the NHRA regarding the removal of graves must be adhered to. The exhumation and removal of graves is strongly discouraged as graves are highly significant to many people and there are many traditional, cultural and personal sensitivities concerning the removal of graves.

Potential or unidentified graves (Os3-02, LILO-01, LILO-02)	• A buffer of at least 30m must be placed around the sites to ensure that during construction, the sites are not damaged • Monitoring of site clearance activities in the vicinity of these sites must be undertaken by a heritage specialist					
Alternative 1	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	High	Permanent	Unlikely	2
After Mitigation	Negative	Local	Low	Long- term	Unlikely	1
Significance of Impact and Preferred Alternatives	The graveyard site (LILO-06) is located outside the proposed LILO corridor footprint of the project (Alternative 1). Two of the potential grave sites are located inside the LILO corridor (Alternative 1) and one is located inside the Alternative 1 layout for the PV footprint. Therefore, monitoring of site clearance and construction activities in the vicinity of all three sites should be undertaken.					
Alternative 2	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	High	Permanent	Unlikely	2
After Mitigation	Negative	Local	Low	Long- term	Unlikely	1
Significance of Impact and Preferred Alternatives	The graveyard site (LILO-06) is located outside the proposed LILO corridor footprint of the project (Alternative 2). Two of the three potential grave sites are located inside the LILO corridor (Alternative 2) and the other one is avoided by the Alternative 2 layout for the PV project. Therefore, monitoring of site clearance and construction activities in the vicinity of LILO-01 and LILO-02 should be undertaken.					

13.17 Palaeontology

The findings from the Palaeontological Impact Assessment (Butler, 2023) follow. The specialist report is contained in **Appendix E6**.

13.17.1 Impact Description

Based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the development footprint is rare. This is in contrast with the High Sensitivity allocated to the development area by the SAHRIS Palaeosensitivity Map and DFFE Screening Tool. A medium Palaeontological Significance has been allocated for the construction phase of the PV development pre-mitigation and a low significance post mitigation. The construction phase will be the only development phase impacting Palaeontological Heritage and no significant impacts are expected to impact the Operational and Decommissioning phases. As the No-Go Alternative considers the option of ‘do nothing’ and maintaining the status quo, it will have a Neutral impact on the Palaeontological Heritage of the development. The Cumulative impacts of the development near Kroonstad is considered to be medium pre- mitigation and Low post mitigation and falls within the acceptable limits for the project. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. The construction of the development may thus be permitted in its whole extent, as the development

footprint is not considered sensitive in terms of palaeontological resources. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.
If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the Chance Find Protocol must be implemented by the ECO/site manager in charge of these developments.

13.17.2 Impact Assessment

The impact assessment shown in **the tables** below were extracted from the PIA (Butler, 2023). Please refer to the PIA under Appendix E of the EIA Report in order to view the impact assessment methodology. A summary of the impact assessment is included below.

Table a: Impacts on Alternative 1							
Impacts	Extent	Duration	Magnitude	Reversibility	Irreplaceable loss	Cumulative effect	Impact
Pre-mitigation	1	4	3	4	4	2	45
Post mitigation	1	4	1	4	4	2	15

Table b: Impacts on (Alternative 2)							
Impacts	Extent	Duration	Magnitude	Reversibility	Irreplaceable loss	Cumulative effect	Impact
Pre-mitigation	1	4	3	4	4	2	45
Post mitigation	1	4	1	4	4	2	15

Environmental parameter	Issues	Rating prior to mitigation	Average	Rating post mitigation	Average
Planning Phase Alternative 1 Oslaagte Solar 3 PV Facility	No Impact	0	No Impact	0	No Impact
Construction Stage Alternative 1 Oslaagte Solar 3 PV Facility Loss of fossil heritage	Destroy or permanently seal-in fossils at or below the surface that are then no longer available for scientific study	45	Negativ e Medium impact	16	Negative Low impact
Operational Phase Alternative 1 Oslaagte Solar 3 PV Facility	No Impact	0	No Impact	0	No Impact
Decommissioning Phase Alternative 1 Oslaagte Solar 3 PV Facility	No Impact	0	No Impact	0	No Impact
Planning Phase Alternative 2 Oslaagte Solar 3 PV Facility	No Impact	0	No Impact	0	No Impact
Construction Stage Alternative 2	Destroy or permanently seal-in fossils at or below the surface	45	Negativ e	16	Negative Low impact

Environmental parameter	Issues	Rating prior to mitigation	Average	Rating post mitigation	Average
Oslaagte Solar 3 PV Facility Loss of fossil heritage	that are then no longer available for scientific study		Medium impact		
Operational Phase Alternative 2 Oslaagte Solar 3 PV Facility	No Impact	0	No Impact	0	No Impact
Decommissioning Phase Alternative 2 Oslaagte Solar 3 PV Facility	No Impact	0	No Impact	0	No Impact

13.18 Visual Quality

The findings from the Visual Impact Assessment (Buys, 2023) follow. The specialist report is contained in **Appendix E8**.

13.18.1 Impact Description

The nature of the visual impacts will be the visual effect that the activity would have on the receiving environment. These visual impacts would be:

- The construction and operation of the proposed PV facility and its associated infrastructure may have a visual impact on the study area, especially within (but not restricted to) a 1 - 5km radius of the proposed facility. The visual impact will differ amongst places, depending on the distance from the facility.
- Visibility from sensitive receptors. The proposed development will be visible from receptors outside the proposed project area. These include:
  - Site personnel at the operation;
  - People travelling to work and commercial activities in the surrounding areas;
  - People travelling on the surrounding access routes to their place of residence;

- Surrounding farming communities; and
- Surrounding residential areas.

When considering the viewshed analysis, the visibility rating is **moderate** (theoretical visibility of project elements between a quarter and half of the study area).

Given that the study area has a low VAC (due to vegetation and the flat to gentle landscape) and **moderate** visual resource value, the proposed project will have a moderate (without mitigation measures) visual intrusion on surrounding sensitive receptors. Ensuring that vegetation is retained on the periphery of these areas, and wherever possible, lights be directed downwards as to avoid illuminating the sky and limit the reflection from the solar panels, the visual impact on the surrounding environment will be **moderate** depending on the proximity to the sensitive receptors.

13.18.2 Impact Assessment

The differences between the two (2) alternatives are negligible from a visual perspective resulting in the impact assessment being similar. Therefore, the impact assessment below is for both alternatives.

Table 36: Construction phase visual impact assessment (Buys, 2023)

Phase	Potential Visual Impacts	Visual Significance											
		Before Mitigation						After Mitigation					
		M	D	S	P	SP	RATING	M	D	S	P	SP	RATING
Construction	Site establishment • This will involve the vegetation clearance and stripping of soil in areas designated for surface infrastructure.	6	2	3	3	33	Medium	6	2	3	2	22	Low
	Site Clearing of the project footprint: • Removal of vegetation leading to increased visual contrast and loss of VAC and increase visual intrusion on sensitive receptors. • Alteration of current landscape features impacting on landscape character and sense of place.	6	2	3	4	44	Medium	6	2	3	2	22	Low
	Construction of Solar PV facility and associated infrastructure.	6	2	3	4	44	Medium	6	2	3	2	22	Low
	Construction vehicle movement and increased human activity in and around the proposed site.	6	2	3	2	22	Low	6	2	3	1	11	Low
	General and hazardous waste management.	2	2	2	2	12	Low	2	2	2	1	6	Low
	Formation of dust plumes because of construction activities.	4	2	3	2	18	Low	4	2	3	1	9	Low
	Use of security lighting.	4	2	2	2	16	Low	4	2	2	1	8	Low
	Topographical alteration which will lead to increased visual intrusion and potential impact on sense of place.	6	2	3	4	44	Medium	6	2	3	2	22	Low

Table 37: Operational phase visual impact assessment (Buys, 2023)

Phase	Potential Visual Impacts	Visual Significance											
		Before Mitigation						After Mitigation					
		M	D	S	P	SP	RATING	M	D	S	P	SP	RATING
Operational	Topographical alteration which will lead to increased visual intrusion and potential impact on sense of place.	6	4	3	4	52	Medium	6	4	3	2	26	Low
	Increased vehicle and human activity in and around the Solar PV facility and associated infrastructure.	6	4	3	2	26	Low	6	4	3	1	13	Low
	Night-time illumination due to security lighting and lighting associated with the Solar PV facility and associated infrastructure.	6	4	2	3	36	Medium	6	4	2	2	24	Low
	Potential visual impact of solar glint and glare as a visual distraction.	6	4	3	3	39	Medium	6	4	3	2	26	Low

Table 38: Decommissioning phase visual impact assessment (Buys, 2023)

Phase	Potential Visual Impacts	Visual Significance											
		Before Mitigation						After Mitigation					
		M	D	S	P	SP	RATING	M	D	S	P	SP	RATING
Decommissioning	General decommissioning and closure activities leading to visual intrusion on sensitive receptors.	6	1	3	2	20	Low	6	1	2	2	14	Low
	Dismantling and removal Solar PV facility and associated infrastructure.	6	1	3	1	10	Low	6	1	2	1	7	Low
	Cleaning, landscaping, and replacement of soils over the disturbed area.	6	1	3	1	10	Low	6	1	2	1	7	Low
	Waste generation and disposal	4	1	2	2	14	Low	4	1	2	1	7	Low
	Ineffective rehabilitation leading to landscape scarring, permanent visual contrast and a permanent alteration of the landscape character and sense of place.	6	4	3	3	39	Medium	6	1	2	3	21	Low

13.19 Air Quality

13.19.1 Impact Description

Sensitive receptors to dust and other air quality impacts in the study area include people residing in the surrounding rural areas, agricultural activities, and ecological features (fauna and flora).

The Project proposes the use of a renewable resource (solar), which is a cleaner form of energy generation than using fossil fuels, with environmental benefits.

Sources of air quality impacts associated with the Project may include:

- ❑ Construction phase –
  - Dust from the use of dirt roads by construction vehicles;
  - Dust from bare areas that have been cleared for construction purposes; and
  - Emissions from construction equipment and machinery.
- ❑ Operational phase –
  - Impacts to air quality caused by the operation and maintenance of the facility include dust from the use of dirt roads and tailpipe emissions from vehicles.

Mitigation measures are included in the EMPr to ensure that the air quality impacts during the construction phase are suitably monitored and managed and that regulated thresholds are not exceeded. The EMPr also includes measures to control and minimize greenhouse gas emissions by optimising the utilisation of construction resources, as well as preventing fires related to construction activities.

During the operational phase of the Solar PV Plant, local atmospheric pollution may reduce the irradiation received or contain significant levels of airborne corrosive substances. The efficiency of the solar plants be also reduced if the modules are soiled (covered) by particulates/dust.

13.19.2 Impact Assessment

Environmental Feature	**Air Quality**
Relevant Alternatives & Activities	**Construction domain of development footprint**
Project life-cycle	**Construction phase**
Potential Aspects & Impacts	**Proposed Management Objectives / Mitigation Measures**
• Excessive dust levels as a result of construction activities. • Emissions from construction equipment and machinery.	• Appropriate dust suppression measures or temporary stabilising mechanisms to be used when dust generation is unavoidable (e.g., dampening with water, chemical soil binders, straw, brush packs, chipping), particularly during prolonged periods of dry weather. Dust suppression to be undertaken for all bare areas, including construction area and access roads. Note that all dust suppression

	requirements should be based on the results from the dust monitoring and the proximity of sensitive receptors. • Speed limits to be strictly adhered to. • All vehicles and machinery used at the site are to be in good working condition and fitted with appropriate emission controls • Construction plant to be operated efficiently and turned off when not in use.

