SCOPING REPORT

Draft – 22 May 2023

THE DEVELOPMENT OF THE BONSMARA SOLAR POWER PLANT NEAR CARLETONVILLE, GAUTENG PROVINCE

ENVIRONAMICS

PROJECT DETAIL

DFFE Reference No.	:	To be confirmed
Project Title	:	The development of the Bonsmara Solar Power Plant Near Carletonville, Gauteng Province
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Reviewed	:	Mrs. Carli van Niekerk
Client	:	Bonsmara Solar Power Plant (Pty) Ltd
Report Status	:	Draft Scoping Report
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GLOSSARY OF TERMS AND ACRONYMS

BA	Basic Assessment
BAR	Basic Assessment Report
CEA	Cumulative Effects Assessment
DFFE	Department of Forestry, Fisheries and the Environment
DM	District Municipality
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EP	Equator Principles
EPFI	Equator Principles Financial Institutions
Environmental impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects.
GNR	Government Notice Regulation
I&AP	Interested and affected party
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
IRP	Integrated Resource Plan
kV	Kilo Volt
LM	Local Municipality
Mitigate	Activities designed to compensate for unavoidable environmental damage.
MW	Megawatt
NEMA	National Environmental Management Act No. 107 of 1998
NERSA	National Energy Regulator of South Africa
NWA	National Water Act No. 36 of 1998
PAOI	Project Area of Influence
PPP	Public Participation Process

PV	Photovoltaic
QDS	Quarter Degree Square
REIPPP	Renewable Energy IPP Procurement Process
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework
SPP	Solar Power Plant
VU	Vegetation Unit

CONTEXT FOR THE DEVELOPMENT

According to Eskom, the demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand, fueled by increasing economic growth and social development, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmentally responsible development, the impacts of climate change and the need for sustainable development. The use of renewable energy technologies, as one of a mix of technologies needed to meet future energy consumption requirements is being investigated as part of the national Department of Mineral Resources and Energy's (DMRE) (previously referred to as the Department of Energy) long-term strategic planning and research process.

The primary rationale for the proposed solar photovoltaic (PV) facility is to add new generation capacity from renewable energy to the national electricity mix and to aid in achieving the goal of 42% share of all new installed generating capacity being derived from renewable energy forms, as targeted by DMRE (Integrated Resource Plan Update 2010-2030). The IRP also identifies the preferred generation technologies required to meet the expected demand growth up to 2030 and incorporates government objectives including affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources and localisation and regional development. In terms of the Integrated Resource Plan Update (2019 IRP Update, 2010-2030), over the short term (of the next two or three years), clear guidelines arose; namely to continue with the current renewable bid programme with additional annual rounds of 1000 MW PV, with approximately 8.4GW of the renewable energy capacity planned to be installed from PV technologies over the next twenty years.

The proposed project is intended to form part of the Department of Mineral Resources and Energy's (DMREs) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme or any other programmes/opportunities to generate power in South Africa. The REIPPP Programme aims to secure 14 725 Megawatts (MW) of new generation capacity from renewable energy sources, while simultaneously diversifying South Africa's electricity mix. According to the 2021 State of the Nation Address, Government will soon be initiating the procurement of an additional 11 800 MW of power from renewable energy, natural gas, battery storage and coal in line with the Integrated Resource Plan 2019 and fulfilling their commitments under the United Nations Framework Convention on Climate Change and its Paris Agreement which include the reduction of greenhouse gas emissions. Eskom, our largest greenhouse gas emitter, has committed in principle to net zero emission by 2050 and to increase its renewable capacity.

In response to the above, Bonsmara Solar Power Plant (RF) (Pty) Ltd is proposing the development of a photovoltaic solar facility and associated infrastructure (including grid connection infrastructure) for the purpose of commercial electricity generation on an identified site located on the Farm Leeuwpan No. 697, Registration Division IQ, Gauteng Province situated within the Merafong Local Municipality area of jurisdiction (refer to Figure A for the locality map). From a regional site selection perspective, this region is preferred for solar energy development due to its global horizontal irradiation value of around 2118 kwh/m^2.

The project entails the generation of up to 250 MW electrical power through photovoltaic (PV) technology. The total development footprint of the project will approximately be 500 hectares process (including supporting infrastructure on site) within the 4272 hectares assessed as part of the Environmental Impact Assessment process. Based on the environmental constraints identified on the project site, it is anticipated that the development footprint of the PV facility (including supporting infrastructure) will be reconfigured to allow for the avoidance of sensitive environmental features.

The Bonsmara Solar Power Plant forms a part of the Pluto PV cluster comprising a total of four (04) proposed PV facilities located on the same property. Each solar PV facility is concurrently undergoing individual S&EIR processes.

EXECUTIVE SUMMARY

Like many other developing municipalities in the country, the Merafong City Local Municipality faces a number of challenges in addressing the needs of sustainable growth and providing quality services (IDP, 2020-2021). The Merafong City Local Municipality, IDP (2020/2021), has identified specific issues that require special attention including but not limited to poverty; job creation; unemployment; and inequalities.

The Merafong City Local Municipality does not regard the development of an IDP as the only requirement prevailing legislation. Therefore, there are specific reasons why the municipality should prepare the IDP. One of the main reasons is that developmental responsibilities have been prescribed by the Constitution, which is aimed at ensuring quality for the life of the municipality's residents. The responsibility does not only relate to the provision of basic services, but also include job creation as well as the promotion of accountability and eradication of poverty within the municipality (IDP, 2020/21). The IDP considers the economic structure and performance and how the municipality relies heavily on the agricultural and mining sector and the general decline of the sector. It indicates that alternative sectors to the declining sectors of the area needs to be explored, which includes the renewable energy sector.

Bonsmara Solar Power Plant (RF) (Pty) Ltd intends to develop a 250 MW photovoltaic solar facility and associated infrastructure on the Farm Leeuwpan No. 697, Registration Division IQ, Gauteng Province situated within the Merafong City Local Municipality and West Rand District Municipality area of jurisdiction. The town of Carletonville is located approximately 17 km south of the proposed development (refer to Figure A and B for the locality and regional map). The total development footprint of the project will approximately be 500 hectares process (including supporting infrastructure on site) within the 4272 hectares assessed as part of the Environmental Impact Assessment process. The site was identified as being highly desirable due to its suitable climatic conditions, topography (i.e., in terms of slope), environmental conditions (i.e., low agricultural potential, low ecological sensitivity and archaeology), proximity to a grid connection point (i.e., for the purpose of electricity evacuation), as well as site access via a main road (i.e., to facilitate the movement of machinery, equipment, infrastructure and people during the construction phase).

In terms of the National Environmental Management Act (Act 107 of 1998), with specific reference to Sections 24 and 24D, as read with GNR 324-327, as amended (2017), Environmental Authorisation is required for the Bonsmara Solar Power Plant. The following listed activities have been identified with special reference to the proposed development and are listed in the EIA Regulations (as amended):

- Activity 11(i) (GN.R. 327): *"The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."*
- Activity 12(ii)(c) (GN.R. 327): "*The development of (ii) infrastructure or structures with a physical footprint of 100 square metres or more; (c) within 32 meters of a watercourse measured from the edge of a watercourse."*

- Activity 24 (ii) (GN.R. 327): *"The development of a road (ii) with reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters."*

- Activity 28(ii) (GN.R. 327): *"Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."*

- Activity 56 (ii) (GN.R 327): "*The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres…"*

- Activity 1 (GN.R. 325): *"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more..."*

- Activity 15 (GN.R. 325): *"The clearance of an area of 20 hectares or more of indigenous vegetation..."*

- Activity 4 (c)(iv) (GN.R 324): "*The development of a road wider than 4 metres with a reserve less than 13,5 metres within (c) the Gauteng province, (iv) Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans."*

- Activity 10 (c)(iv) (GN.R 324): *"The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres (c) the Gauteng province, (iv) Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans."*

- Activity 12 (c)(ii) (GN.R 324): *"The clearance of an area of 300 square metres or more of indigenous vegetation (c) in the Gauteng Province, (ii) within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans."*

- Activity 14(ii)(c)(c)(iv) (GN.R 324): "*The development of (ii) infrastructure or structures with a physical footprint of 10 square metres or more, where such development occurs (c) within 32 metres of a watercourse, measured from the edge of a watercourse, c) within the Gauteng Province, within (iv) sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans."*

- Activity 18 (c)(iv) (GN.R 324): *"The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre (c) in the Gauteng Province within (iv) sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans."*

Activities required for the development of the solar facility which are listed under Listing Notice 1, 2 and 3 (GNR 327, 325 and 324) implies that the development could potentially have an impact on the environment that will require mitigation. Subsequently a 'thorough assessment process' is required as described in Regulations 21-24 of the EIA Regulations in order to obtain Environmental Authorisation. Environamics has been appointed as the independent consultant to undertake the Scoping and Environmental Impact Reporting (S&EIR) on behalf of Bonsmara Solar Power Plant (Pty) Ltd.

Regulation 21 of the EIA Regulations requires that a scoping report must contain the information set out in Appendix 2 of the Regulations or comply with a protocol or minimum information requirements relevant to the application as identified and gazetted by the Minister in a government notice. Appendix 2 of GNR326 requires that information which is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process undertaken be set out in the scoping report.

The potentially sensitive areas which have been identified through the environmental scoping study are detailed in the chapters to follow. The scoping phase provides a high-level overview of the sensitivity on the Bonsmara Solar Power Plant project site. The detail is based on the desktop review of available baseline information for the project site, as well as the sensitivity data received from specialist studies undertaken during the scoping phase. During the scoping phase, the affected area was investigated in sufficient detail in order to provide reliable insight into the potential for constraining factors on the site. The sensitivity map/s must be used as a tool by the developer to avoid any areas flagged to be of higher risk or sensitivity, which must in turn inform the development layout that will be further investigated during the EIA Phase in order to develop an environmentally suitable, reasonable and practical facility layout for the Bonsmara Solar Power Plant.

Based on the high-level assessments undertaken to inform this scoping process, it has been predicted that the proposed development will have a net positive impact for the area and will subsequently ensure the optimal utilisation of resources and land. All negative environmental impacts can be effectively mitigated through the recommended mitigation measures and no residual negative impacts are foreseen. The potentially most significant environmental impacts associated with the development, as identified in this scoping phase, are briefly summarised below.

It must be noted that the Environmental Impact Assessment (EIA) phase of the project will consider the impacts on a more detailed level and provide feedback on the facility layout for the proposed project.

<u>Predicted impacts during the construction phase:</u>

During the construction phase minor negative impacts are foreseen over the short term. The latter refers to a period of 18-24 months. The potentially most significant impacts relate to habitat destruction caused by clearance of vegetation and socio-economic impacts such as the creation

of direct and indirect employment opportunities, economic multiplier effects from the use of local goods and services and temporary increase in traffic disruptions and movement patterns.

Predicted impacts during the operational phase:

During the operational phase the site will serve as a solar PV energy facility and the potential impacts will take place over a period of 20 – 25 years. The negative impacts are generally associated with habitat destruction caused by clearance of vegetation, displacement of priority avian species from important habitats, collision and electrocutions of avifauna and visual impact of sensitive visual receptors located within a 500m radius of the proposed development and powerline. The provision of sustainable services delivery also needs to be confirmed. The operational phase will have a direct positive impact through the creation of employment opportunities and skills development, development of non-polluting, renewable energy infrastructure and contribution to economic development and social upliftment.

Predicted impacts during the decommissioning phase:

The negative impacts generally associated with the decommissioning phase include: habitat destruction caused by clearance of vegetation and the loss of permanent employment. However, skilled staff will be eminently employable and a number of temporary jobs will also be created in the process. It is not expected that the facility will be decommissioned, but rather that the technology used will be upgraded.

Cumulative impacts:

Cumulative impacts could arise as other similar projects are constructed in the area. According to the Department of Forestry, Fisheries and Environment database six (06) other solar plants have been proposed in relatively close proximity to the proposed activity.

The potential for cumulative impacts may therefore exist. The Draft Scoping Report includes an assessment of the potential cumulative impacts associated with the proposed development. Potential cumulative impacts with a significance rating of negative medium during the construction phase relate to: habitat destruction and fragmentation, impact on the characteristics of the watercourse, displacement of priority avian species from important habitats, loss of important avian habitats, impacts of employment opportunities, business opportunities and skills development and impact associated with large-scale in-migration of people. Cumulative impacts during the operational phase relate to: habitat destruction and fragmentation, impacts on the characteristics of the watercourse and visual intrusion. The cumulative effect of the generation of waste was identified as being potentially significant during the decommissioning phase.

Regulation 23 of the EIA Regulations determine that an EIA report be prepared and submitted for the proposed activity after the competent authority approves the final scoping report. The EIA report will evaluate and rate each identified impact and identify mitigation measures that may be required. The EIA report will contain information that is necessary for the competent authority to consider the application for Environmental Authorisation and to reach a decision contemplated in Regulation 24 of the EIA Regulations.

1 INTRODUCTION

This section aims to introduce the Scoping Report and specifically to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (...) must include- (a) details of:
(i) the EAP who prepared the report; and
(ii) the expertise of the EAP, including a curriculum vitae.

1.1 LEGAL MANDATE AND PURPOSE OF THE REPORT

The National Environmental Management Act identifies listed activities (in terms of Section 24) which are likely to have an impact on the environment. These activities cannot commence without obtaining an Environmental Authorisation (EA) from the relevant competent authority, the Department of Forestry, Fisheries and the Environment (DFFE). Sufficient information is required by the competent authority to make an informed decision and the project is therefore subject to an environmental assessment process which can be either a Basic Assessment Process or a full Scoping and Environmental Impact Assessment process.

The Listing Notices 1, 2 and 3 (GNR 327, 325 and 324) outline the activities that may be triggered and therefore require EA. This implies that the development is considered as potentially having a significant impact on the environment. Subsequently a 'thorough S&EIA assessment process' is required as described in Regulations 21-24. A detailed description of the listed activities that are triggered are included in chapter 2 to follow. According to Appendix 2 of Regulation 326 the objective of the scoping process is to, through a consultative process:

- Identify the relevant policies and legislation relevant to the activity;
- Motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- Identify and confirm the preferred activity and technology alternative through an identification of impacts and risks and ranking process of such impacts and risks;
- Identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of identification of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- Identify the key issues to be addressed in the assessment phase;
- Agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred

site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and

- Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

This Draft Scoping Report has been submitted to the DFFE for review and comment. According to Regulation 326 all registered I&APs and relevant State Departments (including Organs of State) must be allowed the opportunity to review and provide comment on the scoping report. The Draft Scoping Report has been made available to I&APs and all relevant State Departments. They have been requested to provide written comments on the report within 30 days of receiving it. All issues to be identified and comments received during the review period will be documented and compiled into a Comments and Response Report to be included as part of this Final Scoping Report. Where comments have been received prior to the release of the Draft Scoping Report for the 30-day review and comment period, these comments have been included in Appendix C5 and C6 and has also been included and responded to in the Comments and Responses Report (Appendix C7).

