PROPOSED PARYS UP TO 200MW SOLAR PHOTOVOLTAIC (PV) AND BATTERY ENERGY STORAGE SYSTEM (BESS) HYBRID PROJECT NEAR THE TOWN OF PARYS, FREE STATE PROVINCE

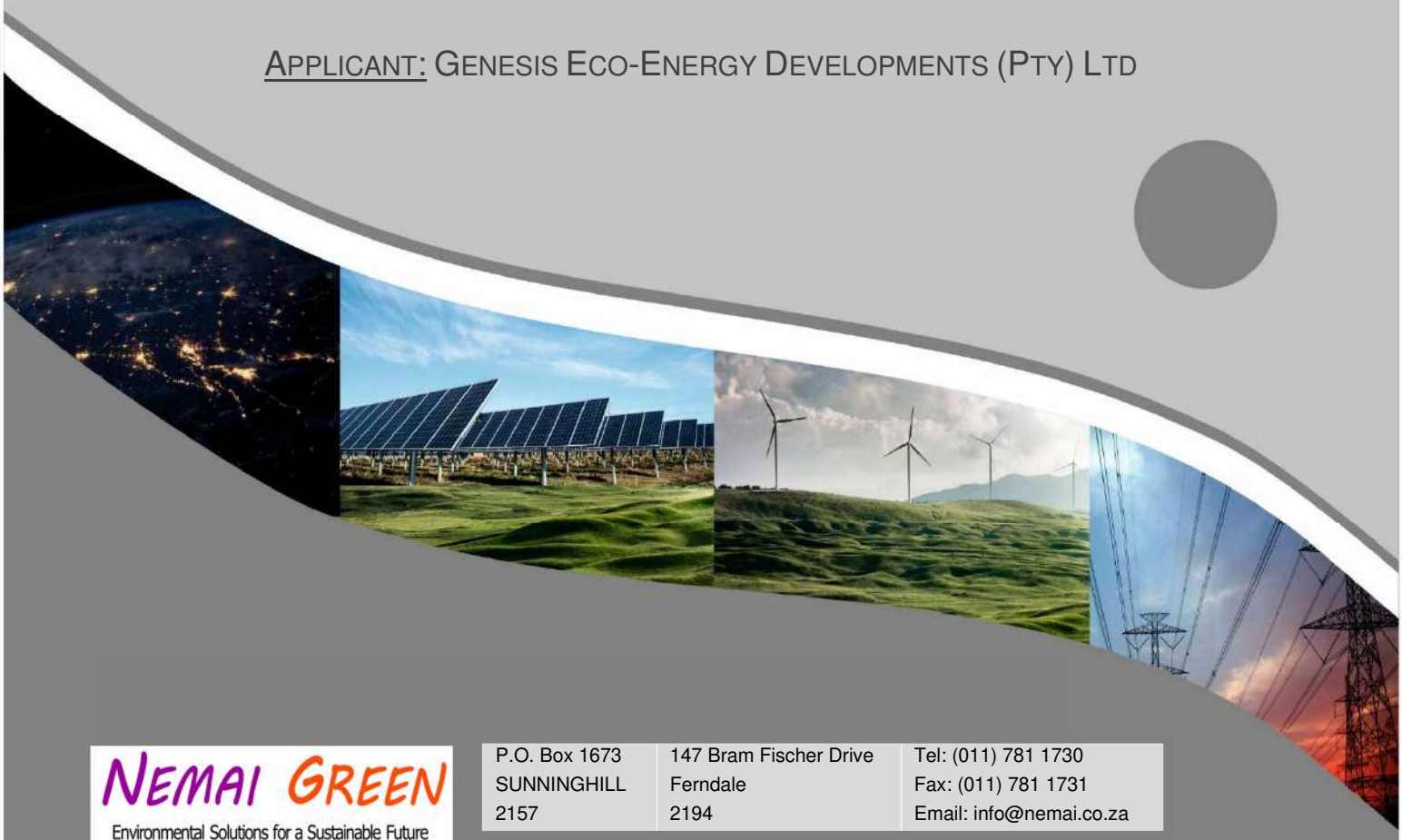
SCOPING REPORT

DFFE REFERENCE NO.: *TO BE ASSIGNED*

DRAFT

SEPTEMBER 2022

APPLICANT: GENESIS ECO-ENERGY DEVELOPMENTS (PTY) LTD



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TITLE AND APPROVAL PAGE

Project Name:	Proposed Parys up to 200MW Solar Photovoltaic (PV) and Battery Energy Storage System (BESS) Hybrid Project near the town of Parys, Free State Province
Report Title:	Scoping Report
Authority Reference:	*DFFE Reference Number to be assigned*
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Applicant:	Genesis Eco-Energy Developments (Pty) Ltd

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EXECUTIVE SUMMARY

A. PROJECT BACKGROUND AND MOTIVATION

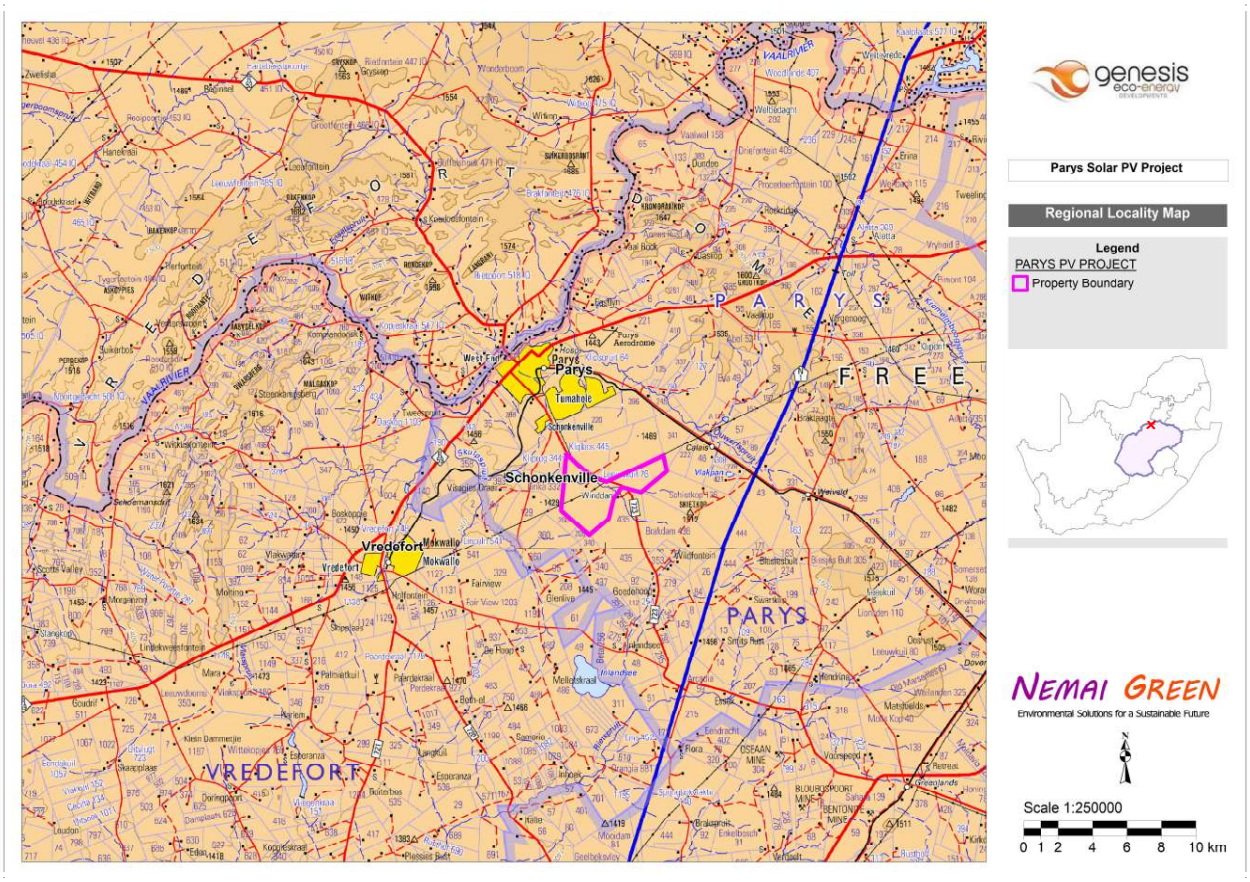
Electricity generation sources need to be diversified to ensure security of supply and reduction in the carbon footprint created by the current heavy reliance of South Africa (SA), via Eskom, on coal to produce electricity. The electricity demand is increasing in SA, and in order to match that demand 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 Battery Energy Storage Systems (BESS) that the Department of Mineral Resources and Energy (DMRE) intends to develop and implement as identified in the approved Integrated Resource Plan (IRP) 2019.

Genesis Eco-Energy Developments (Pty) Ltd (the Applicant) has proposed the development of the Parys up to 200MW Solar PV Project and BESS near the town of Parys, in the Free State Province (the “Project”). The electricity generated by the Project will be injected into the existing Eskom 132 kV distribution system. The Applicant intends to bid for the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) bid windows and /or other renewable energy markets within SA, such as the Corporate and Industrial (C&I) Sector.

This document serves as the draft Scoping Report for the proposed Project.

B. PROJECT LOCATION

The Project is located in the northern part of the Free State Province and falls within the Fezile Dabi District Municipality and Ngwathe Local Municipality. The site is located approximately 3.5km to the south-east of the town of Parys and is crossed by the R723.



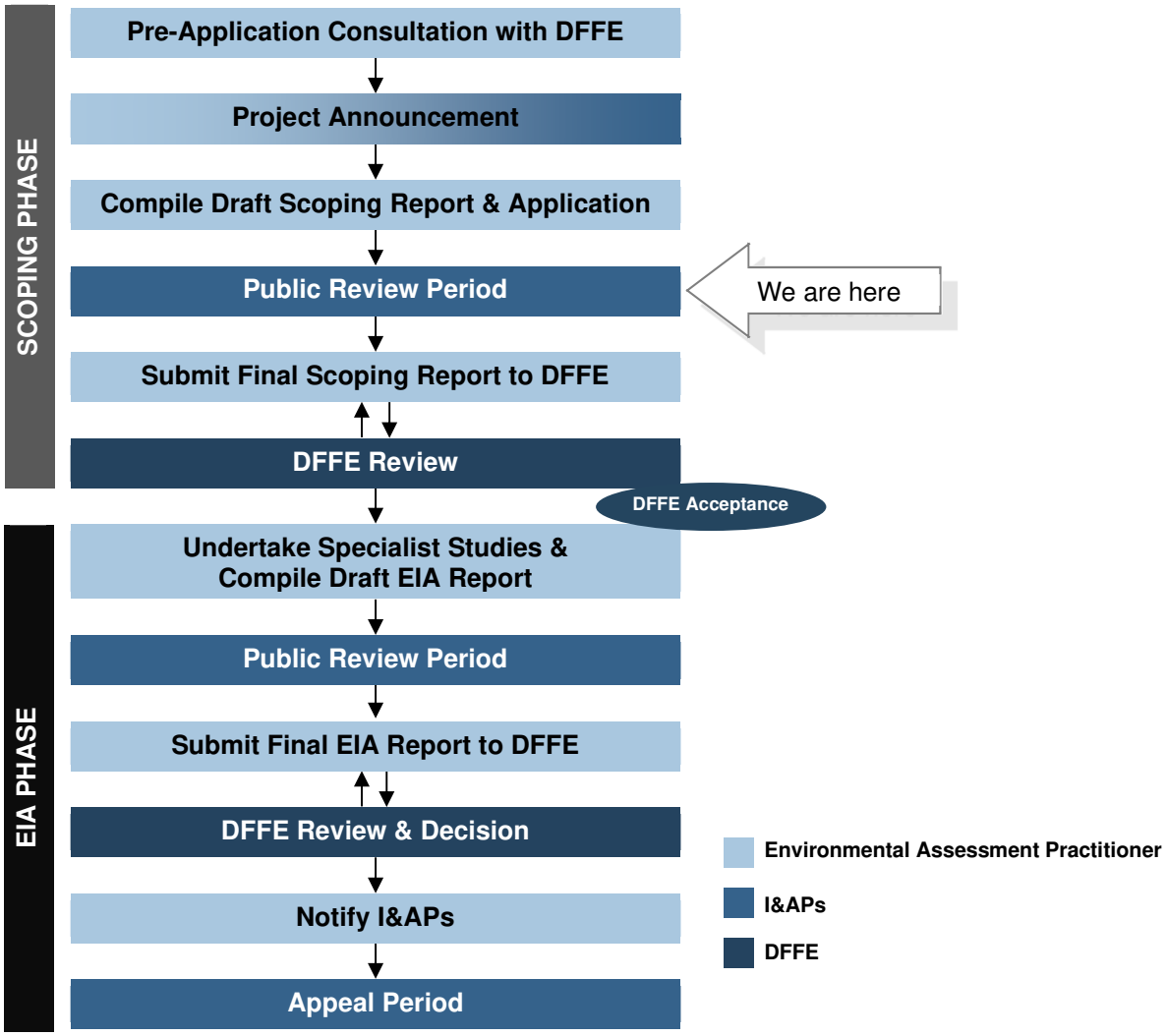
Regional locality map

The property earmarked for the Project covers a combined area of approximately 1234 ha, of which the buildable area determined by the engineering team is approximately 335 ha. The overall length of the proposed 132 kV power lines between the on-site substation and the grid connection point at Eskom's existing Parys 132/11 kV Substation is approximately 0.57km.

C. SCOPING AND EIA PROCESS

The process for seeking Environmental Authorisation (EA) for the Project under the National Environmental Management Act (Act No. 107 of 1998) (NEMA) is being undertaken in accordance with the Environmental Impact Assessment (EIA) Regulations of 2014 (as amended). In terms of NEMA, the lead decision-making authority for the environmental assessment is the Department of Forestry, Fisheries and the Environment (DFFE).

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 below.



Overview of S&EIR Process

D. PROJECT'S TECHNICAL DESCRIPTION

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

- PV panel arrays, which are the subsystems which convert incoming sunlight into electrical energy;
- Mounting structures to support the PV panels;
- BESS to store electrical energy and discharge electrical energy when required;
- On-site inverters to convert direct current (DC) to facilitate alternating current (AC) connection between the solar energy facility and electricity grid;
- New 132 kV power lines between the on-site substation and the grid connection point;
- Cabling between the Project's components, to be laid underground (where practical);
- Administration Buildings (Offices);
- Workshop areas for maintenance and storage;
- Temporary laydown areas;
- Internal access roads and perimeter fencing of the footprint;
- High Voltage (HV) Transformers; and
- Security Infrastructure.

An overview of the project life-cycle, as well as the resources required to execute the Project, is provided in the Scoping Report.

The alternatives under consideration for the Project include technology alternatives and the no-go option. The EIA phase will include a detailed comparative analysis of the Project's feasible alternatives that emanate from the Scoping exercise, which will include environmental (with specialist input) and technical evaluations.

E. PROFILE OF THE RECEIVING ENVIRONMENT

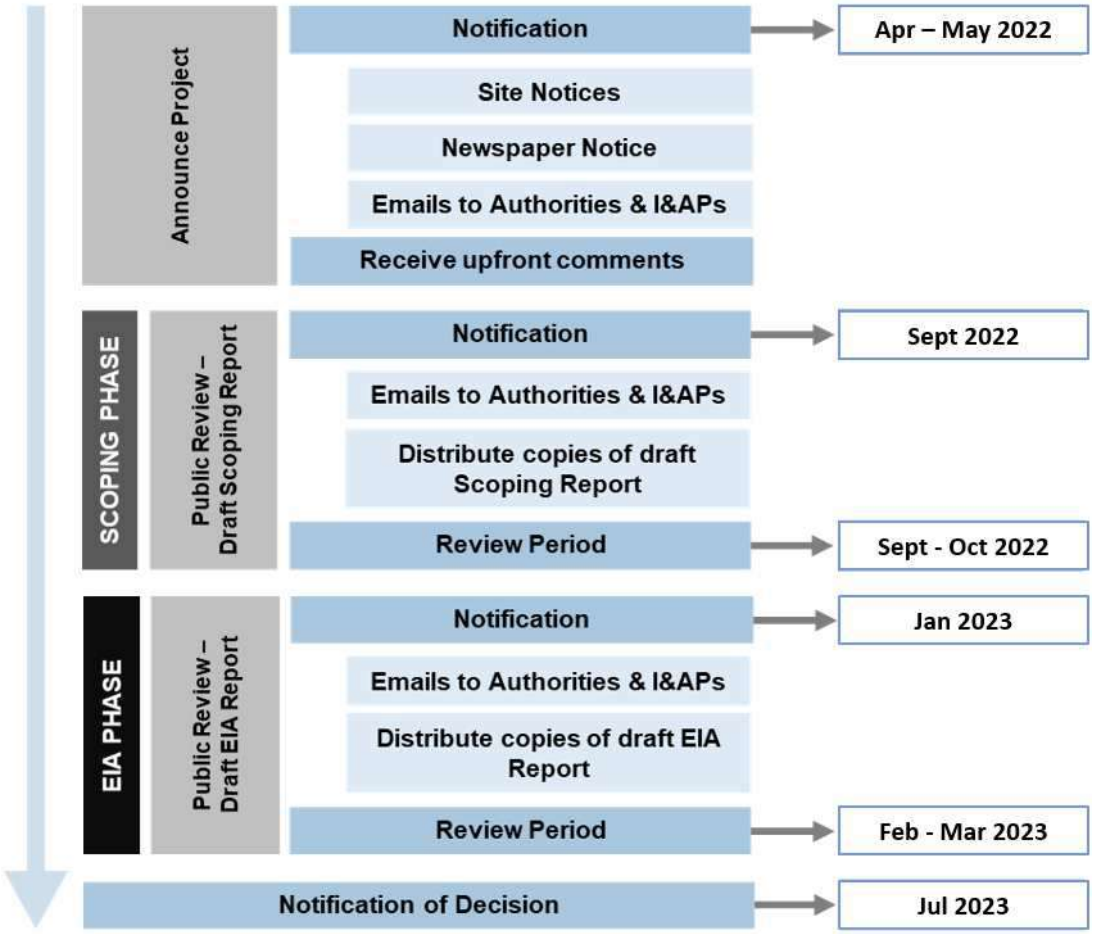
The Scoping Report provides a general description of the status quo of the receiving environment in the Project Area. This serves to provide the context within which the Scoping exercise is being undertaken. It also allows for an appreciation of sensitive environmental features and possible receptors of the effects of the proposed Project. A brief overview is also provided of the manner in which the environmental features may be affected (positively or negatively) by 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

F. PUBLIC PARTICIPATION

The diagram to follow outlines the public participation process for the upfront Announcement Phase (completed), Scoping Phase (current) and EIA Phase (pending).



Outline of Public Participation Process

The Scoping Report explains the public participation tasks undertaken during the Scoping Phase, including the following

- Compiling the database of Interested and Affected Parties (I&APs);
- Obtaining landowner consent;
- Period to review the draft Scoping Report;
- Notification of review of the draft Scoping Report;
- Providing access to the draft Scoping Report; and
- Addressing comments received on the draft Scoping Report.

G. ENVIRONMENTAL ISSUES

Pertinent environmental issues, which will receive specific attention during the EIA Phase through a detailed quantitative assessment and relevant specialist studies (where deemed necessary), are listed below.

Potentially significant environmental issues for prioritisation during the EIA Phase

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. ▪ Servitude restrictions.
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.
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. ▪ Damage to the PV facility and towers of the power line from major flood events. ▪ 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.	▪ 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

Environmental Factor	Construction Phase Potential Issues / Impacts	Operational Phase Potential Issues / Impacts
	▪ Emissions from construction equipment and machinery. ▪ Tailpipe emissions from construction vehicles.	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.
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. ▪ Glint and glare from PV facility. ▪ 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.

Cumulative impacts are identified in the Scoping Report by combining the potential environmental implications of the proposed Project with the impacts of other projects and activities that have occurred in the past, are currently occurring, or are proposed in the future within the Project Area.

A methodology to quantitatively assess the potential impacts is also provided in the Scoping Report, which will be employed during the EIA Phase.

H. PLAN OF STUDY FOR EIA

The Scoping Report is concluded with a Plan of Study, which explains the approach to be adopted to conduct the EIA for the proposed Project in accordance with the following pertinent tasks and considerations:

- Potentially significant environmental issues identified during the Scoping Phase;
- Feasible alternatives to be assessed during Environmental Impact Assessment Phase;
- Specialist studies;
- Public Participation process to be undertaken for the EIA Phase;
- Contents of the EIA Report;
- Consultation with authorities; and
- EIA process timeframes.

I. CONCLUSION

Key outcomes of the Scoping Phase for the proposed Solar PV Plant and power line are as follows:

- Alternatives for achieving the objectives of the proposed activity were considered;
- Potentially significant issues pertaining specifically to the pre-construction, construction and operational phases of the Project were identified;
- Sensitive features of the environment that may be affected by the Project were identified;
- Stakeholders were identified and notified of the review of the draft Scoping Report;
- A Plan of Study was developed to explain the approach to be adopted during the EIA Phase; and
- The scoping exercise set the priorities for the ensuing EIA Phase.

No fatal flaws were identified in terms of the proposed activities and the receiving environment that would prevent the environmental assessment from proceeding beyond the Scoping Phase. It is the opinion of the EIA team that Scoping was executed in an objective manner and that the process and report conform to the requirements of Regulation 21 and Appendix 2 of the EIA Regulations of 2014 (as amended), respectively. It is also believed that the Plan of Study for EIA is comprehensive and will be adequate to address the significant issues identified during Scoping, to select the Best Practicable Environmental Option (BPEO), and to ultimately allow for informed decision-making.

AMENDMENTS PAGE

Date	Nature of Amendment	Amendment No.	Signature
September 2022	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
COD	Commercial Operation Date
COVID-19	Coronavirus Disease 2019
CPV	Concentrated Photovoltaics
CR	Critically Endangered
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
DMRE	Department of Mineral Resources and 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
EHS	Environmental, Health, and Safety
EMPr	Environmental Management Programme
EN	Endangered
ESA	Ecological Support Area
FSHRA	Free State Heritage Resources Authority
GHG	Greenhouse Gas
GIS	Geographical Information System
GN	Government Notice
GVA	Gross Value Added
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

KZN	KwaZulu-Natal
MOSS	Metropolitan Open Space System
Na	Sodium
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)
NWA	National Water Act (Act No. 36 of 1998)
OHS	Occupational Health and Safety
PS	Performance Standards
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
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
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SIP	Strategic Integrated Projects
SOTER	Soil and Terrain
ToR	Terms of Reference
UFS	University of the Free State
VFB	Vanadium Flow Battery
VRB	Vanadium Redox Battery
VU	Vulnerable
WMA	Water Management Area

UNITS OF MEASUREMENT

°C	Degrees Celsius
ha	Hectare
km	Kilometre
kV	Kilovolt
l/s	Litres per Second
m	Metre
m^2	Square metre
mm	Millimetre
MW	Megawatt
MWh	Megawatt hour
%	Percentage

1 PURPOSE OF THIS DOCUMENT

Nemai Green was appointed by Genesis Eco-Energy Developments (Pty) Ltd (the "Applicant") to conduct the Environmental Impact Assessment (EIA) for the **Proposed Parys up to 200MW Solar Photovoltaic (PV) and Battery Energy Storage Systems (BESS) Hybrid Project near Parys, in the 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 Scoping Report** for the proposed Project. The purpose of the Scoping phase, which constitutes the first phase of the overall EIA process, includes the following (but not limited to):

- Identify the legal framework in terms of the proposed Project;
- Identify and engage with Interested and Affected Parties (I&APs) and allow for adequate participation in the EIA process;
- Assess the receiving environment in terms of current state and potential positive or negative impacts;
- Consider alternatives for achieving the Project's objectives;
- Identify significant issues to be investigated further during the execution of the EIA Phase;
- Determine the scope of the ensuing EIA Phase, in terms of specialist studies, public participation, assessment of impacts and appraisal of alternatives; and
- Allow for informed decision-making with regard to the EIA process.

The final Scoping Report and Plan of Study for the EIA will be submitted to the Department of Forestry, Fisheries and the Environment (DFFE), which is the competent authority to decide on the application in terms of NEMA.

2 DOCUMENT ROADMAP

As a minimum, this Scoping Report aims to satisfy the requirements stipulated in Appendix 2 of the EIA Regulations. **Table 1** presents the document's composition in terms of the aforementioned regulatory requirements.