	+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	medium	short-term	likely	3
After Mitigation	-	local	low	short-term	unlikely	1

Environmental Feature	**Air Quality**
Relevant Alternatives & Activities	**Operation of the Solar PV Plant**
Project life-cycle	**Operational phase**
Potential Aspects & Impacts	**Proposed Management Objectives / Mitigation Measures**
• Influence of air quality and soiling on operational efficiency of Solar PV Plant.	• An appropriate maintenance and cleaning plan is to be developed for the PV panels.

	+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	medium	long-term	likely	2
After Mitigation	-	local	low	long-term	unlikely	1

13.20 Noise

13.20.1 Impact Description

Sensitive receptors to noise impacts in the study area include people residing in the surrounding rural areas, ecological receptors (fauna) and livestock.

During construction, localised increases in noise will be caused by earthworks, establishment and operating of site construction laydown area, construction of proposed infrastructure, transportation of construction workers and material, activities at the construction camp, and general construction noise.

Solar PV facilities produce electricity during the daytime hours, when the sun's rays are collected by the panels. When there is little to no irradiance, noise emitted by the 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 in close proximity to these components. Other sources of noise include operation and maintenance vehicles and activities.

During the operational phase, power lines produce an audible sound or buzz because they are producing something called a corona discharge that is interacting with the surrounding air. The corona discharge is a side-effect of the electric field the power line generates by carrying electricity. The discharge can be greater and the buzzing louder if there is increased moisture or pollutants in the air. Under normal conditions, corona-generated noise is not audible. The noise may be audible under certain wet conditions. Conductors are selected based on factors such as audible noise, corona, and electromagnetic field mitigation. In addition, corona rings can be fitted if deemed necessary. Corona is not associated with any adverse health effects in humans or livestock.

Noise that emanates from construction and operational activities are addressed through targeted best practices in the EMPr. The associated regulated standards need to be adhered to.

Project personnel working on the construction site will experience the greatest potential exposure to the highest levels of noise and vibration. Workplace noise and vibration issues will be managed as part of the Occupational Health and Safety Management System to be employed on site, which will include specific measures aimed at preventing hearing loss and other deleterious health impacts.

13.20.2 Impact Assessment

Environmental Feature	**Noise**
Relevant Alternatives & Activities	**Construction domain of development footprint**
Project life-cycle	**Construction phase**
Potential Aspects & Impacts	**Proposed Management Objectives / Mitigation Measures**
• Noise as a result of construction activities	• The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents. • Working hours to be agreed upon with Project Manager, so as to minimise disturbance to landowners/occupiers and community members. • Noise preventative measures (e.g., screening, muffling, timing, pre-notification of affected parties) to be employed.

	+/- Impacts	**Extent**	**Magnitude**	**Duration**	**Probability**	**Significance**
Before Mitigation	-	local	medium	short-term	likely	2
After Mitigation	-	local	low	short-term	unlikely	1

13.21 Hazardous Substances & Waste

13.21.1 Impact Description

Improper management of hazardous substances and waste may pollute the biophysical environment (air, water and soil), and pose risks to humans, flora and fauna. It may also cause visual impacts.

Hazardous substances to be stored and used during the construction and operational phases of the Project include oil, fuel, solvents, pesticides, lithium-ion batteries (BESS), etc.

General construction waste will comprise of surplus or off-specification materials (e.g., concrete, wooden pallets, packaging paper or plastic, wood, metals, etc.) and construction debris. Domestic waste will include food waste, plastic, glass, aluminum cans and waste paper. A small proportion of the waste generated during construction phase will be hazardous and may include used oil, hydraulic fluids, waste fuel, grease and waste oil containing rags. Wastewater, including water adversely affected in quality through construction-related activities and human influence, will include sewage, water used for washing purposes (e.g., equipment, staff) and drainage over contaminated areas (e.g., workshop, equipment storage areas).

Waste types likely to be generated during routine operation and maintenance activities include dielectric fluids, clearing agents, oils, solvents, wastewater, defunct / damaged PV cells and substation components, as well as domestic waste.

Provision is made in the EMPr to manage impacts associated with hazardous substances and waste.

13.21.2 Impact Assessment

Environmental Feature	**Hazardous Substances & Waste**
Relevant Alternatives & Activities	**Storage and use of hazardous substances & generation of waste**
Project life-cycle	**Construction & operational phases**
Potential Aspects & Impacts	**Proposed Management Objectives / Mitigation Measures**
• Environmental pollution caused by improper management of hazardous substances and waste.	• Hazardous substances shall be stored and handled in accordance with the appropriate legislation and standards, which include the Hazardous Substances Act (Act No. 15 of 1973), Occupational Health and Safety Act (No. 85 of 1993), relevant associated Regulations and applicable SANS and international standards. • Storage and use of hazardous materials will be strictly controlled to prevent environmental contamination and will adhere to the requirements stipulated on the Material Safety Data Sheets. • In the event of spillages of hazardous substances the appropriate clean up and disposal measures shall be implemented. • BESS to have electrical and fire protection measures in the form of battery temperature monitoring, circuit breakers, fire detection and fire suppression as per regulatory requirements. • Waste to be disposed of at a licenced waste disposal facility. • Water used for cleaning of PV panels will not contain any harmful chemicals or additives. • Wastewater to be properly disposed of. Contaminated water will not be discharged to the environment. • Used lithium-ion batteries and PV panels are to be removed by the suppliers, who are to recycle material and recover any hazardous substances (as relevant). Provision to be made in the supply agreements between the Proponent and the selected suppliers.

	+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	medium-high	long-term	likely	3
After Mitigation	-	local	low	long-term	unlikely	1

Potential risks and related control measures associated with the BESS facility are captured in **Table 39** below. A detailed risk assessment will need to be undertaken based on the type of BESS technology selected and the final design of the Solar PV Plant. The outcomes of this risk assessment will need to be incorporated into the Operational EMPr.

Table 39: Proposed management of risk to BESS (based on Arup, 2018)

No.	Risk	Possible Consequences	Control Measures
1	Risk posed by veld fires (external to site) to BESS facility	Damage to BESS	▪ Implementation of a fire break around the site ▪ Include measures to deal with veld fires in the Emergency Response Plan ▪ Coordination with local fire authorities ▪ Provide fire extinguishers on site
2	Damage caused to cells by an external event	Lithium Ion Cell leakage	▪ Lithium batteries do not contain free liquid electrolytes ▪ Individual cells are used which minimises extent of release
3	Damage to batteries from vehicle collision	▪ Damage to battery cells ▪ Electrical risks	▪ Use of perimeter fence around BESS facility ▪ Appropriately designed internal access roads ▪ Limit of speed limit within fenced facility ▪ Earthing system installed as per normal electrical facilities
4	Transformer oil leakage due to corrosion of tank base or leakage of oil tank	Leakage of transformer oil to environment, with resultant pollution	▪ Use of fully bunded oil storage for transformers ▪ Regular tank inspections
5	Collapse or fall of overhead electricity line onto BESS facility	Damage to BESS facility	▪ BESS facility to be located outside of power line servitude
6	Security breach into BESS facility for theft of components	Theft of equipment or risk to personnel	▪ Installation of security fencing around entire Solar PV Plant and around the BESS facility ▪ Installation of security system to monitor key areas ▪ Inspections to monitor for security breaches
7	Spread of fire across BESS facility between battery packs	Localised fire causing damage by spreading to BESS facility	▪ Separation distances between battery packs in accordance with manufacturer recommendations ▪ Adherence to fire management measures ▪ Provide fire extinguishers on site ▪ BESS area will have a non-flammable buffer area to prevent the spread of fire. ▪ BESS will have electrical and fire protection measures in the form of battery temperature monitoring, circuit breakers, fire detection and fire suppression
8	Electrocution due to electrical fault	Electrical fault causing personnel injury	▪ Normal electrical standards and installation of appropriate earthing system ▪ Use of appropriately qualified maintenance personnel
9	Lightning striking BESS facility	Lightning strike causing damage to facility or personnel	▪ Include lightning protection measures, if deemed necessary
10	High rainfall and flooding to site	Damage to electrical equipment	▪ BESS facility to be developed outside of the 1:100 year floodline of any watercourse
11	High wind events and seismic events	Structural damage to equipment or battery packs	▪ Appropriate design of BESS facility, taking into consideration *inter alia* climatic and geotechnical conditions

13.22 Traffic

13.22.1 *Impact Description*

A Traffic Impact Assessment was undertaken for the proposed Project (**Appendix E9**).

The potential transport related impacts are described below.

Potential impact during Construction:

- Construction related traffic
- The construction traffic would also lead to noise and dust pollution.
- This phase also includes the construction of roads, excavations, trenching for electrical cables and other ancillary construction works that will temporarily generate the most traffic.

Potential impact during Operation

- During operation, it is expected that staff and security will visit the facility.
- Maintenance vehicles are expected on site at times.
- Should municipal water not be available, water will have to be transported to the site.

13.22.2 *Impact Assessment*

TRAFFIC CONGESTION CONSTRUCTION PHASE						
Potential Impact	Mitigation					
Traffic congestion during the construction phase	• Stagger component delivery to site • Reduce the construction period, where possible • Source mobile batch plants and quarries in close proximity to the site • Staff and general trips should occur outside of peak traffic periods as much as possible • Conduct regular maintenance of gravel roads by the Contractor during the construction phase and by Client/Facility Manager during operation phase.					
Without Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Medium	Short-term	Almost certain	2
With Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Low	Short-term	Likely	1

AIR QUALITY CONSTRUCTION PHASE						
Potential Impact	Mitigation					
Air quality will be affected by dust pollution	• Dust suppression of gravel roads during the construction phase, as required. • Regular maintenance of gravel roads by the Contractor during the construction phase and by Client/Facility Manager during operation phase.					
Without Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Medium	Short-term	Almost certain	2
With Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Low	Short-term	Likely	1

NOISE POLLUTION CONSTRUCTION PHASE						
Potential Impact	Mitigation					
Noise pollution due to the increase in traffic	• Stagger component delivery to site • Reduce the construction period, where possible • The use of mobile batch plants and quarries in close proximity to the site • Staff and general trips should occur outside of peak traffic periods					
Without Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Medium	Short-term	Almost certain	2
With Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Low	Short-term	Likely	1

IMPACT TABLE – OPERATIONAL PHASE
The traffic generated during this phase will be minimal and will have not have any impact on the surrounding road network. However, the Client/Facility Manager is to ensure that regular maintenance of gravel roads occurs during operation phase to minimize/mitigate dust pollution.

13.23 Civil Aviation

13.23.1 Impact Description

Possible impacts that may be caused by a Solar PV Plant to civil aviation include potential glare and glint from *inter alia* PV panels, steel array mounting, glass windows and rooftops that might cause temporary loss of vision to pilots on arrival or departure. Towers and transmission lines can disrupt airplane flight paths in and near airports and endanger low-flying airplanes, especially those used in agricultural management activities.

Glint and glare are caused by many reflective materials, whereby light from the sun is reflected off such materials with a potential to cause hazard, nuisance or unwanted visual impact. It is noted that solar panels are designed to absorb, not reflect, irradiation.

The proposed PV Site and powerline are located approximately 15 km or more from the Buitenzorg airfield south of Kroonstad. According to the findings from the Screening Tool, the PV Site has low sensitivity and the powerline is low sensitivity in terms of the relative civil aviation theme (see **Figure 65** below). Accordingly, no Glint and Glare Impact Assessment in terms of Obstacle Notice 4/2017, was undertaken, as there are “no major or other types of civil aviation aerodromes” in proximity to the site.

The SACAA was engaged with as part of the EIA and the Applicant will adhere to the requirements of this authority.

Figure 65: Map of relative civil aviation theme sensitivity for Solar PV Site and LILO

13.23.2 Impact Assessment

A quantitative impact assessment was not undertaken from a civil aviation perspective, due to the reasons provided in **Section 13.23.1** above.