1.2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Environamics was appointed by the applicant as the independent EAP to conduct the EIA and prepare all required reports. All correspondence to the EAP can be directed to:

Contact person: Mr. Herman Alberts

EAPASA Registration: 2019/1328

Postal Address: 14 Kingfisher Street, Tuscany Ridge Estate, Potchefstroom, 2531

Telephone: 063 685 2093 (Cell)

Electronic Mail: herman@environamics.co.za

And/or

Contact person: Christia van Dyk

Postal Address: 14 Kingfisher Street, Tuscany Ridge Estate, Potchefstroom, 2531

Telephone: 078 470 5252 (Cell)

Electronic Mail: christia@environamics.co.za

Regulation 13(1)(a) and (b) determines that an independent and suitably qualified and experienced EAP should conduct the S&EIR process. In terms of the independent status of the EAP a declaration is attached as Appendix A to this report. The expertise of the EAP responsible for conducting the S&EIR process is also summarized in the curriculum vitae included as part of Appendix A.

1.3 DETAILS OF SPECIALISTS

Table 1.1 provides information on the specialists that have been appointed as part of the S&EIR process. Regulation 13(1)(a) and (b) determines that an independent and suitably qualified, experienced and independent specialist should conduct the specialist study, in the event where the specialist is not independent, a specialist should be appointed to externally review the work of the specialist as contemplated in sub regulation (2), must comply with sub regulation 1. In terms of the independent status of the specialists, their declarations are attached as Appendix E to this report. The expertise of the specialists is also summarized in their respective reports.

Table 1.1: Details of specialists

Study	Prepared by	Contact Person	Postal Address	Tel	e-mail
Geotechnical Feasibility Assessment (*to be included in the EIA Report*)	To be Confirmed	-	-	-	-
Avifaunal Impact Assessment	The Biodiversity Company	Andrew Husted	-	Cell: 081 319 1225	info@thebiodiversitycompany.com
Terrestrial Biodiversity, and Wetland Impact Assessments	The Biodiversity Company	Marnus Erasmus / Andrew Husted	-	Cell: 081 319 1225	info@thebiodiversitycompany.com
Heritage Impact Assessment	CTS Heritage	Jenna Lavin	34 Harries Street, Plumstead, Cape Town, 7800	Cell: 083 619 0854	jenna.lavin@ctsheritage.com
Paleontological Impact Assessment					
Soil and Agricultural Impact Assessment	The Biodiversity Company	Andrew Husted	-	Cell: 081 319 1225	info@thebiodiversitycompany.com
Visual Impact Assessment	Donaway Environmental Consultants	Johan Botha	30 Fouche Street Steynsrus, 9515	Tel: 082 316 7749	johan@donnaway.co.za
Social Impact Assessment	Donaway Environmental Consultants	Johan Botha	30 Fouche Street Steynsrus, 9515	Cell: 082 493 5166	johan@donnaway.co.za
Transport Impact Assessment Study	BVi CONSULTING ENGINEERS	AJ Tarrant	Edison Square c/o Edison Way & Century Avenue Century City 7441		adriant@bviwc.co.za

1.4 STATUS OF THE EIA PROCESS

The EIA process is conducted strictly in accordance with the stipulations set out in Regulations 21-24 of Regulation No. 326. Table 1.2 provides a summary of the EIA process and future steps to be taken. It can be confirmed that to date:

- A pre-application meeting request was submitted to DFFE on 19 May 2023.
- It was then confirmed that a pre-application meeting is not required via email dated 21 May 2023.
- A newspaper advertisement was placed in the Carletonville Herald on 19 March 2023, informing the public of the EIA process and for the public to register as I&APs.
- A site visit was conducted by the EAP on 28 February 2023.
- Site notices were erected on site on 28 February 2023 informing the public of the commencement of the EIA process.
- The Background Information Document (BID) was circulated to all I&APs and surrounding landowners on 13 March 2023.
- An application form and the draft Scoping Report has been submitted to DFFE on 22 May 2023.
- The draft Scoping Report has been made available for a 30-day review and comment period from 22 May 2023 – 22 June 2023.

It is envisaged that the Final Scoping Report will be submitted to the Department in June/July 2023 and that the Final Scoping Report will be accepted by the Department in August 2023. The S&EIR process should be completed within approximately nine months of submission of the Draft Scoping Report, i.e., by March 2024 – see Table 1.2.

Table 1.2: Estimated timeframe for completion of the 'scoping and EIA process'

Activity	Prescribed timeframe	Timeframe
Site visit		28 February 2023
Public participation (BID)	30 Days	13 March – 17 April 2023
Submit application form and DSR	-	22 May 2023
Public participation (DSR)	30 Days	22 May – 22 June 2023
Submit FSR	44 Days	July 2023
Department acknowledges receipt	10 Days	July 2023

Department approves/reject	43 Days	By August 2023
Public participation (DEIR)	30 Days	August - September 2023
Submission of FEIR & EMPr	-	October 2023
Department acknowledges receipt	10 Days	October 2023
Decision	107 Days	March 2024
Department notifies of decision	5 Days	March 2024
Registered I&APs notified of decision	14 Days	March 2024
Appeal	20 Days	April 2024

1.5 SPECIALIST STUDIES IDENTIFIED IN THE DFFE SCREENING TOOL REPORT

The table included below provides an indication of the specialist studies identified by the DFFE Screening Tool Report (Appendix B), an indication of whether the studies were undertaken or not and a motivation or confirmation of the studies being included or not.

Table 1.3: Specialist studies identified by the DFFE screening tool for the PV facility and specialist studies completed

Study identified in the DFFE Screening Tool and sensitivity	**Study included?**	**Appendix**
Agricultural Impact Assessment Sensitivity: High Feature(s): Old field, potential crop cultivation Land capability	Yes	An Agriculture Potential Assessment is included in Appendix E4. The high sensitivity is disputed by the report.
Animal Species Assessment Sensitivity: High Feature(s): Presence of sensitive animal species i.e., Aves-*Circusranivorus*	Yes	Refer to Appendix E1. The Terrestrial Biodiversity, Plant and Animal Species Impact Assessment Report also includes the relevant Animal Species Assessment. This assessment has been undertaken in terms of the Protocols of GNR320 – refer to the content of the report.

Archaeological and Cultural Heritage Impact Assessment Sensitivity: Low	Yes	A Heritage Assessment is included in Appendix E5 of the Scoping Report, as per the requirements of the National Heritage Resources Act.
Aquatic Biodiversity Impact Assessment Sensitivity: Very High Feature(s): The project area lies within a Wetlands - Dry Highveld Grassland Bioregion (Depression) or (Seep)	Yes	A Wetland Baseline & Risk Assessment Report is included in Appendix E1. This assessment has been undertaken in terms of the Protocols of GNR320 – refer to the content of the report.
Avian Impact Assessment Sensitivity: Very High Feature(s): The project area lies within 50 km of Colonies	Yes	Avifauna Scoping Assessment Report is included as Appendix E2 of the Scoping Report. A full Avifauna Assessment will be included with the EIR phase. This assessment has been undertaken in terms of the Protocols of GNR320 – refer to the content of the report.
Civil Aviation Assessment Sensitivity: Low	No	The identification of the site as low sensitivity considering civil aviation is agreed to by the EAP. This is based on the current land use of the site being used for agricultural purposes. The Civil Aviation Authority (CAA) has been identified as an I&AP, and has received the Draft Scoping report for review and commenting. No comments from the CAA have been received as part of the public participation process.
Defence Theme Sensitivity: Low	No	The site verification report confirms the low sensitivity of the site as no military operations are located close to the development.

		The project is therefore not expected to have an impact on Defence Installations.
Landscape / Visual Impact Assessment Sensitivity: High Feature(s): The project area lies at a Mountain tops and high ridges	Yes	A Visual Impact Assessment is included in Appendix E3 of the Scoping Report.
Palaeontological Impact Assessment Sensitivity: Very High Feature(s): Features with a Very High paleontological sensitivity	Yes	A Palaeontological Impact Assessment is included in Appendix E6 of the Scoping Report, as per the requirements of the National Heritage Resources Act.
Plant species Assessment Sensitivity: Medium Feature(s): Presence of Sensitive species 1147 and 1248.	Yes	Refer to Appendix E1. The Terrestrial Biodiversity, Plant and Animal Species Impact Assessment Report also includes the relevant Plant Species Assessment. This assessment has been undertaken in terms of the Protocols of GNR320 – refer to the content of the report.
RFI Assessment Sensitivity: Low	No	The site verification is inconclusive as no desktop information could be sought; however on-site evidence of the low sensitivity was available during the site inspection since no potential RFI could be identified. The South African Radio Astronomy Observatory (SARAO) have been consulted regarding the development of the project and the Scoping Report has been circulated to SARAO for review and commenting. No comment has been received from SARAO to date.

Terrestrial Biodiversity Impact Assessment Sensitivity: Very High Feature(s): The presence of Critical Biodiversity area 2, an Ecological Support area and Protected Areas Expansion Strategy	Yes	A Terrestrial Biodiversity Compliance Statement Report is included in Appendix E1 of the Scoping Report. This assessment has been undertaken in terms of the Protocols of GNR320 – refer to the content of the report.
Geotechnical Assessment Sensitivity: Not indicated	No	The Geotechnical Assessment will be conducted before construction begins as part of the micro-siting of the facility layout. The consideration of geotechnical aspects is considered to be of a technical concern rather than an environmental concern.
Socio-Economic Impact Assessment Sensitivity: Not indicated	Yes	A Social Impact Assessment is included in Appendix E7 of the Scoping Report.

1.6 STRUCTURE OF THE REPORT

This report is structured in accordance with the prescribed contents stipulated in Appendix 2 of Regulation No.326. It consists of eight sections demonstrating compliance to the specifications of the regulations as illustrated in Table 1.4.

Table 1.4: Structure of the report

Requirements for the contents of a scoping report as specified in the Regulations		Section in report
(a)	details of -	1
	(i) the EAP who prepared the report; and	
	ii) the expertise of the EAP, including a curriculum vitae.	
(b)	the location of the activity, including-	2
	(i) the 21-digit Surveyor General code of each cadastral land parcel;	

	(ii) where available, the physical address and farm name;	
	(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	
(c)	a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is-	
	(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	
	(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	
(d)	a description of the scope of the proposed activity, including-	
	(i) all listed and specified activities triggered;	
	(ii) a description of the activities to be undertaken, including associated structures and infrastructure.	
(e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	3
(f)	a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	4
(g)	a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including –	5
	(i) details of all the alternatives considered;	
	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	
	(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	
	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	
	(ix) the outcome of the site selection matrix;	

	(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and	
	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	
(g)	(v) 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- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	6
	(vi) the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	
	(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	
	(viii) the possible mitigation measures that could be applied and level of residual risk;	
(i)	a plan of study for undertaking the environmental impact assessment process to be undertaken, including-	8
	(i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;	
	(ii) a description of the aspects to be assessed as part of the EIA process;	
	(iii) aspects to be assessed by specialists;	
	(iv) a description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists;	
	(v) a description of the proposed method of assessing duration and significance;	
	(vi) an indication of the stages at which the competent authority will be consulted;	
	(vii) particulars of the public participation process that will be conducted during the EIA process; and	
	(viii) a description of the tasks that will be undertaken as part of the EIA process;	

	(ix) identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	
(j)	an undertaking under oath or affirmation by the EAP in relation to-	Appendix A to the report
	(i) the correctness of the information provided in the report;	
	(ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and	
	(iii) any information provided by the EAP to I&APs and any responses by the EAP to comments or inputs made by I&APs;	
(k)	an undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and I&APs on the plan of study for undertaking the EIA;	
(l)	where applicable, any specific information required by the CA; and	N/A
(m)	any other matter required in terms of section 24(4)(a) and (b) of the Act.	N/A

2 ACTIVITY DESCRIPTION

This section aims to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (...) must include-

(b) the location of the activity, including-

(i) the 21-digit Surveyor General code of each cadastral land parcel;

(ii) where available, the physical address and farm name;

(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;

(c) a plan which locates the proposed activity applied for at an appropriate scale, or, if it is-

(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or

(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;

(d) a description of the scope of the proposed activity, including-

(i) all listed and specified activities triggered;

(ii) a description of the activities to be undertaken, including associated structures and infrastructure.

2.1 THE LOCATION OF THE ACTIVITY AND PROPERTY DESCRIPTION

The project entails the development of a photovoltaic solar facility and associated infrastructure on The Farm Leeuwpan No. 697, Registration Division IQ, Gauteng Province situated within the Merafong City Local Municipality area of jurisdiction. The proposed development is located in the Gauteng Province in the northern interior of South-Africa (refer to Figure B for the regional map). The town of Carletonville is located approximately 17 km South of the proposed development (refer to Figure B for the locality map).

The project entails the generation of up to 250 MW electrical power through the installation and operation of photovoltaic (PV) panels. The total development footprint of the project will approximately be 500 hectares process (including supporting infrastructure on site) within the 4272 hectares assessed as part of the Environmental Impact Assessment process.

Based on the environmental constraints identified on the project site, it is anticipated that the development footprint of the PV facility (including supporting infrastructure) will be reconfigured to allow for the avoidance of sensitive environmental features. The full extent of the development and EIA Footprint have been considered during scoping with the aim of confirming the suitability from an environmental and social perspective. A development footprint will be defined based on

the outcomes of the scoping phase and will be further assessed in the EIA phase. The property on which the facility is to be constructed will be leased by Bonsmara Solar Power Plant (RF) (Pty) Ltd from the property owner for the life span of the project (minimum of 20 years).

It is expected that generation from the facility will tie in with a newly proposed collector substation to be connected to the existing Pluto 400/275/22kV MTS, it may also be required to create a 132KV feeder bay and transformation at Pluto MTS in order to connect the collector substation at the MTS with a single or double circuit 132KV connection line. The connection power line will be constructed within the limits of the identified grid connection corridor.