Table 1: Scoping Report Roadmap

Chapter	Title	Correlation with GN No. R 982, Appendix 2	Description of content of GN No. R 982, Appendix 2
1	Purpose of this Document	–	–
2	Document Roadmap	–	–
3	Project Background and Motivation	2(1)(f)	A motivation for the need and desirability for the proposed development.
4	Project Location	2(1)(b) & 2(1)(c)	A description of the location of the activity.
5	Legislation and Guidelines Considered	2(1)(e)	A description of the policy and legislative context within which the development is proposed.
6	Scoping and EIA Process	2(1)(a)	Details of Environmental Assessment Practitioner (EAP) who prepared the report and the expertise of the EAP.
7	Assumptions and Limitations	–	–
8	Need and Desirability	2(1)(f)	A motivation for the need and desirability for the proposed development.
9	Project Description	2(1)(c) & 2(1)(d)	A description of the scope of the proposed activity.
10	Alternatives	2(1)(g)(i)	Details of all the alternatives considered.
		2(1)(g)(vii)	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected.
11	Profile of the Receiving Environment	2(1)(g)(iv)	Environmental attributes associated with the alternatives.
		2(1)(g)(vii)	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected.
12	Public Participation	2(1)(g)(ii)	Details of the public participation process.
		2(1)(g)(iii)	A summary of the issues raised by I&APs.
13	Potentially Significant Environmental Issues	2(1)(g)(v)	Impacts and risks identified for each alternative.
		2(1)(g)(vii)	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected.
		2(1)(g)(vi)	The methodology used in identifying and ranking the potential environmental impacts and risks associated with the alternatives.
14	Plan of Study for EIA	2(1)(h)	A plan of study for undertaking the environmental impact assessment process.

Chapter	Title	Correlation with GN No. R 982, Appendix 2	Description of content of GN No. R 982, Appendix 2
Appendix F		2(1)(i) and 2(1)(j)	An undertaking under oath or affirmation by the EAP.
N/A		2(1)(k)	Where applicable, any specific information required by the competent authority.
N/A		2(1)(l)	Any other matter required in terms of section 24(4)(a) and (b) of the Act.

Note that the following sections of Appendix 2 of the EIA Regulations will be investigated further and reported on in the EIA Report, following the execution of the relevant specialist studies and targeted public participation:

- ❑ Section 2(1)(g)(v) - *The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts-*
  (a) can be reversed;
  (b) may cause irreplaceable loss of resources; and
  (c) can be avoided, managed or mitigated.

  The impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts -
  (a) can be reversed;
  (b) may cause irreplaceable loss of resources; and
  (c) can be avoided, managed or mitigated.
- ❑ Section 2(1)(g)(vii) - *Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.*
- ❑ Section 2(1)(g)(viii) - *The possible mitigation measures that could be applied and level of residual risk.*
- ❑ Section 2(1)(g)(ix) - *The outcome of the site selection matrix.*
- ❑ Section 2(1)(g)(xi) - *A concluding statement indicating the preferred alternatives, including preferred location of the activity.*

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 Parys total of 200MW Solar PV with BESS Hybrid Project near Parys, in the Free State Province. The electricity generated by the Project will be injected into the existing Eskom 132 kV distribution system.

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.

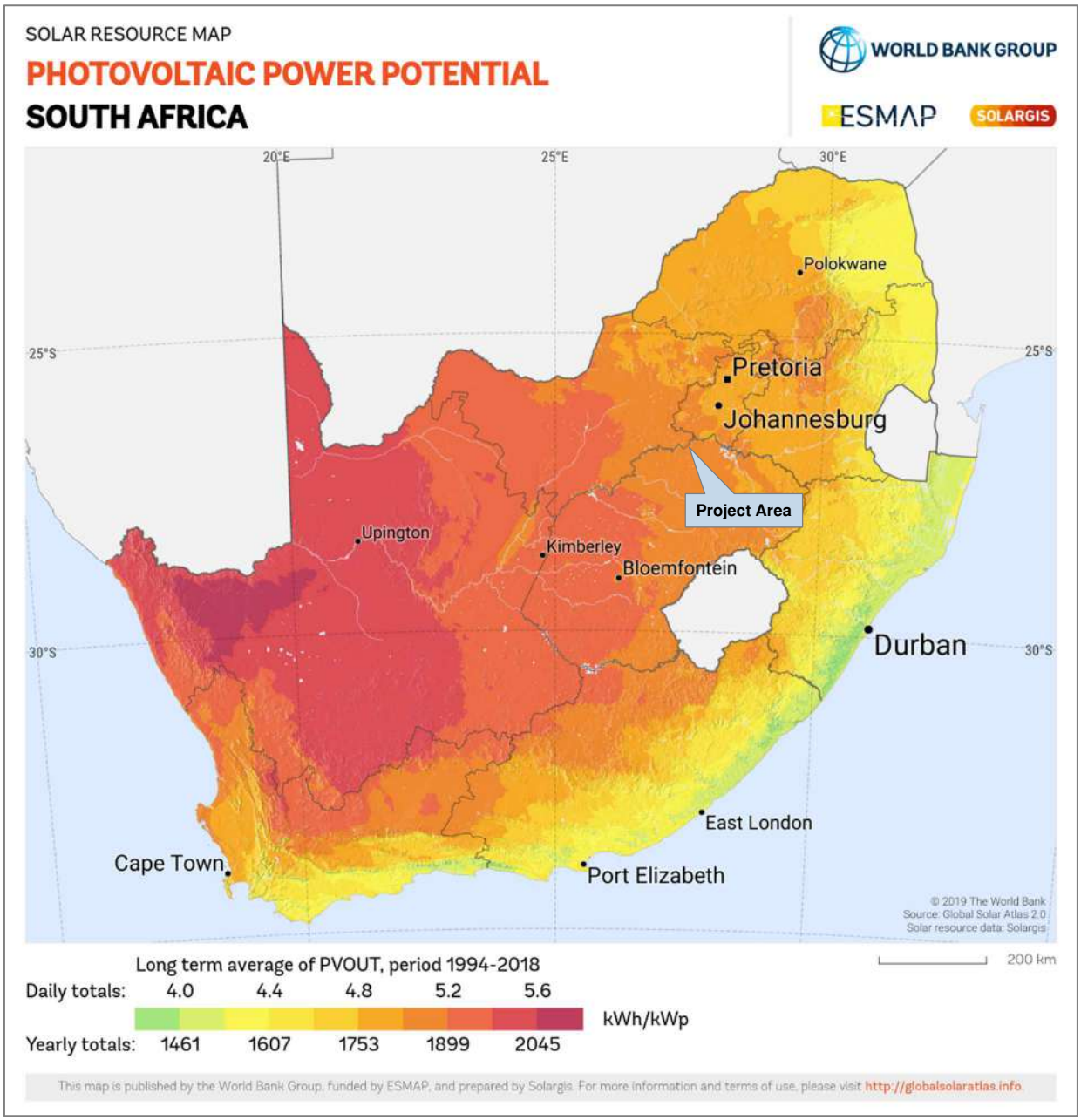


Figure 1: Location of the Project relative to PV Power Potential
(© 2019 The World Bank, Source: Global Solar Atlas 2.0, Solar resource data: Solargis)

4.2 Geographical Context

The Project is located approximately 8km to the south of the town of Parys' business district (CBD) and falls within Ward 15 of the Ngwathe Local Municipality (NLM), in the Free State Province. The R723 runs through the site. The locality maps are provided in **Figure 2** and **Figure 3** below, and are also contained in **Appendix A**.

The property earmarked for the Project covers a combined area of approximately 1234 ha, of which the buildable area determined by the project team is approximately 335 ha. The overall length of the proposed 132 kV power lines between the on-site substation and the grid connection point at Eskom's existing Parys Rural 132/11 kV Substation is approximately 0.57km.

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	
RE of the Farm Leeuwkuil 76	F02500000000007600000
Power Line Route Tie-in to Existing Substation	
Portion 4 of the Farm Leeuwkuil 76	F02500000000007600004
Power Line and Access Road Routes	
RE of the Farm Leeuwkuil 76	F02500000000007600000

The Project's coordinates are as follows (shown in **Table 3, 4** and **5** below):

- **PV Site Boundaries** –

Table 3: PV Site Coordinates

Description	Coordinates
PV Area 1 (Eastern Site)	
Corner and Bend Coordinates of buildable area	26°57'28.33"S; 27°31'12.82"E
	26°57'7.85"S; 27°32'0.88"E
	26°57'22.44"S; 27°32'5.08"E
	26°57'23.72"S; 27°32'6.47"E
	26°57'31.78"S; 27°32'8.55"E
	26°58'10.06"S; 27°31'16.97"E
	26°58'9.72"S; 27°31'16.33"E
	26°58'8.91"S; 27°31'13.74"E
	26°58'8.05"S; 27°31'13.08"E
	26°58'8.04"S; 27°31'11.94"E

Description	Coordinates
	26°58'6.04"S; 27°31'8.66"E
	26°58'6.45"S; 27°31'5.87"E
	26°58'6.03"S; 27°31'6.05"E
	26°58'2.37"S; 27°31'6.62"E
	26°57'39.82"S; 27°31'22.92"E
	26°57'29.43"S; 27°31'35.10"E
	26°57'28.25"S; 27°31'38.92"E
	26°57'28.85"S; 27°31'45.14"E
	26°57'27.75"S; 27°31'47.26"E
	26°57'26.70"S; 27°31'46.35"E
	26°57'25.52"S; 27°31'47.77"E
	26°57'24.50"S; 27°31'46.95"E
	26°57'23.54"S; 27°31'42.19"E
	26°57'24.43"S; 27°31'37.75"E
	26°57'25.60"S; 27°31'34.35"E
	26°57'35.90"S; 27°31'22.24"E
PV Area 2 (Central/southern Site)	
Corner and Bend Coordinates of buildable area	26°58'18.06"S; 27°29'29.07"E
	26°58'6.25"S; 27°29'49.11"E
	26°58'8.15"S; 27°29'53.87"E
	26°58'8.44"S; 27°29'57.51"E
	26°58'10.09"S; 27°30'2.57"E
	26°58'8.89"S; 27°30'6.03"E
	26°58'11.87"S; 27°30'7.96"E
	26°58'11.88"S; 27°30'12.40"E
	26°58'15.24"S; 27°30'15.95"E
	26°58'17.32"S; 27°30'22.66"E
	26°58'24.08"S; 27°30'17.71"E
	26°59'1.41"S; 27°30'6.99"E
	26°59'2.37"S; 27°30'5.69"E
	26°58'58.70"S; 27°30'5.07"E
	26°58'57.61"S; 27°30'0.15"E
	26°59'1.80"S; 27°29'58.91"E
	26°59'5.14"S; 27°30'1.92"E
	26°59'9.67"S; 27°29'55.79"E

Description	Coordinates
	26°58'15.69"S; 27°29'50.87"E
	26°58'29.58"S; 27°29'30.45"E
PV Area (Western Site)	
Corner and Bend Coordinates of buildable area	26°57'43.36"S; 27°28'35.75"E
	26°57'18.03"S; 27°28'37.75"E
	26°57'4.63"S; 27°28'39.61"E
	26°57'7.63"S; 27°28'42.20"E
	26°57'9.60"S; 27°28'41.57"E
	26°57'11.66"S; 27°28'42.13"E
	26°57'13.14"S; 27°28'42.11"E
	26°57'44.91"S; 27°29'22.60"E
	26°57'46.80"S; 27°29'19.39"E
	26°57'47.85"S; 27°29'10.42"E
	26°57'48.15"S; 27°28'57.58"E
	26°57'45.94"S; 27°28'50.44"E
	26°57'45.60"S; 27°28'40.51"E
	26°57'45.30"S; 27°28'39.73"E
	26°57'43.73"S; 27°28'37.35"E

- **Powerline routes** (bend points) –

Table 4: Powerline Route Coordinates

Description	Coordinates
PV Area 1 (Eastern Site) connecting powerline	
Start point (at PV area onsite substation)	26°58'5.19"S; 27°31'9.60"E
Bend 1	26°58'5.49"S; 27°31'7.39"E
Bend 2	26°58'7.87"S; 27°31'5.91"E
Bend 3	26°58'8.19"S; 27°31'3.84"E
Bend 4	26°58'1.20"S; 27°30'35.38"E
Bend 5	26°58'5.77"S; 27°29'55.12"E
End point (at Collector substation)	26°58'8.41"S; 27°29'52.96"E
PV Area 2 (Central/southern Site) connecting powerline	
Start point (at PV area collector substation)	26°58'8.37"S; 27°29'52.63"E
Bend 1	26°58'5.69"S; 27°29'51.07"E
Bend 2	26°58'3.55"S; 27°29'48.94"E

Description	Coordinates
Bend 3	26°57'57.11"S; 27°29'59.96"E
End point (at Eskom substation)	26°57'56.62"S; 27°30'0.60"E
PV Area (Western Site) connecting powerline	
Start point (at PV area onsite substation)	26°57'44.14"S; 27°29'15.23"E
Bend 1	26°57'44.50"S; 27°29'19.82"E
Bend 2	26°58'6.15"S; 27°29'49.68"E
End point (at Collector substation)	26°58'8.53"S; 27°29'51.40"E

- **Access road routes** (bend points) –

Table 5: Access Road Coordinates

Description	Coordinates
PV Area 1 (Eastern Site) access road	
Start point (at PV area)	26°58'4.84"S; 27°31'6.46"E
Bend 1	26°58'6.04"S; 27°30'59.40"E
Bend 2	26°58'4.44"S; 27°30'47.97"E
Bend 3	26°58'4.04"S; 27°30'43.22"E
End point (at existing road tie-in)	26°58'4.11"S; 27°30'41.43"E
PV Area 2 (Central/southern Site) access road	
Start point (at PV area)	26°58'7.96"S; 27°29'53.02"E
Bend 1	26°57'59.90"S; 27°30'9.58"E
Bend 2	26°57'57.45"S; 27°30'10.29"E
End point (at existing road tie-in)	26°57'54.92"S; 27°30'9.68"E
PV Area (Western Site) access road	
Start point (at PV area)	26°57'44.92"S; 27°29'16.75"E
Bend 1	26°57'44.93"S; 27°29'17.99"E
Bend 2	26°57'45.96"S; 27°29'20.45"E
Bend 3	26°57'46.10"S; 27°29'24.09"E
Bend 4	26°57'47.40"S; 27°29'28.71"E
End point (at existing road tie-in)	26°57'47.74"S; 27°29'30.21"E

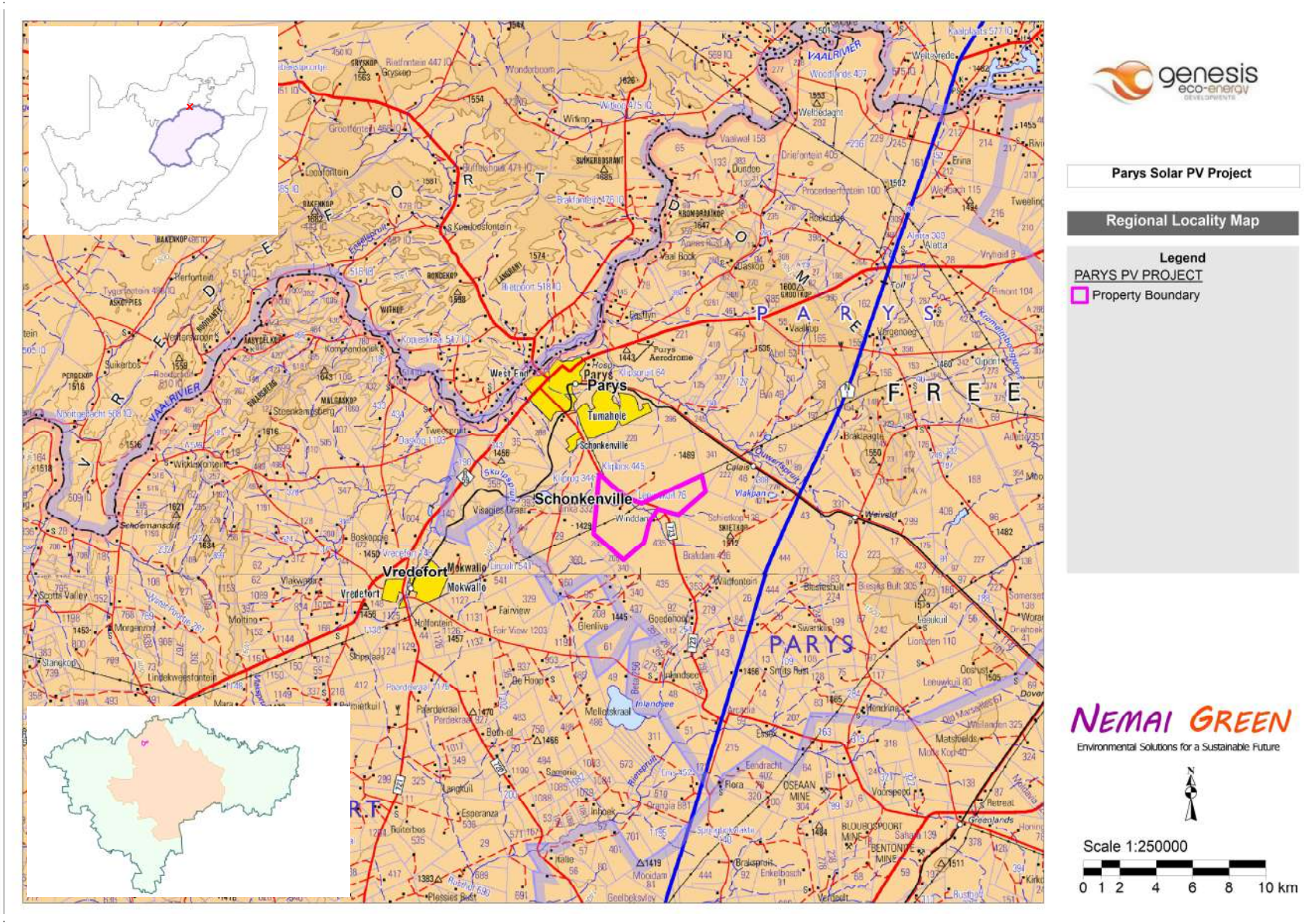


Figure 2: Regional locality map

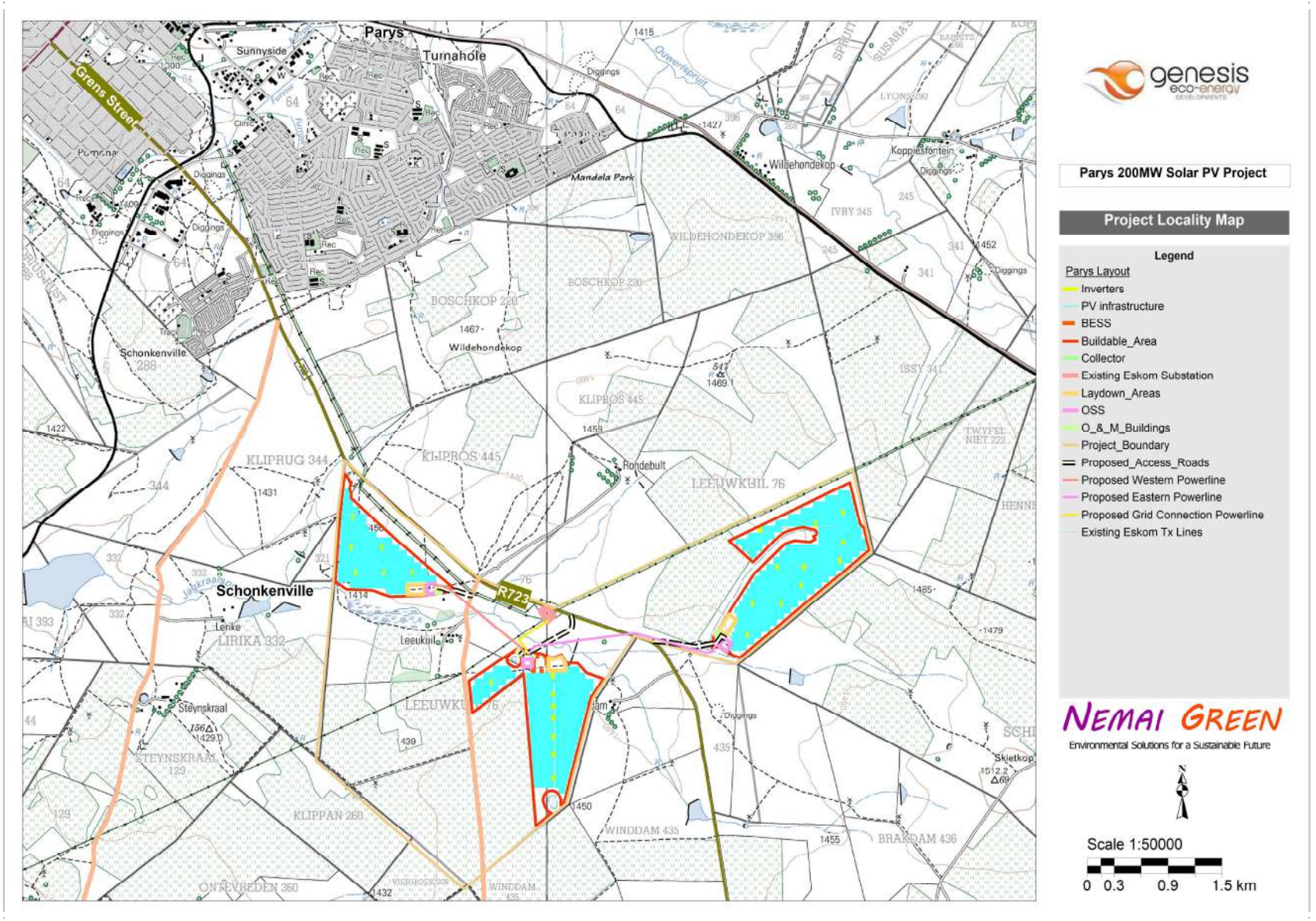


Figure 3: Locality map (topographical map)

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 6** 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 6: 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) 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.</td><td>Proposed 132 kV overhead power lines outside an urban area.</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>Possible crossing of watercourses by access road network, as well as PV Solar infrastructure (e.g. powerline).</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.*	*Possible crossing of watercourses by access road network, as well as PV Solar infrastructure (e.g. powerlines).*
	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) 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 -* *(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.*	*Access roads (construction and operational phases) are expected to exceed thresholds.* *Internal roads within the PV sites will have a reserve of 12m and be 4m wide. Access roads from the PV sties to the existing roads will have a reserve of 14m and be 8m wide.*
	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.* *Status of vegetation to be confirmed as part of the Terrestrial Ecological Impact Assessment.*
	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) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;*	*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 48(i): *The expansion of -* *(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or* *(ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more;* *where such expansion 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 expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;* *(bb) where such expansion 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 expansion occurs within an urban area; or* *(ee) where such expansion occurs within existing roads, road reserves or railway line reserves.*	*Possible expansion of infrastructure associated with the development, with a physical footprint of 100 square metres or more within watercourse(s) / within 32 m from watercourse(s).*
	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.*	*Potential widening of existing farm roads (construction and operational phases).*
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 and BESS hybrid with a total generation capacity of up to 200MW renewable solar energy.*
	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 to be cleared for entire Project (excluding linear components) will exceed 20 hectares.* *Status of vegetation to be confirmed as part of the*

Legislation	Description and Relevance	
		Terrestrial Ecological Impact Assessment.
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)(ee)(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:* *(ee) Critical biodiversity 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.*	*Access roads will be 8m width within Critical Biodiversity Area (CBA) in terms of the Free State Biodiversity Plan; access roads fall within 10km of a World Heritage Site.*
	GN No. R.985 – Activity 12 - (b)(ii) & (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* *ii. Within critical biodiversity areas identified in bioregional plans;* *iv. Areas within a watercourse or wetland; or within 100 metres from the edge of a* *watercourse or wetland.*	*Clearance of areas of indigenous vegetation as part of the development footprint (access roads, powerline, PV site sections), including within areas consisting of CBA 2 and within 100 m from the edge of a watercourse or wetland.*
	GN No. R.985 – Activity 14(ii)(a) & (c) - (b)(i)(ff)(hh): *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;* *b. Free State* *i. Outside urban areas:* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(hh) 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 area of a biosphere reserve.*	*Development footprint within watercourse(s) / within 32 m from watercourse(s), within CBA 2 and falling within the Ngwathe EMF, and within 10km of a World Heritage Site.*

Legislation	Description and Relevance	
	GN No. R.985 – Activity no. 18(b)(i)(ee)(gg) & (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:* *(ee) Critical biodiversity 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 area of a biosphere reserve; or* *(hh) Areas within a watercourse or wetland; or within 100 metres from the edge of* *a watercourse or wetland.*	*Access roads (existing farm roads) to the PV sites (construction and operational phases) may be upgraded, within CBAs and within 100 m from the edge of a watercourse or wetland and within 10km of a World Heritage Site.*
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. 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.	
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.	

Legislation	Description and Relevance
	○ 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. ▪ 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 6** above.

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 possible activities that could possibly be triggered by the Project were included in the Application Form (contained in **Appendix B**) that will be submitted to the DFFE with the draft Scoping Report. A refinement of these activities will take place as the EIA process unfolds, if necessary.

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) will make suitable provisions for waste management, including the storage, handling and disposal of waste.
- Operational phase –
  - Minimum waste will be generated during the operational phase;
  - Waste from the on-site office and workshop will be sent to licenced municipal waste disposal sites; and
  - Waste generated during maintenance or replacement of panels and inverters will be sent to suitable disposal sites.