13.24 Existing Structures and Infrastructure

13.24.1 Impact Description

An existing overhead power line traverses the PV Site and the R76 runs along the eastern boundary of the site. The setbacks / conditions required by the custodians of infrastructure on the PV Site and along the power line route will need to be adhered to.

Potential impacts of the Project to existing structures and infrastructure include:

- Disruptions to services or damage caused as a result of construction activities;
- Disruptions to traffic on R76 during construction (see **Section 13.19** above); and
- Construction-related disturbances (e.g. noise, dust).

A detailed survey will be conducted to identify all physical features that are located within the final project footprint. Optimisation of the layout during the design phase will seek to avoid existing structures and infrastructure, where possible. Where avoidance is not possible, suitable compensation measures need to be established, as necessary.

During the public participation process conducted to date, infrastructure owners and custodians (example Eskom Distribution) provided wayleave requirements and conditions when working near or closer to existing services.

13.24.2 Impact Assessment

Environmental Feature	**Existing Structures and Infrastructure**
Relevant Alternatives & Activities	**All activities that affect existing structures and infrastructure**
Project life-cycle	**Construction & operational phases**
Potential Aspects & Impacts	**Proposed Management Objectives / Mitigation Measures**
• Disruption of existing services. • Damage to existing structures and infrastructure.	• Identify and record existing services and infrastructure. • Conform to requirements of relevant service providers and infrastructure custodians (e.g. Eskom. Transnet, Telkom, SANRAL, FSDPRT, etc.). • Ensure access to infrastructure is available to service providers at all times. • Immediately notify service providers of disturbance to services. Rectify disturbance to services, in consultation with service providers. Maintain a record of all disturbances and remedial actions on site. • Adequate reinstatement and rehabilitation of affected environment.

	+/- Impacts	**Extent**	**Magnitude**	**Duration**	**Probability**	**Significance**
Before Mitigation	-	local	medium-high	short-term to permanent	likely	3
After Mitigation	-	local	low	short-term	unlikely	1

13.25 Health and Safety

13.25.1 Impact Description

Construction Phase

Health and safety related risks associated with the Project during the construction phase include the following:

- Hazards related to construction work;
- Increased levels of dust and particulate matter, as well as noise;
- Water (surface and ground) contamination;
- Poor water and sanitation services for construction workers;
- Communicable diseases;
- Psychosocial disorder (e.g. social disruptions);
- Safety and security to the local community; and
- Lack of suitable health services.

These risks are addressed through mitigation measures identified under other environmental features, such as socio-economic environment, surface water, air quality, noise, as well as best practices included in the EMPr. Additional management requirements will be included in the Project's Occupational Health and Safety system.

Operational Phase

The predominant types of hazards associated with battery systems include electric shock, stored energy, chemical, flammable emission, thermal runaway, transportation, kinetic energy and manual handling (Energy Storage Council, 2016). A lithium-ion based BESS must be designed with proper disconnects, relays, thermal management, enclosures, layout, monitoring and controls to mitigate risks to the required level of safety. Operating strategies spanning proper planning, risk assessment, storage methods, maintenance protocols, and response protocols are the other important factors in mitigating lithium-ion safety risks (Butler, 2013).

Electromagnetic fields (EMFs) are produced whenever electricity is used. Research into electric and magnetic fields undertaken at utility scale PV installations in California by Chang and Jennings (1994), indicated that magnetic fields were significantly less for solar arrays than for household applications. Chang and Jennings (1994) found magnetic fields from solar arrays were not distinguishable from background levels at the site boundary, suggesting the health risk of EMFs from solar arrays is minimal.

For a transmission line, the strength of the electric field varies generally with the operating voltage of the line (measured in volts) while the magnetic field strength is related to the current flowing in the line (measured in amps) (Parsons Brinckerhoff, 2013). EMF strengths dependent on *inter alia* the height of the electrical wires above the ground and their geometric arrangements, which are supported by the transmission structures.

Even though the EMF inside a substation is high (but less than occupational limits), the fields outside the substation decrease with distance, as is the case with power lines (Wolhuter & Holtzhausen, 2015). It is documented in literature that EMF levels reduce rapidly with distance from the source. The Project's proposed substation, which contains high voltage transformers, will be enclosed by security fencing to prevent unauthorised access and the exposure to high voltage electricity. This will also provide safe distance between electrical equipment and the general public.

Other health and safety risks associated with the Project during the operational phase include the following:

- Leaching of materials from broken or fire damaged PV modules;
- Injuries to workers from operation and maintenance activities (vehicle accidents, replacement of components/parts, etc.) and;
- Emergency fire hazards; and
- Electrocution of workers.

13.25.2 *Impact Assessment*

Environmental Feature	Health and Safety
Relevant Alternatives & Activities	**Construction activities**
Project life-cycle	**Construction phase**
Potential Aspects & Impacts	**Proposed Management Objectives / Mitigation Measures**
• Health and safety risks during construction.	• Dedicated Occupational Health and Safety system to be implemented by the Contractor. • Undertake a hazard identification and risk assessment and identify preventive and protective measures. • Conduct basic safety awareness training with construction workers. • Provide all workers with the necessary Personal Protective Equipment (PPE). • Prevent environmental contamination. • Provide potable water and sanitation services to workers. • All workers shall be clearly identifiable and shall remain within the construction domain during working hours. • Prepare an Emergency Response Plan. • Ensure adequate control of communicable diseases. • Maintain access control to construction domain.

	+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	high	short-term	likely	3
After Mitigation	-	local	low	short-term	unlikely	1

Relevant Alternatives & Activities	Operation and maintenance activities
Project life-cycle	**Operational phase**
Potential Aspects & Impacts	**Proposed Management Objectives / Mitigation Measures**
• Health and safety risks posed by operation and maintenance activities.	• Dedicated Occupational Health and Safety system to be implemented by the Operator of the PV Plant. • Conduct basic safety awareness training with all operational staff. • Temporary Contractors to adhere to Occupational Health and Safety requirements. • Provide potable water and sanitation services to operational staff. • Prepare an Emergency Response Plan. • Measures at the battery storage area to manage fire risks will include a non-flammable buffer area to prevent the spread of fire, battery temperature monitoring, circuit breakers, fire detection and fire suppression as per fire and electrical regulatory requirements. • Provide adequate access/egress for installation and maintenance at the BESS. • Maintain servitude. • Ensure EMF remain less that occupational limits within substation. • Control access to the substation.

	+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	high	long-term	likely	3
After Mitigation	-	local	low	long-term	unlikely	1

13.26 Social Environment

The findings from the Social Impact Assessment (Tanhuke & Chidley, 2023) follow. The specialist report is contained in **Appendix E7**.

13.26.1 Impact Description

The activities, aspects and impacts associated with the social environment are captured in **Table 40** below.

Table 40: Activities, aspects and impacts related to the social environment (Tanhuke & Chidley, 2023)

Activity	Aspect	Potential Impact – Positive	Potential Impact – Negative
Land and Servitude Rights Acquisition	Land Acquisition		Loss of agricultural production
			Loss of land (including, structures and cultivated areas) through project infrastructure
			Community dissatisfaction
	Servitude Rights		Some restrictions on use of productive land
Scheme Operations	Electricity generation	Economic growth and induced impacts.	
	Supply of goods and services to the project	Opportunity for local business	
		Opportunity for local labour force	
	Administration and Technical Input	Employment of staff locally	
		Skills development	
Construction Phase	Access into properties		Security concern
			Risk of intrusion
	Solar Park Construction – piling, frame erection and solar panel mounting, electrical installation and rehabilitation	Employment of people locally	
		Sourcing of equipment, machinery, and services locally	
			Noise
			Dust
		Employment of local people	

Activity	Aspect	Potential Impact – Positive	Potential Impact – Negative
			Injuries on site
			Increased community conflicts due to employment of outsiders
			Influx of people seeking employment and associated impacts (e.g., cultural conflicts, squatting, demographic changes, anti-social behaviour, and incidence of HIV/AIDS)
		Sourcing of equipment, machinery, and services locally	
			Livestock and game animal safety
	Transport of goods to site and employment of staff		Increased traffic
	Transmission Line	Employment of people locally	
			Security concerns when contractor's access private property
		Sourcing of equipment, machinery, and services locally	
			Damage or wear to access roads
	Rehabilitation		Security Concerns
			Damage to property or equipment

13.26.2 *Impact Assessment*

Table 41: Planning Phase Impacts - Institutional, Legal, Political and Equity (Tanhuke & Chidley, 2023)

Environmental Feature	Institutional, Legal, Political and Equity
Project life cycle	All Phases
Potential Impact	Proposed Management Objectives / Mitigation Measures
Loss of land through project infrastructure	• Where the construction takes place will result in the land being acquisitioned and so adequate steps must be taken to ensure that the owner is not treated unfairly in the process.

	• Promptly address any concerns raised by the public in a transparent manner.					
	• Include all relevant community members in decisions affecting them.					
Some restrictions on use of productive land	• Once the project is operational, the land will be dedicated exclusively to the project and so its prior productivity will no longer apply. This must be clearly communicated and the owner should be adequately compensated.					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Site	Moderate	Long Term	High	2
After Mitigation	Negative	Site	Low	Long Term	High	1
Significance of Impact and Preferred Alternatives	The impact on project progress could be significant if grievances are not addressed. This can be effectively mitigated through the establishment of a grievance procedure and adherence to local by-laws The impact has no consequence for project alternatives.					

Table 42: Construction Phase Impacts (Tanhuke & Chidley, 2023)

Environmental Feature	Economic Opportunities					
Project life-cycle	Construction phase					
Potential Impact	Proposed Management Objectives / Mitigation Measures					
Economic and social stimuli arising from the developmental initiative of the project.	• Local SMMEs should be given an opportunity to participate in the construction of the project through the supply of services, material or equipment.					
	• Youth development should be considered as an initiative so that there is a benefit of transferring skills to the community. This can be achieved through the assistance of the local municipality.					
	• The main contractor should employ non-core labour from the regional study area as far as possible during the construction phase.					
Informal trading being established at the site boundaries	• Spaza/informal trader shops may open next to the site to cater for construction workers. These should be controlled by the contractor to limit their footprint and to ensure that the MLM By-laws are complied with.					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Positive	Regional	Medium	Short Term	Likely	1
After Mitigation	Positive	Regional	Large	Short Term	Likely	3
Significance of Impact and Preferred Alternatives	Individuals who will benefit during the construction are limited to those who actively participate in the construction activity through employment, sub-contracting or other economic opportunities. Active participation should be encouraged. The benefits on such a construction will take place irrespective of which site alternative is preferred.					

Environmental Feature	Gender Relations					
Project life-cycle	All phases					
Potential Impact	Proposed Management Objectives / Mitigation Measures					
Cultural resistance towards women because of increased gender representation in the workforce	• Sensitise staff in respect of gender sensitive issues that are pertinent to the workplace. • Ensure gender inclusivity and equity with respect to all compensation. • Prioritise gender inclusivity and equity in access to resources, goods, services and decision making with the aim of empowering women. • Promote equal job opportunities for women and men during the construction and operational processes. • Prioritise and articulate gender inclusivity and equity in the project documents by including specific strategies and guidelines for implementation. • The project documents should also include clear mechanisms through which the actual implementation of the activities and the impact on the ground can be monitored and evaluated. • Develop a grievance procedure to specifically address gender matters. • Factors such as culture should be considered when planning for gender activities since they play a great role in influencing gender relations.					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Site	Moderate	Short term	High	2
After Mitigation	Negative	Site	Low	Short term	High	1
Significance of Impact and Preferred Alternatives	The impact on project equity promotion would be moderate if this impact were not addressed. This can be effectively mitigated through the design of a specific gender-focused. The impact has no impact on alternative project layouts.					