Table 2.1: General site information

Description of affected farm portion	Solar Power Plant: Farm Leeuwpan No. 697 Grid Connection Corridor: Portion 88 of the Farm De Pan 51. The Remaining Extent of the Farm De Pan 51. Portion 5 of the Farm De Pan 5. Portion 90 of the Farm De Pan 51. Portion 1 of the Farm De Pan 51. Portion 7 of the Farm Wildfontein No. 52 Portion 34 of the Farm Holfontein No. 49. Remaining Extent of Portion 5 of the Farm Holfontein No. 49
Province	Gauteng
District Municipality	West Rand District Municipality
Local Municipality	Merafong City Local Municipality
Ward numbers	1
Closest towns	Carletonville is located approximately 17km south of the proposed development.
21 Digit Surveyor General codes	Solar Power Plant: Farm Leeuwpan No. 697 T0IQ00000000069700000

	<u>Grid Connection Corridor:</u> Portion 88 of the Farm De Pan 51 T0IQ00000000005100088 The Remaining Extent of the Farm De Pan 51 T0IQ00000000005100000 Portion 5 of the Farm De Pan 5 T0IQ00000000005100005 Portion 90 of the Farm De Pan 51 T0IQ00000000005100090 Portion 1 of the Farm De Pan 51 T0IQ00000000005100001 Portion 7 of the Farm Wildfontein No. 52 T0IQ00000000005200007 Portion 34 of the Farm Holfontein No. 49 T0IQ00000000004900034 Portion 5 of the Farm Holfontein No. 49 T0IQ00000000004900005
Type of technology	Photovoltaic solar facility
Structure Height	Panels ~ 6m. Buildings ~ 6m. Power line ~ 32m; and Battery storage facility ~ 8m.
Battery storage	Within a 4-hectare area of the infrastructure and ancillary complex
Surface area to be covered (Development footprint)	Approximately 500 ha[1]

[1] The development footprint is subject to change following specialist input.

EIA Footprint	Assessed 4272 ha
Structure orientation	The panels will either be fixed to a single-axis horizontal tracking structure where the orientation of the panel varies according to the time of the day, as the sun moves from east to west or tilted at a fixed angle equivalent to the latitude at which the site is in order to capture the most sun.
Generation capacity	Up to 250MW

The site is located outside urban areas and is bordered by agricultural (mainly cattle grazing) land uses. The site survey revealed that the affected property currently consists of agricultural activities – refer to plates 1-8 for photographs of the affected property and proposed development footprint area.

2.2 ACTIVITY DESCRIPTION

The proposed development will trigger the following activities:

Table 2.2: Listed activities

Relevant notice:	**Activity No (s)**	**Description of each listed activity as per project description**:
GNR. 327 (as amended in 2017)	Activity 11(ii)	• *"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."* • Activity 11(i) is triggered since the proposed photovoltaic solar facility will transmit and distribute electricity of 132 kilovolts outside an urban area. The infrastructure for the distribution of electricity will include a power line (132kV), a collector substation and an on-site HV/MV substation and switching station (132kV).
GNR. 327 (as amended in 2017)	Activity 12(ii)(c)	• "*The development of (ii) infrastructure or structures with a physical footprint of 100 square metres or more; (a) within a watercourse or (c) within 32 meters of a watercourse measured from the edge of a watercourse."* • Activity 12(ii)(c) is triggered as depression and seep wetlands have been identified on the site. A depression and seep wetland is located within 32 meters of the power line corridor.

GNR. 327 (as amended in 2017)	Activity 24(ii)	• *"The development of a road (ii) with reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters."* • Activity 24(ii) is triggered as the proposed access roads to Bonsmara Solar Power Plant will be up to 10m wide.
GNR. 327 (as amended in 2017)	Activity 28(ii)	• *"Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."* • Activity 28(ii) is triggered as portions of the affected farm has been previously used for grazing and the property will be re-zoned to "special" use. The development footprint of the solar power plant will be 500 hectares.
GNR. 327 (as amended in 2017)	Activity 56(ii)	• *"The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres…"* • Activity 56(ii) is triggered as the existing access to the affected property does not have a reserve and will need to be widened by more than 6 metres.
GNR. 325 (as amended in 2017)	Activity 1	• *"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more."* • Activity 1 is triggered since the proposed photovoltaic solar energy facility will generate up to 250 megawatts electricity through the use of a renewable resource.
GNR. 325 (as amended in 2017)	Activity 15	• *"The clearance of an area of 20 hectares or more of indigenous vegetation."* • In terms of vegetation type the site falls within the Carletonville Dolomite Grassland which is described by Mucina and Rutherford (2006) as 'vulnerable'. Activity 15 is triggered since portions of the site has not been lawfully disturbed during the preceding ten years; therefore, more than 20 hectares of indigenous vegetation will be removed. The development footprint of the solar power plant will be 500ha in extent.
GNR. 324 (as	Activity 4 (c)(iv)	• "*The development of a road wider than 4 metres with a reserve less than 13,5 metres within (c) the Gauteng*

amended in 2017)		*province, (iv) Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans."* • Activity 4 (c)(iv) is triggered as internal, perimeter and access roads with a width of between 4 and 10 meters will be constructed. Parts of the site are within a Critical Biodiversity Area 2.
GNR. 324 (as amended in 2017)	Activity 10 (c)(iv)	• *"The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres (c) the Gauteng province, (iv) Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans."* • Activity 10(c)(iv) is triggered since the proposed development will require infrastructure for the storage and handling of dangerous goods (diesel and/or oils) in containers with a capacity exceeding 30 but not exceeding 80 cubic metres. Parts of the site are within a Critical Biodiversity Area 2.
GNR. 324 (as amended in 2017)	Activity 12 (c)(ii)	• *"The clearance of an area of 300 square metres or more of indigenous vegetation (c) in the Gauteng Province, (ii) within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans."* • Activity 12 (c)(ii) is triggered since the proposed development is located in the Gauteng province and portions of the site has not been lawfully disturbed during the preceding ten years and therefore indigenous vegetation is present on the site. Parts of the site are within a Critical Biodiversity Area 2.
GNR. 324 (as amended in 2017)	Activity 14(ii)(c)(c)(iv)	• "*The development of (ii) infrastructure or structures with a physical footprint of 10 square metres or more, where such development occurs (a) within a watercourse or (c) within 32 metres of a watercourse, measured from the edge of a watercourse, (c) within the Gauteng Province, within (iv) sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans."* • Activity 14(ii)(c)(c)(iv) is triggered as the project is located within the Gauteng Province. A depression and

		seep wetland have been identified on the site. A depression and seep wetland are located within 32 meters of the power line corridor. Parts of the site are within a Critical Biodiversity Area 2.
GNR. 324 (as amended in 2017)	Activity 18 (c)(iv)	• *"The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre (c) in the Gauteng Province within (iv) sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans."* • Activity 18 (c)(iv) is triggered since the existing main access road to the site will need to be widened by more than 4 metres. The project is located within the Gauteng Province. Parts of the site are within a Critical Biodiversity Area 2.

The potentially most significant impacts will occur during the construction phase of the development, which will include the following activities:

- Site clearing and preparation: Certain areas of the site and access road will need to be cleared of vegetation and some areas may need to be levelled.
- Civil works to be conducted:

- Terrain levelling if necessary– Levelling will be minimal as the potential site chosen is relatively flat.
- Laying foundation- The structures will be connected to the ground through cement pillars, cement slabs or metal screws. The exact method will depend on the detailed geotechnical analysis.
- Construction of access and inside roads/paths – existing paths will be used where reasonably possible. Access will be obtained via a public gravel road off of the R500 regional road. An internal site road network will also be required to provide access to the solar field and associated infrastructure. Additionally, the turning circle for trucks will also be taken into consideration.
- Trenching – all Direct Current (DC) and Alternating Current (AC) wiring within the PV plant will be buried underground. Trenches will have a river sand base, space for pipes, backfill of sifted soil and soft sand and concrete layers where vehicles will pass.

2.3 PHOTOVOLTAIC TECHNOLOGY

The term photovoltaic describes a solid-state electronic cell that produces direct current electrical energy from the radiant energy of the sun through a process known as the Photovoltaic Effect. This refers to light energy placing electrons into a higher state of energy to create electricity. Each PV cell is made of silicon (i.e., semiconductors), which is positively and negatively charged on

either side, with electrical conductors attached to both sides to form a circuit. This circuit captures the released electrons in the form of an electric current (direct current).

The key components of the proposed project are described below:

- PV Panel Array - To produce up to 250MW, the proposed facility will require numerous linked cells placed behind a protective glass sheet to form a panel. Multiple panels will be required to form the solar PV arrays which will comprise the PV facility. The PV panels will be tilted at a northern angle in order to capture the most sun or using one-axis tracker structures to follow the sun to increase the yield.

- Wiring to Inverters - Sections of the PV array will be wired to inverters. The inverter is a pulse width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency.

- Connection to the grid - Connecting the array to the electrical grid requires transformation of the voltage from 480V to 33kV to 132kV and higher. The normal components and dimensions of a distribution rated electrical substation will be required. Output voltage from the inverter is 480V and this is fed into the step-up transformers to 132kV. An onsite substation will be required to step the voltage up to 132kV, after which the power will be evacuated into a new proposed collector substation to step the voltage up from 132KV to 275/400KV in order to evacuate the power into the national grid at the same voltage level as the MTS via the proposed 132/275/400KV power line. Whilst Bonsmara Solar Power Plant (RF) (Pty) Ltd has not yet received a cost estimate letter from Eskom, it is expected that generation from the facility will tie in with a newly proposed collector substation to be connected to the existing Pluto 400/275/22kV MTS, it may also be required to create a 132KV feeder bay and transformation at Pluto MTS in order to connect the collector substation at the MTS with a single or double circuit 132KV connection line. The connection power line will be constructed within the limits of the grid connection corridor. The project will generate up to 250MW of electricity. Refer to the Figure below.

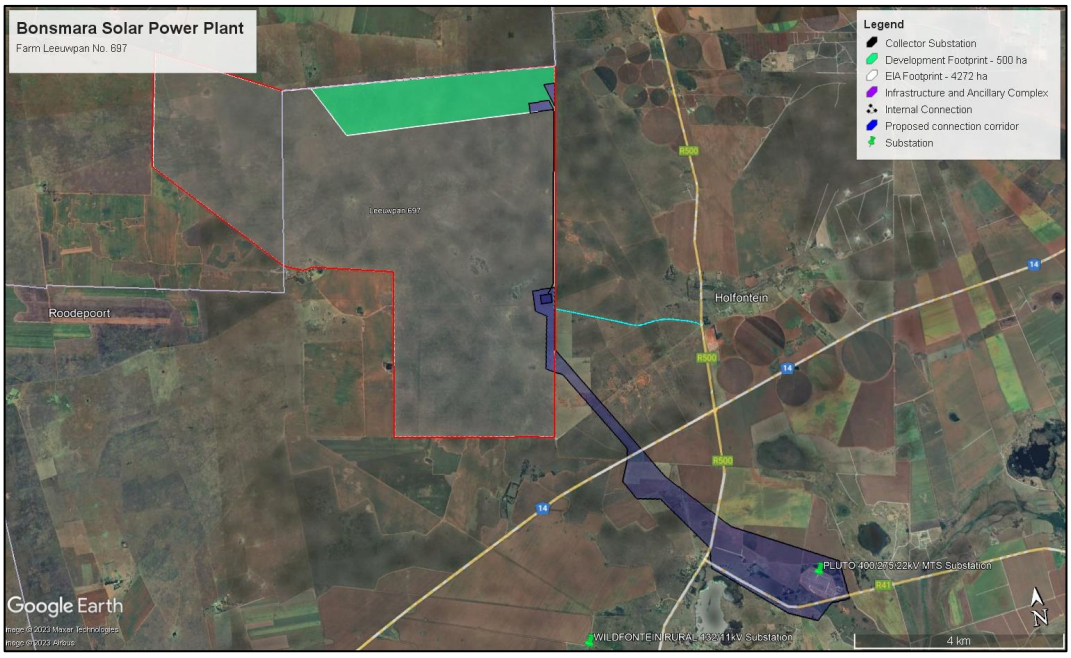


Figure 2.1: Proposed grid connection corridor for the Bonsmara Solar Power Plant

- Electrical reticulation network – An internal electrical reticulation network will be required and will be lain ~2-4m underground as far as practically possible.

- Supporting Infrastructure – All associated infrastructure will be constructed within the limits of the infrastructure and ancillary complex which will include an on-site substation, Battery Energy Storage System, Operations and Maintenance buildings etc.

- Battery storage – A Battery Storage Facility with a maximum height of 8m and a maximum volume of 1,740 m^3 of batteries and associated operational, safety and control infrastructure.

- Roads – Access will be obtained via a public gravel road off of the R500 regional road to the east of the site. An internal site road network will also be required to provide access to the solar field and associated infrastructure.

- Fencing - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm. Fencing with a height of 2.5 meters will be used.

2.4 LAYOUT DESCRIPTION

The draft layout plan provided within this scoping report considers technical constraints from a 'development viewpoint'. The environmental limitations of the site and aspects such as environmentally sensitive areas, roads, fencing and servitudes on site will be further investigated during the detailed EIA phase – refer to Figure I. The total surface area proposed for the layout

includes the PV panel arrays (spaced to avoid shadowing), access and maintenance roads and associated infrastructure (buildings, power inverters, power line, battery energy storage system, on-site substation and switching station and perimeter fences). Limited features of environmental significance exist on site, however the sensitivities that do exist have to be avoided in the layout of the solar facility which will be further assessed during the EIA phase (refer to Figure H).

Table 2.3 below provides detailed information regarding the layout for the proposed facility as per DFFE requirements.

Table 2.3: Technical details for the proposed facility

Component	Description / dimensions
Height of PV panels	6 meters
Area of PV Array	500 Hectares (Development footprint)
Number of inverters required	Minimum 50
Area occupied by inverter / transformer stations / substations / BESS	Central inverters+ LV/MV trafo: 750 m^2 Substation: 1.5 ha BESS: 4 ha
Capacity of on-site substation	132kV
Capacity of the power line	132kV
Area occupied by both permanent and construction laydown areas	Permanent Laydown Area: 500 Hectares Construction Laydown Area: ~16 ha
Area occupied by buildings	Infrastructure & Ancillary Complex 1: 10 ha Infrastructure & Ancillary Complex 2: 6 ha
Battery storage facility	Maximum height: 8m Maximum volume: 1740 m^3 Capacity ~up to 500MWh
Length of access roads	To be confirmed with the layout of the facility
Width of access roads	8 m – 10 m
Length of internal roads	To be confirmed with the layout of the facility
Width of internal roads	4 m – 6 m
Length of perimeter roads	To be confirmed with the layout of the facility
Width of perimeter roads	6 m – 8 m
Grid connection corridor width	200 m up to 1.2 km
Grid connection corridor length	7.5km
Power line servitude width	32m
Height of fencing	Approximately 2.5 meters

2.5 SERVICES PROVISION

The following sections provides information on services required on the site e.g. water, sewage, refuse removal, and electricity.

2.5.1 Water

Adequate provision of water will be a prerequisite for the development. Water for the proposed development will most likely be obtained from ground water resources or alternatively collected with water trucks from an authorized water service provider and stored on site. A full assessment of the application for water use authorisation will only be undertaken in the event that the project proponent has obtained preferred bidder status by the Department of Mineral Resources and Energy.