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 may entail the following activities that constitute water uses in terms of Section 21 of the NWA, which will be confirmed in consultation with DWS and following the completion of the delineation of the watercourses:

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

If the above water uses are triggered a Water Use Licence Application will be submitted to DWS to seek authorisation in terms of the NWA.

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).

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

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.

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

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 Scoping Report:

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

- Integrated Environmental Management Guideline Series 7: Public Participation in the EIA Process (DEA, 2010);
- EIA Guideline for Renewable Energy Projects (Department of Environmental Affairs (DEA, 2015); and
- Guidelines for Involving Specialists in the EIA Processes Series (Brownlie, 2005).

5.5 National and Regional Plans

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

- Fezile Dabi District Municipality Integrated Development Plan (IDP);
- Ngwathe Local 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 4** below, although the Project is located on the border on a REDZs, and falls within the Central Strategic Transmission Corridor, it is not located within any REDZs. 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.

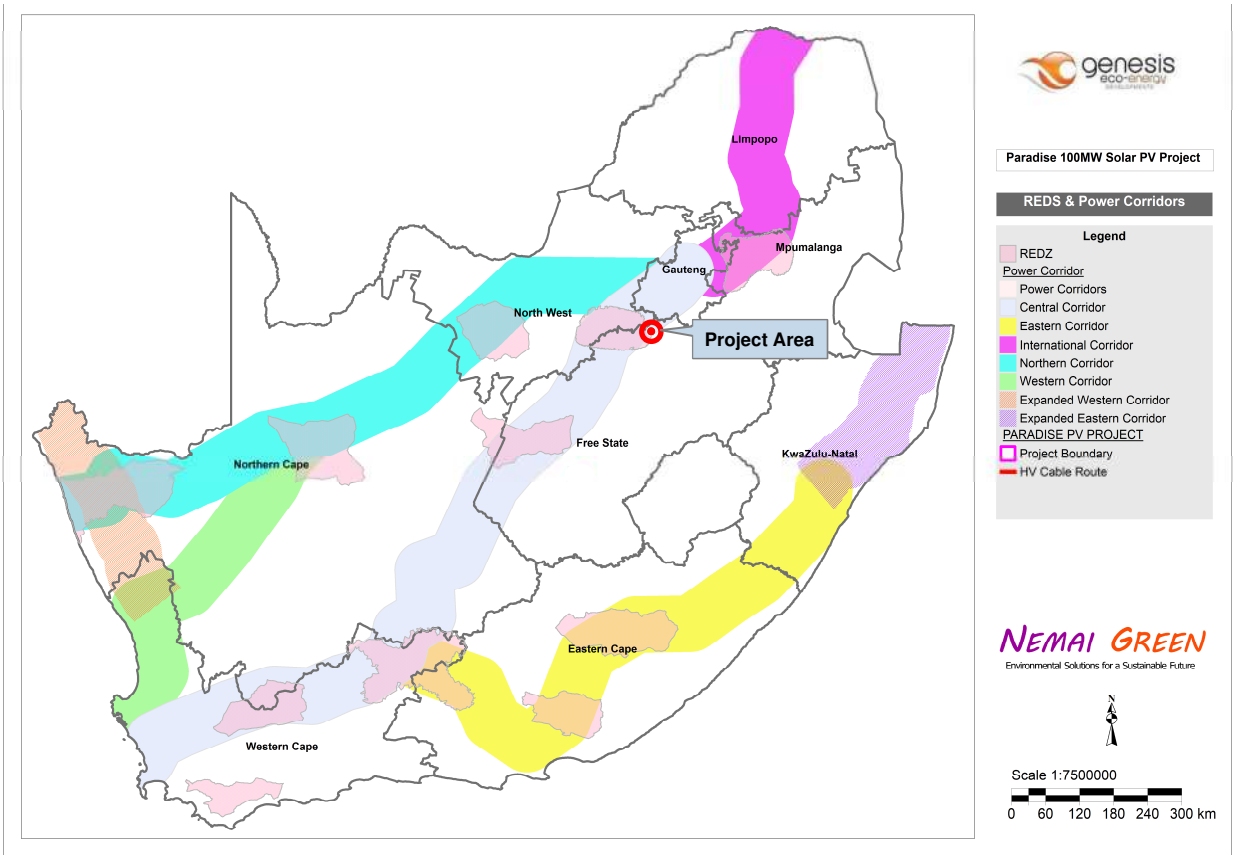


Figure 4: The Project in relation to REDZs

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 (amongst others).

Various other authorities with jurisdiction over elements of the receiving environment or project activities (refer to **Section 5.2** above) will also be consulted during the course of the EIA. Refer to the database of Interested and Affected Parties (I&APs) contained in **Appendix D** 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 7** below, and their respective Curricula Vitae are contained in **Appendix C**. The oath of the EAP is contained in **Appendix F**.

Table 7: Scoping and EIA Core Team Members

Name	Qualifications	Selected Experience - Renewable Energy & Bulk Power Projects
D. Henning (20 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. ▪ Extraction of Gas and Electric Power Production Plant in the Rubavu District, Rwanda. ▪ Impompomo Hydropower Plant, Mpumalanga, SA.

Name	Qualifications	Selected Experience - Renewable Energy & Bulk Power Projects
		▪ Hydropower Plant within Hydraulic Network at Rand Water's Zoekfontein Site, Gauteng Province, SA. ▪ 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.

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, as contemplated in Regulation 16(1)(b)(v) of the EIA Regulations.

The aims of the National Web Based Environmental 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 are appended to the Application Form, which is included in **Appendix B**.

6.4 Environmental Assessment Triggers

The process for seeking authorisation under NEMA is 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** 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. A copy of the Application Form is contained in **Appendix B**.

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 5** below. The objectives of the Scoping phase, based on the EIA Regulations, are captured in **Section 1** above.

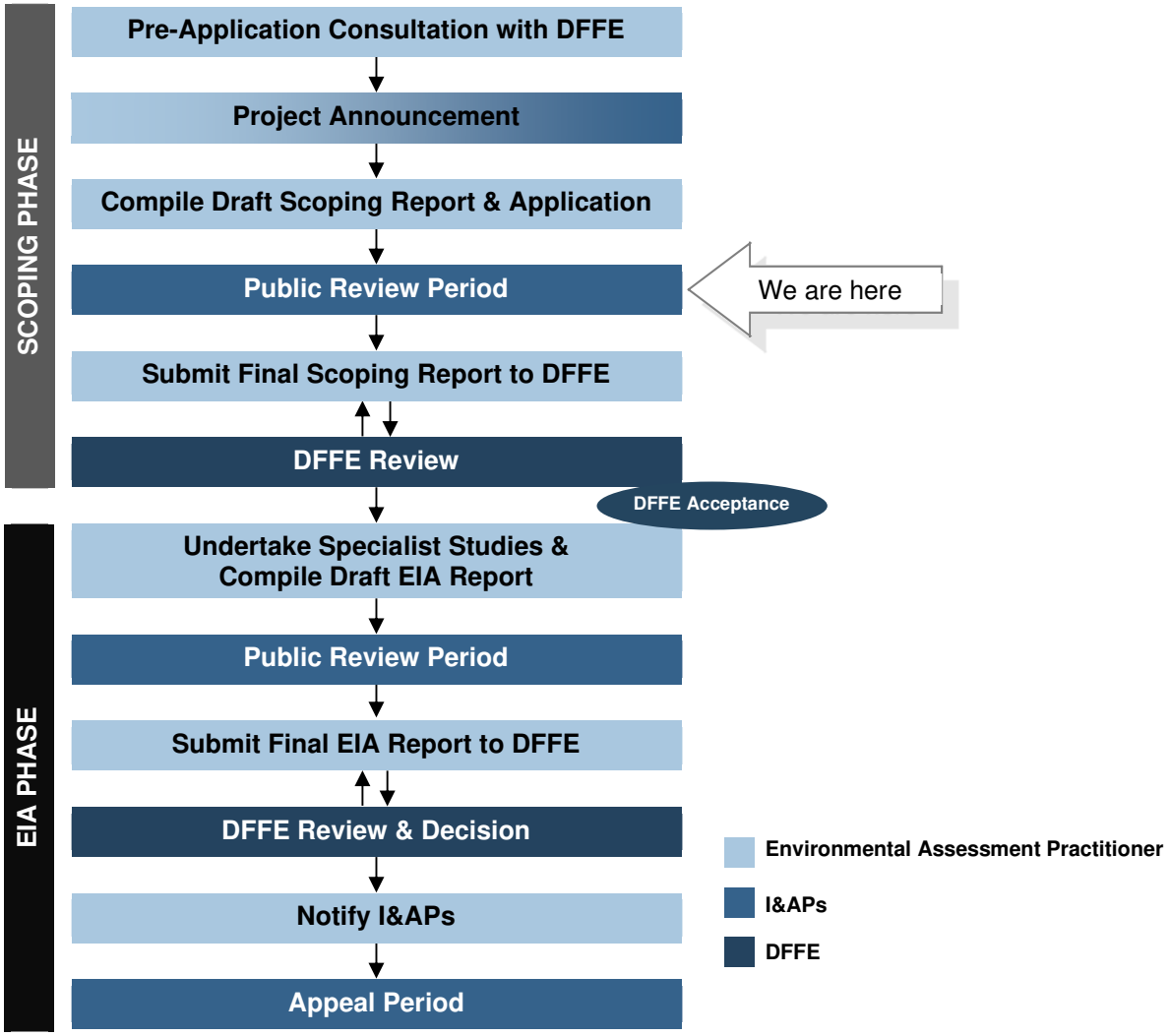


Figure 5: S&EIR process outline

6.5.2 DFFE Pre-application Consultation

A Pre-Application Meeting was held with DFFE on 18 November 2021 (refer to the minutes of the meeting appended to the Application Form in **Appendix B**). The purpose of the meeting included the following:

- To present an overview of the Project to DFFE;

- To seek clarification regarding certain matters that pertain to the S&EIR process; and
- To determine DFFE's requirements.

6.5.3 Landowner Consent & Landowner Notification

According to Regulation 39(1) of the EIA Regulations, if the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an Environmental Authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land. This requirement does not apply *inter alia* for linear developments (e.g. pipelines, power lines, roads) or if it is a Strategic Integrated Project (SIP) as contemplated in the Infrastructure Development Act, 2014.

The written consent of the landowner for the property where the PV Site is proposed is appended to the Application Form, which is included in **Appendix B**.

6.5.4 Application Form

A copy of the Application Form, which will be submitted to DFFE together with the draft Scoping Report, is provided in **Appendix B**.

The Application Form makes provision for all the activities associated with the Project's life-cycle. The activities triggered in terms of Listing Notices 1, 2 and 3 were confirmed based on the following:

- An understanding of the project description and the receiving environment;
- The findings from the National Web Based Environmental Screening Tool;
- Discussions held with DFFE during the pre-application meeting; and
- Technical input received from the Applicant and project team.

6.5.5 Screening of Alternatives

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 a project.

A write-up on alternatives is provided in **Section 10** below. A motivation for the Best Practicable Environmental Option (BPEO) will be provided in the EIA Report.

6.5.6 Impact Prediction

The potential environmental impacts associated with the proposed Project were identified during the Scoping Phase through an appraisal of the following (amongst others):

- Proposed footprint of the project infrastructure and components in relation to the receiving environment;

- Activities associated with the project life-cycle (i.e. pre-construction, construction, operation and decommissioning);
- Profile of the receiving environment and the potential sensitive environmental features and attributes; and
- Legal and policy context.

The Scoping exercise aimed to identify and qualitatively predict potentially significant environmental issues for further consideration and prioritisation during the EIA stage (see **Section 13** below). Note that "significance" relates to whether the effect (i.e. change to the environmental feature / attribute) is of sufficient importance that it ought to be considered and have an influence on decision-making.

During the EIA stage a detailed quantitative impact assessment will be conducted via contributions from the project team and requisite specialist studies, and through the application of the impact assessment methodology contained in **Section 13.4** below. Suitable mitigation measures will be identified to manage (i.e., prevent, reduce, rehabilitate and/or compensate) the environmental impacts, and will be included in the EMPr.

6.6 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.

According to the REEA Database, no renewable energy applications have been made for properties that are located within a 30km radius of the PV Site (refer to **Figure 6** below). The closest renewable energy application is located approximately 34km northwest of the proposed site:

1. Potchefstroom Spruite Solar Farm within Tlokwe City Council (application 14/12/16/3/3/1/1279), (status: Withdrawn/Lapsed).

The cumulative impact of renewable energy applications within 30 km will thus not be considered in this application.

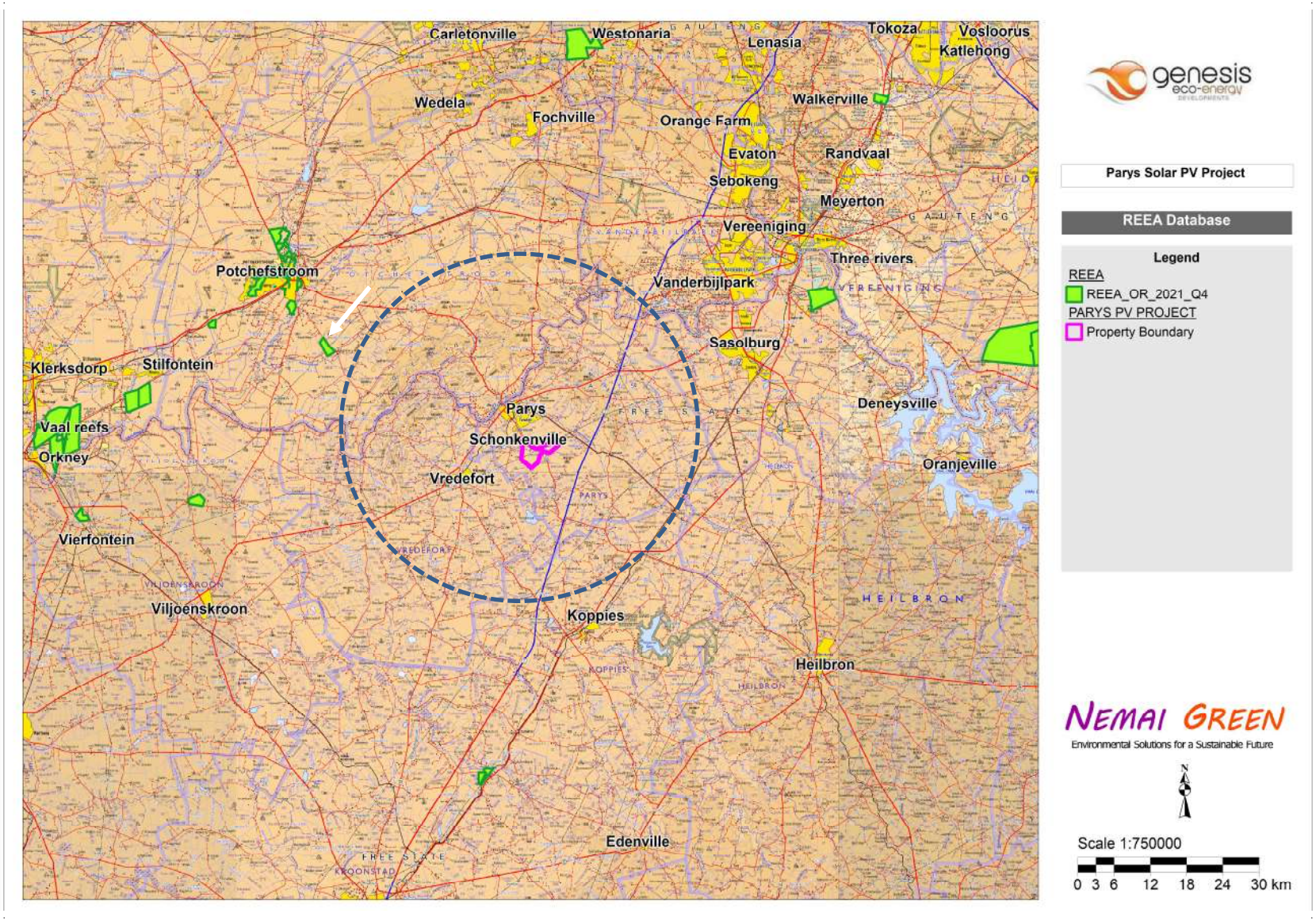


Figure 6: Renewable energy applications in relation to the Project (within a 30km radius). Nearest application indicated by arrow.

7 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations accompany the Scoping exercise:

- In accordance with the purpose of Scoping, the report does not include detailed specialist investigations on the receiving environment, which will only form part of the EIA Phase. The environment in the Project Area was primarily assessed in the Scoping Phase through site visits and appraisals, desktop screening, incorporating information from other studies, and input received from authorities and I&APs. A refinement of all maps will also be undertaken in the EIA Phase, if necessary.
- As the design of the Project's components and technical information, provided by the Applicant, 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. Subsequent project modifications that emanate from discussions with the I&APs, findings from specialist studies and technical considerations will be conveyed during the public participation of the EIA Phase and will be incorporated into the draft EIA Report, which will be lodged in the public domain.

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 will be presented in the EIA Report. 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 (MMM, 2022) to domesticate the Sustainable Development Goals is to promote developments in renewable energy. This IDP further states that the MMM 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. The Project falls within an area that is designated for crop farming in terms of the SDF (MMM, 2020a). An Agricultural Impact Assessment will be undertaken during the EIA Phase and the findings will be presented in the EIA Report.
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 Site 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: ▪ Aquatic Assessment; ▪ Terrestrial Ecological Assessment; and ▪ Avifaunal Assessment. The findings of the above studies will be presented in the EIA Report. Mitigation measures will be included in the EIA Report and EMPr to disturbances to ecosystems, according to the mitigation hierarchy.

Question No.	Response
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. The above impacts will be assessed during the EIA Phase. Mitigation measures will be 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, water used for washing purposes and drainage over contaminated areas. ▪ 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 will be undertaken during the EIA Phase and the findings will be presented in the EIA Report.
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. During the operational phase electricity will be sourced from the energy-generation facility itself and/or from the existing electrical infrastructure on the property.

Question No.	Response
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 Plant proposes to generate electricity from a renewable resource. The total generation capacity of the Project will be 100MW renewable solar energy. Impacts to the receiving environment will be assessed during the EIA Phase and will be presented in the EIA Report. Opportunity costs are associated with the net benefits forgone for the development alternative. This will be assessed further during the EIA Phase.
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.

Question No.	Response
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), 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?*	Potential impacts to the social environment include the following: ▪ Construction phase – 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 will be undertaken during the EIA Phase and the findings will be presented in the EIA Report. Mitigation measures to manage impacts to the social environment will be 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 14km to the south of Bloemfontein's CBD. There is evidence that the PV Site was previously used for agricultural purposes, which will be assessed further as part of the Agricultural Impact Assessment.
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 will be assessed by the respective specialists during the EIA Phase and will be adjusted to avoid sensitive features, as necessary. Options under consideration are presented in **Section 10** below. The BPEO will be identified in the EIA Report, taking into consideration of the specialists' findings.
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 13.3** below. The EIA Report will provide an assessment of the potential cumulative impacts.

Question No.	Response
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. One of the opportunities identified for the Local Municipality through the IDP is PV energy generation. The Parys area is largely an agricultural and tourism area. An SDF and LED could not be located for the area.
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*	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. Not deemed to be relevant, due to the nature of the development. 2.5.4. Impacts on surrounding land uses will be assessed as part of the Agricultural Impact Assessment, Social Impact Assessment and Visual Impact Assessment (amongst others). 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 5.7** 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 EIA Report. 2.5.14. Refer to the response to question no. 1.5 above.

Question No.	Response
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),* *2.5.14. 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 the EIA Report.
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. These impacts will be assessed as part of the Agricultural Impact Assessment, Social Impact Assessment and Visual Impact Assessment (amongst others).
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 will only be identified in the EIA Report, taking into consideration of the specialists' findings.
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. Consent has been provided by the landowner for the proposed development.

Question No.	Response
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 will be included in the EIA Report. Mitigation measures to manage these impacts will be 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,* *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?*	**Section 12** below provides an overview of the public participation process to date, which includes the following: ▪ Compiling the database of I&APs; ▪ 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 announcement phase are contained in **Appendix E4**.
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 will be 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 will be assessed in the EIA Report. These risks will be 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. Further information will be included in the EIA Report.

Question No.	Response
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?*	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. 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.
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. The total generation capacity of the Project will be up to 200MW renewable solar energy. Impacts to the receiving environment will be assessed through various specialist studies that will be included in the EIA Report.
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.
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?	A rehabilitation fund is setup for the project to provide for any potential remedial work. This is also supported by a sound EMPr to address any foreseeable risks throughout the life cycle of the project.
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 will only be identified in the EIA Report, taking into consideration of the specialists' findings.
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. The EIA Report will provide an assessment of the potential cumulative impacts.

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.

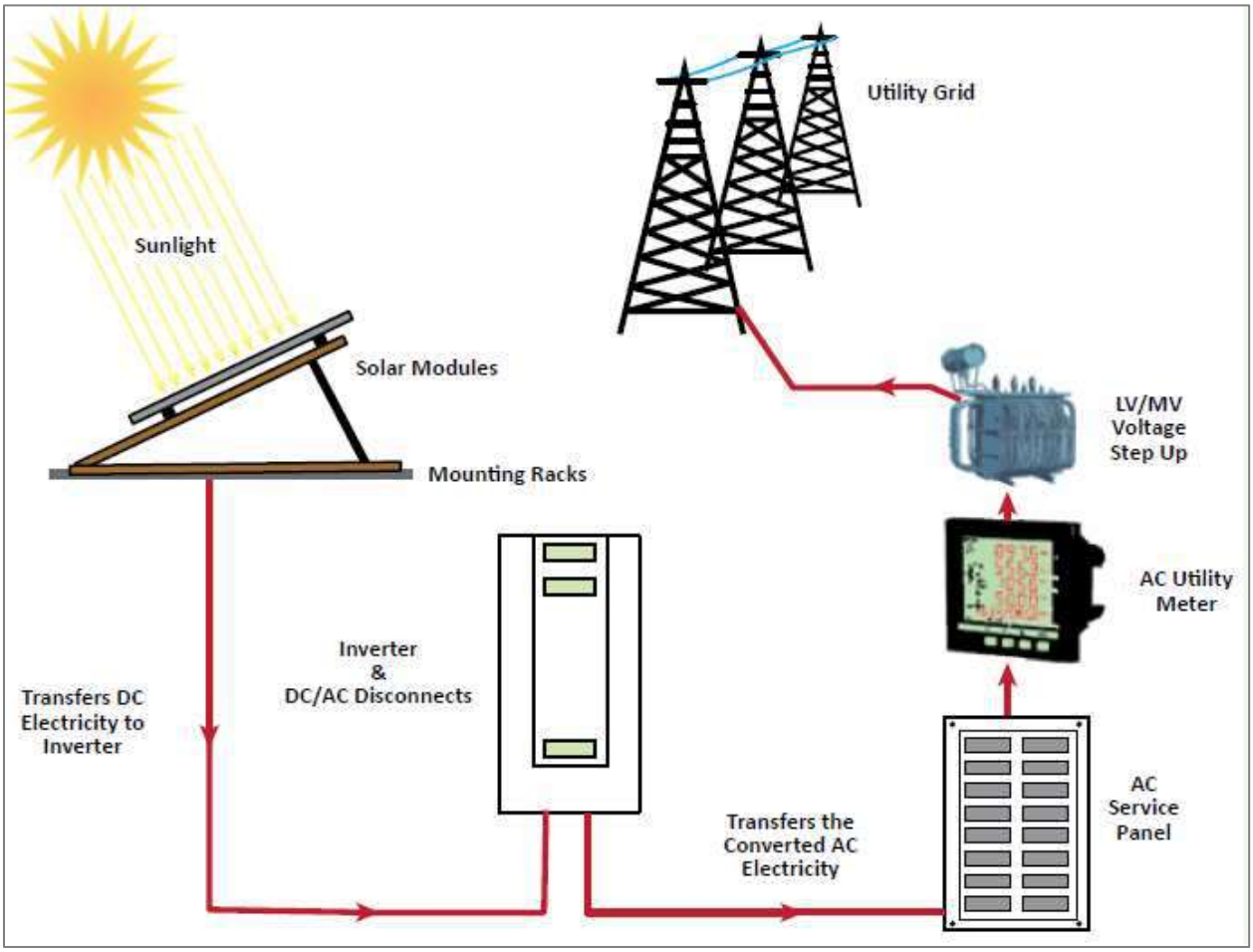


Figure 7: Overview of Solar PV Power Plant (IFC, 2015)

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	Description / Dimensions
1.	Height of PV panels	± 2 m
2.	Area of PV Array	± 335 ha
3.	Number of inverters required	Approximately 25
4.	Area occupied by inverter / transformer stations / substations	▪ Area occupied by inverter stations (25 inverter stations) = 0.13 x 25 = ± 3.25 ha ▪ Area occupied by Operation & Maintenance infrastructure = ± 0.75 ha ▪ Area occupied by facility (step-up/Collector) substation = ± 0.7 ha ▪ Area occupied by the onsite substations = ± 2.8 ha
5.	Capacity of on-site substation	Up to a maximum of 134 MW per PV site, 132 kV/22kV
6.	Area occupied by both permanent and construction laydown areas	▪ Construction areas = 6.51 ha combined ▪ Operation & Maintenance infrastructure = ± 0.75 ha ▪ Total combined = ± 7.26 ha
7.	Area occupied by buildings and BESS	▪ Area occupied by Operation & Maintenance infrastructure = ± 0.75 ha ▪ Area occupied by BESS = ± 2.21 ha
8.	Length of internal roads	± 26.72 km
9.	Width of roads	▪ The internal roads = 12 m reserve and road width of 4 m. ▪ Access roads = 14 m reserve and road width of 8 m.
10.	Proximity to grid connection	Approximately 0.57 km 132 kV transmission line from PV Site to existing Eskom's Parys 132/22 kV Substation
11.	Height of fencing	2.4 m – 3 m
12.	Type of fencing	Type will vary around the site, welded mesh, palisade and electric fencing

9.3.2 Project Layout

The layout of the Solar PV Plant is shown in **Figure 8** below. The desirability of the earmarked site for the development of the proposed Solar PV Plant is due to the following key characteristics:

- **Solar Irradiation**: The feasibility of a solar facility, 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 Solar PV Plant will be injected into the existing Eskom 132 kV distribution system (refer to **Section 9.5** below). The PV Site is located close to the Eskom grid.