Environmental Feature	*Property and Production*
Project life-cycle	Construction phase
Potential Impact	Proposed Management Objectives / Mitigation Measures
Risk of intrusion	• The project proponent should ensure entrance management and control.
Livestock & game animals Safety	• There should be clear demarcation of the area in development so that livestock and game animals are prevented from wandering nearby.
Loss of agricultural production	• The project proponent should ensure that the schedule for construction is made available to the local community so that they can suitably prepare.

Damage to property	• If a risk exists of damage taking place on a property as a result of construction, a condition survey should be undertaken prior to construction; • The contractor is to make good and acknowledge any damage that occurs on any property as a result of construction work; • Where crops and agricultural machinery are damaged, compensation is to be paid to the farmer for the proven loss of these crops; • The farmer should be compensated for any loss of income experienced at the account of the contractor.					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Medium	Short Term	Likely	1
After Mitigation	Positive	Local	Minor	Short Term	Likely	3
Significance of Impact and Preferred Alternatives	Costs related to damage and theft should be borne by the developer. There are no alternatives suggested.					

Environmental Feature	Disturbances Arising from Construction					
Project life-cycle	Construction phase					
Potential Impact	Proposed Management Objectives / Mitigation Measures					
Increase in Dust	• Dust and disturbance can be mitigated through the use of appropriate dust suppression mechanisms. • Adherence to road signage can be added as an advantage and a measure to manage the increase in dust levels; • Mitigation measures management should be adhered to according to the relevant specialist studies.					
Noise impacts	• Prior notice should be given to surrounding communities of noisy event such as blasting. • Construction work should take place during working hours – defined as 07h00 to 17h00 on weekdays and 07h00 to 14h00 on Saturdays. Should overtime work be required, that will generate noise, consultation with the affected community or landowner should take place.					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Medium	Short Term	Likely	2
After Mitigation	Negative	Local	Low	Short Term	Moderate	1
Significance of Impact and Preferred Alternatives	Disturbances and irritation during construction is to be expected. These can then be successfully mitigated through contractor specifications that are issued at a tender stage and through the continuous monitoring of contractor proceedings and performance during construction phase. Negative impacts owing to the construction will unfortunately be experienced irrespective of the site and routing alternative that is most preferred and chosen.					

Environmental Feature	Worker Health and Safety					
Project life cycle	Construction Phase					
Potential Impact	Proposed Management Objectives / Mitigation Measures					
Injuries on Site	• The provisions of the OHS Act 85 of 1993 and the Construction Regulations of 2014 should be implemented on all sites; • Account should be taken of the safety impacts on the local community when carrying out the longitudinal aspects of the project, such as the powerline; • Contractors should establish HIV/AIDS awareness programmes at their site camps. • Gender sensitive work place practises should be planned for and adopted on site. Employment practises should be demonstrated free of coercion or harassment.					
Protecting the Vulnerable	• There should be a policy on harassment that is well understood by all. • There should be separate changing facilities for men and women, and they should be clearly marked as such. • There should separate toilet facilities for men and women, and they should be clearly marked as such.					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Medium	Short Term	Likely	2
After Mitigation	Negative	Local	Low	Short Term	Moderate	1
Significance of Impact and Preferred Alternatives	The significance of the impact is high as community attitudes can be altered. The implementation of the overall mitigation measures is essential and necessary to minimise the impact from workers' health and safety and community impacts.					

Environmental Feature	Influx of Job Seekers
Project life cycle	Construction Phase
Potential Impact	Proposed Management Objectives / Mitigation Measures
Job seekers influx into the community.	• All employment of locally sourced labour should be controlled and formalised. No employment should take place from the project gate and contracts of employment should be entered into taking into account the Labour Relations Act; • If possible, and if the relevant Ward Councillors deems it necessary, the employment process should include the affected Ward Councillors and their ward committee. • To limit the growth of informal settlements in the project area, labour should be sourced from existing labour sending areas, from people who resided in the area prior to appointment. This process should include the Ward Councillor to ensure that only local residents are employed, rather than labour migrants. • No staff accommodation should be allowed on site; • To limit the growth of settlements near the project site the project proponent should provide worker transport to and from the work site for the duration of construction.
Increased community conflicts due to employment of local and non-local labourers	• Programmes should be developed to boost the local economy. These can be in the form of Corporate Social Responsibility (CSR) that will favour local empowerment.

Increase health risk	• Measures should be taken to provide condoms and, where necessary, access to counselling to address any risks to health.					
Increased social pathologies such as crime, drug abuse and sexual behaviours.	• The mitigation method will require a change in community values and attitudes; This can be done through creating social awareness, and educating the workforce with regards crime awareness and social pathology prevention					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Site	Moderate	Short term	High	2
After Mitigation	Negative	Site	Low	Short term	High	1
Significance of Impact and Preferred Alternatives	The significance of the impact is high as community attitudes can be altered. The implementation of the overall mitigation measures is essential and necessary to minimise the impact from job-seekers influx and community impacts.					

Environmental Feature	Security					
Project life cycle	Construction Phase					
Potential Impact	Proposed Management Objectives / Mitigation Measures					
Ensuring the security of the project site	• The camp site for the project and the longitudinal construction sub-site laid down areas should be fenced for the duration of construction; • All contractors' staff should be easily identifiable through their respective uniforms; • A project policy on management of workers should be developed. This would include education and awareness to be conducted with regards crime, trespassing and not gathering outside the site could be conducted. • Security staff should only be allowed to reside at contractor camps and no other employees.					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Medium	Short Term	Likely	2
After Mitigation	Negative	Local	Low	Short Term	Moderate	1
Significance of Impact and Preferred Alternatives	Disturbances and irritation during construction are to be expected. These can then be successfully mitigated through contractor specifications that are issued at a tender stage and through the continuous monitoring of contractor proceedings and performance during construction phase.					

Environmental Feature	Economic Impacts (positive)
Project life-cycle	Operational Phase
Potential Impact	Proposed Management Objectives / Mitigation Measures
Economic	• The solar park will stimulate the local economy through the provision of jobs and through local procurement.

	• It will contribute to the improvement of the national electricity supply at a price that has been set by a competitive bidding process					
Local Procurement	• Local SMMEs should be given an opportunity to participate in the operation of the project through the supply of services, material or equipment.					
	• A procurement policy promoting the use of local business where possible, should be put in place and applied throughout the operational phases of the project.					
Job Creation and Skills Development	• Women should be given equal employment opportunities and encouraged to apply for positions.					
	• A skills transfer plan should be put in place at an early stage and workers should be given the opportunity to develop skills whilst in employment.					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Positive	Regional	High	Long Term	Likely	3
After Mitigation	Positive	Regional	High	Long Term	Likely	3
Significance of Impact and Preferred Alternatives	The solar park in the regional study area will provide economic stimulus to the regional study area for the long-term. The solar park should adopt policies that are supportive of local procurement and support for local enterprises. Economic impact considerations require that the most cost-effective transmission power line route be adopted to service the project.					

Table 43: Operational Phase Impacts (Tanhuke & Chidley, 2023)

Environmental Feature	Economic well-being (negative)					
Project life-cycle	Operational Phase					
Potential Impact	Proposed Management Objectives / Mitigation Measures					
Loss of productive land	• A very low impact that does not require mitigation.					
Loss of grazing land	• A very low impact that does not require mitigation.					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Low	Short Term	Low	1
After Mitigation	Negative	Local	Low	Short Term	Low	1
Significance of Impact and Preferred Alternatives	This impact is not considered significant. It should be noted that this study defers to the agricultural specialists with regards the impact of the project on regional production.					

13.27 "No-Go" Impacts

The "no-go option" is the alternative of not implementing the activity / development. The "no-go option" also provides the baseline against which the impacts of other alternatives are compared.

The “no go option” needs to be considered in light of the motivation (see **Section 3** above) as well as the need and desirability of the Project (see **Section 8** above).

SA has identified the need to supply diversified power generation that includes renewable energy technologies, such as proposed by the Project. This is in light of the country’s endeavour and commitment to reduce the carbon footprint created by the current heavy reliance on coal to produce electricity. In this regard, the Applicant intends to bid for the current and future REIPPPP bid windows and/or other renewable energy markets within SA.

In contrast, should the proposed Project not go ahead, any potentially significant environmental issues associated with the Project (refer to **Section 13.9** to **Section 13.26** above) would be irrelevant and the status quo of the local receiving environment would not be affected by the Project-related activities. The prerogative will lie with the landowner to determine an alternative future desired use of the land where the Solar PV Plant is proposed. It is noted that the site was historically used for agricultural purposes, but it is currently used for grazing. With the “no-go option” the objectives of the Project would not be met. This will *inter alia* mean that the Project’s intended benefits will not materialise. From a social perspective, the No-Go alternative will present the following implications:

- There will be no contribution employment and skills development to the local community.
- The local economy will remain unchanged as the area and will not attract new economic investment.
- The opportunity to improve the overall supply of electricity in the regional will be missed; and
- The economic stimulus presented by the project will be foregone.

There will be less economic development as there will be no opportunities for SMMES and local labourers. Having taken into consideration the project aims of electricity generation using renewable power sources and considering the assessment above which does not indicate any fatal socio-economic flaws, the benefits from the project going ahead, from a socio-economic perspective, will be larger than not proceeding.
The “no go option” is thus not preferred.

13.28 Cumulative Impacts

13.28.1 Introduction

A cumulative impact, in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

13.28.2 Other Renewable Energy Projects in Proximity to the Proposed PV Site

Cumulative impacts can be identified by combining the potential environmental implications of the Project with the impacts of projects and activities that have occurred in the past, are currently occurring, or are proposed in the future within the Project Area. It is noted that the accurate characterisation of the future state of the Project area is inherently speculative to an extent, due to the dynamic nature of future decisions related to land use and growth, protection of terrestrial and aquatic biological resources, water use (consumptive, waste-related and encroachments), etc.

According to the REEA Database (quarter 4, 2022), the following renewable energy applications have been made for properties that are located within a 30km radius of the PV Site (refer to **Figure 66** below):

- Status: **approved** –
    - The construction and operation of the Grid connection infrastructure for 100Mac Rondavel solar energy facility, near Kroonstad in Free State Province (14/12/16/3/3/1/2405), which is located approximately 15.5km to the northwest of the Project.
    - The construction and operation of the EGI to the proposed 100Mac Vrede Solar Energy facility, BESS and associated infrastructure located near Kroonstad, Free State Province (14/12/16/3/3/1/2406), which is located approximately 15.4km to the northwest of the Project.
- Status: **in process** –
    - SunCorp/Solar Reserve JV (Pty) Ltd, 5MW Photovoltaic Solar Energy Facility, which is located approximately 18.2km to the southeast of the Project.

Four additional PV facilities are being proposed on land adjacent or in close proximity to Oslaagte Solar 3. These include:

- Oslaagte Solar 1 (Pty) Ltd, 240MW Photovoltaic Solar Energy Facility, located southeast;
- Oslaagte Solar 2 (Pty) Ltd, 460MW Photovoltaic Solar Energy Facility, located southeast;
- Leeuwspruit Solar 1 (Pty) Ltd, 320MW Photovoltaic Solar Energy Facility, located southwest;
- Leeuwspruit Solar 2 (Pty) Ltd, 300MW Photovoltaic Solar Energy Facility, located southwest.