The estimated maximum amount of water required during construction is 45 000 m^3 annualy during the 18 - 24 months of construction. The estimated maximum amount of water required during the facility's 20 years of production is 7000m^3 per annum. Much of this usage is for the cleaning of the solar panels. Since each panel requires approximately 2 litres of water for cleaning. It is estimated that the panels may only need to be washed twice per annum, but provision is made for quaternary cleaning (March, May, July, and September).

Drinking water supplied will comply with the SANS:241 quality requirements. Water quality from the borehole will be tested to confirm SANS:214 quality, if water quality is not sufficient for drinking, bottled water will be supplied to staff during construction and operational phases of the project.

Water saving devices and technologies such as the use of dual flush toilets and low-flow taps, the management of stormwater, the capture and use of rainwater from gutters and roofs will be considered by the developer. Furthermore, indigenous vegetation will be used during landscaping and the staff will be trained to implement good housekeeping techniques.

2.5.2 Stormwater

To avoid soil erosion, it is recommended that the clearing of vegetation be limited. Stormwater management and mitigation measures will be included in the Environmental Management Programme (EMPr) to be submitted as part of the EIR.

2.5.3 Sanitation and waste removal

Portable chemical toilets will be utilised, that will be serviced privately or by the local municipality. Waste will be disposed of at a licensed landfill site. The construction- and hazardous waste will be removed and disposed of at licensed landfill sites accepting such kinds of wastes. During the operational phase household waste will be removed to a licensed landfill site by a private contractor or by the local municipality. The relevant Local Municipality(s) have been contacted, to formally confirm that it has the capacity to provide the proposed development with these services for the lifetime of the project (20 years). The Developer still awaits confirmation. This will be provided during the EIA Phase.

2.5.4 Electricity

During the construction phase of the development, electricity will either be generated on site through a small solar system or through the use of generators or the existing Eskom supply on the farm will be utilised. This will depend on the Engineering, Procurement, and Construction (EPC)

contractor appointed. During operation electricity use will be limited and will primarily be related to the lighting of the facility and domestic use. Design measures such as the use of energy saving light bulbs will be considered by the developer. During the day, electricity will be sourced from the photovoltaic plant, and from the electricity connection at night.

2.6 Decommissioning of the facility

The operating period will be 20 years from the commencement date of the operation phase. Thereafter two rights of renewal periods of 40 years and 20 years will be relevant. It is anticipated that new PV technologies and equipment will be implemented, within the scope of the Environmental Authorisation, when influencing the profitability of the solar facility.

A likely extension of the plant's lifetime would involve putting new, more efficient, solar panels on the existing structures to improve the efficiency of the facility as the technology improves. The specifications of these new panels will be the same as the current panels under consideration, but the conversion efficiency of sunlight to energy will be greater (comparable to new computer chips, that are the same, but faster and more efficient). If, for whatever reason the plant halts operations, the Environmental Authorisation and contract with the landowner will be respected during the decommissioning phase.

The decommissioning process will consist of the following steps:

- The PV facility would be disconnected from the Eskom grid.
- The BESS, inverters and PV modules would be disconnected and disassembled.
- Concrete foundations (if used) would be removed and the structures would be dismantled.
- Wastewater storage conservancy tank would be responsibly removed and area would be rehabilitated.
- The underground cables would be unearthed and removed and buildings would be demolished and removed.
- The fencing would be dismantled and removed.
- The roads can be retained should the landowner choose to retain them, alternatively the roads will be removed and the compaction will be reversed.
- Most of the wires, steel and PV modules are recyclable and would be recycled to a reasonable extent. The Silicon and Aluminium in PV modules can be removed and reused in the production of new modules.
- Any rubble and non-recyclable materials will be disposed of at a registered landfill facility.

The rehabilitation of the site would form part of the decommissioning phase. The aim would be to restore the land to its original form (or as close as possible). The rehabilitation activities would include the following:

- Removal of all structures and rubble;

- Breaking up compaction where required, loosening of the soil and the redistribution of topsoil; and

Restoration of the surface to the original contours and application of hydro seeding.

3 LEGISLATIVE AND POLICY CONTEXT

This section aims to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (...) must include-

(e) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;

3.1 INTRODUCTION

Environmental decision making with regards to solar PV plants is based on numerous policy and legislative documents. These documents inform decisions on project level environmental authorisations issued by the National Department of Forestry, Fisheries and the Environment (DFFE) as well as comments from local and district authorities. Moreover, it is significant to note that they also inform strategic decision making reflected in the IDPs and SDFs. Therefore, to ensure streamlining of environmental authorisations it is imperative for the proposed activity to align with the principles and objectives of key national, provincial and local development policies and legislation. The following acts and policies and their applicability to the proposed development are briefly summarised:

- The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)
- National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA]
- The National Energy Act, 2008 (Act 34 of 2008)
- National Water Act, 1998 (Act No. 36 of 1998)
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
- The National Heritage Resources Act, 1999 (Act No. 25 of 1999)
- Conservation of Agricultural Resources Act, 1983 (Act No. 85 of 1983)
- The National Forests Act, 1998 (Act 84 of 1998)
- The White Paper on the Energy Policy of the Republic of South Africa (1998)
- The White Paper on Renewable Energy (2003)
- Integrated Resource Plan (IRP) for South Africa (2010-2030)
- National Development Plan of 2030
- National Infrastructure Plan of South Africa (2012)

- New Growth Path Framework (2010)
- Climate Change Bill (2018)
- Climate Change Bill (2021) – for public comment
- Strategic Integrated Projects (SIPs) (2010 – 2030)
- Strategic Environmental Assessment (SEA) for wind and solar PV Energy in South Africa (2014)
- Gauteng Provincial Spatial Development Framework (PSDF) (2012)
- West Rand DM Integrated Development Plan (IDP) 2017 – 2021 (2017)
- Merafong City Local Municipality Integrated Development Plan 2020/2021 (2020)
- Merafong City Local Municipality Spatial Development Framework (2017)

The key principles and objectives of each of the legislative and policy documents are briefly summarised in Tables 3.1 and 3.2 to provide a reference framework for the implications for the proposed activity.

3.2 LEGISLATIVE CONTEXT

Table 3.1: Legislative context for the construction of photovoltaic solar plants

LEGISLATION	ADMINISTERING AUTHORITY	DATE	SUMMARY / IMPLICATIONS FOR PROPOSED DEVELOPMENT
The Constitution of South Africa **(Act No. 108 of 1996)**	National Government	1996	The Constitution is the supreme law of the Republic and all law and conduct must be consistent with the Constitution. The Chapter on the Bill of Rights contains a number of provisions, which are relevant to securing the protection of the environment. Section 24 states that "everyone has the right to (a) an environment that is not harmful to their health or well-being and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that – (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. The Constitution therefore, compels government to give effect to the people's environmental right and places government under a legal duty to act as a responsible custodian of the country's environment. It compels government to pass legislation and use other measures to protect the environment, to prevent pollution and ecological degradation, promote conservation and secure sustainable development. The development of the Bonsmara Solar Power Plant and the aspects related thereto considers the creation of an environment which is not harmful or degraded through the implementation of appropriate mitigation measures.
The National Environmental Management Act **(Act No. 107 of 1998)**	National Department of Environmental Affairs (now known as the Department of Forestry, Fisheries and the Environment) and the Gauteng Province	1998	NEMA provides for co-operative governance by establishing principles and procedures for decision-makers on matters affecting the environment. An important function of the Act is to serve as an enabling Act for the promulgation of legislation to effectively address integrated environmental management. Some of the principles in the Act are accountability; affordability; cradle to grave management; equity; integration; open information; polluter pays; subsidiary; waste avoidance and minimisation; co-operative governance; sustainable development; and environmental protection and justice.

	Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA)		The mandate for EIA lays with the National Environmental Management Act (107 of 1998) and the EIA Regulations No. 324, 325, 326, and 327 promulgated in terms of Section 24 of NEMA. The EIA Regulations determine that an Environmental Authorisation is required for certain listed activities, which might have a detrimental effect on the environment. The EIA process undertaken for the Bonsmara Solar Power Plant is in-line with the requirements of NEMA for the Application for Environmental Authorisation.
The National Energy Act (Act No. 34 of 2008)	Department of Mineral Resources and Energy	2008	One of the objectives of the National Energy Act was to promote diversity of supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources, including solar: "To ensure that diverse energy resources are available, in sustainable quantities, and at affordable prices, to the South African economy, in support of economic growth and poverty alleviation, taking into account environmental management requirements (…); to provide for (…) increased generation and consumption of renewable energies…" (Preamble). Considering that the Bonsmara Solar Power Plant is proposed to make use of PV technology and the solar resource for the generation of electricity, the proposed project is in-line with the Act.
The National Water Act (Act No. 36 of 1998)	Department of Water Affairs (now known as Department of Water and Sanitation)	1998	Sustainability and equity are identified as central guiding principles in the protection, use, development, conservation, management and control of water resources. The intention of the Act is to promote the equitable access to water and the sustainable use of water, redress past racial and gender discrimination, and facilitate economic and social development. The Act provides the rights of access to basic water supply and sanitation, and environmentally, it provides for the protection of aquatic and associated ecosystems, the reduction and prevention of pollution and degradation of water resources. As this Act is founded on the principle that National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, a person can only be entitled to use water if the use is permissible under the Act. Chapter 4 of the Act lays the basis for regulating water use. Also, should a water use license be required for the project, the National Water Act will be applicable in terms of obtaining the relevant license.

National Environmental Management: Waste Act **(Act No. 59 of 2008)**	National Department Environmental Affairs (DEA) (now known as the Department of Forestry, Fisheries and the Environment)	2008	NEMWA has been developed as part of the law reform process enacted through the White Paper on Integrated Pollution and Waste Management and the National Waste Management Strategy (NWMS). The objectives of the Act relate to the provision of measures to protect health, well-being and the environment, to ensure that people are aware of the impact of waste on their health, well-being and the environment, to provide for compliance with the measures, and to give effect to section 24 of the Constitution in order to secure an environment that is not harmful to health and well-being. Regulations No. R921 (of 2013) promulgated in terms of Section 19(1) of the National Environmental Management: Waste Act (59 of 2008) determines that no person may commence, undertake or conduct a waste management activity listed in this schedule unless a license is issued in respect of that activity. It is not envisaged that a waste permit will be required for the proposed development as no listed activities in terms of waste management are expected to be triggered.
National Environment Management: Air Quality Act **(Act No. 39 of 2004)**	National Department Environmental Affairs (DEA) (now known as the Department of Forestry, Fisheries and the Environment)	2004	The object of this Act is to protect the environment by providing reasonable measures for the protection and enhancement of the quality of air in the Republic; the prevention of air pollution and ecological degradation; and securing ecologically sustainable development while promoting justifiable economic and social development. Regulations No. R248 (of 31 March 2010) promulgated in terms of Section 21(1)(a) of the National Environmental Management Act: Air Quality Act (39 of 2004) determine that an Atmospheric Emission License (AEL) is required for certain listed activities, which result in atmospheric emissions which have or may have a detrimental effect on the environment. The Regulation also sets out the minimum emission standards for the listed activities. It is not envisaged that an Atmospheric Emission License will be required for the proposed development.
The National Heritage Resources Act	South African Heritage Resources Agency (SAHRA)	1999	The Act aims to introduce an integrated and interactive system for the management of heritage resources, to promote good governance at all levels, and empower civil society to nurture and conserve heritage resources so that they may be bequeathed to future generations and to lay down principles for governing heritage resources management throughout the Republic. It also aims to establish the South African Heritage Resources Agency together with its Council to co-

(Act No. 25 of 1999)			ordinate and promote the management of heritage resources, to set norms and maintain essential national standards and to protect heritage resources, to provide for the protection and management of conservation-worthy places and areas by local authorities, and to provide for matters connected therewith. The Act protects and manages certain categories of heritage resources in South Africa. For the purposes of the Heritage Resources Act, a "heritage resource" includes any place or object of cultural significance. In this regard the Act makes provision for a person undertaking an activity listed in Section 28 of the Act to notify the resources authority. The resources authority may request that a heritage impact assessment be conducted if there is reason to believe that heritage resources will be affected. A case file has been opened on SAHRIS for the Bonsmara Solar Power Plant with case reference number 20882, and all relevant documents were submitted for their comments and approval. The Heritage and Palaeontological Impact Assessment undertaken for the solar PV facility is included as Appendix E5.
Conservation of Agricultural Resources Act (Act No. 85 of 1983)	National and Provincial Government	1983	The objective of the Act is to provide control over the utilisation of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith. Consent will be required from the Department of Agriculture, Forestry and Fisheries (now known as the Department of Forestry, Fisheries and the Environment) in order to confirm that the proposed development is not located on high potential agricultural land and to approve the long-term lease agreement. A Soil Site Sensitivity Verification has been undertaken for the Bonsmara Solar Power Plant PV facility and is included as Appendix E4.
The National Forests Act, 1998 (Act 84 of 1998)	Department of Environmental Affairs (now known as the Department of	1998	The purposes of this Act are to: (a) promote the sustainable management and development of forests for the benefit of all; (b) create the conditions necessary to restructure forestry in State forests;

	Forestry, Fisheries and the Environment)	(c) provide special measures for the protection of certain forests and trees: (d) promote the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes. (e) promote community forestry; (f) promote greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination. Section 12(1) read with s15(1) of the NFA stated that the Minister may declare a particular tree, group of trees, woodland; or trees belonging to a particular species, to be a protected tree, group of trees, woodland or species. A list of protected tree species was gazetted in GN 635 of 6 December 2019. The effect of the declaration is that no person may (a) cut, disturb, damage or destroy; or (b) possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, or any forest product derived from a protected tree, except under a license granted by the Minister; or in terms of an exemption published by the Minister in the Gazette. A Terrestrial Biodiversity Impact Assessment has been undertaken for the Bonsmara Solar Power Plant PV facility and is included in Appendix E1.