- **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 R723, which runs through the site.

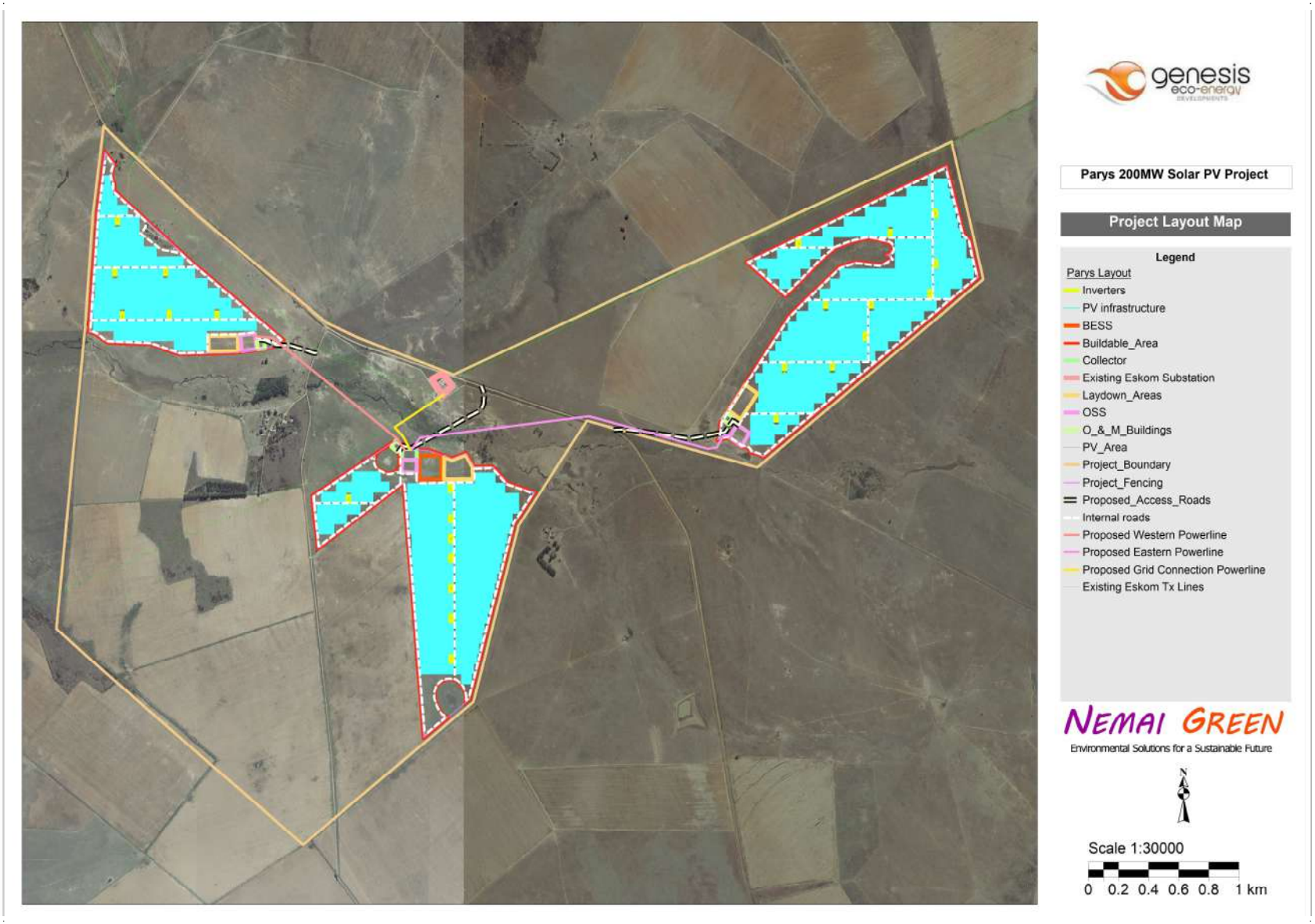


Figure 8: Proposed Layout of the Solar PV Plant (Orthophotograph)

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

- Requirements of the PV Plant;
- Preliminary understanding of sensitive features on the site (e.g., watercourses). This will be refined based on the findings from the specialist studies during the EIA Phase;
- Existing servitudes and infrastructure; and
- Exclusion zones associated with defunct mining areas.

9.3.3 Components of the Proposed Solar PV Plant

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

- PV panel arrays, which are the subsystems which convert incoming sunlight into electrical energy;
- Mounting structures to support the PV panels;
- On-site inverters to convert DC to facilitate AC connection between the solar energy facility and electricity grid;
- Lithium Ion BESS;
- New 132 kV power lines between the on-site substation and the grid connection point;
- Cabling between the Project's components, to be laid underground (where practical);
- Administration Buildings (Offices);
- Workshop areas for maintenance and storage;
- Temporary laydown areas;
- Internal access roads and perimeter fencing of the footprint;
- High Voltage (HV) Transformers; and
- Security Infrastructure.

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

9.3.4 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.

9.3.5 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 9** below.

Figure 9: 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 will be left grassed.

9.3.6 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 South Africa 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.

9.3.7 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 to a depth of approximately 0.5 m.

9.3.8 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 10** below.

Figure 10: 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.

9.3.9 Medium Voltage AC Cabling

Medium voltage AC cabling from the transformers to the high voltage substations is buried in trenches underground at a depth of approximately 1 m. The cables are protected from accidental damage by placing brightly coloured orange danger tape in the trench and sometimes concrete slabs. Cable routes are generally indicated by concrete cables markers on the ground at bend points and road crossings.

9.3.10 High Voltage Substations

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

Figure 11: Example of High Voltage Substation
(source: https://www.protogenenergy.com/)

A typical HV Substation will look like the substation shown in **Figure 11** 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 12** below).

Figure 12: Example of High Voltage Transformers
(source: https://www.electricityforum.com/)

9.3.11 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, and 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.

9.3.12 Roads

Existing roads are located near the site, which will serve as the entrance roads for the 3 planned access roads to the PV sites. The 3 access roads will have 14 m reserves and widths of 8 m. The internal roads will have a reserve of 12 m and a 4 m width and will be gravel, except for paving close to the buildings for parking and access into the buildings.

The basic layout consists of rows of single axis trackers, similar to that shown in **Figure 13** below.

Figure 13: Example of Roads Between Trackers and Medium Voltage Substations
(source: https://ecoinventos.com/)

9.3.13 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.

9.3.14 Stormwater Infrastructure

The topography of the sites is relatively flat. Over most of the site the ground surface slopes are less than 1 %. The relative flatness of the sites makes the management of stormwater runoff not too difficult 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 (BESS)

9.4.1 Types of Electrical Energy Storage Systems

Electrical Energy storage systems consist of Mechanical, Chemical, Electrical, Thermal and Electrochemical systems. **Figure 14** 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.

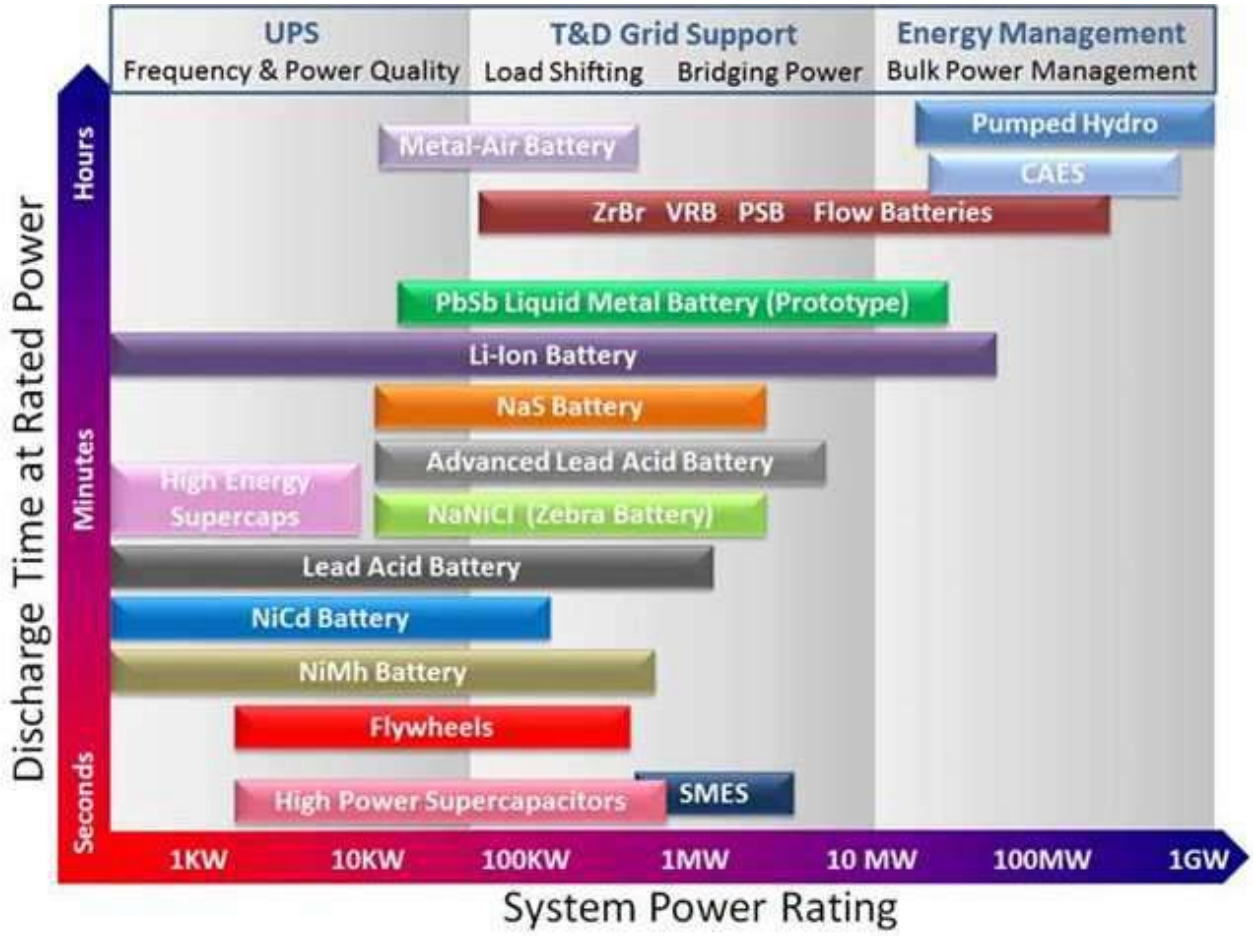


Figure 14: Grid Energy Storage Technologies and Applications
(Adapted from Climate Policy Initiative for the Energy Transitions Committee)

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 45 MW (180 MWh) of BESS. 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 will be contained in shipping containers.

There will be up to a maximum of 45 shipping containers, each with a battery storage capacity of 1 MW. The approximate dimensions of the containers will be up to a maximum of 20 m long, 3 m wide and 3 m high. Level and fenced off platforms would be created for the battery storage areas of approximately 2.21ha. The location of the BESS facility is shown in the technical layout drawing.

An example of similar utility scale BESS is shown in **Figure 15** below.

Figure 15: Example of BESS installation
(https://biiworld.com/)

The Lithium in the technology is considered hazardous / dangerous goods. Used batteries will be removed by the suppliers for recycling off-site. Batteries containing chemicals 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 of approximately 5m to prevent the spread of fire. The battery energy storage system 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. One power line route is under consideration (see **Figure 18** below) and connects to the existing Eskom Parys 132/22 kV Substation located to the north of the site through a 0.57 km single circuit twin conductor 132 kV line. The voltage of the electricity generated by the Project will be transformed on site via a step-up transformer in the on-site substation that will be constructed by

the Applicant. The Project's proposed overhead power line will be aligned alongside property boundaries and existing power lines as far as possible.

Examples of a 132 kV transmission line as well as a high voltage transmission line connecting to a substation are shown in **Figure 16** and **Figure 17** below, respectively.

Figure 16: Example of a 132 kV transmission line

Figure 17: Example of High Voltage Transmission Line Connecting to Substation

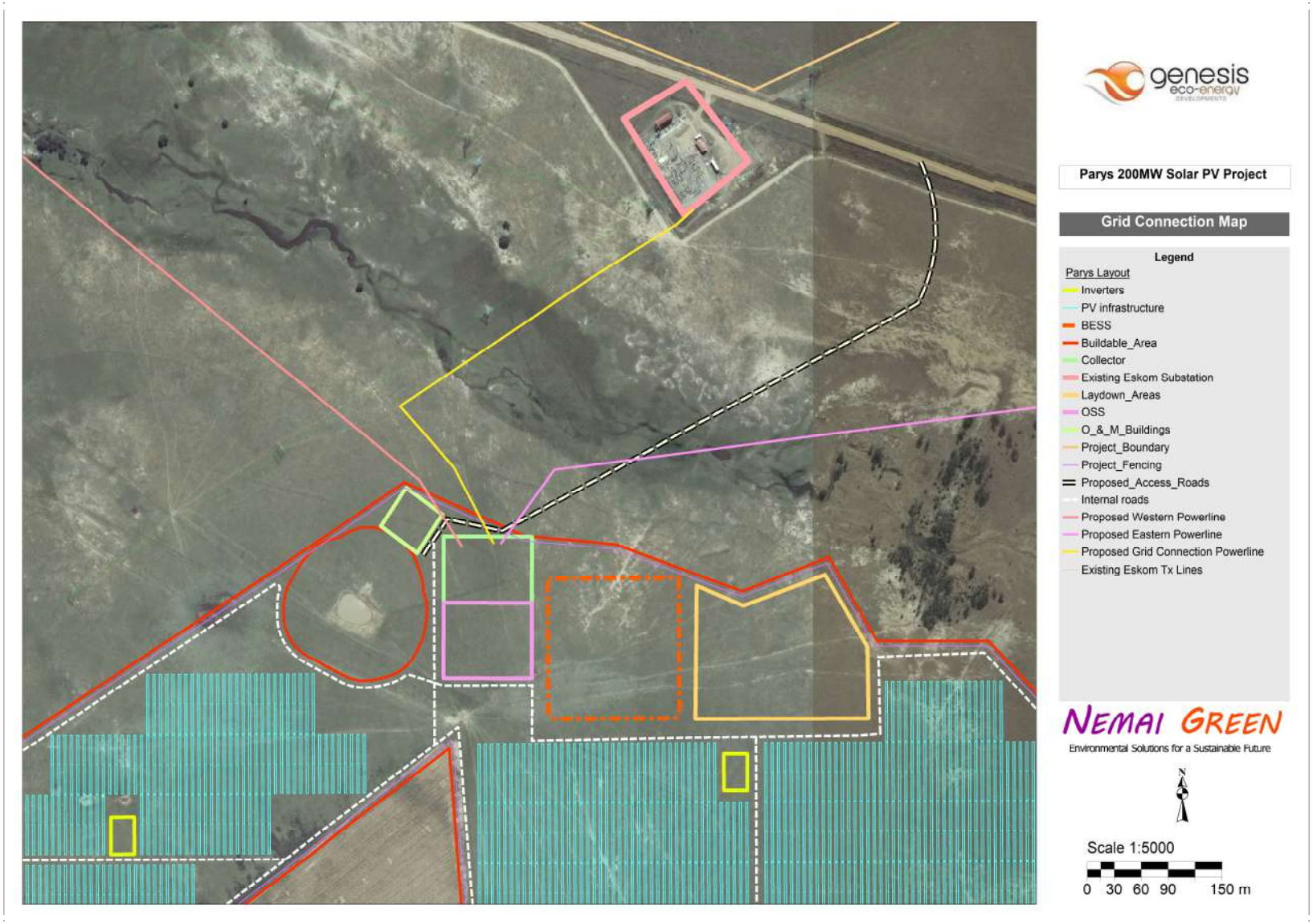


Figure 18: Proposed Power Line Route to existing Eskom Parys Substation (Orthophotograph)

9.6 Implementation Programme

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

- ❑ Preferred Bidder Status: April 2023
- ❑ Financial Close: October 2023.
  According to (Yescombe, 2002, cited in Pieters, et. al., 2014), Financial close is reached when all project contracts, financing documentation, and agreements have been signed, and all conditions from the lenders have been fulfilled or waived. In general, lenders for REIPPPP projects require the following [18]:
  - *A fixed project completion date;*
  - *A fixed project cost;*
  - *Limited technology risk;*
  - *Guarantees of the project output;*
  - *Liquidated damages for delays and project performance;*
  - *Some form of security from the contractor; and*
  - *Restrictions on contractors' ability to claim extensions of time and additional costs.*
- ❑ Notice to proceed (commencement of construction): November 2023.
- ❑ Commercial Operation Date (COD): November 2024.

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 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.

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 will be 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

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

Operation

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

9.8.3 Sanitation

Construction

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

Operation

Sewage from the buildings and toilets across the site will be discharged into various septic tank systems. The soakaway systems will be designed with sufficient spare capacity to accommodate the possibility of excessive usage above the anticipated average. This option is the most cost-effective system for this Project. It is to be considered that a well-constructed and maintained septic tank should be odourless and problem free.

Should the receiving environment be regarded as sensitive, then the use of honey sucker services from an independent contractor will be considered.

9.8.4 Waste

Construction

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

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

- Sewage;
- Water used for washing purposes (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

There will be no temporary access roads during construction.

Operation

The Project site is accessible by the R723 which runs through the site.

9.8.6 Stormwater

Construction

Best environmental practices will be implemented during construction to manage stormwater. These measures will be 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

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

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 early morning and early 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 for each PV footprint will be required during the construction phase and is demarcated in the layout drawing giving a total number of laydown areas of 3 (refer to **Figure 8** above).

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's alternatives considered during the Scoping process. The EIA process will provide a detailed comparative analysis of feasible alternatives from environmental (including specialist input) and technical perspectives.

By conducting the comparative analysis, the 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*".

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.

10.3 Layout / Design Alternatives

It is anticipated that the space available at the PV Site will be adequate to position the facility and its associated infrastructure to avoid areas of sensitive environmental features, which will be determined in the EIA Phase through the specialist studies.

An initial layout was proposed by the Applicant (**Figure 19**), however, through the environmental screening process and with input from biodiversity specialists, the layout was later refined to take sensitive environmental features into consideration. Therefore, currently one layout alternative is presented for inclusion in the study (**Figure 20**).

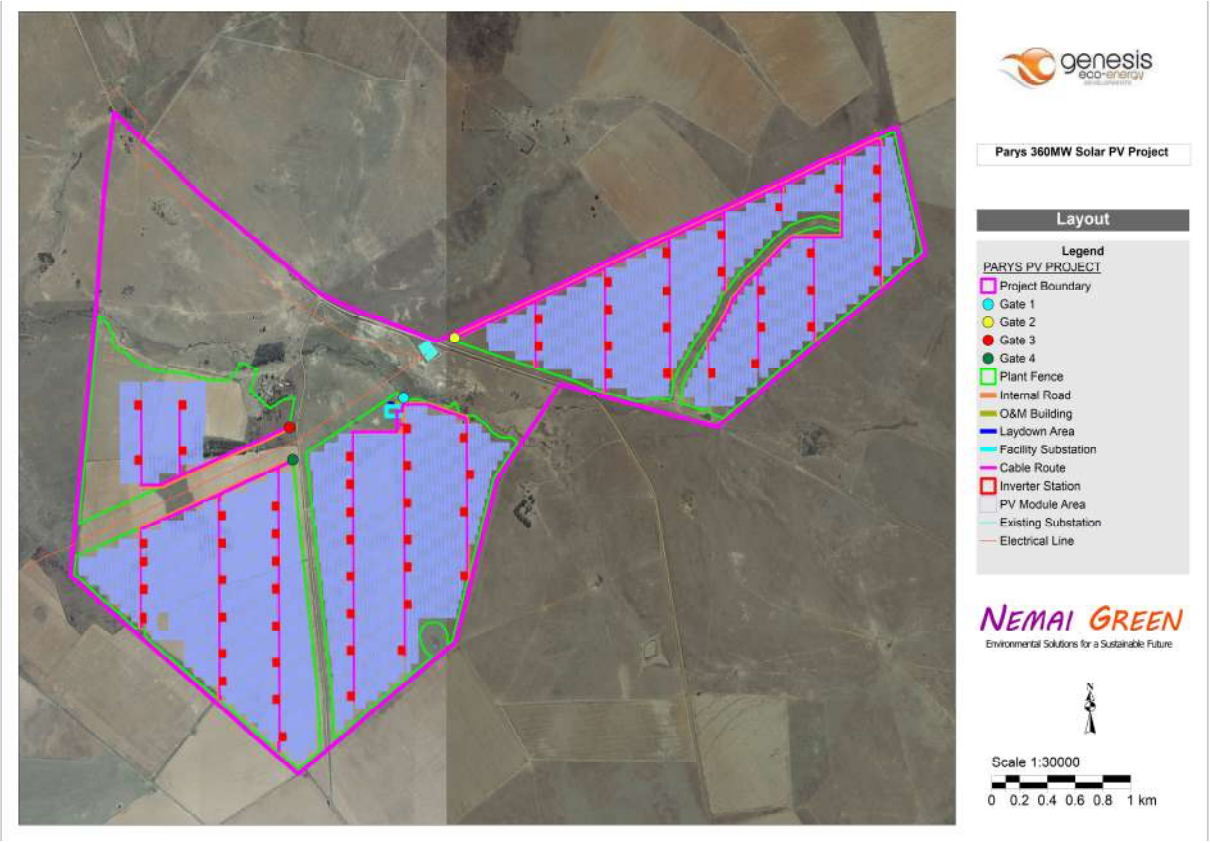


Figure 19: Initial Proposed Layout of the Solar PV Plant (Orthophotograph)

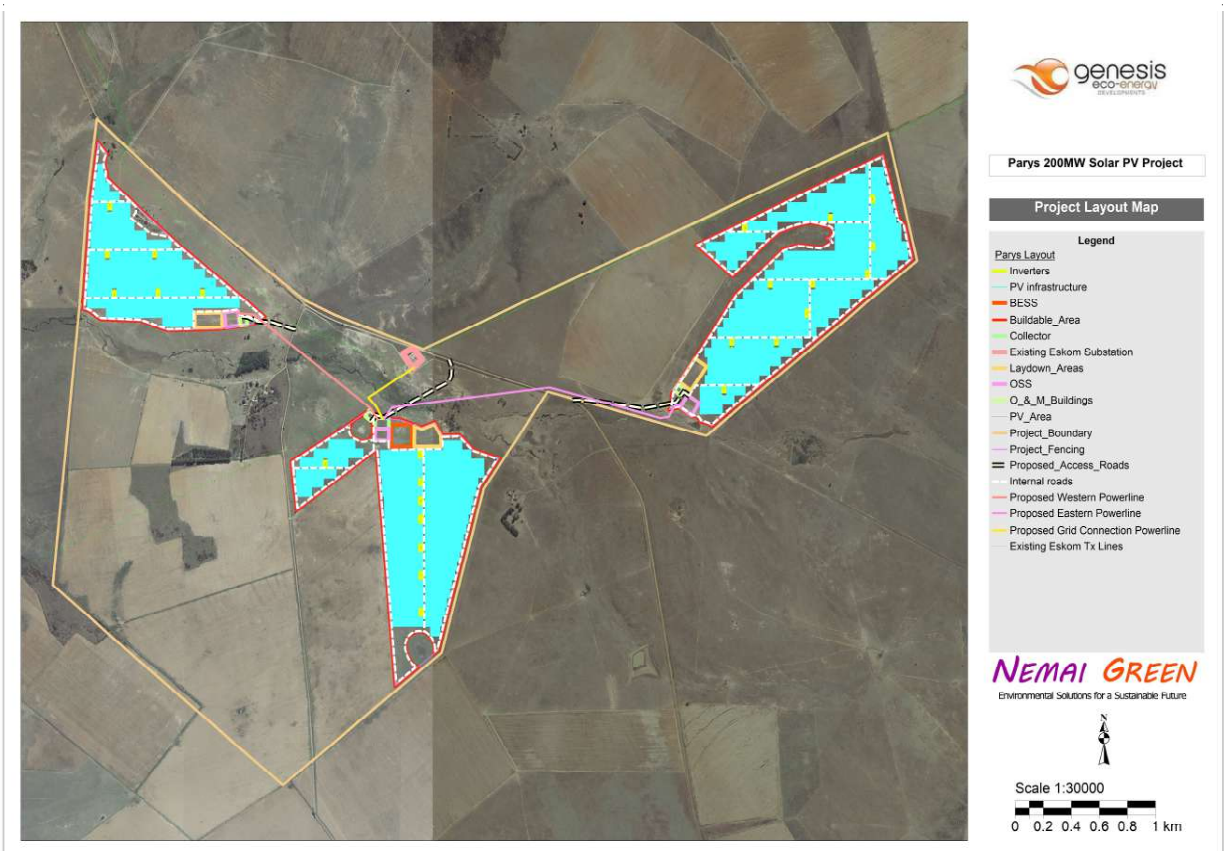


Figure 20: Current Proposed Layout of the Solar PV Plant (Orthophotograph)

10.4 Technology Alternatives

10.4.1 PV Technology

Solar PV technology consists of either monofacial or bifacial solar panels used on either a fixed mounting system or tracking mounting system. The following is noted in this regard:

- Single axis tracker system – this is preferred as it optimises the yield output and is the standard for utility scale solar PV installation. Some additional benefits associated with this technology include its robustness, long lifetime, the equipment prices have drastically decreased the past 10 years, it is easy to maintain, it does not cause any emissions and no waste is generated. The selected tracker type is the single axis E-W tracker system which specifically has its collector move from east to west tracking the suns movement throughout the day.
- Fixed mounted system – This is not preferred in utility scale solar PV plants as it is not able to generate as much energy as a solar PV system using a tracker system. This option will not be considered further.