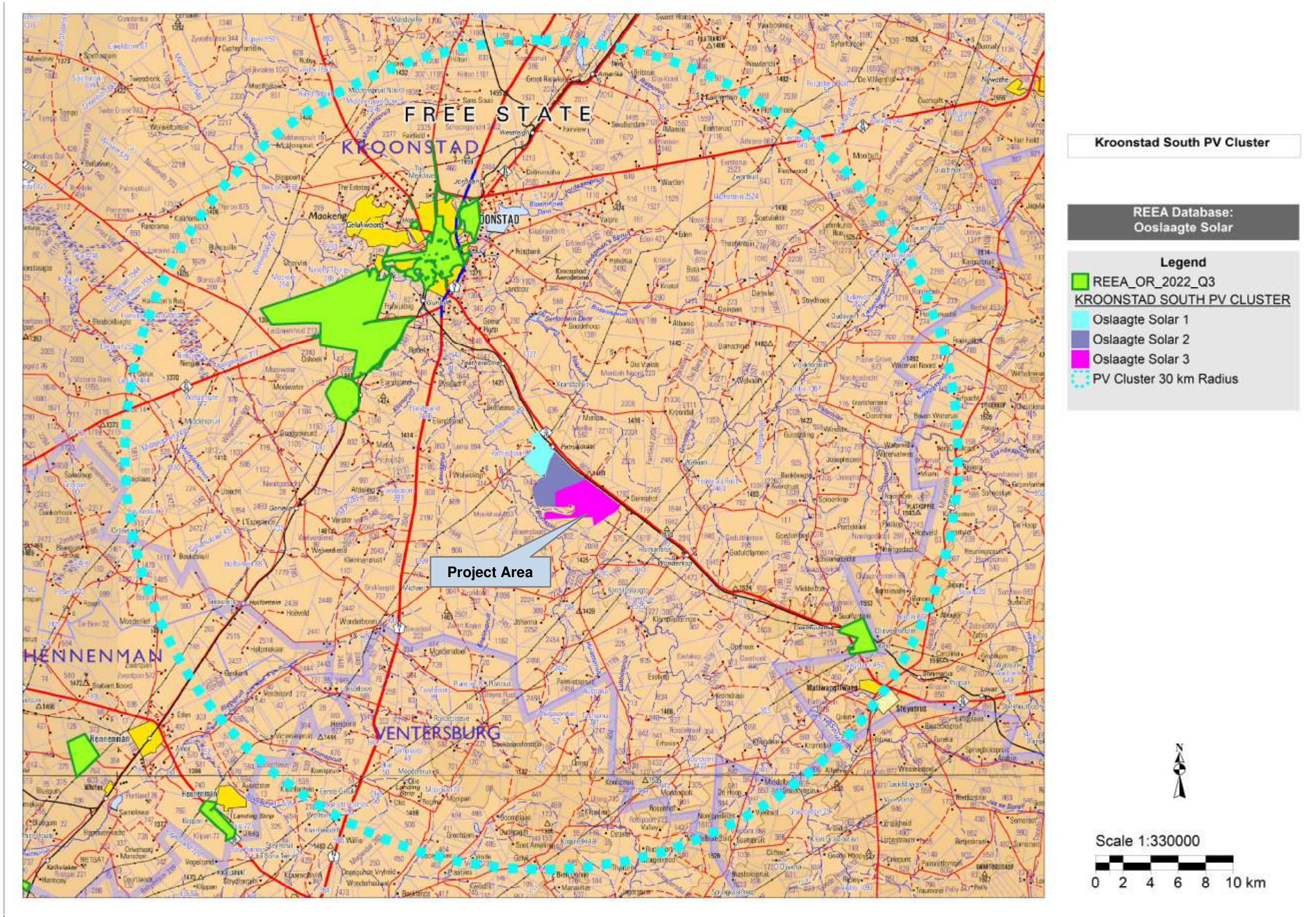


Figure 66: **Renewable energy applications in relation to the Project (within a 30km radius)**

The following is noted in terms of the cumulative impacts of the Project and the **approved** renewable energy applications for properties that are located within a 30km radius of the PV Site (assuming that these developments will proceed):

- There will be a cumulative loss of indigenous vegetation for these renewable energy developments. The total footprint area of the proposed Project's Solar PV Plant is difficult to estimate since most of the vegetation falling under the panels will be retained, and only hardstanding areas will be stripped of vegetation. It is noted that the Terrestrial Biodiversity Compliance Statement confirmed that the Project Area is mostly of a 'Low' sensitivity. The total areas to be cleared for the other renewable energy applications could not be conclusively established. From a desktop scan it can be seen that parts of the areas proposed for the approved applications have been affected by agricultural activities.
- Cumulative impacts to freshwater resources through sedimentation (silt-laden runoff) caused by inadequate stormwater management, as well as contaminated through inadequate storage and handling of hazardous materials and poor management of waste and wastewater, would affect the same catchment. Provision is made in the Project's EMPr to manage stormwater and to prevent pollution of water resources.
- The renewable energy developments will require water for construction and operational purposes. As explained in **Section 9.8.2** above, water for the Project will be supplied from approved sources such as the MLM or through existing or new boreholes. Provision is made in the Project's EMPr to manage the consumptive use of water.
- Localised impacts in terms of noise, reduction in air quality (dust) and traffic disruptions will be managed by the provisions of the EMPr for the respective renewable energy developments.
- The cumulative traffic impact assumes that all proposed and authorized renewable energy projects within 30 km be constructed at the same time. This is a precautionary approach, as in reality these projects would be subject to a highly competitive bidding process. Only a handful of projects would be selected to enter into a power purchase agreement with Eskom, and construction is likely to be staggered depending on project-specific issues.
- The construction and decommissioning phases are the only significant traffic generators for renewable energy projects. The duration of these phases is short term (i.e., the impact of the generated traffic on the surrounding road network is temporary and renewable energy facilities, when operational, do not add any significant traffic to the road network). Even if all renewable energy projects within the area are constructed at the same time, the roads authority will consider all applications for abnormal loads and work with all project companies to ensure that loads on the public roads are staggered and staged to ensure that the impact will be acceptable.
- A total area of 30 km surrounding the PAOI were used to assess the total habitat loss in the area and subsequently the cumulative impact. To determine the intact remnant habitat the NBA (2018) remnant spatial data was utilised. The future renewable energy projects were also considered by utilising the REEA Q4 (2022) spatial dataset. In order to remove any duplication, only the areas that overlap with the remanence areas were considered. The total cumulative loss was found to be 41.97%. Avifauna cumulative impacts are included in the tables below.

Table 44: Cumulative Impacts to avifauna associated with the proposed project – Project in Isolation (Husted, 2023)

Impact	Project in Isolation							
	Extent	Probability	Duration	Reversibility	Irreplaceability	Cumulative Effect	Magnitude/ Intensity	**Significance**
Loss of habitat	1	4	2	2	3	2	2	
	Site: The impact will only affect the site.	Definite: Impact will certainly occur (Greater than a 75% chance of occurrence).	Medium term: The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).	Partly reversible: The impact is partly reversible but more intense mitigation measures are required.	Significant loss of resources: The impact will result in significant loss of resources.	Low cumulative impact: The impact would result in insignificant cumulative effects.	Medium: Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).	**Negative Low Impact**

Table 45: Cumulative Impacts to avifauna associated with the proposed project – Cumulative Effect (Husted, 2023)

Impact	Cumulative Effect							
	Extent	Probability	Duration	Reversibility	Irreplaceability	Cumulative Effect	Magnitude/ Intensity	**Significance**
Loss of habitat, and disruption of surrounding ecological corridors.	3	4	3	3	3	4	2	
	Province/region: Will affect the entire province or region.	Definite: Impact will certainly occur (Greater than a 75% chance of occurrence).	Long term: The impact and its effects will continue or last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years).	Barely reversible: The impact is unlikely to be reversed even with intense mitigation measures.	Significant loss of resources: The impact will result in significant loss of resources.	High cumulative impact: The impact would result in significant cumulative effects	Medium: Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).	**Negative Medium Impact**

13.28.3 The Proposed Project's contribution towards Cumulative Impacts

The following is noted in terms of the Project's contribution towards cumulative impacts:

- The construction period may cause traffic-related impacts in terms of the local road network, which will be associated with heavy vehicle construction traffic for the delivery of material, transportation of construction workers and general construction-related traffic. This may compound traffic impacts if other large-scale projects are planned during the same period. The EMPr includes mitigation measures to manage traffic-related impacts.
- The clearance of the vegetative cover over large areas associated with the Project's development footprint may exacerbate erosion, which is already encountered in the greater area as a result of other land use disturbances. Mitigation measures to control erosion are included in the EMPr.
- From an agricultural perspective, the proposed development will not have impacts on farming land due to fragmentation or subdivisions of land that can lead to unsustainable farming units. There is no subdivision proposed and the land will return to farming after the life of the project.
- There will be an increase in the dust levels during the construction phase, as a result of earthworks, use of haul roads and other gravel roads, stockpiles, material crushing, etc. Sensitive receptors to dust and other air quality impacts in the study area are discussed in **Section 13.19.1** above. Measures to manage dust are included in the EMPr.
- Construction of the proposed facilities along with construction activities of other developments in the Project Area could potentially increase noise impacts on surrounding land uses. This impact will be temporary in nature. It is further noted that noise is a localised issue that diminishes in intensity with distance from the source. Sensitive receptors to noise in the study area are discussed in **Section 13.20.1** above. The Project's contribution to cumulative noise impacts is thus not anticipated to be significant. Measures are included in the EMPr to manage noise impacts that may be caused by the Project.
- In terms of the potential cumulative visual impacts, the proposed site is surrounded by various commercial and agricultural activities. In addition, according to the REEA Database, there are three (3) renewable energy applications have been made for properties located near the project site. The majority of the proposed site currently grassland vegetation and land previously used for agricultural purposes. The clearance and subsequent development of the site will result in the alteration of this space. Consequently, the development of this site will add cumulatively to the loss of sense of place. While the result in a change in the sense of place for those areas that look onto the project site, the magnitude of the impact is likely to be low as the majority of the sensitive receptors are located more than 5km from the project site.
- Changes in demographics in the region due to the influx of employment seekers may cause problems such as crime, STDs, conflicts with local communities, etc. This was assessed as part of the Social Impact Assessment and mitigation measures are included in the EMPr.
- There is a potential for positive cumulative economic effects from the construction of multiple developments in the area. The increased creation of jobs and economic input into local businesses would provide a benefit to local communities.

13.28.4 Cumulative Environmental Impact Statement

From a cumulative impact perspective, there are four (4) known approved renewable energy applications within a 30km radius of the Project's PV Site (refer to **Section 13.28.2** above) according to the REEA Database (quarter 2, 2022). Cumulative impacts in relation to the Project were assessed individually in **Section 13.9** to **Section 13.26** above and mitigation measures were developed for each of the impact categories.

14 ANALYSIS OF ALTERNATIVES

14.1 General

Alternatives are the different ways in which a project can be executed to ultimately achieve its objectives. Examples could include carrying out a different type of action, choosing an alternative location or adopting a different technology or design for the project.

By conducting the comparative analysis, the Best Practicable Environmental Option (BPEO) can be selected with technical and environmental justification. Münster (2005) defines BPEO as the alternative that "*provides the most benefit or causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term*".

14.2 "No-Go" Option

The implications of the "no-go" option are discussed in **Section 13.27** above. The "no go option" is not preferred, as the objectives of the Project will not be met, and the associated benefits will not materialise. Although not proceeding with the Project would avoid the adverse environmental impacts, these impacts are considered to be manageable through the provisions contained in the EIA Report and EMPr.

14.3 Layout Alternatives

14.3.1 Solar PV Plant

The original layout of the Solar PV Plant, referred to as PV Layout Alternative 1 (shown in **Figure 3** and **Figure 8** above and **Figure 67** below), was assessed by the specialists (refer to **Section 12.4** to **Section 12.11** above).