3.3 POLICY CONTEXT

Table 3.2: Policy context for the construction of photovoltaic solar plants

POLICY	ADMINISTERING AUTHORITY	DATE	SUMMARY / IMPLICATIONS FOR PROPOSED DEVELOPMENT
The White Paper on the Energy Policy of the Republic of South Africa	Department of Mineral Resources and Energy	1998	The White Paper on the Energy Policy of the Republic of South Africa establishes the international and national policy context for the energy sector, and identifies the following energy policy objectives: • Increasing access to affordable energy services • Improving energy governance • Stimulating economic development • Managing energy-related environmental and health impacts • Securing supply through diversity • Energy policy priorities The White Paper sets out the advantages of renewable energy and states that Government believes that renewables can in many cases provide the least cost energy service, particularly when social and environmental costs are included. The White Paper acknowledges that South Africa has neglected the development and implementation of renewable energy applications, despite the fact that the country's renewable energy resource base is extensive, and many appropriate applications exist. The White Paper notes that renewable energy applications have specific characteristics that need to be considered. Advantages include: • Minimal environmental impacts in operation in comparison with traditional supply technologies; and • Generally lower running costs, and high labour intensities. Disadvantages include: • Higher capital costs in some cases; • Lower energy densities; and

			• Lower levels of availability, depending on specific conditions, especially with sun and wind-based systems. The Bonsmara Solar Power Plant is in line with this policy as it proposes the generation of renewable energy from the solar resource.
The White Paper on Renewable Energy	Department of Mineral Resources and Energy	2003	This White Paper on Renewable Energy supplements the *White Paper on Energy Policy*, which recognises that the medium and long-term potential of renewable energy is significant. This Paper sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa. The White Paper notes that while South Africa is well-endowed with renewable energy resources that have the potential to become sustainable alternatives to fossil fuels, these have thus far remained largely untapped. Government's long-term goal is the establishment of a renewable energy industry producing modern energy carriers that will offer in future years a sustainable, fully non-subsidised alternative to fossil fuels. The medium-term (10-year) target set in the White Paper is: *10 000 GWh (0.8 Mtoe) renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro. The renewable energy is to be utilised for power generation and non-electric technologies such as solar water heating and bio-fuels. This is approximately 4% (1667 MW) of the projected electricity demand for 2013 (41539 MW)* (Executive Summary, ix). The Bonsmara Solar Power Plant is in line with this paper as it proposes the generation of renewable energy from the solar resource.
Integrated Resource Plan (IRP) for South Africa	Department of Mineral Resources and Energy	2010-2030	The Integrated Resource Plan for Electricity for South Africa of 2010–2030 (further referred to as the IRP) is a "living plan" which is expected to be revised and updated continuously as necessary due to changing circumstances. According to the Summary of the plan the current IRP for South Africa, which was originally initiated by the Department of Energy (DoE) in June 2010 (the Department is now known as Department of Mineral Resources and Energy), led to the Revised Balanced Scenarios (RBS) for the period 2010–2030. "*This scenario was derived based on the cost-optimal solution for new build options (considering the direct costs of new build power plants), which was then "balanced" in accordance with qualitative measures such as local job creation".* In addition to all existing and committed power plants, the RBS included 11,4 GW of

renewables, which relates to the proposed Bonsmara Solar Power Plant PV facility. In 2010 several changes were made to the IRP model. The main changes in the IRP were the disaggregation of renewable energy technologies to explicitly display solar photovoltaic (PV), concentrated solar power (CSP), and wind options (RSA, 2011a).

The summary of the IRP further explains that traditional cost-optimal scenarios were developed based on the previously mentioned changes in the IRP. This resulted in the Policy-Adjusted IRP, which stated that:

"*The installation of renewables (solar PV, CSP and wind) have been brought forward in order to accelerate a local industry*; *To account for the uncertainties associated with the costs of renewables and fuels, a nuclear fleet of 9,6 GW is included in the IRP; The emission constraint of the RBS (275 million tons of carbon dioxide per year after 2024) is maintained; and Energy efficiency demand-side management (EEDSM) measures are maintained at the level of the RBS*" (RSA, 2011a:6).

"The Policy-Adjusted IRP includes the same amount of coal and nuclear new builds as the RBS, while reflecting recent developments with respect to prices for renewables. In addition to all existing and committed power plants (including 10 GW committed coal), the plan includes 9,6 GW of nuclear; 6,3 GW of coal; 17,8 GW of renewables; and 8,9 GW of other generation sources" (RSA, 2011a:6).

The IRP highlights the commitments before the next IRP. The commitments pertaining to the purpose of the proposed project in renewable energy is: "*Solar PV programme 2012-2015: In order to facilitate the connection of the first solar PV units to the grid in 2012 a firm commitment to this capacity is necessary. Furthermore, to provide the security of investment to ramp up a sustainable local industry cluster, the first four years from 2012 to 2015 require firm commitment."*

"*Solar PV 2016 to 2019: As with wind, grid upgrades might become necessary for the second round of solar PV installations from 2016 to 2019, depending on their location. To trigger the associated tasks in a timely manner, a firm commitment to these capacities is necessary in the next round of the IRP at the latest. By then, the assumed cost decreases for solar PV will be confirmed*" (IRP, 2011a:17).

In conclusion the IRP recommends that an accelerated roll-out in renewable energy options should be allowed with regards to the benefits of the localization in renewable energy technologies (RSA, 2011a). It is however important to take note that since the release of the IRP in 2011 there has been a number of developments in the energy sector of South Africa. Therefore, the IRP was updated and was open for

comments until March of 2017. The new IRP of 2019 was formally published in October 2019. For the revision scenario, analysis was conducted. The results revealed that for the period ending 2030 that: *"The committed Renewable Energy Independent Power Producers Programme, including the 27 signed projects and Eskom capacity rollout ending with the last unit of Kusile in 2022, will provide more than sufficient capacity to cover the projected demand and decommissioning of plants up to approximately 2025"; "Imposing annual build limits on renewable energy will not affect the total cumulative capacity and the energy mix for the period up to 2030*"; and *"the scenario without renewable energy annual build limits provides the least-cost option by 2030*" (RSA, 2018:34).

Lastly, the draft IRP of 2018 also included the scenario analysis for the period post 2030. Here it was observed that: "*Imposing annual build limits on renewable energy will restrict the cumulative renewable installed capacity and the energy mix for this period; adopting no annual build limits on renewables or imposing a more stringent strategy to reduce greenhouse gas emissions implies that no new coal power plants will be built in the future unless affordable cleaner forms of coal-to-power are available; and the scenario without renewable energy annual build limits provides the least-cost option by 2050*" (RSA, 2018:34–35).

In the final IRP of 2019 key considerations were taken into account together with required actions to be taken for the IRP of 2019 to be credible. In terms of renewable energy technologies like solar and wind, the IRP stated that *"The application of renewable build limits 'smoothes out' the capacity allocations for wind and solar PV which provides a constant pipeline of projects to investment; this addresses investor confidence*". The decision stated against this key consideration is to *"retain the current annual build limits on renewables (wind and PV) pending the finalization of a just transition plan"* (RSA, 2019:46). Hereby the IRP also recognises renewable technologies' potential to diversify the electricity mix, create new industries and job opportunities and localize across the value chain (RSA, 2019:13).

The Bonsmara Solar Power Plant is in line with this plan as it proposes the generation of renewable energy from the solar resource and will contribute to the energy mix of the country as set out in this plan.

National Development Plan of 2030	The Presidency: National Planning Commission	-	The National Development Plan aims to "eliminate poverty and reduce inequality by 2030" (RSA, undated). In order to eliminate or reduce inequality, the economy of South Africa needs to grow faster in order to benefit all South Africans. In May 2010 a draft national development plan was drafted, which highlighted the nine (9) key challenges for South Africa. The highest priority areas according to the plan are considered to be the creation of employment opportunities and to improve the quality of national education. In this regard, the plan sets out three (3) priority areas, namely, to raise employment by a faster growing economy, improve the quality of education, and to build the capability of the state in order to play a more developmental and transformative role. One of the key challenges identified was that the economy is unsustainably resource intensive and the acceleration and expansion of renewable energy was identified as a key intervention strategy to address this challenge. The development of the Bonsmara Solar Power Plant will contribute to the intervention strategy as identified within the plan.
National Infrastructure Plan of South Africa	Presidential Infrastructure Coordinating Commission	2012	In the year 2012 the South African Government adopted a National Infrastructure Plan (hereafter referred to as the Plan). The aim of this Plan is to transform the economic landscape, while strengthening the delivery of basic services and creating new employment opportunities. This Plan also supports the integration of African communities, and also sets out the challenges and enablers that our country needs in order to respond to the planning and development of infrastructure with regards to fostering economic growth (RSA, 2012). The Plan has developed eighteen (18) strategic integrated projects (further referred to as SIPs). These SIPs stretch over all nine (9) provinces, covering social and economic infrastructure, and projects that enhances development and growth. Of the eighteen (18), five (5) are geographically focused, three (3) spatial, three (3) energy, three (3) social infrastructure, two (2) knowledge, one (1) regional integration, and one (1) water and sanitation focussed. The three (3) SIPs according to the Plan, which are energy focused and correlate to the proposed project are as follow: - SIP 8: Green energy in support of the South African economy; - SIP 9: Electricity generation to support socio-economic development; and - SIP 10: Electricity transmission and distribution for all. SIP 8 according to the Plan "*support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the IRP 2010 and support bio-fuel production*

		facilities". The purpose of SIP 9 according to the Plan is to "*accelerate the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances*". SIP 9 should also monitor the implementation of major projects such as new power stations like Medupi, Kusile and Ingula. Lastly, SIP 10 aims to "*expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development*" (RSA, 2012:20). The Bonsmara Solar Power Plant is in line with this plan as it proposes the generation of renewable energy from the solar resource which supports socio-economic development and will contribute to meeting the electricity demand of the country as set out in this plan.
New Growth Path Framework	Department of - Economic Development	The New Growth Path was developed after 16 years of South Africa's democracy, to respond to emerging opportunities and risks while building on policies. This framework provides a dynamic vision on how to collectively achieve a more developed, equitable and democratic society and economy. This framework mainly reflects the commitment of the South African Government to create employment opportunities for its people in all economic policies (RSA, 2011b). This framework sets out the markers for job creation and growth and also identify where there are viable changes in the character and structure of production, in order to create a more inclusive, greener economy in the long-term. It is stated in the framework that in order for this framework to reach its objectives, the Government is committed to: - Identify the possible areas of employment creation; and - Develop a policy to facilitate employment creation especially with regards to social equity, sustainable employment and growth in the creation of employment activities (RSA, 2011b). This framework also identifies investments in five key areas, one of which is energy. This framework also states that the green economy is a priority area, which includes the construction of and investment in renewable energy technologies like solar (RSA, 2011b). In this regard it will also assist creating employment opportunities over the medium- and long-term.

			Considering that the construction of and investment in renewable energy is a key area identified within the framework, the Bonsmara Solar Power Plant is considered to be in-line with the framework.
Climate Change Bill	National Department of Environmental Affairs (now known as the Department of Forestry, Fisheries and the Environment)	2018	On 08 June 2018 the Minister of Environmental Affairs published the Climate Change Bill ("the Bill") for public comment. The Bill provides a framework for climate change regulation in South Africa aimed at governing South Africa's sustainable transition to a climate resilient, low carbon economy and society. The Bill provides a procedural outline that will be developed through the creation of frameworks and plans. The following objectives are set within the Bill: • Provide for the coordinated and integrated response to climate change and its impacts by all spheres of government in accordance with the principles of cooperative governance; • Provide for the effective management of inevitable climate change impacts through enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to building social, economic, and environmental resilience and an adequate national adaptation response in the context of the global climate change response; • Make a fair contribution to the global effort to stabilise greenhouse gas concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe and in a manner that enables economic, employment, social and environmental development to proceed in a sustainable manner. The Bonsmara Solar Power Plant comprises a renewable energy generation facility and would not result in the generation or release of emissions during its operation.
Climate Change Bill	National Department of Forestry, Fisheries and the Environment	2021	The Department of Forestry, Fisheries and the Environment has published a new Climate Change Bill for public comment. The bill notes that climate change represents an urgent threat to human societies and the planet, and requires an effective, progressive and incremental response from both government and citizens. It recognises that South Africa has a global responsibility to reduce greenhouse gasses and that the anticipated impacts arising as a result of climate change have the potential to undermine achieving of the country's developmental goals.

			The main objective of the bill is to enable the development of an effective climate change response and the long-term, just transition to a climate-resilient and lower-carbon economy and society, and to provide for matters connected therewith. The Bonsmara Solar Power Plant comprises a renewable energy generation facility and would not result in the generation or release of emissions during its operation.
Strategic Integrated Projects (SIPs)	The Presidential Infrastructure Coordinating Committee	2010 - 2030	The Presidential Infrastructure Coordinating Committee (PICC) is integrating and phasing investment plans across 18 Strategic Infrastructure Projects (SIPs) which have five core functions: to unlock opportunity, transform the economic landscape, create new jobs, strengthen the delivery of basic services and support the integration of African economies. A balanced approach is being fostered through greening of the economy, boosting energy security, promoting integrated municipal infrastructure investment, facilitating integrated urban development, accelerating skills development, investing in rural development and enabling regional integration. SIP 8 and 9 of the energy SIPs supports the development of the solar energy facility: • SIP 8: Green energy in support of the South African economy: Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010 – 2030) and supports bio-fuel production facilities. • SIP 9: Electricity generation to support socio-economic development: The proposed Bonsmara Solar Power Plant PV facility is a potential SIP 9 Project as electricity will be generated and social and economic upliftment, development and growth will take place within the surrounding communities. It would become a SIP 9 project if selected as a Preferred Bidder project by the Department of Mineral Resources and Energy. SIP 9 supports the acceleration of the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances. The Bonsmara Solar Power Plant could be registered as a SIP project once selected as a preferred bidder under the REIPPP Programme. The project would then contribute to the above-mentioned SIPs

Strategic Environmental Assessment (SEA) for wind and solar PV Energy in South Africa	National Department of Environmental Affairs (now known as the Department of Forestry, Fisheries and the Environment)	2014	The then Department of Forestry, Fisheries and the Environment (DFFE) has committed to contribute to the implementation of the National Development Plan and National Infrastructure Plan by undertaking Strategic Environmental Assessments (SEAs) to identify adaptive processes that integrate the regulatory environmental requirements for Strategic Integrated Projects (SIPs) while safeguarding the environment. The wind and solar photovoltaic (PV) SEA were accordingly commissioned by DEA in support of SIP 8, which aims to facilitate the implementation of sustainable green energy initiatives. This SEA identifies areas where large scale wind and solar PV energy facilities can be developed in terms of SIP 8 and in a manner that limits significant negative impacts on the environment, while yielding the highest possible socio-economic benefits to the country. These areas are referred to as Renewable Energy Development Zones (REDZs). The REDZs also provide priority areas for investment into the electricity grid. Currently one of the greatest challenges to renewable energy development in South Africa is the saturation of existing grid infrastructure and the difficulties in expanding the grid. Proactive investment in grid infrastructure is likely to be the most important factor determining the success of REDZs. Although it is intended for the SEA to facilitate proactive grid investment in REDZs, such investment should not be limited to these areas. Suitable wind and solar PV development should still be promoted across the country and any proposed development must be evaluated on its own merit. The Bonsmara Solar Power Plant is not located within a REDZ, but the development will contribute to the expansion of renewable energy facilities and infrastructure within the country, and provide the positive opportunities associated with it.
Gauteng Provincial Spatial Development Framework (PSDF) (2012)	Gauteng Provincial Government	2012	The Gauteng Spatial Development Framework has a number of aspects that need to be taken into account when developing the SDF. In particular, this framework is, "*premised on building Gauteng as a City Region that allows agriculture to provide a link between rural and urban economic development, shaped by infrastructure led investment*". The framework seeks to: o Provide a clear future provincial spatial structure that is robust to accommodate growth and sustainability.