A bifacial solar panel receives irradiation on both sides of the panel, which increases the yield. This is preferred over monofacial solar panels that only receive power on one of its sides (see **Figure 21** below).

Figure 21: Monofacial (top) and bifacial (bottom) solar panels
(https://www.bluestemenergysolutions.com/bifacial-versus-monofacial-solar-panels-an-analysis/)

10.4.2 BESS Technology

The BESS can be broken into solid state and flow battery systems (Refer to **Section 9.4** above). The preferred alternative is solid state lithium-ion technology. The EIA Report will evaluate the advantages and disadvantages associated with the types of BESS.

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 evaluation of the alternatives.

The no-go alternative can be regarded as the baseline scenario against which the impacts of the Project are evaluated. This implies that the current status and conditions associated with the proposed Project footprint will be used as the benchmark against which to assess the possible changes (impacts) associated with the Project.

In contrast, should the proposed Project not go ahead, any potentially significant environmental issues would be irrelevant, and the status quo of the local receiving environment would not be affected by the project-related activities. The objectives of the Project, including the benefits (such as the exploitation of SA's renewable energy resources, potential economic development and related job creation, and increased security of electricity supply), will not materialise.

The no-go alternative will be assessed during the EIA Phase, taking into consideration the findings of the specialist studies and the outcomes of public participation (amongst others).

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 Scoping exercise was conducted. It also allows for an appreciation of sensitive environmental features and possible receptors of the effects of the proposed Project and provides a baseline against which impacts can be determined. The study area includes the entire footprint of the Project, including the proposed Solar PV Plant and the power line.

A brief overview is also provided of the manner in which the environmental features may be affected (positively or negatively) by the proposed Project. Significant environmental issues are discussed further in **Section 13** below. These preliminary impacts are only discussed concisely on a qualitative level, as part of the Scoping Phase. The EIA Report will provide a comprehensive evaluation of the potential impacts and will quantify the effects to the environment based on the methodology presented in **Section 13.4** below.

11.2 Land Use

Status Quo

The Project is located approximately 8km to the south of the town of Parys' business district (CBD) and falls within Ward 15 of the Ngwathe Local Municipality (NLM), in the Free State Province. The R723 runs through the site. The Project's PV Site is vacant and was historically used for agricultural purposes.

Agriculture is the dominant land use in the Project area. The following land uses are encountered around the Project's PV Site:

- The SAJWV Olienhout Shooting Range along the R723.
- Eskom Parys Rural 132/11 kV substation south of the R723;
- Farming activities on the property and surrounding properties.

Views of the Project's PV Site are provided in **Figure 22** and **Figure 23** below.

Figure 22: Existing Eskom substation as viewed from the R723 looking south.

Figure 23: View looking south at farm lands on the property, including farm house to the right of the image.

Potential Impacts / Implications

- Solar power is regarded as one of the most land-intensive power generation technologies. However, layouts can be flexible as the systems are modular and the PV modules can be arranged to fit within most footprints. The land is suitable for the scale and requirements of the proposed Project.
- The Project's proposed overhead power line will be aligned alongside property boundaries and existing power lines as far as possible.
- The Project has a limited life span. Following decommissioning and rehabilitation, alternative land uses, such as returning the land to agriculture, can be pursued.

- Requirements and restrictions associated with servitudes on the properties need to be adhered to.
- The restrictions associated with the shooting range to the east need to be determined.

Specialist Study Triggered / Additional Investigations

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

- Agricultural Impact Assessment;
- Terrestrial Ecological Impact Assessment;
- Visual Impact Assessment; and
- Heritage Impact Assessment.

The layout will incorporate the findings of the specialist studies and will attempt to avoid environmentally sensitive areas. The layout will be presented in the EIA Report.

11.3 Climate

Status Quo

Parys's climate is classified as warm and temperate. When compared with winter, the summers have much more rainfall. According to Köppen and Geiger, this climate is classified as Cwb (https://en.climate-data.org/africa/south-africa/free-state/parys-12809/).

The mean minimum and maximum temperatures for Parys over the year are shown in **Figure 24** below. The average annual temperature is 26°C. The warmest month, on average, is January with an average temperature of 22°C. The coolest month on average is June, with an average temperature of 9°C.

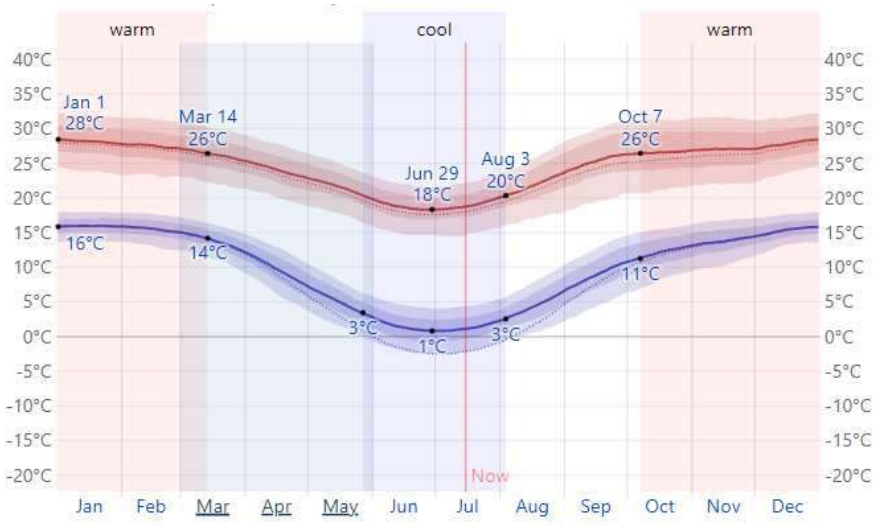


Figure 24: Average minimum and maximum temperatures in Parys

(Copyright © 2022 https://weatherspark.com/y/94201/Average-Weather-in-Parys-South-Africa-Year-Round)

The mean monthly precipitation over the year is shown in **Figure 25** below. The average annual precipitation 727 mm.

Figure 25: Average monthly precipitation in Parys

(Copyright © 2022 https://weatherspark.com/y/94201/Average-Weather-in-Parys-South-Africa-Year-Round)

Potential Impacts / Implications

- The Project proposes to generate energy from a renewable resource, by harnessing solar energy. Renewable energy sources play a role in providing energy services in a sustainable manner and, in particular, in mitigating climate change.
- The proposed site was found to be suitable for the development of the Solar PV Plant due to the local climate and good solar resource (irradiation) (amongst others).
- High wind speeds will need to be factored into the plant specifications and the operation of the tracking systems.
- The efficiency of the facility could be adversely affected if the modules are soiled (covered) by particulates/dust. Soiling of modules will require an appropriate maintenance and cleaning plan.
- Climate change may impact on the Project through extreme floods, which may pose a risk to the facility's infrastructure.

Specialist Study Triggered / Additional Investigations

- The EMPr will make provision for the maintenance of the facility.
- Infrastructure will be located outside of the 1:100 year floodline of any watercourse.

11.4 Geology and Soil

Status Quo

The Project Area falls within the core area of the Vredefort Dome, a unique geological feature formed approximately 2 million years ago and is the oldest and largest meteorite impact structure on earth and is underlain by the Karoo Supergroup.

As shown in **Figure 26** below, the PV Site geology is dominated by Meinhardskraal Granite and Sand River Gneiss.

Soil types are characterised by imperfectly drained soils, often shallow and often with a plinthic horizon, which may be seasonally wet over the majority of the southern parts of the site. The northern areas of the site are characterised by structureless and textural contrast soils, which may have favourable physical properties, somewhat high natural fertility; relative wetness favourable in dry areas. The limitation associated with these soils are restricted depth, imperfect drainage, high erodibility; slow water infiltration; and seasonal wetness.

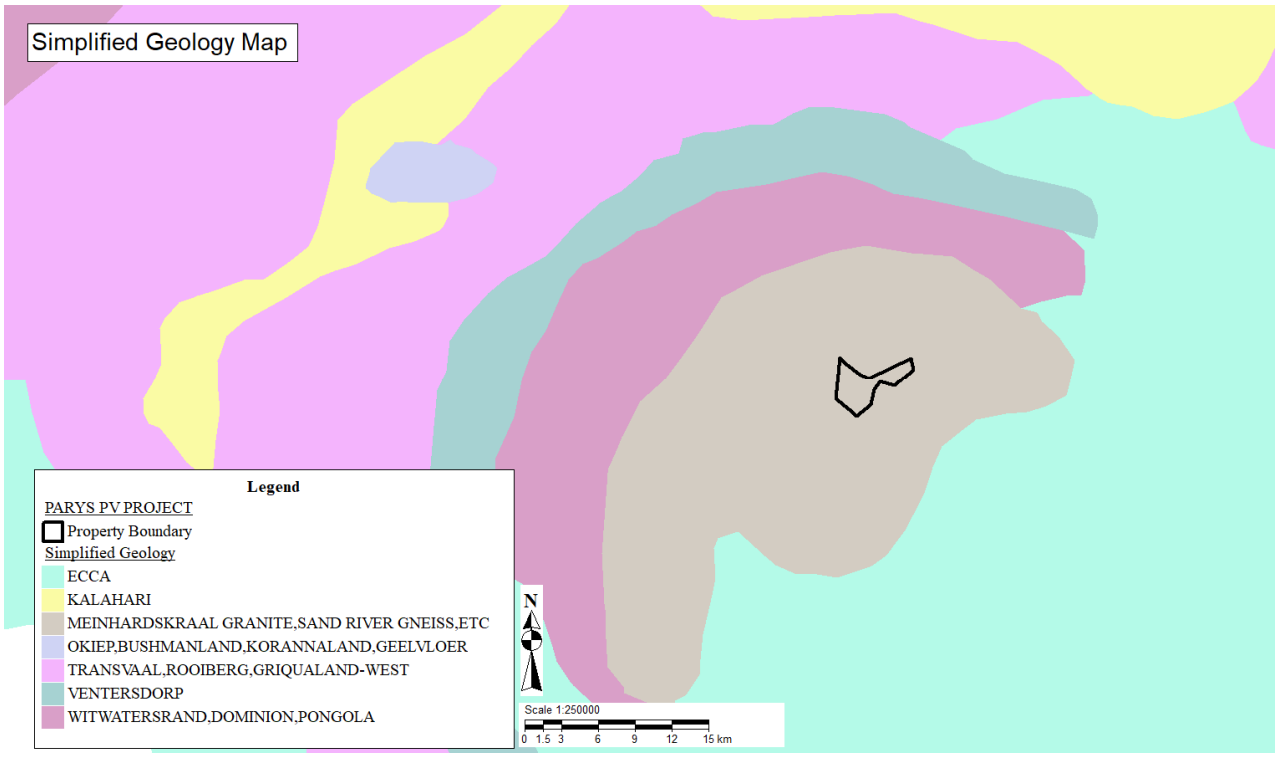


Figure 26: Geology description

Potential Impacts / Implications

- The geotechnical characteristics determine the suitability of the PV Site in terms of foundations for structures and infrastructure.
- Construction phase:
  - Loss of soil suitable to agriculture.
  - Establish need to rehabilitate eroded areas.
  - Use of heavy equipment during the construction phase could lead to soil compaction.

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

❑ Operational phase:

- Erosion may take place if stormwater is not adequately managed.
- Soil could be contaminated through inadequate storage and handling of hazardous materials, leaks from the BESS and poor management of waste and wastewater.

Specialist Study Triggered / Additional Investigations

- ❑ The findings from geotechnical investigations need to be considered during the Project design phase.
- ❑ An Agricultural Impact Assessment will be undertaken, and the findings will be included in the EIA Report. The layout will take into consideration the agricultural potential of the area.
- ❑ The EMPr will contain measures to mitigate against impacts to soil, for example the management of topsoil, preventing soil contamination during construction, etc.

11.5 Topography

Status Quo

In terms of the terrain morphology, the PV Site is characterised by plains with low relief. In terms of the SOTER database (see **Figure 27** below), the landform encountered over most of the PV Site is characterised as a plain at a medium level.

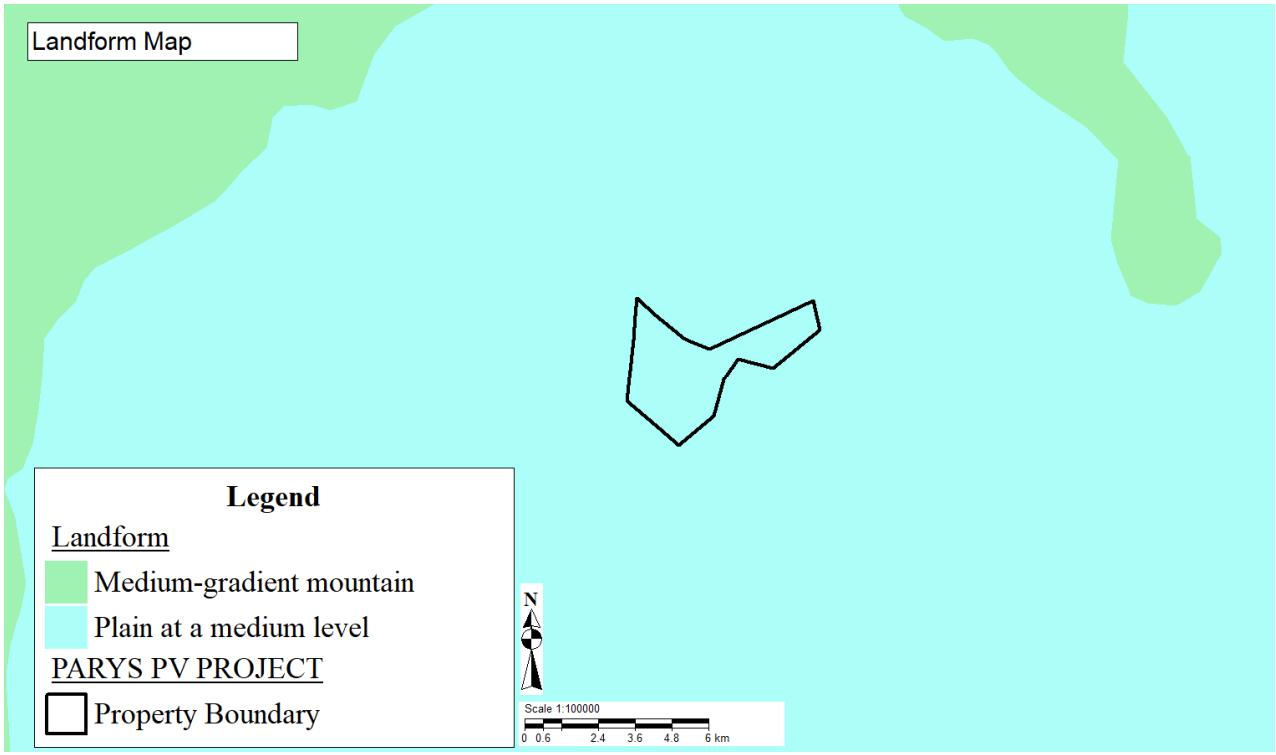


Figure 27: SOTER Landforms

The elevation profiles of the PV Site are as follows (see **Figure 28** below).:

- From west to east the elevation rises from 1433m to 1477m above sea level over a distance of approximately 6.6km; and
- From north to south the elevation rises from 1433m to 1457m above sea level over a distance of approximately 2.3km.

The main topographical feature on the site is a watercourse, the Jagkraalspruit, that flows east to west across the property. This watercourse will be delineated as part of the Aquatic Impact Assessment that will be included in the EIA Report.

Figure 28: Map of site profiles – Top: west to east; and Bottom: north to south

Potential Impacts / Implications

- The topography is relatively flat which makes it suitable for the development of a large scale Solar PV Plant.
- Visual impacts may be caused by the transformation of the landscape.
- Erosion of areas cleared for construction purposes.
- From a glint and glare perspective, it is noted that the solar panels are designed to absorb, not reflect, irradiation.

Specialist Study Triggered / Additional Investigations

- The findings of the Visual Impact Assessment will be included in the EIA Report.
- The EMPr will make provision for managing visual impacts and stormwater during the construction and operational phases of the Project.

11.6 Surface Water

Status Quo

The Project Area is situated in the C23C Quaternary Catchment, which falls within the Vaal Water Management Area (WMA). The Project Area drains into the perennial Jagkraalspruit, which flows westward through the site. The Jagkraalspruit joins the Skulpspruit and Lesothospruit before flowing into the Vaal River. Watercourses in the Project Area are shown in **Figure 29** and **Figure 30** below.

According to the National Wetland Map 5 spatial data (Van Deventer *et al*., 2018), Depression wetlands occur on the PV Site which will be excluded from the development. This will be confirmed as part of the wetland delineations in the EIA Phase.

According to the findings from the National Web Based Environmental Screening Tool, an area of very high sensitivity in terms of aquatic biodiversity occurs in the PV Site, which is associated with wetlands. The remainder of the site shows low sensitivity (see **Figure 31** below). The layout was amended to avoid the high sensitivity areas.