The initial Aquatic and Wetland Compliance Statement advocated that the proposed development avoid the non-perennial drainage lines, as well as their associated buffers. The HIA advocated for the exclusion of heritage resources and their buffers. In response, PV Layout Alternative 1 was revised to avoid encroachment into the drainage lines and heritage resources and their buffer areas. This new layout is referred to as PV Layout Alternative 2 (see **Figure 68** below) and includes the associated changes to the various components of the Solar PV Plant.

Through the specialist's impact assessments and consideration of alternative 1 and 2 layouts, the following was concluded:

- The internal layouts of the facility will not impact upon the social environment beyond the plant.

- In terms of visual impacts of the two (2) alternatives the visual impacts between the two are negligible. Therefore, the specialist's recommendation is that alternative two (2) be used as the preferred layout due to the reduced area of the infrastructure.
- The new layout is minor as far as agriculture is concerned because their placement is not on highly sensitive land; all supporting infrastructure is on low/moderate or moderately sensitive land. Because there is no difference on the two option's impact on agriculture, the figures and description will be done based on the layout of Alternative 2.
- The specialist has confirmed the Low sensitivity and recommends that the development of the PV facility with the use of Alternative 2 as layout may proceed with low impacts on the freshwater features.
- In terms of the impact on the identified heritage resources, the original layout for the Oslaagte Solar 3 PV footprint (Alternative 1) has been revised to exclude certain environmentally sensitive areas (Alternative 2). The Alternative 2 layout avoids the identified heritage resources that would be impacted by the Alternative 1 layout. Therefore, from a heritage perspective, Alternative 2 is the preferred layout.
- As the geology of the alternatives are the same there is no preference between the alternatives from a Palaeontological point of view.
- The overall impact of the project is regarded as acceptable should the mitigations and recommendations be implemented. The alternative design is the preferred layout.

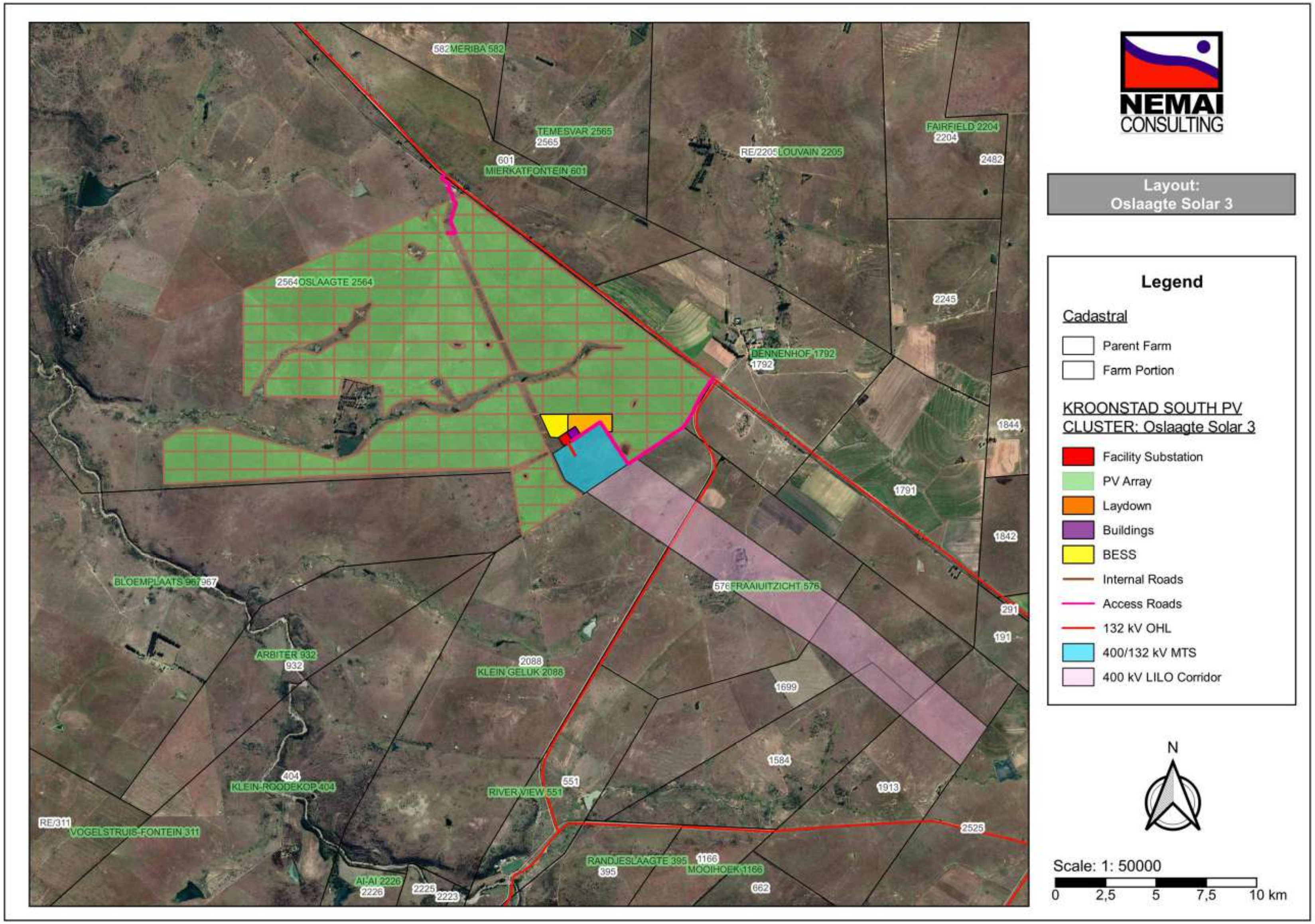


Figure 67: **PV Layout Alternative 1**

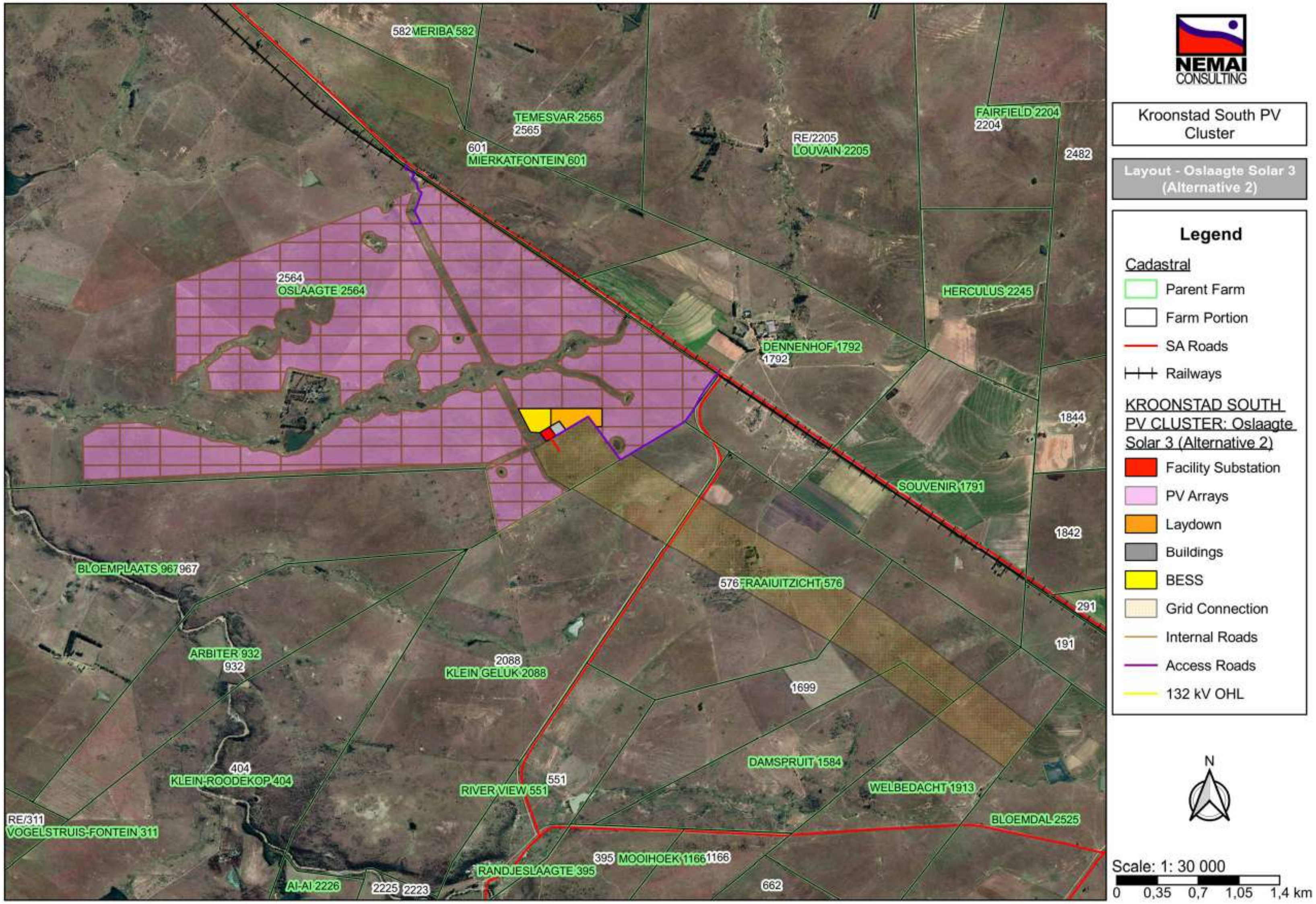


Figure 68: **PV Layout Alternative 2**

Based on the recommendations of the specialists, PV Layout Alternative 2 was identified as the BPEO.

14.4 Technology Alternatives

14.4.1 PV Technology

The different solar PV technologies, as explained in **Section 10.4.1** above, include a single axis tracker system and bifacial solar panels. These technology options do not constitute alternatives however, and the choice of technology will be determined during detailed design.

14.4.2 BESS Technology

The BESS can be broken into solid state and flow battery systems. A single battery technology, namely solid state, will be implemented for the Project.

15 PUBLIC PARTICIPATION

15.1 Introduction

The purpose of public participation includes the following:

1. To provide I&APs with an opportunity to obtain information about the Project;
2. To allow I&APs to express their views, issues, and concerns with regard to the Project;
3. To grant I&APs an opportunity to recommend measures to avoid or reduce adverse impacts and enhance positive impacts associated with the Project; and
4. To enable the Applicant to incorporate the needs, concerns, and recommendations of I&APs into the Project, where feasible.

The public participation process that is being undertaken is governed by NEMA and the EIA Regulations. **Figure 78** below outlines the public participation process for the upfront Announcement Phase (completed), Scoping Phase (completed) and EIA Phase (current).