		○ Specify a clear set of spatial objectives for municipalities to achieve in order to ensure realisation of the future provincial spatial structure. ○ Propose a set of plans that municipalities have to prepare in their pursuit of these objectives. ○ Provide a common language and set of shared planning constructs for municipalities ○ to use in their planning processes and plans. ○ Enable and direct growth. In the Gauteng Spatial Development Framework (GSDF), the province outlines issues of population growth with a predicted population of 28 million people in the Gauteng City Region (GCR) by 2055 and therefore Gauteng requires a serious overhaul of its planning fundamentals to address the social, environmental and economic needs of an added 16 million people in the Gauteng province. The GSDF has mentioned that there are too many inadequacies and inequalities that exist in the present Gauteng economic system, and these are in many respects deeply embedded in failings in the spatial structure of the city region. In addition to the GSDF there are various policies and strategies that have been developed that provide direction to municipalities with regard to the type of developments to promote in the area. Some of these documents included the Integrated Energy Strategy, Green Economy Strategy, ICT Strategy and the Innovation Strategy. Although these strategies do not directly impact on the spatial development of the regions, it does provide some guidance with regard to the types of activities to be promoted. These strategies promote manufacturing related to the green economy, better use of broadband and fibre optic infrastructure that may facilitate developments such as BPO parks. The development of the Bonsmara Solar Power Plant is in-line with the framework based on the contributions and opportunities presented by a development of this nature.
West Rand District Municipality Integrated Development	West Rand District Municipality 2017	The long-term vision of the West Rand District Municipality (WRDM) is to: *"Integrating District Governance to achieve a better life for all".* The above stated vision defines what WRDM would like to attain over medium to long-term, and for that achievement to effectively materialize, their mission is: *"to provide an integrated and excellent developmental district governance system in the West Rand".*

Plan (IDP) 2017 – 2021 (2017)			The core values for the DM are set to be the following: o Service excellence; o Pride; o Integrity; o Responsibility; o Transparency; o Accountability; o Innovation; and o Teamwork The West Rand District Municipality lies to the west of Johannesburg, about 50 minutes from OR Tambo International Airport. It borders the North West Province and accessibility is easy from all major Gauteng centres. This region is a great base from which to explore this fascinating and ancient part of South Africa. The West Rand Region has a rich and diverse landscape with the lovely Magaliesberg Mountains forming the backdrop. Towns in the region include Krugersdorp, Randfontein; Westonaria and Carletonville. The development of the Bonsmara Solar Power Plant will contribute to the goals of the area, albeit to a limited extent.
Merafong City Local Municipality Integrated Development Plan (IDP)	Merafong City Local Municipality	2020/ 21	The Vision, Mission and Values were confirmed as follows. Vision: “A prosperous, Sustainable and Community-oriented City” Mission: “To provide quality services to our community through accountable governance” Values: “Integrity, Accountable, Committed, Teamwork, Proactive, Service excellence”. The Municipality towards building a South Africa that is united, non-racial, non-sexist democratic and prosperous in character. A clarion call by the National democratic revolution that dictates that we should develop concrete programmes to address poverty, to create jobs and grow an inclusive, productive economy to address the persisting problems of unemployment, poverty and inequalities through radical economic transformation.

			The development of the Bonsmara Solar Power Plant will contribute to the goals of the area, albeit to a limited extent.
Merafong City Spatial Development Framework 2019/2020 (SDF) (2017)	Merafong City SDF	2019/ 2020	Spatial Development Frameworks and policies at all spheres of government must address the inclusion of persons and areas that were previously excluded, with an emphasis on informal settlements, former homeland areas and areas characterised by widespread poverty and deprivation. The Merafong City Municipal Spatial Development Framework (MSDF), forms part of a hierarchy of plans feeding into the Integrated Development Plan (IDP). The Spatial Development Framework serves as an input into the IDP and concentrates on the spatial aspects of development planning, whereas the IDP focuses on broader developmental issues. During 2013 the Spatial Planning & Land Use Management Act (Act 16 of 2013) (SPLUMA) was promulgated this legislation puts forward principles to influence spatial planning, land use management and land development. It also provides for national and regional spatial frameworks as well as provincial and municipal frameworks, meaning that a package of plans will be undertaken from national to municipal level to direct spatial planning as well as land use management, while providing for uniform regulation of land use management. The general principles endorsed by this Act is that spatial planning, land use management and land development must promote and enhance five main Development Principles, namely Spatial Justice, Spatial Sustainability; Spatial Efficiency; Spatial Resilience, and Good Administration. The development of the Bonsmara Solar Power Plant will contribute to the goals of the area, albeit to a limited extent.

3.4 OTHER LEGISLATION

Other legislation mainly refers to the following:

- Planning legislation governing the rezoning process and approval of the layout plan.
- Design standards and legislation for services provision such as water, sewerage, electricity, etc.
- Municipal bylaws related to building plans, building regulations, etc.

3.5 RELEVANT GUIDANCE

The following guidance was considered in conducting the EIA:

- The Equator principles III (2013)[2]
- World Bank Group Environmental, Health and Safety General Guidelines (EHS Guidelines) (2007)
- Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution (2007)
- International Finance Corporation's Policy on Environmental and Social Sustainability (2012)
- DEA. (2013). Draft National Renewable Energy Guideline. Department of Environmental Affairs, Pretoria, South Africa
- DEA, (2012), Guideline 5 – Final companion to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2010
- DEA, (2012), Guideline 7 – Public participation in the Environmental Impact Assessment process
- DEA, (2012), Guideline 9 – Need and desirability
- DEA, (2006), Guideline 3 – General guide to the Environmental Impact Assessment Regulations
- DEAT, (2006), Guideline 4 – Public participation in support of the Environmental Impact Assessment Regulations
- DEAT, (2006), Guideline 5 – Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations

[2] Although this report is not written in terms of the Equator Principles (EPs), it fully acknowledges that the EPs will need to be complied with should funding for the project be required.

- BirdLife, (2017). Best Practise Guidelines Birds & Solar Energy: Guidelines for assessing and monitoring the impact of solar power generating facilities on bird in southern Africa.

3.6 CONCLUSION

The S&EIR process is being undertaken in accordance with the EIA Regulations (as amended) published in GNR 326, in terms of Section 24(5) and 44 of the NEMA as amended as well as all relevant National legislation, policy documents, national guidelines, the World Bank EHS Guidelines, the IFC Performance Standards, and the Equator Principles.

The legislative and policy context plays an important role in identifying and assessing the potential social impacts associated with the proposed development, as well as an indication of the need and desirability of the proposed development from a national, provincial and local level. For this reason, the proposed development project will be assessed in terms of its fit with the key legislative, policy and planning documents discussed above.

The main findings of the review of the policy documents on all spheres of Government indicated that strong support was given towards renewable energy, specifically PV solar energy and therefore it is concluded that there is support for the development of the Bonsmara Solar Power Plant PV facility. The White Paper on the Energy Policy of the Republic of South Africa of 1998 stated that due to the fact that renewable energy resources operate from an unlimited resource base, i.e., the sun, renewable energy can increasingly contribute towards a long-term sustainable energy supply for future generations. This policy further highlights that due to the unlimited resources base of renewable energy in South Africa, renewable energy applications, like PV solar energy and associated infrastructure, are more sustainable in terms of social and environmental costs. The Integrated Resource Planning for Electricity for South Africa of 2010–2030, the National Infrastructure Plan of South Africa and the New Growth Path Framework all support the development of the renewable energy sector. In particular, the IRP also indicated that 43% of the energy generation in South Africa is allocated to renewable energy applications. On a District and Local level limited attention is given explicitly to renewable sources like PV solar energy, however the documents reviewed do make provision for such developments and efficiency in improving the quality of lives in terms of efficient physical infrastructure as well as socio-economic growth. At Provincial, District and Local level the policy documents support the applications of renewables.

The review of the relevant policies and documents related to the energy sector therefore indicate that renewables, like solar energy and the establishment of solar energy facilities and associated infrastructure, are supported on all spheres of Government. The proposed Bonsmara Solar Power Plant is therefore supported by the related policy and planning documents reviewed in this section of the report.

4 THE NEED AND DESIRABILITY

This section aims to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (...) must include – (f) a motivation for the need and desirability of the activity in the context of the preferred location.

4.1 THE NEED FOR THE PROPOSED ACTIVITY

The proposed activity is a direct result of the growing demand for electricity and the need for renewable energy in South Africa. According to Eskom, the demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand, fuelled by increasing economic growth and social development, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmentally responsible development, the impacts of climate change and the need for sustainable development.

Over 90% of South Africa's electricity generation is coal based, the World bank estimates that this results in an annual, per capita carbon emission of ~8.9 tons per person. Based on 2008 fossil-fuel CO_2 emissions statistics released by the Carbon Dioxide Information Analysis Centre, South Africa is the 13th largest carbon dioxide emitting country in the world and the largest emitter in Africa (Boden, et al. 2011). In August 2021 an article confirmed that South Africa is the 12th highest greenhouse gas emitter in the world (source: https://www.news24.com/fin24/economy/eskom-will-only-able-to-meet-global-air-quality-standards-by-2050-owing-to-financial-woes-20210818).

The proposed project is intended to form part of the Department of Mineral Resources and Energy's (DMREs) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme or any other appropriate energy generation programmes / opportunities. The REIPPP Programme aims to secure 14 725 Megawatts (MW) of new generation capacity from renewable energy sources, while simultaneously diversifying South Africa's electricity mix. According to the 2021 State of the Nation Address, Government will soon be initiating the procurement of an additional 11 800 MW of power from renewable energy, natural gas, battery storage and coal in line with the Integrated Resource Plan 2019 and fulfilling their commitments under the United Nations Framework Convention on Climate Change and its Paris Agreement which include the reduction of greenhouse gas emissions. Eskom, the largest greenhouse gas emitter of South Africa, has committed in principle to net zero emission by 2050 and to increase its renewable capacity. During the 2022 State of the Nation Address it was indicated that during the past year the government had taken "firm steps" to bring additional generation capacity online as quickly as possible to close the shortfall in terms of electricity. As a result, it was confirmed that several new generation projects will be coming online over the next few years.

Besides capacity additions, several assumptions have changed since the promulgation of IRP 2010–2030. Key assumptions that changed include the electricity demand projection, Eskom's existing plant performance, as well as new technology costs. These changes necessitated the review and update of the IRP which resulted in the draft IRP 2018 as per table 4.1 below:

Table 4.1: Published Draft IRP 2018 (Approved by Cabinet for Consultation)

	Coal	Nuclear	Hydro	Storage (Pumped Storage)	PV	Wind	CSP	Gas / Diesel	Other (CoGen, Biomass, Landfill)	Embedded Generation
2018	39 126	1 860	2 196	2 912	1 474	1 980	300	3 830	499	Unknown
2019	2 155					244	300			200
2020	1 433				114	300				200
2021	1 433				300	818				200
2022	711				400					200
2023	500									200
2024	500									200
2025					670	200				200
2026					1 000	1 500		2 250		200
2027					1 000	1 600		1 200		200
2028					1 000	1 600		1 800		200
2029					1 000	1 600		2 850		200
2030			2 500		1 000	1 600				200
TOTAL INSTALLED	33 847	1 860	4 696	2 912	7 958	11 442	600	11 930	499	2600
Installed Capacity Mix (%)	44.6	2.5	6.2	3.8	10.5	15.1	0.9	15.7	0.7	

Installed Capacity
Committed / Already Contracted Capacity
New Additional Capacity (IRP Update)

According to the South African Energy Sector Overview (2021), there is currently 1 723MW of installed PV capacity, while an additional 2 600MW and 860MW from wind and solar has been rewarded as part of Bid window 5 and 6, respectively (latter announced in 2022).

4.2 THE DESIRABILITY OF THE PROPOSED ACTIVITY

The facility's contribution towards sustainable development and the associated benefits to society in general is discussed below:

- Lesser dependence on fossil fuel generated power - The deployment of the facility will have a positive macro-economic impact by reducing South Africa's dependence on fossil fuel generated power and assisting the country in meeting its growing electricity demand.
- Increased surety of supply - By diversifying the sources of power in the country, the surety of supply will increase. The power demands of South Africa are ever increasing and by adding solar power this demand can be met, even exceeded without increasing pollution in relation to the use of fossil fuels. The project has the potential of "securing" economic activity by assisting in removing supply constraints if Eskom generation activities result in a supply shortfall. When supply is constrained, it represents a limitation to economic growth. When a supply reserve is available, it represents an opportunity for economic growth.
- Local economic growth - The proposed project will contribute to local economic growth by supporting industry development in line with provincial and regional goals and ensuring advanced skills are drawn to the Gauteng Province. The project will likely encounter widespread support from government, civil society and businesses, all of whom see potential opportunities for revenues, employment and business

opportunities locally. The development of the photovoltaic solar facility will in turn lead to growth in tax revenues for local municipalities and sales of carbon credits, resulting in increased foreign direct investment. The location of the proposed development within the Merafong City Local Municipality is desirable as a large portion of households live within the poverty level (51%) which has an annual income of less than R38 200 (Merafong City IDP, 2020/2021).

- Lower costs of alternative energy - An increase in the number of solar facilities commissioned will eventually reduce the cost of the power generated through solar facilities. This will contribute to the country's objective of utilising more renewable energy and less fossil fuel-based power sources. It will assist in achieving the goal to generate 14 725 MW of electricity from renewable energy as per the Renewable Energy Independent Power Producer Procurement (REIPPP) Programme of the Department of Mineral Resources and Energy. The Government will be initiating the procurement of an additional 11 800 MW of renewable energy as stated during the 2021 State of the Nation Address.

- Reduction in greenhouse gas emissions - The additional power supplied through solar energy will reduce the reliance on the combustion of fossil fuels to produce power. The South African electricity grid is predominantly coal-fired and therefore GHG emissions intensive (coal accounts for more than 92% of the fuel used in South Africa's electricity generation). The reduction of GHG emissions as a result of the project implementation will be achieved due to reduction of CO_2 emissions from combustion of fossil fuel at the existing grid-connected power plants and plants which would likely be built in the absence of the project activity.