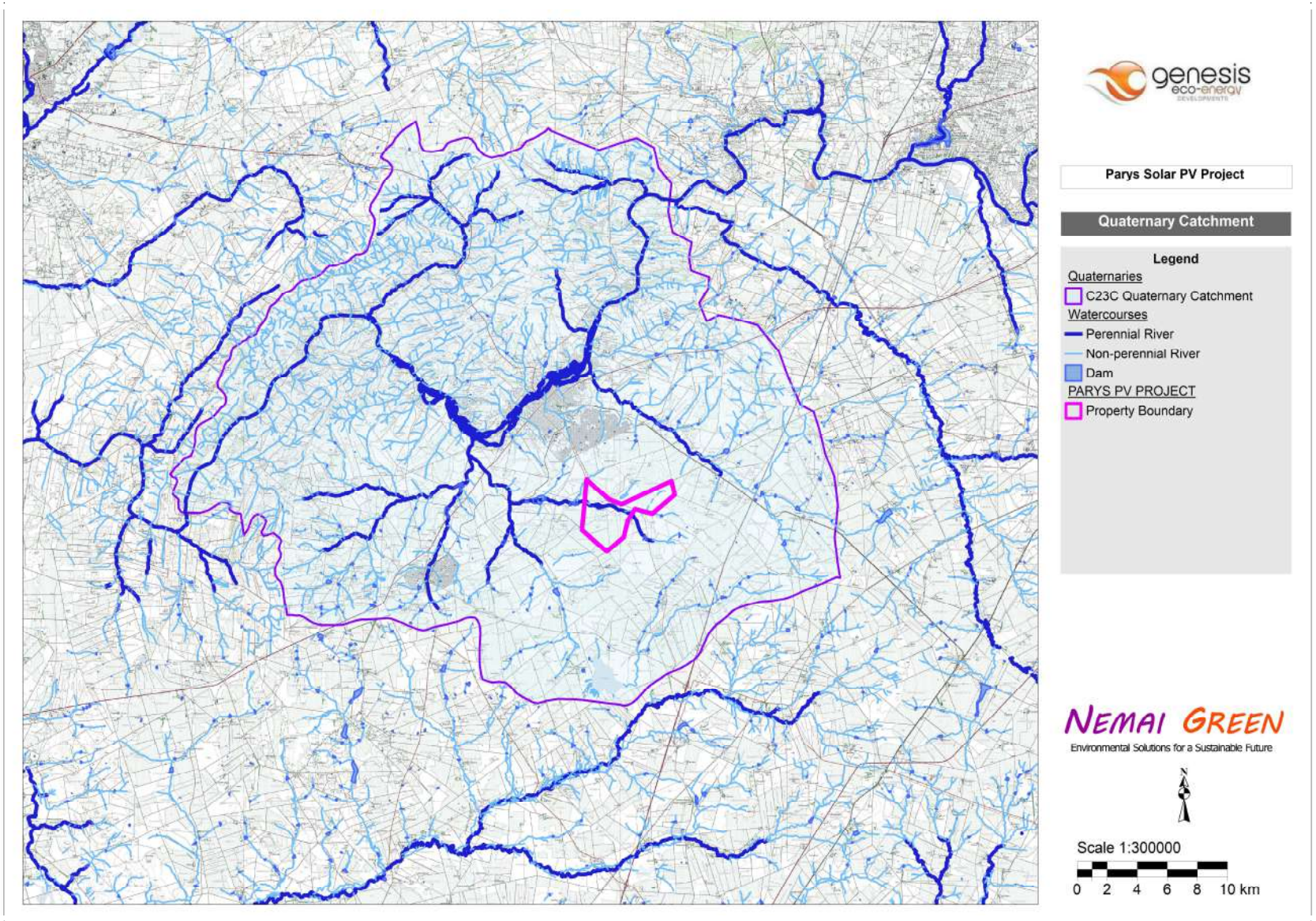


Figure 29: Quaternary catchment and watercourses – regional map

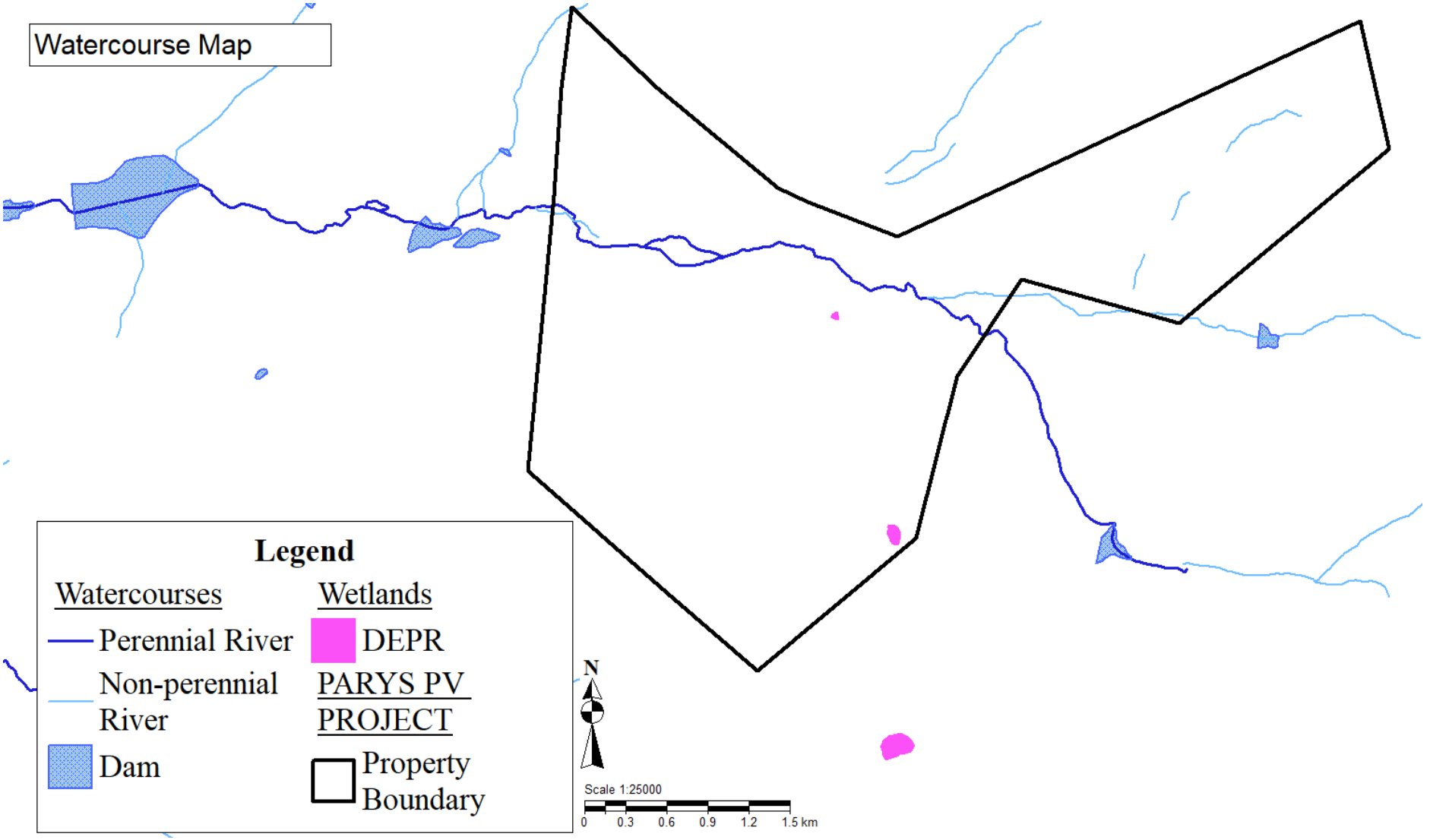


Figure 30: Watercourses in Project Area

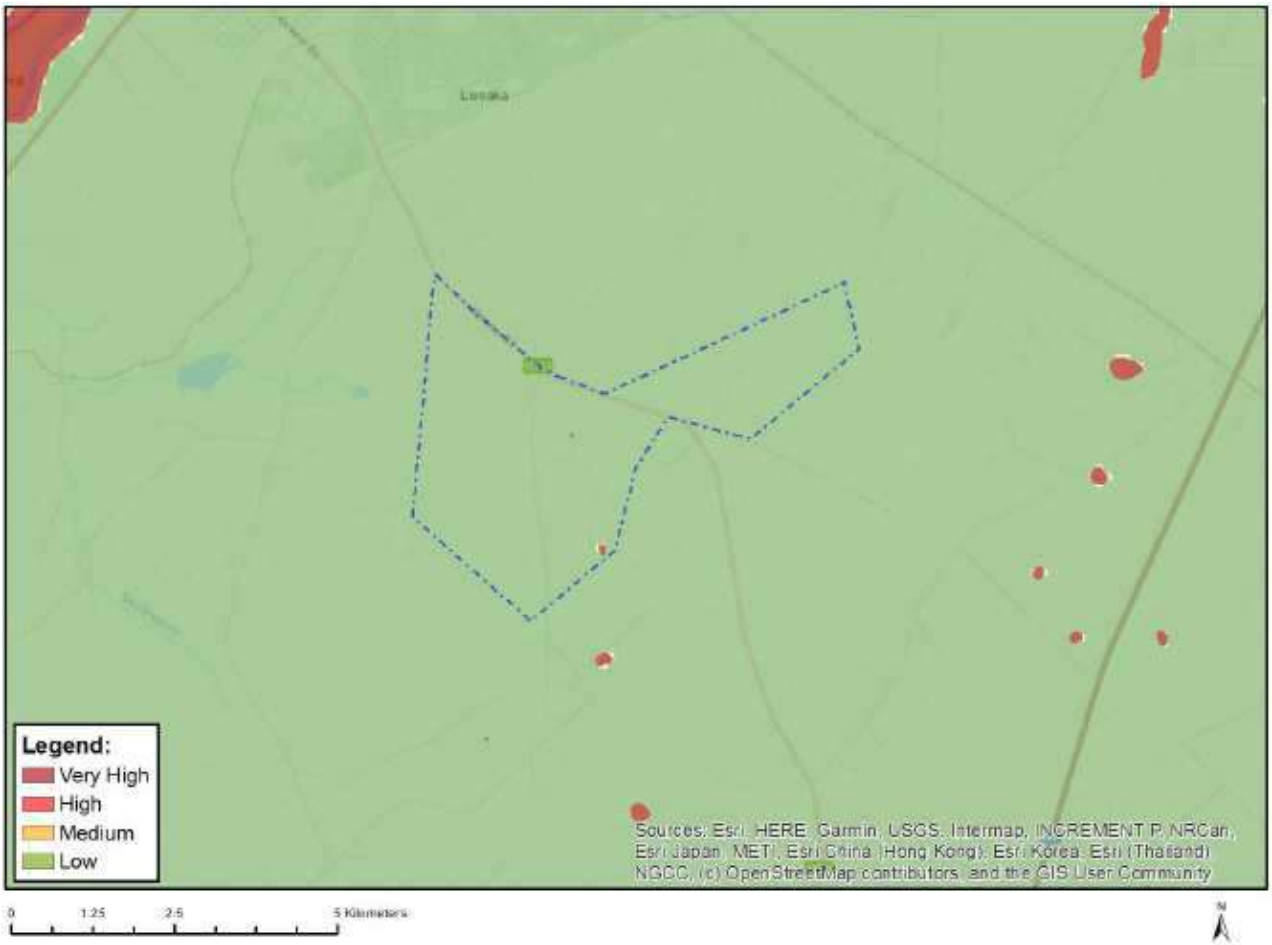


Figure 31: Map of Relative Aquatic Biodiversity Theme Sensitivity

Potential Impacts / Implications

- Construction phase:
  - Damage to riparian corridors or destabilisation of morphology as a result of construction activities in proximity to the watercourses on the PV Site and along the power line.
  - Reduction of water quality through sedimentation (e.g., silt from the construction site transported via runoff) and poor construction practices (e.g., improper management of wastewater, incorrect storage of material, spillages, etc.).
  - Temporary alteration of flow and the structure (i.e. bed and banks) of the watercourse on the PV Site as a result of poor management of stormwater.
  - Alteration of site drainage.
  - Reduction in biodiversity of aquatic biota as a result of the abovementioned drivers.

- Operational phase:
  - Sedimentation through silt-laden runoff, caused by inadequate stormwater management.
  - Damage to the facility from major flood events.
  - 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.
- Alteration of site drainage.

Specialist Study Triggered / Additional Investigations

- ❑ The findings of the Aquatic Impact Assessment will be included in the EIA Report.
- ❑ The layout will take into consideration delineated watercourses and their buffers.
- ❑ Best practices to mitigate impacts to watercourses and to manage stormwater will be included in the EMPr.
- ❑ Should construction activities encroach into the regulated area of a watercourse (i.e. 1:100 year floodline / delineated riparian habitat, or 500 m of a wetland habitat) water use authorisation will be required in terms of Section 21 of the NWA.

11.7 Flora & Fauna

Status Quo

11.7.1 Biomes and Vegetation Types

The proposed PV Site falls in the Grassland Biome and the vegetation type found in the Project Area is the Vredefort Dome Granite Grassland (Gh 11) (Mucina and Rutherford, 2006) (see **Figure 32** below). The Vredefort Dome Granite Grassland listed as a Vulnerable (VU) vegetation type.

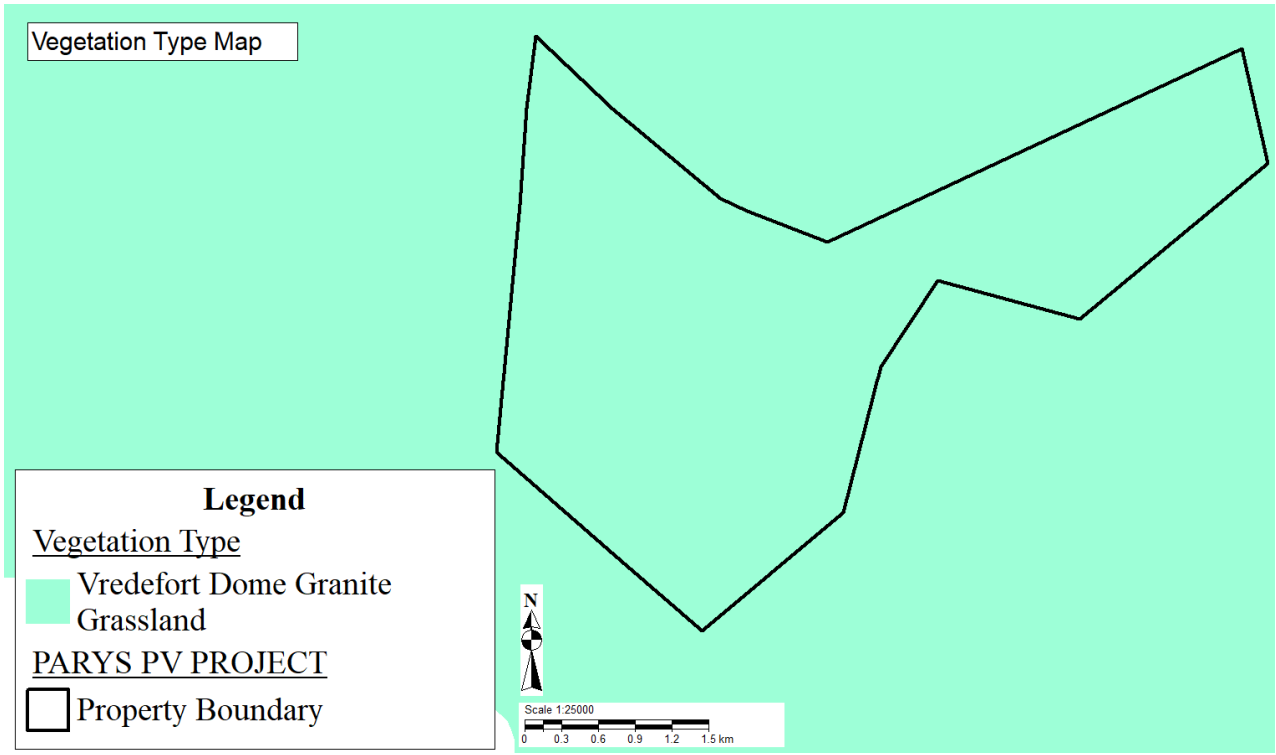


Figure 32: Vegetation types in relation to the Project Area

According to the findings from the National Web Based Environmental Screening Tool, the Project Area has low sensitivity in terms of the relative plant species theme. The site has been affected by

historical agricultural activities, which will be evaluated further as part of the Terrestrial Ecological Impact Assessment during the EIA Phase (Refer to **Appendix B** for the Screening Tool Report included in the Application Form).

11.7.2 Threatened Terrestrial Ecosystems

In terms of Section 52(1)(a) of NEM:BA, a national list of ecosystems that are threatened and in need of protection was gazetted on 9 December 2011. The list classified all threatened or protected ecosystems in South Africa in terms of four categories; Critically Endangered (CR), Endangered (EN), Vulnerable (VU), or Protected. The purpose of categorising these ecosystems is to prioritise conservation areas in order to reduce the rates of ecosystem and species extinction, as well as preventing further degradation and loss of structure, function, and composition of these ecosystems. According to the South African National Biodiversity Institute (SANBI) (2011), the Project Area falls within a threatened ecosystem, which is the Vredefort Dome Granite Grassland that is listed as a VU.

'Ecosystem protection level' is an indicator of how adequately an ecosystem is protected or not. Ecosystems can be classified as not protected, poorly protected, moderately protected or well protected depending on the proportion of each ecosystem that is under conservation management within a protected area, as recognized in the National Environmental Management: Protected Areas Act (Act No. 57 of 2003) (NEM:PAA). These protected areas include state or privately-owned protected areas as well a land under biodiversity stewardship agreements. According to the National Biodiversity Assessment (2018), the project area falls within the area listed as **Not Protected** on a national scale.

According to the findings from the National Web Based Environmental Screening Tool, the relative terrestrial biodiversity theme sensitivity for the PV Site is very high due to the footprint within a vulnerable ecosystem and a CBA2 (Refer to **Appendix B** for the Screening Tool Report included in the Application Form).

11.7.3 Protected Areas

The aim of NEM:PAA is to provide for the protection and conservation of ecologically viable areas representative of SA's biological diversity and natural seascapes.

According to the South Africa Protected Areas Database (SAPAD_OR_2021_Q4), the nearest formally protected areas to the Project Area include the following (refer to **Figure 33** below):

- Chazen Game Lodge (± 19 km to the west);
- Nooitgedacht Private Nature Reserve (± 24 km to the west);
- Venterskroon Private Nature Reserve (± 22 km to the northwest);
- Vechthoek Private Nature Reserve (± 13 km to the north);
- Cloudy Creek Bird Sanctuary and Nature Reserve (± 22 km to the northeast);
- Leeuwspruit Private Nature Reserve (± 29 km to the northeast);

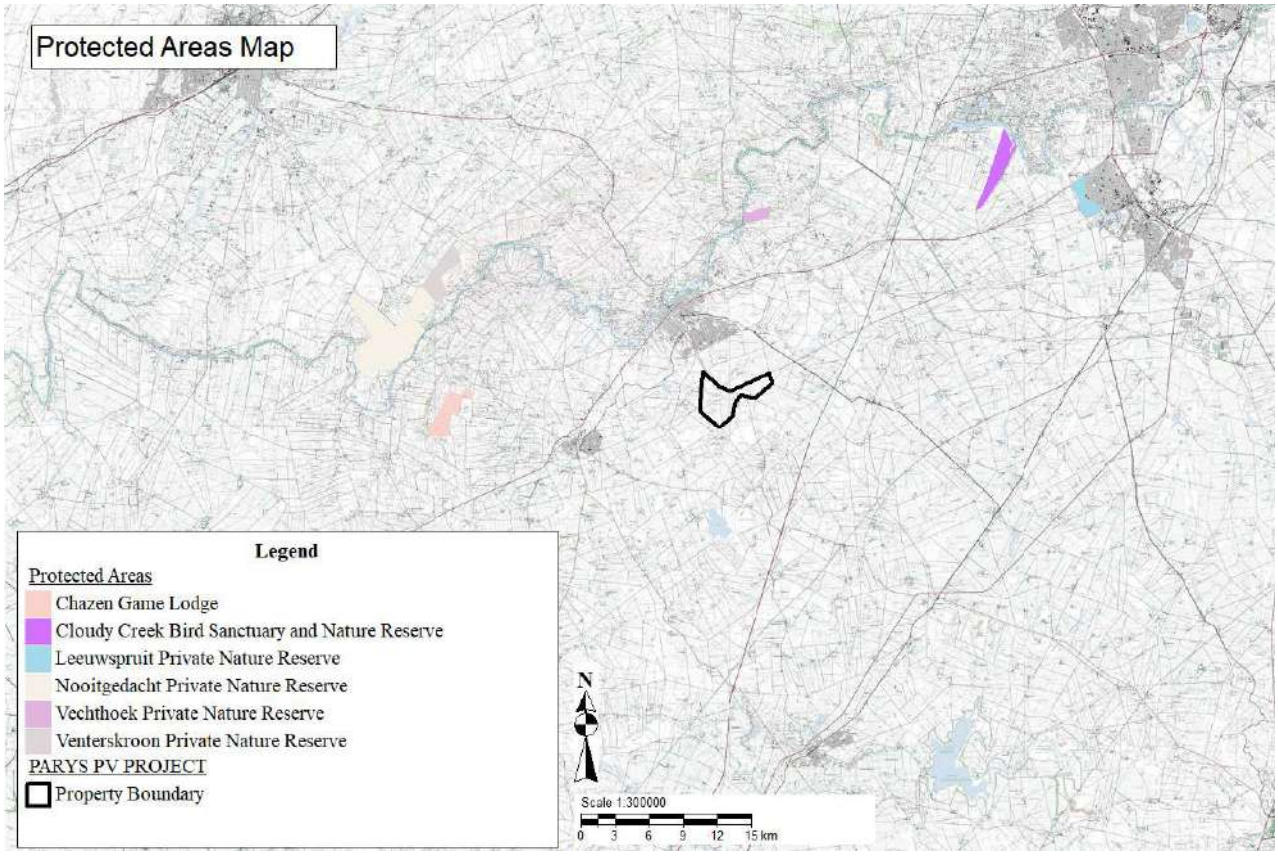


Figure 33: Protected areas in relation to the Project Area

11.7.4 Free State Biodiversity Plan

The Free State Biodiversity Plan (2015) (Collins, 2016) shows Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). CBAs are important for conserving biodiversity while ESAs are important to ensure the long-term persistence of species or functioning of other important ecosystems. Degradation of CBAs or ESAs could potentially result in the loss of important biodiversity features and/or their supporting ecosystems.

The location of the Project Area in relation to the Free State Biodiversity Plan is shown in **Figure 34** below. The Project falls predominately over an area designated as 'other' and 'degraded', with a small section within a CBA2. Ground truthing of these areas, in terms of their actual status, will be undertaken as part of the Terrestrial Ecological Impact Assessment in the EIA Phase.

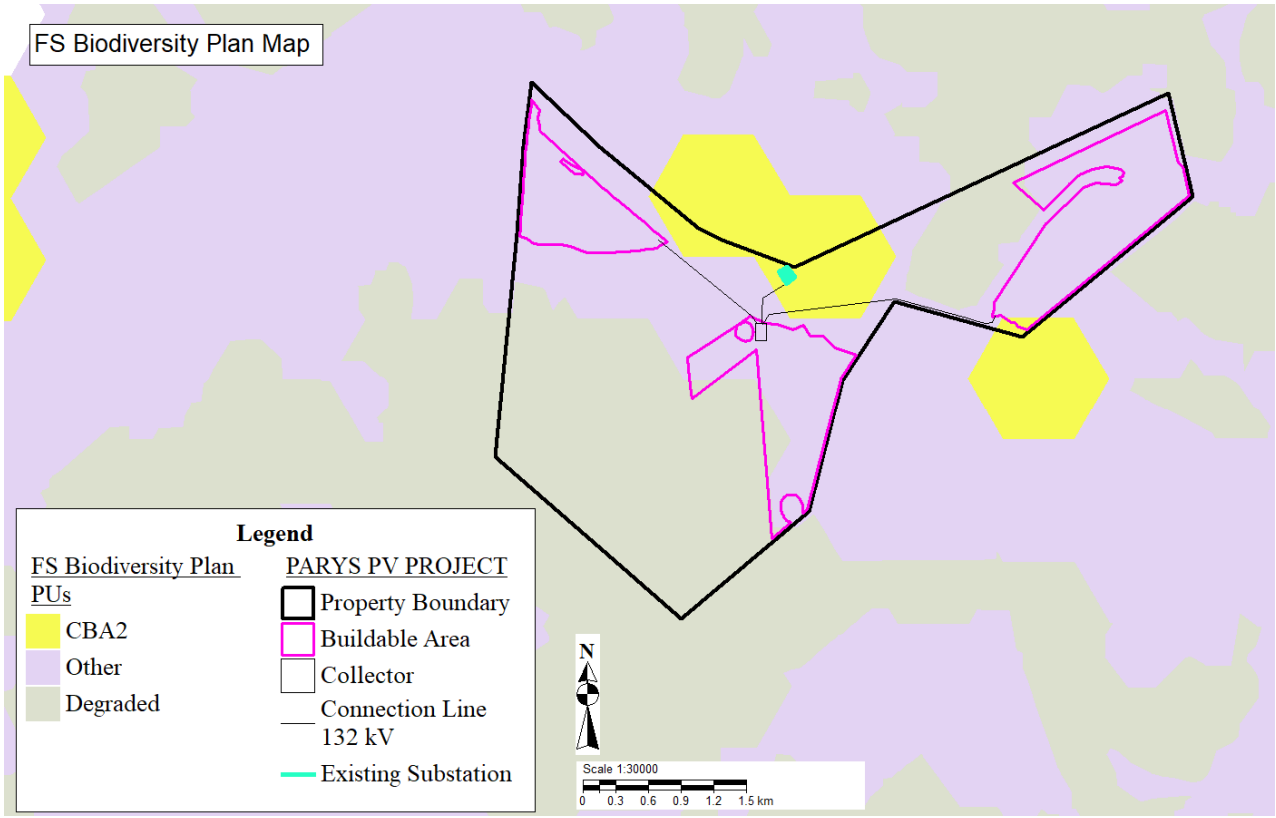


Figure 34: Project Area in relation to the Free State Biodiversity Plan

11.7.5 Important Bird & Biodiversity Area

The Important Bird & Biodiversity Area (IBA) programme of southern Africa (Barnes, 1998) identifies 124 IBAs in South Africa. IBAs are places of international significance for the conservation of birds and other biodiversity and are sites that together form part of a wider, integrated approach to the conservation and sustainable use of the natural environment. There are no IBA's within a 20km radius of the Project Area. The closest IBA is the Suikerbosrand Nature Reserve, which is 77km northeast from the site.

According to the findings from the National Web Based Environmental Screening Tool, the PV Site has a high sensitivity in terms of the relative avian theme. This will be assessed as part of the Avifaunal Impact Assessment during the EIA Phase (Refer to **Appendix B** for the Screening Tool Report included in the Application Form).

Potential Impacts / Implications

- ❑ Construction phase –
  - Clearance of vegetation for site preparation, along access roads and other areas to be disturbed. This could result in habitat loss / fragmentation. The significance of habitat loss will need to consider the total area of habitat affected, the uniqueness of the habitat and the sensitivity and conservation status of the habitat and its associated species.
  - Potential loss, disturbance or displacement of protected fauna and flora species.

- Human - animal conflicts.
- Noise and vibration.
- 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.

❑ Operational phase –

- Habitat fragmentation (e.g., barriers to animal movement).
- Reflection of sunlight from the solar panels could adversely affect birds, including those species that use the watercourses on the site and surrounding areas.
- Landscaping, re-seeding and vegetation control is required to remove the risk of vegetation shading modules and reducing performance of the facility.
- Chemical pollution associated with cleaning the PV panels.
- Shading out of plants by solar panels.
- Proliferation of invasive alien species in disturbed areas.

Specialist Study Triggered / Additional Investigations

❑ The compatibility of the project with the Free State Biodiversity Plan and other environmental management and planning tools will be considered further during the EIA Phase.

❑ The Terrestrial Ecological Impact Assessment in the EIA Phase will assess the status of the sensitive ecological features. Suitable mitigation measures will be identified, and recommendations will be made to address potential impacts.

❑ The layout will be refined to incorporate the findings of the Terrestrial Ecological Impact Assessment and will take into consideration sensitive ecological features.

❑ Best practices to mitigate impacts to flora and fauna will be included in the EMPr.

11.8 Socio-Economic Environment

Status Quo

The following information was sourced from the Fezile Dabi DM and Ngwathe LM IDPs.

❑ **Demographic Profile –**

- Ngwathe LM experienced a negative growth from 1996 to 2001, with an increase in growth rate from 2001 to 2011. Overall, the population has stayed relatively constant over the past 20 years.
- According to 2016 statistics, the majority of the municipality consists of a black African population (104507 people) and white population (11299) with only small numbers representing coloured and Indian/Asian populations (3039 and 61 respectively).
- Gender was recorded as relatively equal between male and female.

- The NLM consists of a relatively young population, with the most numerous age group between 10 – 19 years old according to the 2011 census data.
- The number of people who have completed grade 12, as well as those who havehas increased from 1996 to 2011, and the number of people who have no schooling has decreased over the same period.
- The average number of households has increased from 2001 to 2011, but the average household size has decreased.

❑ **Economic and Employment Profile –**

- According to the NLM IDP, the unemployment rate in the municipality was high in 2011 at 35%. Although high in 2011, there was an improvement as unemployment had decreased from the highest unemployment rate experienced in 2001.
- The number of households using electricity for cooking, heating and lighting has increased dramatically from 1996 (approximately 30%) to 2011 (approximately 88%). The percentage of households connected to electricity infrastructure in 2016 increased to 95%.
- The proportion of households with access to piped water improved from 1996 to 2011 with 94% of households having piped water access in 2016.
- Due to the dominant regional role Parys and Heilbron play in terms of regional service providers and industrial and commercial development, the focus of urbanisation will probably be on these centres.
- Parys with its strong service character and prominent commercial and industrial components, will remain the main town and growth point of the region and will continue to render various services to the surrounding smaller towns and rural areas.
- Ngwathe has a significant weekend related tourism potential that could, in future, contribute to the GGP of the district and should be further exploited.
- The agricultural sector of certain areas in the district is extremely prominent and contributes largely to the GGP of the Fezile Dabi District, which emphasize the agricultural significance of this district. The latter results to industrial development that is agricultural orientated.
- According to the Ngwathe LM IDP (2022), a key opportunity identified within the municipality is PV power generation.

Potential Impacts / Implications

❑ Status of land claims to be verified.

❑ Construction phase:

- 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).

❑ Operational phase:

- Once established, the operation of the Solar PV Plant would result in direct and indirect economic opportunities.
- Visual impacts to surrounding communities.