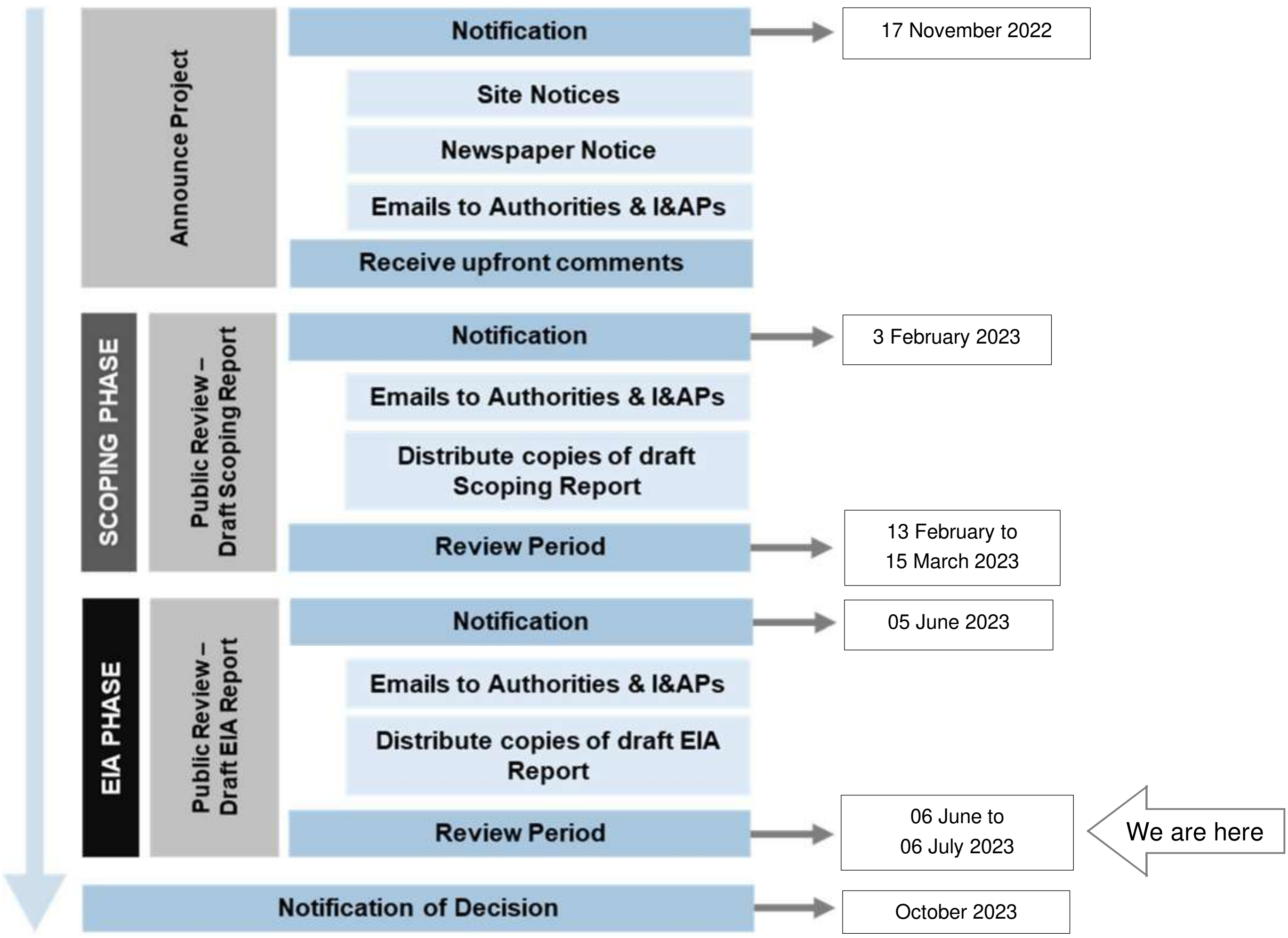


Figure 78: Outline of Public Participation Process (*note: dates are subject to change*)

15.2 Public Participation during the Announcement & Scoping Phases

The primary tasks undertaken as part of public participation during the Announcement and Scoping Phases included the following (details provided in the Scoping Report):

1. Compiling a database of organs of state and I&APs;
2. Announcing the Project by placing notices in newspapers, erecting site notices and circulating a Background Information Document and Reply Form to organs of state and I&APs;
3. Lodging the draft Scoping Report for public review and notifying organs of state and I&APs; and
4. Compiling and maintaining a CRR (contained in **Appendix G**).

15.3 Public Participation during the EIA Phase

15.3.1 Maintenance of the Stakeholders' Database

The database of stakeholders (contained in **Appendix F**), which includes authorities, different spheres of government (national, provincial and local), parastatals, stakeholders, landowners, interest groups, members of the general public and I&APs, was maintained during the EIA phase.

15.3.2 Period to Review the Draft EIA Report

In accordance with Regulation 43(1) of the EIA Regulations, organs of state and I&APs are granted an opportunity to review and comment on the draft EIA Report from **06 June until 06 July 2023**.

15.3.3 Notification of Review of Draft EIA Report

Organs of state and I&APs contained in the database (refer to **Appendix F**) were notified of the review of the draft EIA Report. Proof of notification will be included in the final EIA Report.

15.3.4 I&APs' Access to the Draft EIA Report

The draft EIA Report can be accessed as follows:

- A hardcopy of the draft EIA Report was placed at the Mangaung Public Library; and
- An electronic copy was uploaded to the following website, for downloading purposes: https://nemai.co.za/downloads/.

The draft EIA Report was provided to the following parties, which include key regulatory and commenting authorities with jurisdiction over the receiving environment:

- DFFE (including Biodiversity Conservation Unit);
- DESTEA;
- DWS: Free State Region;
- DMRE;
- FSDPRT; and
- MLM.

A Comment Sheet is provided in **Appendix L**, which can be used to provide comments on the draft EIA Report.

15.3.5 *Public Meeting to Present the Draft EIA Report*

Anyone that has an interest in attending a public meeting will need to inform Nemai Consulting in writing by 15 June 2023. Should a public meeting be requested, a suitable date will be confirmed. Only preregistered parties that confirmed interest will receive an invitation to the public meeting.

15.3.6 *Comments Received on the Draft EIA Report*

The CRR will be updated with all comments received from organs of state and I&APs during the review period of the draft EIA Report. The updated CRR will be appended to the final EIA Report that will be submitted to DFFE.

15.4 Notification of DFFE Decision

Registered I&APs will be notified after having received written notice from DFFE (in terms of NEMA) on the final decision for the Project. The notification will include the appeal procedure to the decision and key reasons for the decision.

16 EIA CONCLUSIONS

16.1 Outcomes of the EIA Phase

The following key tasks were undertaken during the EIA phase for the proposed Project:

- The specialist studies identified in the Plan of Study for the EIA were undertaken and the findings were incorporated into the EIA Report in terms of understanding the environmental status quo and sensitive features, assessing the potential impacts and establishing concomitant mitigation measures, as well as identifying the preferred alternatives;
- Potentially significant impacts pertaining to the pre-construction, construction and operational phases of the Project were identified and assessed, and mitigation measures were provided; and
- 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 below.

16.2 Sensitive Environmental Features

The following sensitive and significant environmental features and aspects that are associated with the Project and its receiving environment are highlighted, for which mitigation measures are included in the EIA Report and EMPr:

- Several non-perennial rivers and stormwater lines were identified in the central, eastern, southern and western portions of the proposed Oslaagte Solar 3 PV facility. Project footprint Alternative 2 avoids these.
- In terms of the Free State Conservation Plan, portions of the Project footprint overlap with an ESA 1 and 2, as well as Other and Degraded.
- The Serendipidie Private Nature Reserve, a protected area, lies approximately to the south of the site and the 400kV powerline corridor traverses the protected area. However, the protected area is degraded and the proposed powerline follows an existing Eskom powerline route.
- Based on field surveys, three SCC were recorded during the survey period, namely, Black-winged Pratincole (Glareola nordmanni), Eupodotis caerulescens (Blue Korhaan) and Sagittarius serpentarius (Secretarybird). Fifteen and eighteen priority species respectively were recorded in the first and second survey. These species are at risk of either habitat loss, collisions or electrocutions.
- Visual impacts are likely to be largely localised and within 5 km of the proposed project boundary, while significant visual impacts with regards to the proposed activities are expected at the sensitive receptors located within 2km of the proposed project boundary.

- The survey of the Oslaagte Solar 3 PV footprint identified six heritage resources within or adjacent to the general project footprint. Four are located within and two adjacent to the boundary of the project footprint (Alternative 1). These include: a historical farmhouse with an outbuilding and a stone kraal (Os3-01), a railway culvert (Os3-04) and a disused road culvert (Os3-05), two areas with demolished structure remains (Os3-02 and Os3-06) and a possible grave (at Os3-02). One site could be the remains of a farm dam wall (Os3-03). All of these sites are avoided by the Alternative 2 layout.
- The survey of the MTS/LILO Corridor footprint identified a total of six heritage resources within or adjacent to the footprint. Two of these sites are located just outside the boundary of the project footprint (LILO-03 and LILO-06), the remaining four sites are located within the project footprint (Alternative 1 and Alternative 2). The identified heritage resources include the remains of an historical farmstead (LILO-05), the remains of a stone wall (LILO-04, probably a kraal) and three sites identified as an informal graveyard (LILO-06) or potential single graves (LILO-01, LILO-02). One site is the remains of a homestead which may contain potential graves (LILO-03).
- No fossiliferous outcrop was detected in the proposed development.
- The R76 and a railway line run along the eastern boundary of the PV Site.

Sensitivities identified within the LILO corridor can be avoided through the strategic placement of powerline towers.

The combined sensitivity map overlaid with the Project's layout and BPEO is provided in **Figure 69, 70 and 71** below. Key environmental features that contributed toward the sensitive areas shown in the map included watercourses and their associated buffer zones, as well as avifaunal habitats, as determined by the relevant specialist studies.