- CDM Project - A solar energy facility also qualifies as a Clean Development Mechanism (CDM) project (i.e., a financial mechanism developed to encourage the development of renewable technologies).

- Climate change mitigation - On a global scale, the project makes a contribution to greenhouse gas emission reduction and therefore contributes toward climate change mitigation.

- Reduced environmental impacts - The reduction in non-renewable electricity consumed from the grid will not only result in a reduction in greenhouse gas emissions, but also the prevention of negative impacts associated with coal mining. For example, coal power requires high volumes of water, in areas of South Africa where water supply is already over-stretched and water availability is highly variable. Photovoltaic solar energy technology also does not produce the sulphur emissions, ash or coal mining concerns associated with conventional coal fired electricity generation technologies resulting in a relatively low level of environmental impacts. It is a clean technology which contributes toward a better-quality environment for employees and nearby communities.

- Social benefits - The project activity is likely to have significant long-term, indirect positive social impacts that may extend to a regional and even national scale. The larger scale impacts are to be derived in the utilization of solar power and the experience gained through the construction and operation of the PV facility. In future, this experience can be employed at other similar solar installations in South Africa.

- Provision of job opportunities - The main benefit of the proposed development operating in the area is that local companies or contractors will be hired for the duration of the construction period. The operational phase will provide permanent job opportunities to the local communities from the surrounding area since security guards and general labourers will be required on a full-time basis. Approximately 500 employment opportunities will be created during the construction and operational phases.

- Indirect socio-economic benefits - The increase in the demand for services such as accommodation, transportation, security, general maintenance and catering will generate additional indirect socio-economic benefits for the local community members.

- Effective use of resources - Because of predominantly the climate and soil limitations, the site is totally unsuitable for cultivated crops, and the viable agricultural land use is limited to grazing only. The proposed development in this specific area will generate alternative land use income through rental for the proposed energy facility, which will have a positive impact on agriculture. It will provide the farming enterprise with increased cash flow and rural livelihood, and thereby improve the financial sustainability of agricultural activities.

- Increased access to electricity: The national electricity crises of 2010 and the resultant effects on South African residents and the economy has highlighted how highly reliant we are on electricity as a source of energy. Government has committed to developing measures to promote energy saving, reduce energy costs to the economy, and reduce the negative impact of energy use on the environment.

- Cumulative impacts of low to medium significance – No cumulative impacts with a high residual risk have been identified. In terms of the desirability of the development of sources of renewable energy therefore, it may be preferable to incur a higher cumulative loss in such a region as this one, than to lose land with a higher environmental value elsewhere in the country.

5 DESCRIPTION OF ENVIRONMENTAL ISSUES

This section aims to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (...) must include-

(h) a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including –

(i) details of all the alternatives considered;

(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;

(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.

(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

(ix) the outcome of the site selection matrix;

(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and

(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;

5.1 CONSIDERATION OF ALTERNATIVES

The DEAT 2006 guidelines on 'assessment of alternatives and impacts' proposes the consideration of four types of alternatives namely, the no-go, location, activity, and design alternatives. It is, however, important to note that the regulation and guidelines specifically state that only 'feasible' and 'reasonable' alternatives should be explored. It also recognizes that the consideration of alternatives is an iterative process of feedback between the developer and EAP, which in some instances culminates in a single preferred project proposal.

The following sections explore different types of alternatives in relation to the proposed activity in more detail.

5.1.1 No-go Alternative

This alternative considers the option of 'do nothing' and maintaining the status quo of the affected environment. The description provided in section 5.3 of this report could be considered the baseline conditions (*status quo*) to persist should the no-go alternative be preferred. The site is currently zoned for agricultural and mining land uses. Should the proposed activity not proceed, the site will remain unchanged and will continue to be used for the current land uses present. The area associated with the development footprint has limited agricultural potential and is unsuitable for cultivation, with grazing considered to be the only agricultural option. The potential opportunity costs in terms of alternative land use income through rental for the energy facility and the supporting social and economic development in the area would be lost if the *status quo* persists.

5.1.2 Location Alternatives

This alternative asks the question, if there is not, from an environmental perspective, a more suitable location for the proposed activity. No other properties have at this stage been secured by Bonsmara Solar Power Plant (RF) (Pty) Ltd in the Carletonville area to potentially establish the Bonsmara Solar Power Plant. From a local perspective the Farm Leeuwpan No. 697 is preferred due to its suitable climatic conditions, topography (i.e., in terms of slope), environmental conditions (i.e., low agricultural potential and archaeology), proximity to a grid connection point (i.e., for the purpose of electricity evacuation), as well as site access (i.e., to facilitate the movement of machinery, equipment, infrastructure and people during the construction phase). Provision will be made in this scoping report to consider the results of the specialist studies to exclude the sensitive areas present, which includes the no-go buffer areas recommended by the specialist. The sensitive areas and associated buffers will be considered by the developer for the facility layout design to optimise the layout for avoidance of the environmental sensitivities identified.

As part of the specialist studies undertaken, areas that will need to be avoided has been identified which includes surface water/wetland features present within the development footprint. The development footprint is however large enough to enable the avoidance of the sensitive features and the associated buffers by the facility layout and still provide an opportunity for the successful development and operation of the Bonsmara Solar Power Plant from a technical perspective.

Therefore, a single preferred location alternative was assessed – refer to Figure 5.1.

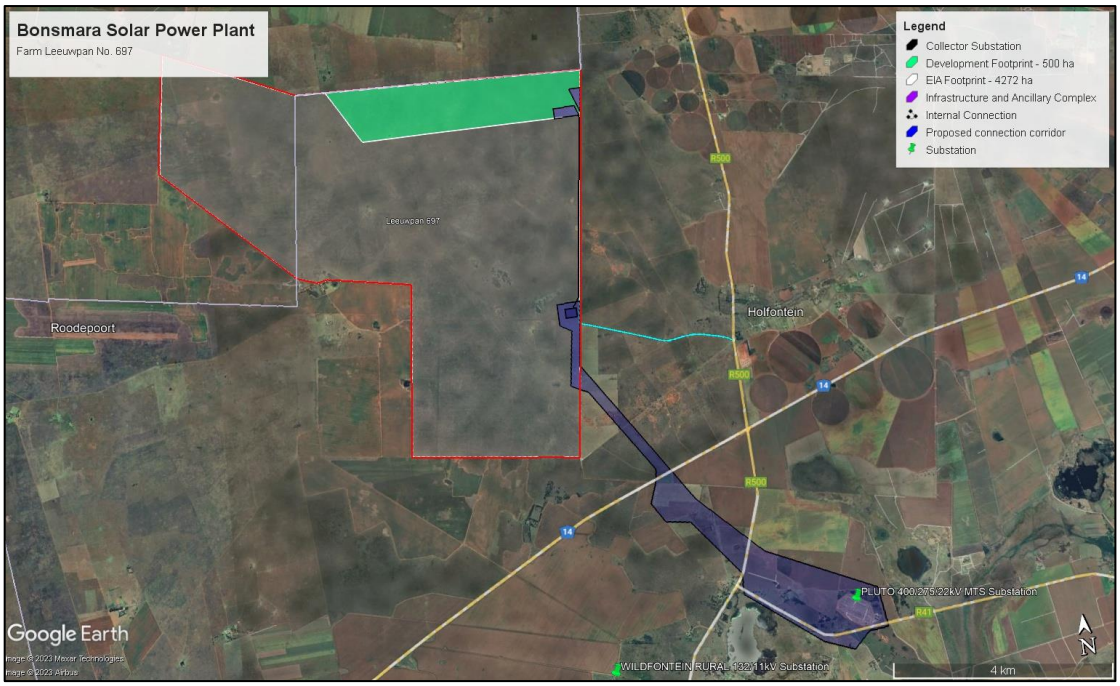


Figure 5.1: Location of the single preferred location alternative (i.e. development footprint) located within the affected property assessed

5.1.3 Activity Alternatives

The scoping process also needs to consider if the development of a solar PV facility would be the most appropriate land use for the particular site.

- Photovoltaic (PV) solar facility – Bonsmara Solar Power Plant (RF) (Pty) Ltd is part of a portfolio of solar PV projects throughout South Africa. Bonsmara Solar Power Plant (RF) (Pty) Ltd is of the opinion that solar PV technology is perfectly suited to the site, given the high irradiation values for of the Carletonville area – refer to Figure 5.2. The technology furthermore entails low visual impacts, have relatively low water requirements, is a simple and reliable type of technology and all the components can be recycled.

- Wind energy facility - Due to the local climatic conditions a wind energy facility is not considered suitable as the area does not have the required wind resource. Furthermore, the applicant has opted for the generation of electricity via solar power rather than the use of wind turbines based on the renewable energy resource available for the area. This alternative is therefore regarded as not feasible and will not be evaluated further in this report.

- Concentrated solar power (CSP) technology - CSP technology requires large volumes of water, and this is a major constraint for this type of technology considering the water challenges and limitation experienced not only in the country but also within the local area. While the irradiation values are high enough to generate sufficient solar power, the water constraints render this alternative not feasible. It must also be noted that the IRP no longer includes the use of CSP as part of the energy mix of the county. Therefore, this alternative will not be considered further in this report.

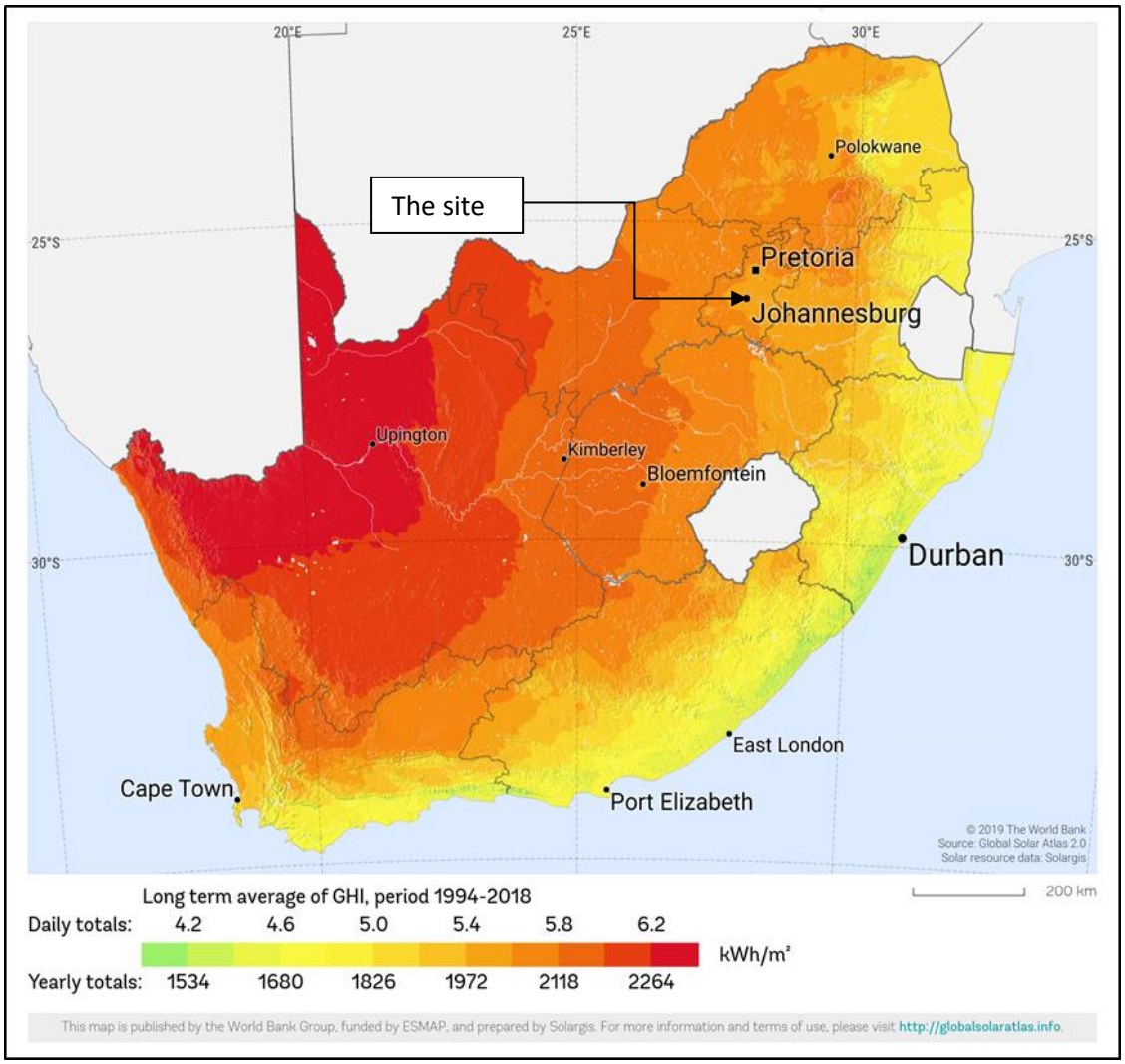


Figure 5.2: Global horizontal irradiation values for South Africa (Solar GIS, 2021) and the **Bonsmara Solar Power Plant** PV facility development footprint

5.1.4 Technical alternatives

Possible technical alternatives for the development of a solar PV facility needs to be considered during the EIA process.

5.1.4.1 Distribution lines

An onsite substation will be required to step the voltage up to 132kV, after which the power will be evacuated into a new proposed collector substation to step the voltage up from 132KV to 275/400KV in order to evacuate the power into the national grid at the same voltage level as the MTS via the proposed 132/275/400KV power line. It is expected that generation from the facility will tie in with a newly proposed collector substation to be connected to the existing Pluto 400/275/22kV MTS, it may also be required to create a 132KV feeder bay and transformation at Pluto MTS in order to connect the collector substation at the MTS with a single or double circuit 132KV connection line. An internal connection line will be required form the on-site substation towards the on-site collector substation, whereafter a connection line will be constructed towards the Pluto MTS. The connection line will be assessed within a 200 m wide (up to 1.2 km wide in the area surrounding the existing Eskom Substation) and 7.5

km long grid connection corridor. The connection power line will be constructed within the limits of the grid connection corridor. The project will generate up to 250MW of electricity.

A 132kV overhead distribution line is the only preferred alternative for the applicant due to the following reasons:

- **Overhead Distribution Lines** - Overhead lines are less costly to construct than underground lines. Therefore, the preference for overhead lines is mainly based on cost. Overhead lines allow high voltage operations, and the surrounding air provides the necessary electrical insulation to earth. Further, the surrounding air cools the conductors that produce heat due to lost energy (Swingler *et al.*, 2006).

  The overall weather conditions in the Limpopo Province are unlikely to cause damage and faults on the proposed overhead distribution power line. Nonetheless, if a fault occurs, it can be found quickly by visual means using a manual line patrol. Repair to overhead lines is relatively simple in most cases and the line can usually be put back into service within a few days. In terms of potential impacts associated with overhead distribution lines these include visual intrusion and threats to sensitive habitat (where applicable).