Specialist Study Triggered / Additional Investigations

❑ A Social Impact Assessment will be undertaken and mitigation measures will need to be identified to manage impacts to the local social environment. The findings will be included in the EIA Report.

11.9 Agriculture

Status Quo

The Project's PV Site is used currently for livestock farming and dryland cultivation; and was historically used for agricultural purposes.

According to the findings from the National Web Based Environmental Screening Tool, areas of high and medium sensitivity in terms of the relative agriculture theme occur in the Project Area (see **Figure 35** below). The PV layout was adjusted to avoid high sensitive areas as far as possible. The agricultural sensitivity and impacts will be assessed through the Agriculture Impact Assessment in the EIA Phase.

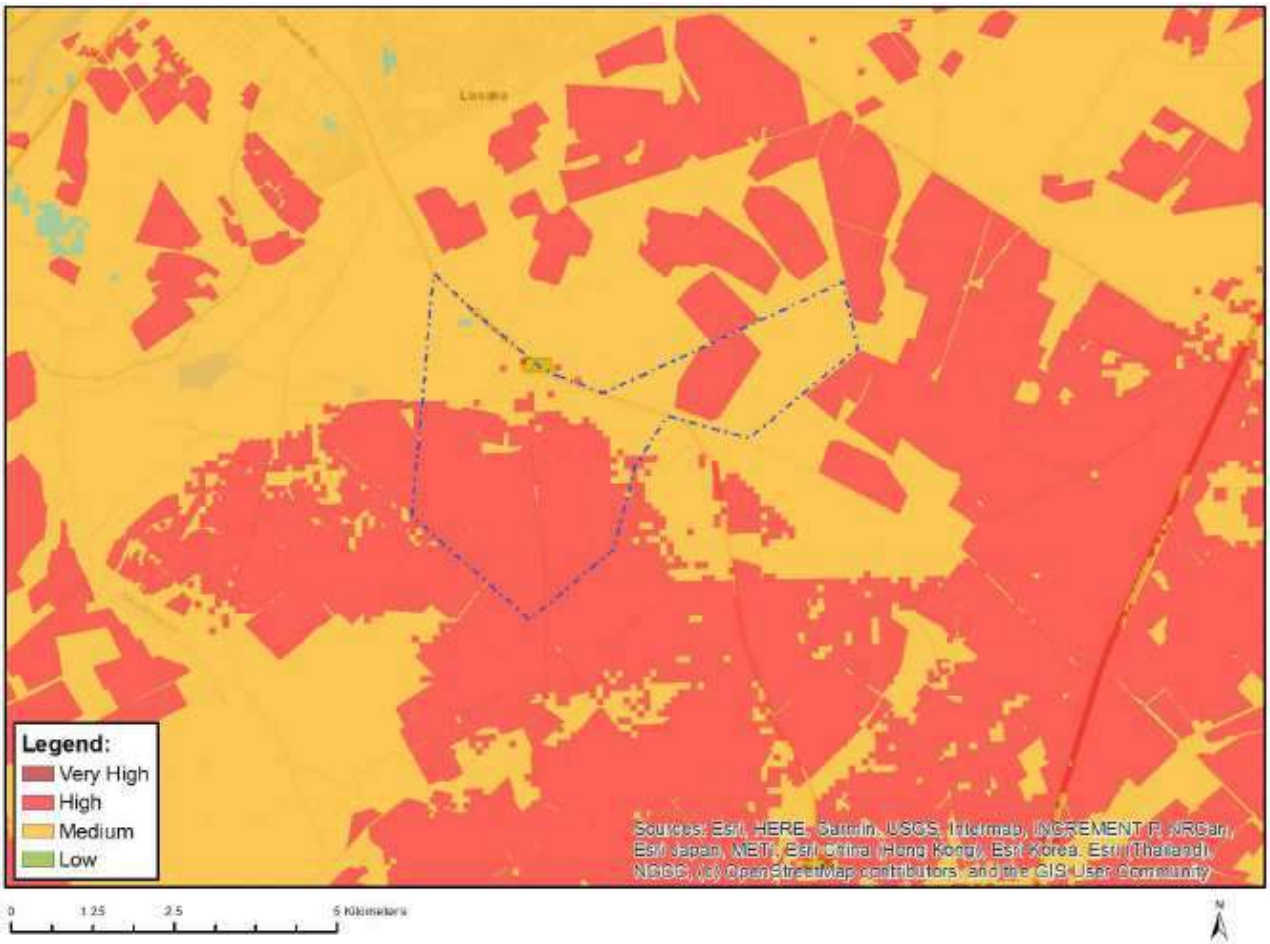


Figure 35: Map of Relative Agriculture Theme Sensitivity

Potential Impacts / Implications

- Construction phase:
  - Loss of agricultural land use due to direct occupation by the development footprint. This will take affected portions of land out of agricultural production.
  - Soil erosion by wind or water due to alteration of the land surface characteristics.
  - Alteration of surface characteristics may be caused by construction related land surface disturbance, vegetation removal, panel surfaces and the establishment of hard standing areas, surfaces and roads. Erosion will cause loss and deterioration of soil resources.
  - Loss of topsoil due to poor topsoil management (burial, erosion, etc.) during construction related soil profile disturbance (levelling, excavations, road surfacing etc.) and resultant decrease in that soil's capability for supporting vegetation.
  - Risk of harm to livestock from construction activities (e.g., open excavations).
- Operational phase:
  - Loss of agricultural land use due to direct occupation by the development footprint. This will take affected portions of land out of agricultural production.
  - Soil erosion by wind or water due to alteration of the land surface characteristics.

Specialist Study Triggered / Additional Investigations

- An Agricultural Impact Assessment will be undertaken and the findings will be included in the EIA Report.

11.10 Air quality

Status Quo

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

- Fugitive dust emissions from agricultural activities and vehicles travelling on unpaved roads;
- Vehicle exhaust emissions from vehicles travelling on paved and unpaved roads, including on the R723 other surrounding roads such as N1 and in the town of Parys;
- Biomass burning (veld fires);
- Domestic fuel burning;
- Waste treatment and disposal; and
- Other fugitive dust sources such as wind erosion from exposed areas.

Potential Impacts / Implications

- 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.
- Construction phase:
  - 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; and
  - Tailpipe emissions from construction vehicles.
- Operational phase:
  - 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.

Specialist Study Triggered / Additional Investigations

- Mitigation measures will be included in the EMPr to ensure that the air quality impacts during the construction phase are suitably managed and that regulated thresholds are not exceeded.
- Soiling of modules will require an appropriate maintenance and cleaning plan.

11.11 Noise

Status Quo

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) and vehicles on the surrounding road network.

Potential Impacts / Implications

- Construction phase:
  - Localised increases in noise may be caused by –
    - Construction equipment, machinery and vehicles;
    - Construction material delivery vehicles; and
    - General activities at the construction camp.
- Operational phase:
  - Solar PV facilities produce electricity during the daytime hours, when the sun's rays are collected by the panels. 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.
  - Localised noise from operation and maintenance vehicles and activities.

Specialist Study Triggered / Additional Investigations

- Noise that emanates from construction and operational activities will be addressed through targeted best practices for noise monitoring and management in the EMPr. The associated regulated standards need to be adhered to.

11.12 Historical and Cultural Features

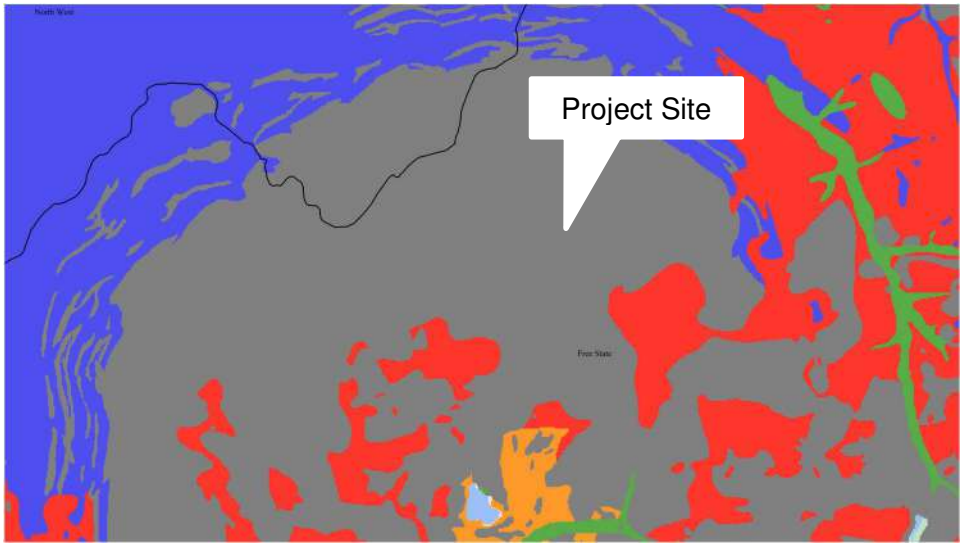
Status Quo

As seen in the 1985 aerial view of the PV Site in **Figure 36** below, the land was historically used for agricultural purposes. According to the Screening Tool relative archaeological and cultural heritage theme, the site has a low sensitivity. The presence of any heritage resources will be confirmed as part of the Heritage Impact Assessment in the EIA Phase. The site falls within 10 km of the Vredefort Dome World Heritage Site.

According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS), the Palaeontological Sensitivity is insignificant or zero, and no palaeontological studies are required (see **Figure 37** below). According to the Screening Tool relative palaeontology theme, the site has a medium and high sensitivity. A desktop Palaeontological Impact Assessment will be

undertaken, however, in order to confirm desktop results (Refer to **Appendix B** for the Screening Tool Report included in the Application Form).

Figure 36: Aerial view of the PV Site dating to 1963



Colour	Sensitivity	Required Action
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required
WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

Figure 37: SAHRIS PalaeoSensitivity Map

Potential Impacts / Implications

- ❑ Construction phase:
  - Possible, but unlikely 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.

Specialist Study Triggered / Additional Investigations

- ❑ The findings of the Heritage Impact Assessment and Palaeontological Impact Assessment will be incorporated into the EIA Report.

11.13 Planning

Status Quo

The following is noted from a planning perspective:

- ❑ The proposed power lines follow existing infrastructure as far as possible.
- ❑ 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.
- ❑ No other renewable energy applications have been made within a 30km radius of the PV Site, according to DFFE's REEA Database (refer to **Section 6.6** above).
- ❑ According to the Ngwathe LM IDP (2022), a key opportunity identified within the municipality is PV power generation.
- ❑ The proposed PV Site is located approximately 8km to the south of a civil aviation aerodrome. 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 with only small portions of the northern section of the site falling within medium sensitivity.

Potential Impacts / Implications

- ❑ Potential incompatibility with planning frameworks to be assessed further during the EIA Phase.

Specialist Study Triggered / Additional Investigations

- ❑ The Applicant will adhere to the regulatory planning requirements pertaining to the Project, as well as to the setbacks and conditions required by authorities.

11.14 Existing Structures and Infrastructure

Status Quo

An existing overhead power line traverses the PV Site (see **Figure 38** below) in a southwest – northeast direction to the existing Eskom Parys Rural Substation, and further lines run between the substation and Parys (see **Figure 39** below). 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 38: North-eastern view of the PV Site showing existing power line

Figure 39: Western view along the R723 (PV Site on left-hand side)

Potential Impacts / Implications

- The Project will need to comply with the requirements of the custodians of infrastructure that traverses the PV Site or run along the boundaries of the sites or are crossed by the power line.

Specialist Study Triggered / Additional Investigations

- Engage further with the owners, custodians and authorities associated with existing infrastructure, including Eskom (amongst others).
- Mitigation measures to be included in the EMPr to manage potential impacts to existing structures and infrastructure.

11.15 Transportation

Status Quo

The Project area is rural in nature. The transportation network in the Project Area is shown in **Figure 40** below. The R723 runs through the Site. The Site falls midway between the N1 (approx. 5.5km to the east) and the R59 (approx. 5.5km to the west).

A railway line runs to the west and north of the site. All other roads in the immediate area are unsurfaced farm roads.

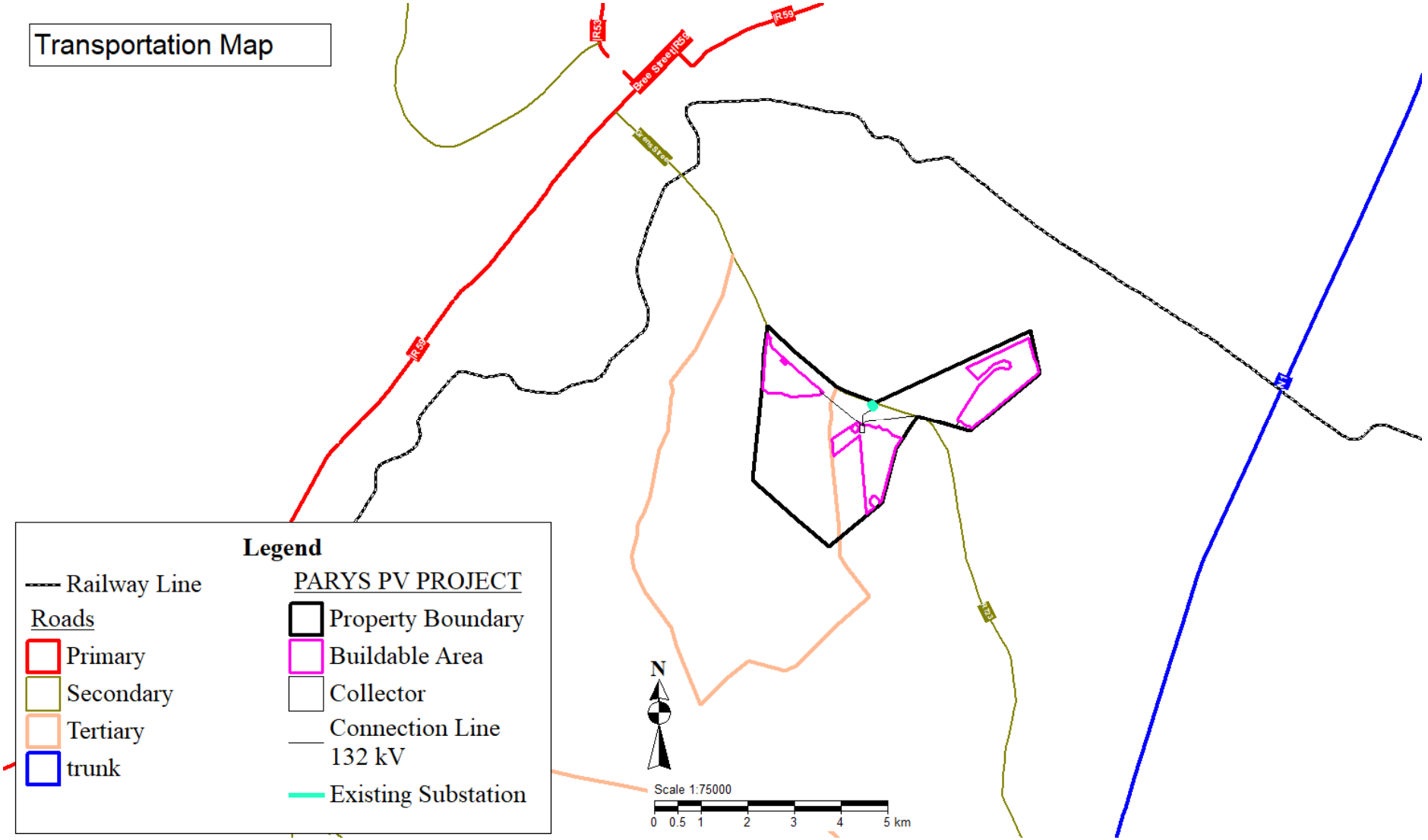


Figure 40: Transportation network

Potential Impacts / Implications

- One of the factors considered in determining the suitability of the Project sites was its accessibility in terms of the existing road network.
- Construction phase:
  - 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 site via the N6 national road.
  - Use of oversized vehicles/abnormal loads, as required.
- Operational phase:
  - Safe access, taking into consideration the high speed environment along the N6.
  - Transportation of maintenance materials, and operational and maintenance staff, to site.

Specialist Study Triggered / Additional Investigations

- The Project will need to comply with the requirements of provincial and national road and transport departments/institutes as necessary for site access.
- Suitable mitigation measures in terms of traffic and the use of roads will be included in the EMPr.

11.16 Health

Status Quo

All health care services are located within the municipal urban nodes of the surrounding areas, most predominantly in Parys. The nearest hospital is the Parys District Hospital to the northwest of the Project Area. The site is largely unserviced, and provision would need to be made for sanitation and water supply.

Potential Impacts / Implications

- Construction phase:
  - 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.

- Operational Phase:
  - Hazards related to operation and maintenance work.
  - Fire and explosion risks during BESS operation.

Specialist Study Triggered / Additional Investigations

- The Project is to comply with the necessary design standards, with appropriate safety considerations taking into consideration factors such as placement criteria, access control to containers, fire and explosion preventative measures, emergency response requirements, etc.
- Health-related risks will be addressed through mitigation measures that will be identified under other environmental features, such as socio-economic environment, surface water, air quality, noise and vibration, climate, as well as best practices included in the EMPr.
- Additional management requirements associated with health will form part of the Project's Occupational Health and Safety System.

12 PUBLIC PARTICIPATION

12.1 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 41** below outlines the public participation process for the upfront Announcement Phase (completed), Scoping Phase (current) and EIA Phase (pending). Note that the dates reflected in the diagram may change due to the dynamic nature of the EIA process.

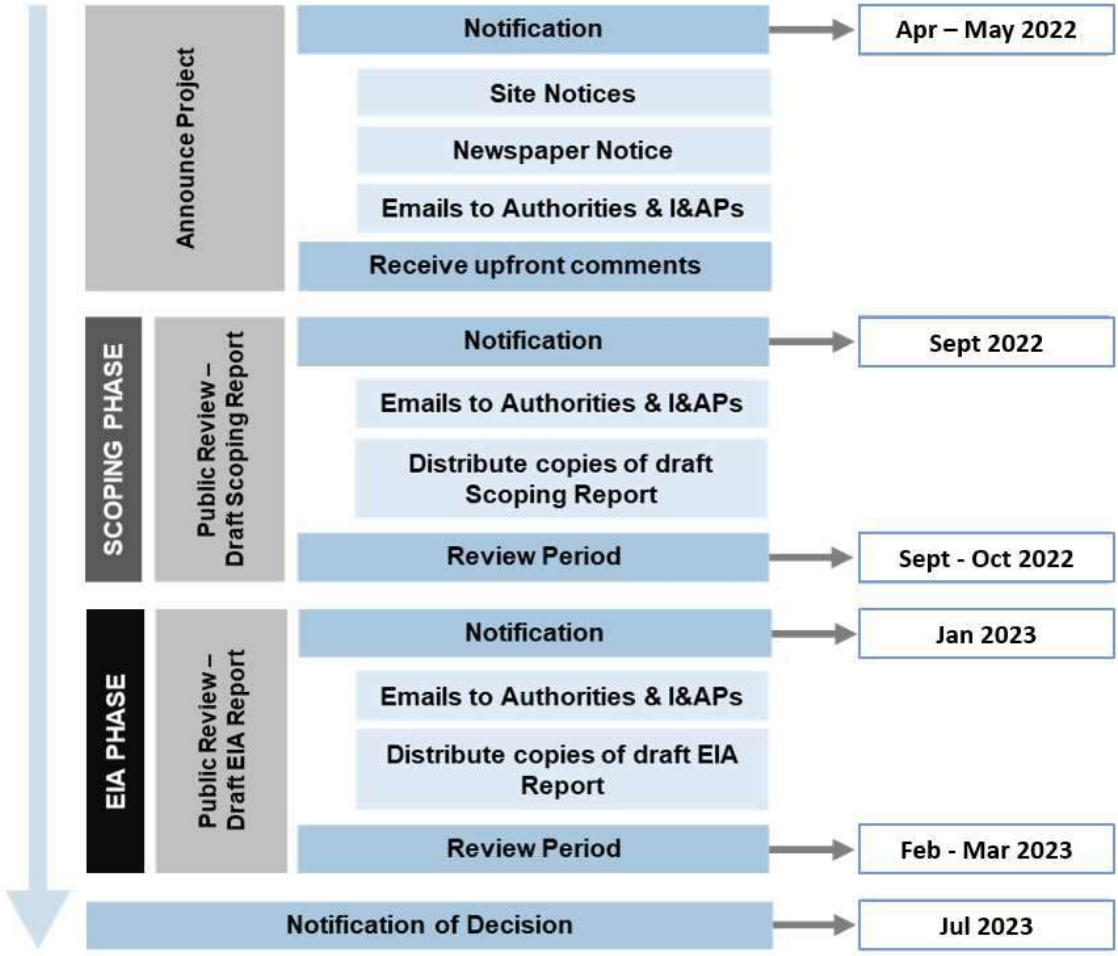


Figure 41: Outline of Public Participation Process (*note: dates are subject to change*)

12.2 Database of I&APs

A database of I&APs, which includes authorities, different spheres of government (national, provincial and local), parastatals, the Ward Councillor, stakeholders, landowners, interest groups and members of the general public, was prepared for the Project and is contained in **Appendix D**. This database will be updated and maintained during the course of the EIA.

12.3 Landowner Consent

According to Regulation 39(1) of the EIA Regulations, if the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an Environmental Authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land. This requirement does not apply *inter alia* for linear developments (e.g. pipelines, power lines, roads) or if it is a SIP as contemplated in the Infrastructure Development Act, 2014.

The written consent of the landowner for the property where the PV Site is proposed is appended to the Application Form, which is included in **Appendix B**.

12.4 Announcement of Project

The Announcement Phase served to obtain upfront comments from I&APs regarding the proposed Project, in order to understand potential concerns and to guide the environmental assessment.

The Project was announced as follows:

- Notices were placed in the Parys Gazette newspaper (refer to copies contained **Appendix E1**);
- Site notices were placed at strategic points within the Project Area (refer to details of the locations and photographs contained in **Appendix E2**); and
- A Background Information Document and Reply Form (contained in **Appendix E3**) were distributed to the I&APs contained in the database.

Copies of comments received during the Announcement Phase are contained in **Appendix E4**.
It should be noted that since the announcement phase the project layout was amended to accommodate environmental sensitivities identified, and as a result the overall capacity of the PV stie has decreased from the initial 360MW proposal to up to 200MW.

12.5 Review of Draft Scoping Report

12.5.1 Period to Review the Draft Scoping Report

In accordance with Regulation 43(1) of the EIA Regulations, I&APs are granted an opportunity to

review and comment on the draft Scoping Report from **09 September until 10 October 2022**.

12.5.2 Notification of Review of Draft Scoping Report

Authorities and I&APs contained in the database were notified via email of the details of the review process. A notice was placed in the Parys Gazette newspaper.

12.5.3 Accessing the Draft Scoping Report

A hardcopy of the draft Scoping Report will be placed at the Parys Municipal Library (41 Phillip St, Parys).

The draft Scoping Report was also uploaded to the following website, for downloading purposes - https://nemai.co.za/environmental/downloadable-documents/

Copies of the Draft Scoping Report will be 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;
- Free State Department of Police, Roads and Transport (DPRT);
- FSHRA;
- Ngwathe LM; and
- Fezile Dabi DM.

A Comment Sheet is provided in **Appendix G**, which can be used to provide comments on the draft Scoping Report.

12.5.4 Public Meeting to Present the Draft Scoping Report

Anyone that has an interest in attending a virtual public meeting will need to inform Nemai Green in writing by 16 September 2022 and will need to provide an email address. Only preregistered parties that confirmed interest will receive an invitation to the virtual public meeting.

12.5.5 Adherence to COVID-19-related Requirements

All I&APs accessing the hardcopy of the draft Scoping Report will need to comply with the prevailing COVID-19-related protocols and requirements, if any.

12.5.6 Comments Received on the Draft Scoping Report

The Scoping Phase serves to identify and prioritise issues for further assessment during the EIA Phase. Accordingly, the comments received from authorities and I&APs during public participation as part of Scoping will be afforded due consideration and further investigation during the pending EIA stage. A Comments and Responses Report will be included in the final Scoping Report, which will summarise the salient issues raised by I&APs and the project team's response.

13 POTENTIALLY SIGNIFICANT ENVIRONMENTAL ISSUES

In accordance with the purpose of the Scoping exercise as part of the overall environmental assessment, this section aims to identify potentially significant environmental issues for further consideration and prioritisation during the EIA stage. This allows for a more efficient and focused impact assessment in the ensuing EIA Phase, where the analysis is largely limited to significant issues and reasonable alternatives. The EMPr that will accompany the EIA Report will, however, provide a comprehensive list of mitigation measures to manage the Project's overall impact to the receiving environment.

13.1 Approach

13.1.1 Predicting Significant Environmental Issues

The potential environmental issues associated with the proposed Project were identified during the Scoping Phase through an appraisal of the following:

- Project-related components and infrastructure;
- Activities associated with the project life-cycle;
- Resources required for construction and operational purposes;
- Nature and profile of the receiving environment and potential sensitive environmental features and attributes (see **Section 11** above);
- Input received during public participation from authorities and I&APs; and
- Legal and policy context (see **Section 5** above).