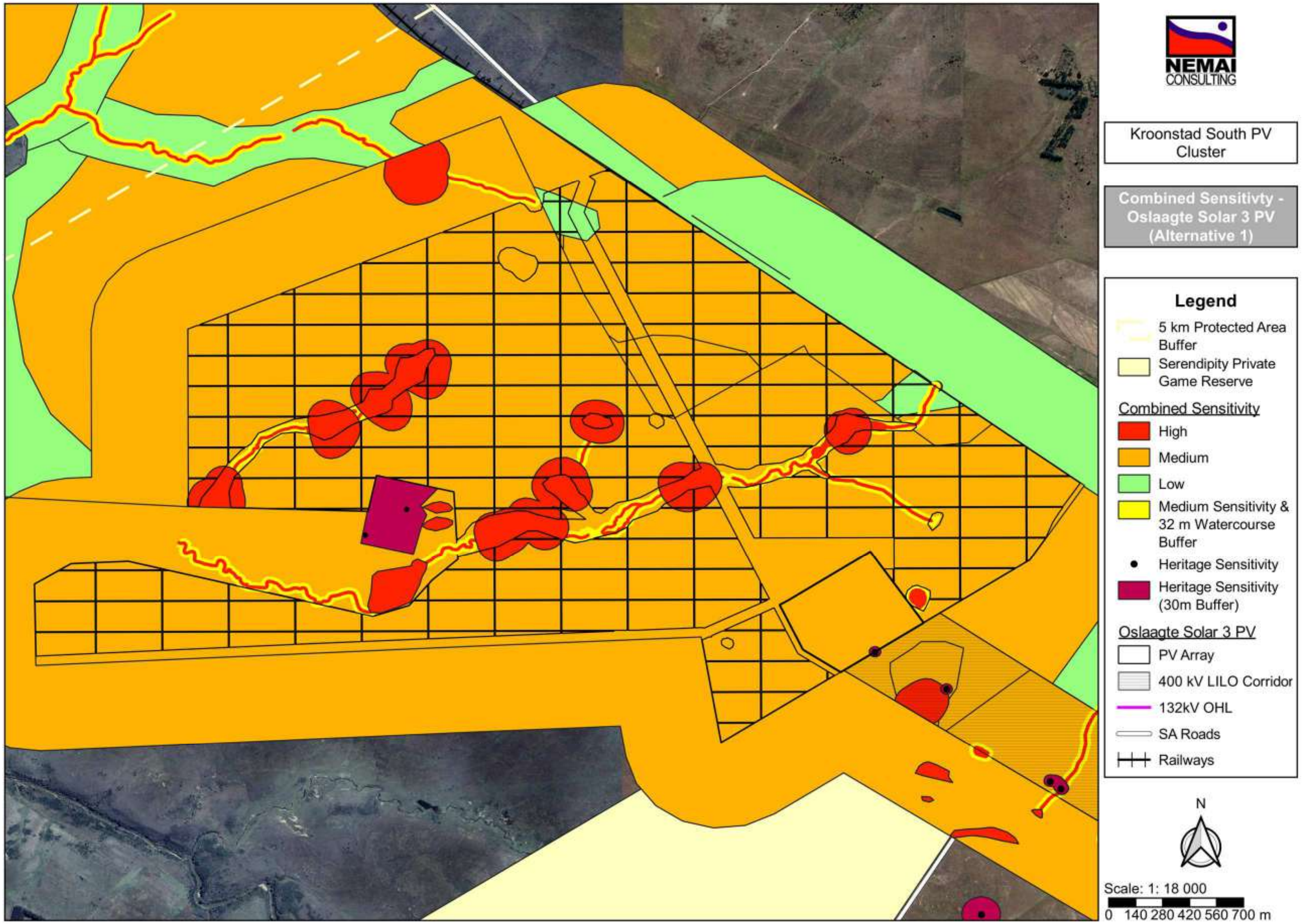


Figure 69: Combined sensitivity map of Layout Alternative 1

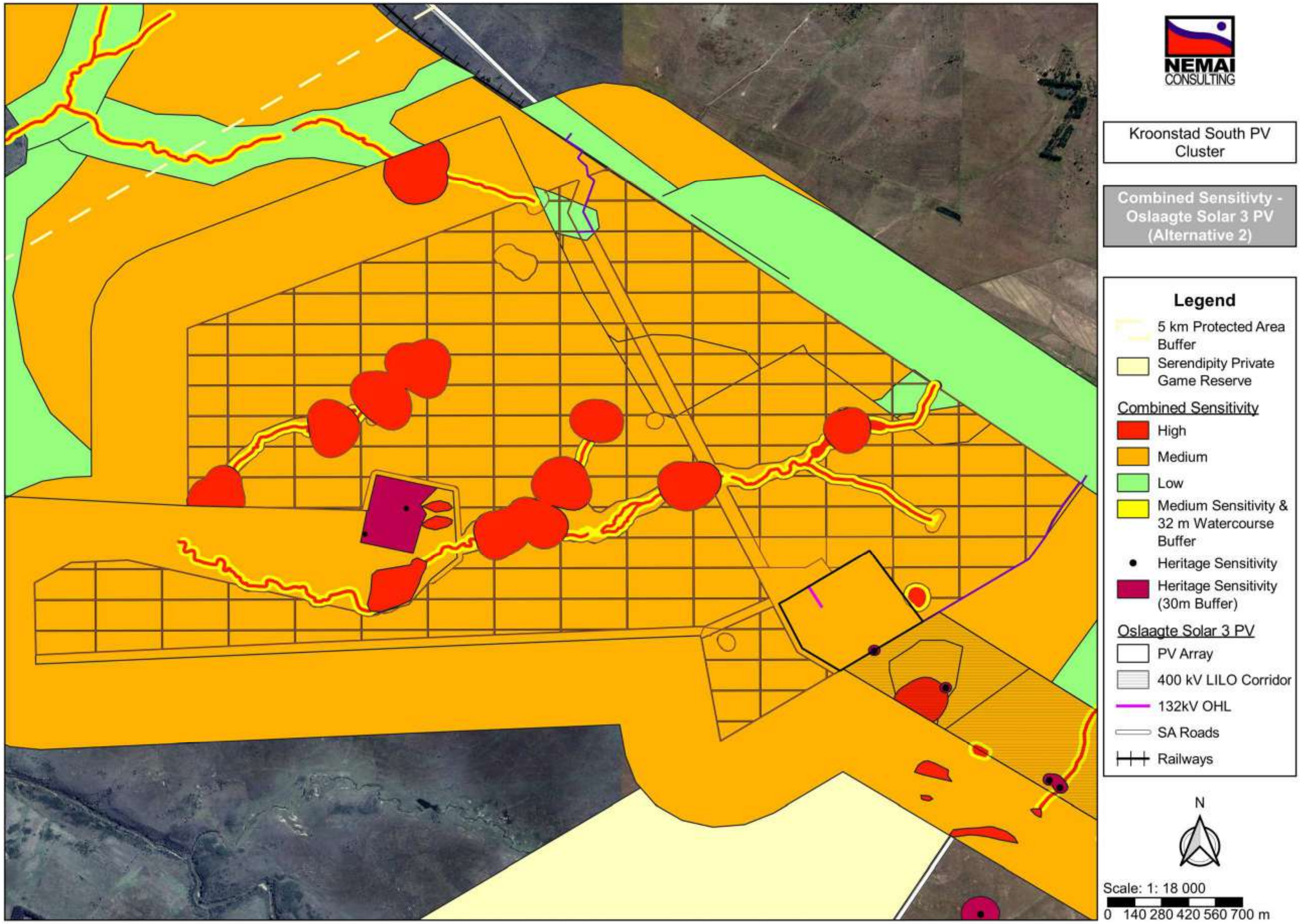


Figure 70: Combined sensitivity map of Layout Alternative 2, the identified BPEO

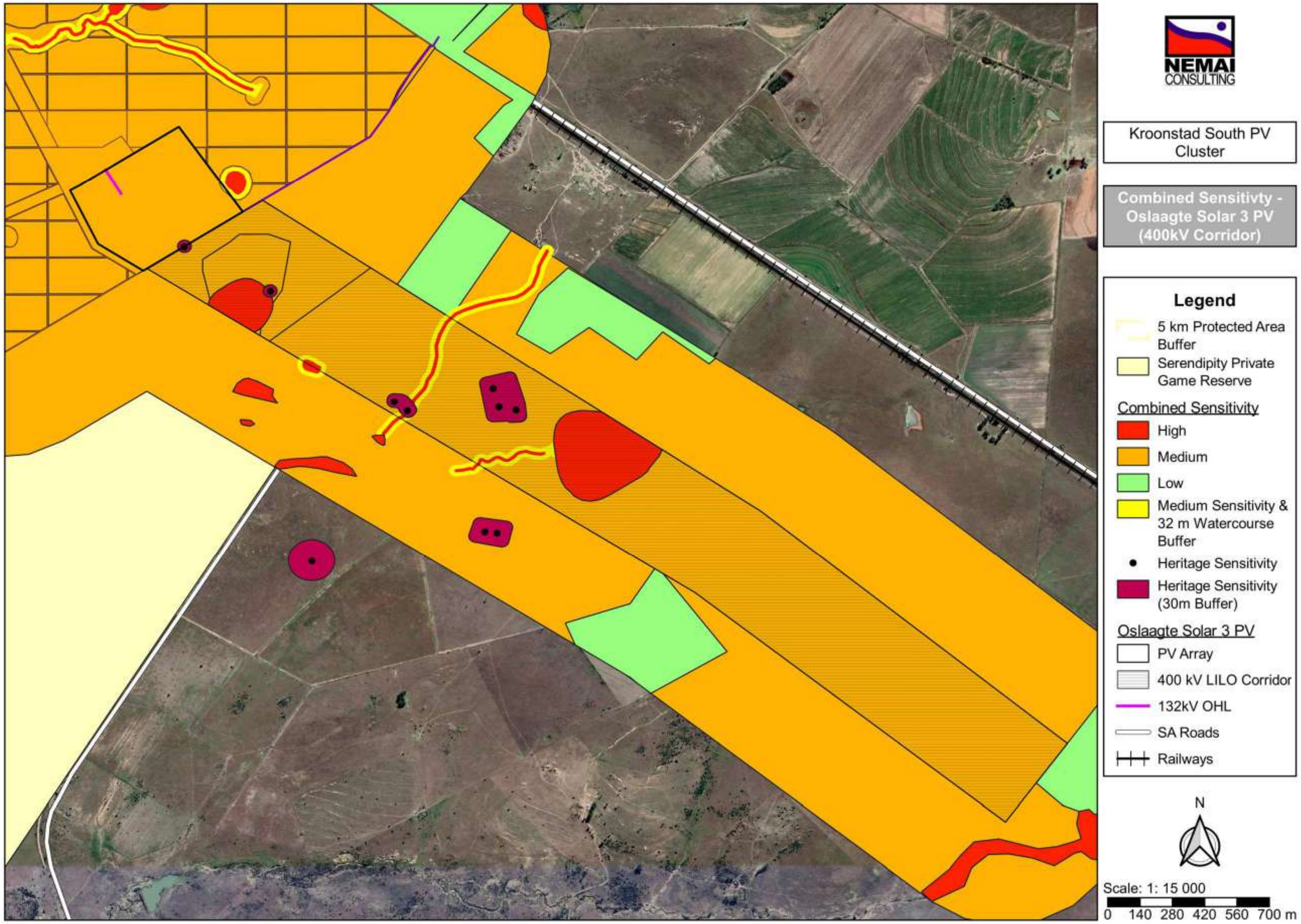


Figure 71: Combined sensitivity map of the LILO corrido

16.3 Environmental Impact Statement

The Project's strategic intent is linked to the SA Government's pursuit of promoting the country's renewable energy development imperatives, which encourages the role of Independent Power Producers (IPPs) to feed into the national grid. In this regard, the Applicant intends to bid for the current and future REIPPPP bid windows and/or other renewable energy markets within SA.

The rationale for the siting of the Project is based on its suitable geographic location, including the area's favourable solar irradiation levels, short distance to grid connection point, flat topography, suitable site access and availability of land. The initial PV Layout was revised to minimise encroachment into the non-perennial drainage lines and heritage sites and their buffer areas. The Project's proposed overhead Powerline Route is aligned alongside existing linear developments as far as possible.

Based on the recommendations of the specialists, technical considerations, feedback from I&APs and the comparison of the impacts, PV Layout Alternative 2 was identified as the BPEO.

The potentially significant environmental impacts were investigated through the relevant specialist studies. Key findings from the EIA, apart from the sensitive environmental features and aspects listed in **Section 16.2** above, which may also influence the conditions of the Environmental Authorisation (if granted), include the following:

- ❑ Avifaunal Baseline and Impact Assessment –
  - A 100 m buffer were placed around the priority species nests. If the nests are in the development footprint then these nests must be regarded as no go buffers for the duration of the breeding season (January- April), if the nests can be found just outside of the development areas then these nests and their buffers must be treated as long term (for the lifetime of the development) no go areas.
- ❑ Powerline Route is to span watercourses. No towers are to be located within watercourses.
- ❑ Undertake a walkdown survey of the power line route to confirm the most suitable locations of the towers. An Aquatic Ecologist and Avifaunal Specialist are to be involved in the walkdown survey.
- ❑ Prepare a comprehensive stormwater management plan prior to construction during the detailed design phase for the PV Site with a focus on erosion prevention and where applicable remediation.
- ❑ Adhere to the requirements of the FSDPRT for the R76 and other tertiary roads impacted by the development.
- ❑ A detailed risk assessment will need to be undertaken based on the type of BESS technology selected and the final design of the Solar PV Plant. The outcomes of this risk assessment will need to be incorporated into the Operational EMPr.

The Project is considered to be compatible with existing land uses encountered in the area. The impacts and risks assessed as part of the EIA process that was undertaken for the Project are considered manageable with the effective implementation of the measures stipulated in this EIA Report and EMPr.

With the selection of the BPEO, the adoption of the mitigation measures included in the EIA Report and the dedicated implementation of the EMPr, it is believed that the significant environmental aspects and impacts associated with this Project can be suitably mitigated. With the aforementioned in mind, it can be concluded that there are no fatal flaws associated with the Project and that authorisation can be issued, based on the findings of the specialists and the impact assessment, through the compliance with the identified environmental management provisions.

It is further the opinion of the EAP and EIA team that the EIA was executed in an objective manner and that the process and EIA Report conform to the requirements stipulated in the EIA Regulations.

The period for which the EA is required is 10 years.

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APPENDICES