Apart from explaining the receiving environment, **Section 11** above succinctly discusses possible impacts during primarily the construction and operational phases of the Project. The significant environmental issues were distilled from this information and are summarised in **Section 13.2** below. Cumulative impacts that were identified during the Scoping Phase are presented in **Section 13.3** below.

13.1.2 Mitigation of Impacts

During the EIA Phase a detailed assessment will be conducted to evaluate potentially significant impacts, with input from the project team, requisite specialist studies and I&APs and through the application of the impact assessment methodology contained in **Section 13.4** below.

Suitable mitigation measures will be identified to manage the environmental impacts according to the following hierarchy:

1. Initial efforts will strive to **prevent** the occurrence of the impact;
2. If this is not possible, mitigation will include measures that reduce or **minimise** the significance of the impact to an acceptable level;

3. **Remediation** and **rehabilitation** will take place if measures cannot suitably prevent or reduce the impacts, or to address the residual impacts; and
4. As a last measure, **compensation** will be employed as a form of mitigating the impacts associated with the Project.

The mitigation measures will be incorporated into the EMPr, which will form part of the EIA Report. The EMPr, together with the Environmental Authorisation (if issued), can act as a standalone document that can be used to *inter alia* monitor against compliance of the Project with its pre-determined objectives, targets and management actions.

13.2 Summary of Potentially Significant Environmental Issues

Pertinent environmental issues, which will receive specific attention during the EIA Phase through a detailed quantitative assessment and relevant specialist studies (where deemed necessary), are listed in **Table 10** below.

Table 10: Potentially Significant Environmental Issues for prioritisation during the EIA Phase

Environmental Factor	Construction Phase Potential Issues / Impacts	Operational Phase Potential Issues / Impacts	Investigations / EIA Provisions
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.	▪ Agricultural Impact Assessment. ▪ Social Impact Assessment. ▪ Optimisation of layout to account for land use restrictions. ▪ EMPr.
Geology	▪ Suitability of geological conditions to support the Solar PV Plant.	▪ Suitability of geological conditions to support the Solar PV Plant.	▪ Geotechnical Study. ▪ EMPr.
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.	▪ EMPr
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.	▪ Optimisation of layouts to account for topographical features. ▪ EMPr.
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.	▪ EMPr.
Surface Water	▪ Alteration of drainage over the PV Site.	▪ Sedimentation through silt-laden runoff, caused by inadequate stormwater management.	▪ Aquatic Impact Assessment and Delineation

Environmental Factor	Construction Phase Potential Issues / Impacts	Operational Phase Potential Issues / Impacts	Investigations / EIA Provisions
	▪ 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).	▪ Damage to the PV facility and towers of the power line from major flood events. ▪ 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.	▪ Optimisation of layout to avoid delineated watercourses and their buffers zones. ▪ EMPr.
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.	▪ Terrestrial Ecological Impact Assessment. ▪ Avifaunal Impact Assessment. ▪ Optimisation of layout to avoid sensitive ecological features ▪ EMPr.
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).	▪ EMPr.
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.	▪ EMPr.
Noise	▪ Localised increases in noise may be caused by construction activities.	N/A	▪ EMPr.
Agriculture	▪ Loss of fertile soil through land clearance. ▪ Soil erosion. ▪ Loss of topsoil.	▪ Loss of possible future agricultural land use due to direct occupation by the development footprint.	▪ Agricultural Impact Assessment. ▪ EMPr.

Environmental Factor	Construction Phase Potential Issues / Impacts	Operational Phase Potential Issues / Impacts	Investigations / EIA Provisions
	▪ Risk of harm to livestock from construction activities.	▪ Soil erosion due to inadequate stormwater management.	
Historical and Cultural Features	▪ Possible direct impacts on below-ground archaeological deposits 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.	▪ Heritage Impact Assessment. ▪ EMPr.
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.	▪ Satisfy requirements of infrastructure owners. ▪ EMPr.
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.	▪ EMPr
Aesthetics	▪ Landscape transformation. ▪ Visual impacts associated with construction activities.	▪ Landscape transformation. ▪ Inadequate reinstatement and rehabilitation of construction footprint. ▪ Light pollution. ▪ Glint and glare from PV facility. ▪ High visibility of power lines to visual receptors.	▪ Visual Impact Assessment. ▪ EMPr.
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.	▪ EMPr.

13.3 Cumulative Impacts

13.3.1 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.

13.3.2 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.

Other renewable energy applications within a 30km radius of the Project are discussed in **Section 6.6** above. According to the REEA Database, renewable energy applications have been made for various properties, with the closest located approximately 34km to northwest. Cumulative impacts associated with existing PV facilities is thus not anticipated. However, should further PV developments, or other large-scale developments take place in the area in future, cumulative impacts may be caused by these various developments, including loss of biodiversity and habitat fragmentation, visual and landscape character impacts, traffic disruptions, impacts to civil aviation, as well as pressures on local facilities, goods and services. These impacts in relation to the Project will be assessed in the EIA Report.

13.3.3 The Proposed Project's contribution towards Cumulative Impacts

The following is noted in terms of the Project's potential contribution towards cumulative impacts, which will be assess further during the EIA phase:

- 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 clearance of vegetative cover for the Project's development footprint will exacerbate erosion.
- Cumulative impacts with regards to habitat loss and fragmentation, as well as cumulative risks to protected fauna and flora species.
- The clearance and disturbances associated with the construction phase could lead to cumulative impacts in terms of the proliferation of invasive alien species.
- 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.
- Although the water use associated with the operation of a Solar PV Plant is relatively low, it could contribute towards cumulative impacts on water demand for developments in the area.
- Any developments that may be enabled by the proposed Project may place a strain on local infrastructure and services.
- 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.
- Cumulative effects in terms of the electromagnetic fields may occur as a result of aligning the proposed Project's power line alongside existing high-voltage power lines.

- 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.

13.4 Methodology to Assess the Identified Impacts

The EIA quantitative impact assessment will further focus on the direct and indirect impacts associated with the Project. All impacts will be analysed with regard to their nature, extent, magnitude, duration, probability and significance. The following definitions and criteria apply:

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 South Africa.

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.

14 PLAN OF STUDY FOR EIA

14.1 General

This Plan of Study, which explains the approach to be adopted to conduct the EIA for the proposed Project, was prepared in accordance with Appendix 2 of the EIA Regulations.

14.2 Potentially Significant Environmental Issues identified during Scoping Phase

The Scoping exercise aimed to identify and qualitatively predict potentially significant environmental issues for further consideration and prioritisation. During the EIA stage a detailed quantitative impact assessment will be conducted via contributions from the project team and requisite specialist studies, and through the application of the impact assessment methodology contained in **Section 13.4** above. Suitable mitigation measures will be identified to manage (i.e., prevent, reduce, rehabilitate and/or compensate) the environmental impacts, and will be incorporated into an EMPr.

Pertinent environmental issues identified during Scoping, which will receive specific attention during the EIA Phase, are listed in **Section 13.2** above (construction and operational phases).

14.3 Feasible Alternatives to be assessed during EIA Phase

The EIA Phase will include a detailed comparative analysis of the Project's feasible alternatives that emanated from the Scoping exercise, which will include environmental (with specialist input) and technical evaluations. This will ultimately result in the selection of a BPEO. The feasible alternatives to be assessed in the EIA Phase will include design/layout alternatives (based on the findings of the specialist studies) as well as technology alternatives.

14.4 Specialist Studies

14.4.1 Overview

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 specialist studies 'triggered' by the nature of the proposed development and its receiving environment include the following:

1. Terrestrial Ecological Impact Assessment;
2. Aquatic Impact Assessment & Delineation;

3. Avifaunal Impact Assessment;
4. Heritage Impact Assessment;
5. Agricultural Impact Assessment;
6. Social Impact Assessment;
7. Visual Impact Assessment; and
8. Desktop Palaeontological Impact Assessment.

For the inclusion of the findings of the specialist studies into the EIA Report, the following guideline will be used: *Guideline for the review of specialist input in EIA processes* (Keatimilwe & Ashton, 2005). Key considerations will include:

- 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 environments has been accurately reflected and considered.

14.4.2 Exclusion of Certain 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 National Web Based Environmental Screening Tool, which are appended to the Application Form (contained in **Appendix B**). **Table 11** below lists the specialist studies that were identified in the Screening Report, but which were not deemed to be necessary.

Table 11: 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 map that was created by the Environmental Screening Tool showed low civil aviation sensitivity in terms of the PV Sites, except for a very small portion in the northern part of the PV site that falls in a medium sensitivity. The very northern sections of the Project Area are located approximately 8km from a civil aviation aerodrome. It was not deemed necessary to undertake this study.
Defence Assessment	The map that was created by the Environmental Screening Tool showed that the Project Area has low sensitivity in terms of the relative defence theme. It was thus not deemed necessary to undertake this study.
Radio Frequency Interference (RFI) Assessment	The map that was created by the Environmental Screening Tool showed that the Project Area a low sensitivity in terms of the relative RFI theme. It was thus not deemed necessary to undertake this study.

14.4.3 Terms of Reference

The following general ToR apply to all the EIA specialist studies to be undertaken for the proposed Project:

1. Address all triggers for the specialist studies, based on the findings of the Scoping Phase.
2. Consider the findings of other specialist studies undertaken in the area, as relevant.

3. Address issues raised by I&APs.
4. Ensure that the requirements of the environmental authorities that have specific jurisdiction over the various disciplines and environmental features are satisfied.
5. Approach to include desktop study and site visits, as deemed necessary, to understand the affected environment and to adequately investigate and evaluate salient issues. Indigenous knowledge (i.e., targeted consultation) should also be regarded as a potential information resource.
6. Assess the impacts (direct, indirect and cumulative) in terms of their significance (using suitable evaluation criteria) and suggest suitable mitigation measures. In accordance with the mitigation hierarchy, negative impacts should be avoided, minimised, rehabilitated (or reinstated) or compensated for, whereas positive impacts should be enhanced. A risk-averse and cautious approach should be adopted under conditions of uncertainty.
7. Consider time boundaries, including short to long-term implications of impacts for project life-cycle (i.e. pre-construction, construction, operation and decommissioning).
8. Consider spatial boundaries, including:
    a. Broad context of the proposed project (i.e., beyond the boundaries of the specific site);
    b. Off-site impacts; and
    c. Local, regional, national or global context.
9. The provision of a statement of impact significance for each issue, which specifies whether or not a pre-determined threshold of significance (i.e., changes in effects to the environment which would change a significance rating) has been exceeded, and whether or not the impact presents a potential fatal flaw or not. This statement of significance should be provided for anticipated project impacts both before and after application of impact management actions.
10. Recommend a monitoring programme to implement mitigation measures and measure performance. List indicators to be used during monitoring.
11. Appraisal of alternatives (including the no-go option) by identifying the BPEO with suitable justification.
12. Engage with other specialists whose studies may have bearing on your specific investigation.
13. Present findings and participate at public meetings, as necessary.
14. Information provided to the EAP needs to be signed off.
15. Sign a declaration stating independence.
16. The appointed specialists must take into account the policy framework and legislation relevant to their particular studies.
17. All specialist reports must adhere to Appendix 6 of the EIA Regulations or to the Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes (GN No. 1150 in Government Gazette No. 43855 of 30 October 2020), as relevant.

14.4.4 Terms of Reference – Specific

14.4.4.1 Aquatic Impact Assessment and Delineation

Summary of Key Issues & Triggers Identified During Scoping

- Impacts posed by the Project's infrastructure to surface water, including encroachment of construction activities into watercourses and their buffer zones.

Approach

- Undertake desktop study (literature review, topographical maps and aerial photographs) and baseline aquatic survey and describe affected aquatic environments/watercourses within the Project Area.
- Determine ecological status of the receiving aquatic environment, including the identification of endangered or protected species.
- Delineate riparian habitat and all wetlands in accordance with the guideline: *A practical field procedure for identification and delineation of wetlands and riparian areas* (DWAF, 2005) (or any prevailing guidelines prescribed by DWS). This includes assessing terrain, soil form, soil wetness and vegetation unit indicators to delineate permanent, seasonal and temporary zones of the wetlands. Allocate conservation buffers from the outer edge of the temporary zones of the wetlands.
- Provide a concise description of the importance of the affected aquatic environments/watercourses in terms of pattern and process, ecosystem goods and services, as appropriate.
- Assess impacts of proposed Project to aquatic environments/watercourses.
- Provide suitable mitigation measures to protect the aquatic ecosystems during the project life-cycle.
- Recommend monitoring programme and indicators for the project life-cycle, where findings from the survey would serve as baseline data.

Nominated Specialist

Organisation:	The Biodiversity Company
Name:	A. Husted
Qualifications:	MSc Aquatic Health
No. of years' experience:	13
Affiliation (if applicable):	South African Council for Natural Scientific Professions (SACNASP) Professional Natural Scientist (Registration No.: 400213/11)

14.4.4.2 Terrestrial Ecological Impact Assessment

Summary of Key Issues & Triggers Identified During Scoping

- Location of the Project's footprint within sensitive terrestrial ecological areas, included CBA1 (along power line route) and Bloemfontein Dry Grassland (listed as a VU).
- The potential loss of significant flora and fauna species, as well as habitat loss and fragmentation.

- Proliferation of invasive alien species, which could spread beyond the construction domain.

Approach

- Undertake baseline survey and describe affected environment within the Project's footprint from a biodiversity perspective.
- Take into consideration the provincial conservation goals and targets.
- Assess the current ecological status and the conservation priority of the Project Area. Provide a concise description of the importance of the affected area to biodiversity in terms of pattern and process, ecosystem goods and services, as appropriate.
- Identify protected and conservation-worthy species. Prepare a terrestrial ecological sensitivity map with the use of GIS, based on the findings of the study.
- Assess impacts to fauna and flora. Consider cause-effect-impact pathways for assessing impacts to biodiversity related to the Project.
- Comply with specific requirements and guidelines of DFFE and DESTEA.
- Consider the Free State Biodiversity Plan (2015) and other relevant policies, strategies, plans and programmes.

Nominated Specialist (to be reviewed by an external specialist)

Organisation:	The Biodiversity Company
Name:	J. Jacobs; C. Burger; A. Husted
Qualifications:	MSc Applied Science; BSc Hons; MSc Aquatic Health
No. of years' experience:	14
Affiliation (if applicable):	SACNASP Professional Natural Scientist (Registration No.: (400018/17)

14.4.4.3 Avifaunal Impact Assessment

Summary of Key Issues & Triggers Identified During Scoping

- Potential impacts to avifaunal species of conservation concern.

Approach

- Comply with the Birdlife SA Guideline: "Birds and Solar Energy Best Practice Guidelines, 2017".
- Undertake baseline survey and describe affected environment within the Project's footprint from an avifauna biodiversity perspective.
- Identify protected and conservation-worthy avifaunal species. Prepare an avifaunal sensitivity map with the use of GIS, based on the findings of the study.
- Assess impacts to avifauna. Consider cause-effect-impact pathways for assessing impacts to avifauna related to the Project.
- Comply with specific requirements and guidelines of DFFE and DESTEA.
- Consider the FS Biodiversity Plan (2015) and other relevant policies, strategies, plans and programmes.

Nominated Specialist

Organisation:	The Biodiversity Company
Name:	T. Clark
Qualifications:	MSc Zoology
No. of years' experience:	10
Affiliation (if applicable):	SACNASP Professional Natural Scientist (Registration No.: 121338)

14.4.4.4 Heritage Impact Assessment

Summary of Key Issues & Triggers Identified During Scoping

- Potential occurrence of heritage resources, graves and structures older than 60 years within the Project's footprint.

Approach

- Undertake a Heritage Impact Assessment in accordance with the NHRA.
- Identify and map all heritage resources in the area affected, as defined in Section 2 of the NHRA, including archaeological sites on or close (within 100 m) of the proposed developments.
- Assess the significance of such resources in terms of the heritage assessment criteria as set out in the regulations.
- Assess the impacts of the Project on such heritage resources.
- Prepare a heritage sensitivity map (GIS-based), based on the findings of the study.
- Identify heritage resources to be monitored.
- Comply with specific requirements and guidelines of FSHRA and SAHRA.

Nominated Specialist

Name:	J. van Schalkwyk
Qualifications:	D Litt et Phil
No. of years' experience:	40
Affiliation (if applicable):	Association for Southern African Professional Archaeologists (ASAPA) Registration No.: 168

14.4.4.5 Desktop Palaeontological Impact Assessment

Summary of Key Issues & Triggers Identified During Scoping

- ❑ According to the PalaeoMap of the SAHRIS, the Palaeontological Sensitivity of the Project Area is very high.

Approach

- ❑ Detect the presence of fossil material within the proposed development footprint.
- ❑ Evaluate the impact of the development on palaeontological resources.
- ❑ Identify mitigation measures to safeguard palaeontological resources, as relevant.

Nominated Specialist

Organisation:	Banzai Environmental (Pty) Ltd
Name:	E. Butler
Qualifications:	MSc Palaeontology
No. of years' experience:	24
Affiliation (if applicable):	Palaeontological Society of South Africa

14.4.4.6 Agricultural Impact Assessment

Summary of Key Issues & Triggers Identified During Scoping

- ❑ Loss of agricultural land with high land capability due to direct occupation by the development footprint.
- ❑ Loss of fertile soil.
- ❑ Soil erosion due to inadequate stormwater management.

Approach

- ❑ Determine agricultural potential in the Project's footprint.
- ❑ Determine impacts of the Project from an agricultural perspective.
- ❑ Suggest suitable mitigation measures to address the identified impacts.

Nominated Specialist

Name:	Dr A. Gouws
Qualifications:	PhD Integrated Land Use Modelling
No. of years' experience:	29
Affiliation (if applicable):	❑ Council of Natural Sciences.No:400036/93, Category: Agricultural sciences. ❑ Member of the Soil Science Society of South Africa

14.4.4.7 Social Impact Assessment

Summary of Key Issues & Triggers Identified During Scoping

- Social impacts associated with the Project.

Approach

- Collect baseline data on the current socio-economic environment.
- Assess social impacts (positive and negative) of the Project.
- Undertake a thorough review of the minutes of public meetings and the Comments and Responses Report.
- Suggest suitable mitigation measures to address the identified social impacts.
- Make recommendations on preferred options from a social perspective.

Nominated Specialist

Organisation:	Nemai Green
Name:	C. Chidley
Qualifications:	BA (Economics); BSc Eng (Civil); MBA
No. of years' experience:	12
Affiliation (if applicable):	N/A

14.4.4.8 Visual Impact Assessment

Summary of Key Issues & Triggers Identified During Scoping

- Visual impacts associated with landscape transformation and the proposed Solar PV Plant.
- Potential impacts during operational phase:

Approach

- Determine the visibility of the proposed Project's components. This analysis should also take into account the existing visual characteristics of the Project Area in relation to the surrounding areas as well as whether or not the Project is compatible with the visual characteristics of the area.
- Determine the specific aesthetic implications of the project, by considering:
  - Visual distance/observer proximity to the facility;
  - Viewer incidence/viewer perception;
  - Visual Absorption Capacity of the landscape; and
  - Visual Impact Index.
- Suggest suitable mitigation measures to address the identified impacts.

Nominated Specialist

Organisation:	SAS Environmental Group of Companies
Name:	N. Breitenbach
Qualifications:	BSc Geography
No. of years' experience:	10 years
Affiliation (if applicable):	SACNASP

14.5 Public Participation – EIA Phase

14.5.1 Updating the Database of I&APs

The database of I&APs will be updated as and when necessary during the course of the EIA.

14.5.2 Review of Draft EIA Report

A 30-day period will be provided to authorities and I&APs to review the draft EIA Report. A hardcopy of the document will be lodged for public review at the Parys Municipal Library.
An electronic copy will be uploaded to the following website for downloading purposes https://nemai.co.za/environmental/downloadable-documents/.

Copies of the draft EIA Report will be provided to the regulatory and commenting authorities listed in **Section 12.5.3** above.

All parties on the I&APs database will be notified via email, post or SMS of the opportunity to review the draft EIA Report, how to access the report, the review period and the process for submitting comments.

All comments received from authorities and I&APs and the responses thereto will be included in the final EIA Report, which will be submitted to DFFE.

14.5.3 Public Meeting

It will be determined whether a public meeting based on the feedback received from I&APs.

14.5.4 Comments and Responses Report

A Comments and Responses Report will be compiled and included in the EIA Report, which will record the date that issues were raised, a summary of each issue, and the response of the team to address the issue.

In addition, any unattended comments from the Scoping Phase or where the status of the previous responses has changed, will also be addressed in the Comments and Responses Report for the EIA Phase.

14.5.5 Notification of DFFE's Decision

Registered I&APs will be notified in writing of DFFE's decision and of the appeal process, in accordance with the National Appeal Regulations, 2014.

14.6 EIA Report

The EIA Report will contain the information that is necessary for DFFE to consider and come to a decision on the application. As a minimum, the EIA Report will contain the information stipulated in Appendix 3 of the EIA Regulations.

The following critical components of the EIA Report are highlighted:

- A description of the policy and legislative context;
- A detailed description of the proposed development (full scope of activities);
- A detailed description of the proposed development site, which will include a plan that locates the proposed activities applied for as well as the associated structures and infrastructure;
- A description of the environment that may be affected by the activity and the manner in which physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed development;
- The methodology of the stakeholder engagement process;
- The Comments and Responses Report and I&APs Database will be appended to the EIA Report;
- A description of the need and desirability of the proposed development and the identified potential alternatives to the proposed activity;
- A summary of the methodology used in determining the significance of potential impacts;
- A description and comparative assessment of the project alternatives;
- A summary of the findings of the specialist studies;
- A detailed assessment of all identified potential impacts;
- A list of the assumptions, uncertainties and gaps in knowledge;
- An Environmental Impact Statement;
- Any aspects which were conditional to the findings of the assessment either by the EAP or specialists which are to be included as conditions of authorisation;
- 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;
- An EMPr that complies with Appendix 4 of the EIA Regulations;
- Copies of all specialist reports will be appended to the EIA Report; and
- Any further information that will assist DFFE during decision making.

14.7 Authority Consultation

The EIA Phase will only commence if DFFE accepts the Scoping Report and the Plan of Study for the EIA. If relevant, the necessary revisions will be made if requested by this Department.

An authorities meeting will be scheduled during the EIA public participation process to present the draft EIA Report and salient findings from the EIA Phase. In addition, copies of the draft EIA Report will be provided to the regulatory and commenting authorities listed in **Section 12.5.3** above.

The Final EIA Report will be submitted to DFFE. Any requested amendments will be discussed with the Department to ensure that their queries are adequately and timeously attended to.

For the remainder of the Scoping and EIA process, DFFE will be engaged with as follows:

- Submit the final Scoping Report to the Department;
- Meet with designated DFFE Environmental Officer to explain the Project and arrange a site visit (if required by DFFE);
- Address comments on the final Scoping Report;
- Arrange an authorities' meeting during the EIA Phase;
- Submit the draft EIA Report to the Department;
- Address comments on the draft EIA Report;
- Obtain a decision; and
- Notify I&APs of the appeal process through DFFE's Appeals Unit.

14.8 EIA Timeframes

Table 12 below presents the proposed timeframes for the EIA process. *Note that these dates are subject to change as the EIA process unfolds*.

Table 12: EIA Timeframes
(Note: dates may change during the course of the EIA)

EIA Milestone	Start	Finish
Submit Application Form and Draft Scoping Report to DFFE	08/09/2022	
Review of Draft Scoping Report by Authorities & I&APs	09/09/2022	10/10/2022
DFFE Review and Decision	17/10/2022	30/11/2022
Review of Draft EIA Report by Authorities & I&APs	02/02/2023	07/03/2023
Submit Final EIA Report & EMPr to DFFE	15/03/2023	
DFFE Review and Decision	16/03/2022	30/06/2023

15 CONCLUSION

The scope of an environmental assessment is defined by the range of issues and alternatives it considers, the nature of the receiving environment, and the approach towards the assessment.

Key outcomes of the Scoping Phase for the proposed Solar PV Plant and power line are as follows:

- Alternatives for achieving the objectives of the proposed activity were considered;
- Potentially significant issues pertaining specifically to the pre-construction, construction and operational phases of the Project were identified;
- Sensitive features of the environment that may be affected by the Project were identified;
- Stakeholders were identified and notified of the review of the draft Scoping Report;
- A Plan of Study was developed to explain the approach to be adopted during the EIA Phase; and
- The scoping exercise set the priorities for the ensuing EIA Phase.

No fatal flaws were identified in terms of the proposed activities and the receiving environment that would prevent the environmental assessment from proceeding beyond the Scoping Phase. It is the opinion of the EIA team that Scoping was executed in an objective manner and that the process and report conform to the requirements of Regulation 21 and Appendix 2 of the EIA Regulations, respectively. It is also believed that the Plan of Study for EIA is comprehensive and will be adequate to address the significant issues identified during Scoping, to select the BPEO, and to ultimately allow for informed decision-making.

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APPENDICES