  Furthermore, overhead power lines also provide an opportunity for the avoidance of sensitive environmental features as the overhead lines can span on-ground environmental features to ensure conservation, therefore providing more flexibility in terms of mitigation of the associated on-ground disturbance.

  The choice of structure to be used for the power line will be determined in consultation with Eskom once the Engineers have assessed the geotechnical and topographical conditions and decided on a suitable structure which meets the prescribed technical requirements. The choice of structures to be used will not have any adverse impacts on the environment. The line will be constructed according to the authorised standards for a power line approved by Eskom Holdings SoC Ltd.

  The following alternatives may be considered for the overhead power line:

  - Single Circuit Overhead Power Line

    The use of single circuit overhead power lines to distribute electricity is considered the most appropriate technology and has been designed over many years for the existing environmental conditions and terrain as specified in the Eskom Specifications and best international practice. Based on all current technologies available, single circuit overhead power lines are considered the most environmentally practicable technology available for the distribution of power. This option is considered appropriate for the following reasons:

    - More cost-effective installation costs;
    - Less environmental damage during installation; and
    - More effective and cheaper maintenance costs over the lifetime of the power line.

  - Double Circuit Overhead Power Line

Where sensitive environmental features are identified, and there is sufficient justification, Eskom will consider the use of double circuit (placing 2 power lines on either side of the same tower structure) to minimise impacts. However, the use of double-circuiting has a number of technical disadvantages, which includes faults or problems on one power line may mean that the other power line is also disabled during maintenance, and this will affect the quality of supply to an area. Larger and taller towers as well as more towers are required for double-circuit power lines.

The double-circuit overhead power line proves more feasible since the single circuit may not have the capacity to transmit the large amount of electricity generated from the plant and during maintenance the entire plant would not have to be offline as one of the double circuit lines would still be able to supply electricity. However, due to the rapid requirement changes, this will only be determined before construction.

- **Underground Distribution Lines** - Underground cables have generally been used where it is impossible to use overhead lines (for example due to space constraints). Underground cables are oil cooled and are also at risk of groundwater contamination. Maintenance is also difficult on underground lines compared to overhead lines. When a fault occurs in an underground cable circuit, it is almost exclusively a permanent fault due to poor visibility. Underground lines are also more expensive to construct than overhead lines.

5.1.4.2 Battery Energy Storage Facility (BESS)

It is proposed that a nominal up to 500 MWh Battery Storage Facility for grid storage would be housed in stacked containers, or multi-storey building, with a maximum height of 8m and a maximum volume of 1,740 m3 of batteries and associated operational, safety and control infrastructure. Three types of battery technologies are being considered for the proposed project: Lithium-ion, Sodium-sulphur or Vanadium Redox flow battery. The preferred battery technology is Lithium-ion.

Battery storage offers a wide range of advantages to South Africa including renewable energy time shift, renewable capacity firming, electricity supply reliability and quality improvement, voltage regulation, electricity reserve capacity improvement, transmission congestion relief, load following and time of use energy cost management. In essence, this technology allows renewable energy to enter the base load and peak power generation market and therefore can compete directly with fossil fuel sources of power generation and offer a truly sustainable electricity supply option.

5.1.5 Design and layout alternatives

Design alternatives were considered throughout the planning and design phase (i.e. what would be the best design option for the development?). In this regard discussions on the design were held between the EAP and the developer, which also included the consideration of sensitive environmental areas and features present as identified by the independent specialists that needs to be avoided by the placement of infrastructure. It should be noted that the final layout plan will be submitted as part of the EIA Report.

The draft layout follows the limitations of the site and aspects such as environmental sensitive areas (supported by specialist input), roads, fencing and servitudes are considered. The total surface area proposed for layout options include the PV panel arrays spaced to avoid

shadowing, access and maintenance roads and associated infrastructure (buildings, power inverters, power lines, BESS and perimeter fences). With regards to the structure orientation, the panels will either be fixed to a single-axis horizontal tracking structure where the orientation of the panel varies according to the time of the day, as the sun moves from east to west or tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture the most sun.

The choice of pylon structure to be used for the power line will be determined in consultation with Eskom and does not significantly affect the environmental impacts of the proposed development as provision has already been made for the visual, ecological and heritage impacts of erecting a power line. No defined structure has been confirmed at this stage and will depend on Eskom's technical requirements. The 132kV line must be constructed according to the authorised standards for a power line approved by Eskom Holdings SoC Ltd. The structure to be utilised for the power line towers will also be informed by the local geotechnical and topographical conditions. The following alternatives are considered with regards to the proposed structures:

Steel lattice towers:

The steel lattice towers provide the following advantages over the other tower types available:

- Enables multipath earthing which enhances the overall electrical performance of the power line.
- Is visually less obtrusive than the mono-pole options.
- Is more practicable that other options i.e. more cost effective and more practical to construct and maintain.
- Is safer to work on than the monopole and wood pole structures.
- Is more durable than the wood pole structures.

Steel monopoles:

The steel monopole is considered less suitable than the steel lattice towers for the following reasons:

- Is visually more intrusive than the lattice towers.
- Is more expensive than the lattice towers.
- Requires more steel than the lattice towers.
- Is more difficult to erect.
- Is not as safe to work on as the lattice towers.

Wood poles:

Wood pole structures are only used in extreme circumstances where a visual impact needs to be avoided. Wood pole structures may be cheaper to produce and to construct, but they have one tenth of the lifespan of the metal counterparts and are far more susceptible to weather conditions which makes them less efficient and practicable. The wood pole structure is also

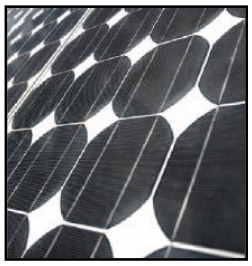
more susceptible to having the cross arms burnt off by electrical faults as well as being susceptible to deformation with height.

5.1.6 Technology alternatives

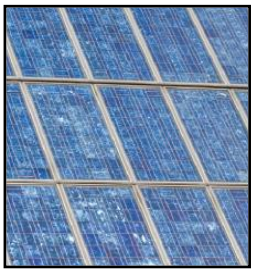
There are several types of semiconductor technologies currently available and in use for PV solar panels. Two, however, have become the most widely adopted, namely crystalline silicon and thin film. These technologies are discussed in more detail below:

- Crystalline (high efficiency technology at higher cost):

  Crystalline silicon panels are constructed by first putting a single slice of silicon through a series of processing steps, creating one solar cell. These cells are then assembled together in multiples to make a solar panel. Crystalline silicon, also called wafer silicon, is the oldest and the most widely used material in commercial solar panels. Crystalline silicon modules represent 85-90% of the global annual market today. There are two main types of crystalline silicon panels that can be considered for the solar facility:



  - Mono-crystalline Silicon - mono-crystalline (also called single crystal) panels use solar cells that are cut from a piece of silicon grown from a single, uniform crystal. Mono-crystalline panels are among the most efficient yet most expensive on the market. They require the highest purity silicon and have the most involved manufacturing process.



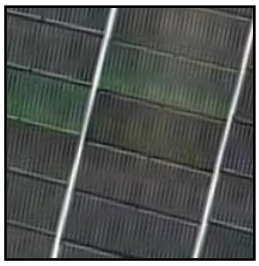
  - Poly-crystalline Silicon – poly-crystalline panels use solar cells that are cut from multifaceted silicon crystals. They are less uniform in appearance than mono-crystalline cells, resembling pieces of shattered glass. These are the most common solar panels on the market, being less expensive than mono-crystalline silicon. They are also less efficient, though the performance gap has begun to close in recent years (First Solar, 2011).

- Thin film (low-cost technology with lower efficiency):

  Thin film solar panels are made by placing thin layers of semiconductor material onto various surfaces, usually on glass. The term *thin film* refers to the amount of semiconductor material used. It is applied in a thin film to a surface structure, such as a sheet of glass. Contrary to popular belief, most thin film panels are not flexible. Overall, thin film solar panels offer the lowest manufacturing costs, and are becoming more prevalent in the industry. Thin films currently account for 10-15% of global PV module sales. There are three main types of thin film used:

- Cadmium Telluride (CdTe) - CdTe is a semiconductor compound formed from cadmium and tellurium. CdTe solar panels are manufactured on glass. They are the most common type of thin film solar panel on the market and the most cost-effective to manufacture. CdTe panels perform significantly better in high temperatures and in low-light conditions.

- Amorphous Silicon - Amorphous silicon is the non-crystalline form of silicon and was the first thin film material to yield a commercial product, first used in consumer items such as calculators. It can be deposited in thin layers onto a variety of surfaces and offers lower costs than traditional crystalline silicon, though it is less efficient at converting sunlight into electricity.



- Copper, Indium, Gallium, Selenide (CIGS) - CIGS is a compound semiconductor that can be deposited onto many different materials. CIGS has only recently become available for small commercial applications, and is considered a developing PV technology (First Solar, 2011).

- <u>Bifacial panels:</u>

  As the name suggests, bifacial solar panels have two faces, or rather, they can absorb light from both sides of the panel. A lot of potential energy transfer is lost in traditional solar cells when the light hits the back of a solar panel. Most bifacial solar panels use monocrystalline cells, whereas traditional cells use polycrystalline materials. The monocrystalline materials, alongside the clear light pathway on both sides of the panel, enable the light to be absorbed from either side of the cell, and it is thought that the overall efficiency of these cells can be up to 30% greater in commercial applications. Although, the exact amount is variable depending on the surface that they are installed on. The front side of the solar panel still absorbs most of the solar light, but the back side of the solar panel can absorb between 5-90% of the light absorbed by the front of the solar panel. Refer to Figure 5.3.

  Traditional solar panels use an opaque back sheet. By comparison, bifacial solar panels either have a clear/reflective back sheet or have dual panes of glass. Most of these solar panels are frameless so any issues with potential-induced degradation (PID) are reduced. To efficiently convert light into electricity from both sides, bifacial solar cells have selective-area metallization schemes that enable light to pass between the metallized areas, rather than the conventional thick metal collectors as seen with monofacial solar panels.

  The technology that (at this stage) proves to be most feasible and reasonable with respect to the proposed solar facility is crystalline silicon panels, due to it being non-reflective, more efficient, and with a higher durability. However, due to the rapid technological advances being made in the field of solar technology the exact type of

technology to be used, such as bifacial panels, will only be confirmed at the onset of the project.

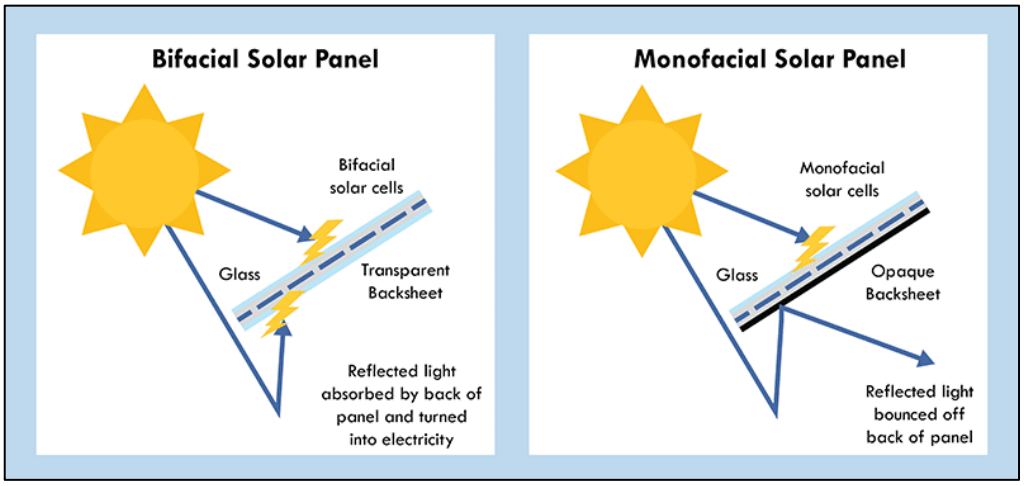


Figure 5.3: Bifacial vs Monoficial Solar Panel absorption.

5.2 PUBLIC PARTICIPATION PROCESS

The following sections provide detailed information on the public participation process conducted in terms of Regulations 39 to 44.

5.2.1 General

The public participation process was conducted strictly in accordance with Regulations 39 to 44. The following three categories of variables were taken into account when deciding the required level of public participation:

- The scale of anticipated impacts;
- The sensitivity of the affected environment and the degree of controversy of the project; and
- The characteristics of the potentially affected parties.

Since the scale of anticipated impacts is low, the general land use of the area is related to mining and agriculture, the limited environmental sensitivity of the site and the fact that no conflict was foreseen between potentially affected parties, no additional public participation mechanisms are considered at this stage of the process. The following actions have already been undertaken:

➢ Site notices

Site notices (size 60 cm x 42 cm) were erected on site on 28 February 2023 informing the public of the commencement of the S&EIR process. Photographic evidence of the site notices is included in Appendix C3.

➢ Newspaper advertisement

Since the proposed development is unlikely to result in any impacts that extend beyond the municipal area where it is located, it was deemed sufficient to advertise in a local newspaper. An advertisement was placed in the Carletonville Herald on 19 March 2023

(see Appendix C2) notifying the public of the EIA process and requesting Interested and Affected Parties (I&APs) to register with, and submit their comments to Environamics Environmental Consultants. I&APs were given the opportunity to raise comments within 30 days of the advertisement.

- Background Information Document (BID)

  A BID was released to all I&APs including the adjacent landowners, key stakeholders and relevant organs of state on 13 March 2023. The BID provided information on the proposed development, the S&EIA process. I&APs were invited to register onto the project I&AP database.

- Direct notification of identified I&APs

  Identified I&APs, including key stakeholders representing various sectors, has been directly informed of the EIA process via registered post, telephone calls, WhatsApp's and emails (as relevant). The BID was distributed with the notification. For a complete list of I&APs with their contact details see Appendix C4 to this report.

- Direct notification of surrounding landowners and occupiers

  Written notices were also provided via registered post, WhatsApp or email (as relevant) to all surrounding landowners and occupiers.

- Circulation of Draft Scoping Report

  Copies of the Draft Scoping Report (DSR) has been provided to all I&APs via courier, Dropbox and/or email (as relevant). Hard copies of the report will be made available on request and where an I&AP does not have the resources to view the report on an online platform.

5.2.2 Consultation Process

Regulation 41 requires that the landowner, surrounding landowners, municipality, relevant ward councillor, any organ of state having jurisdiction in respect of any aspect of the activity should be given written notice of the activity. A complete list of all the consultees who received written notice as well as proof of correspondence is attached as Appendices C4 and C5.

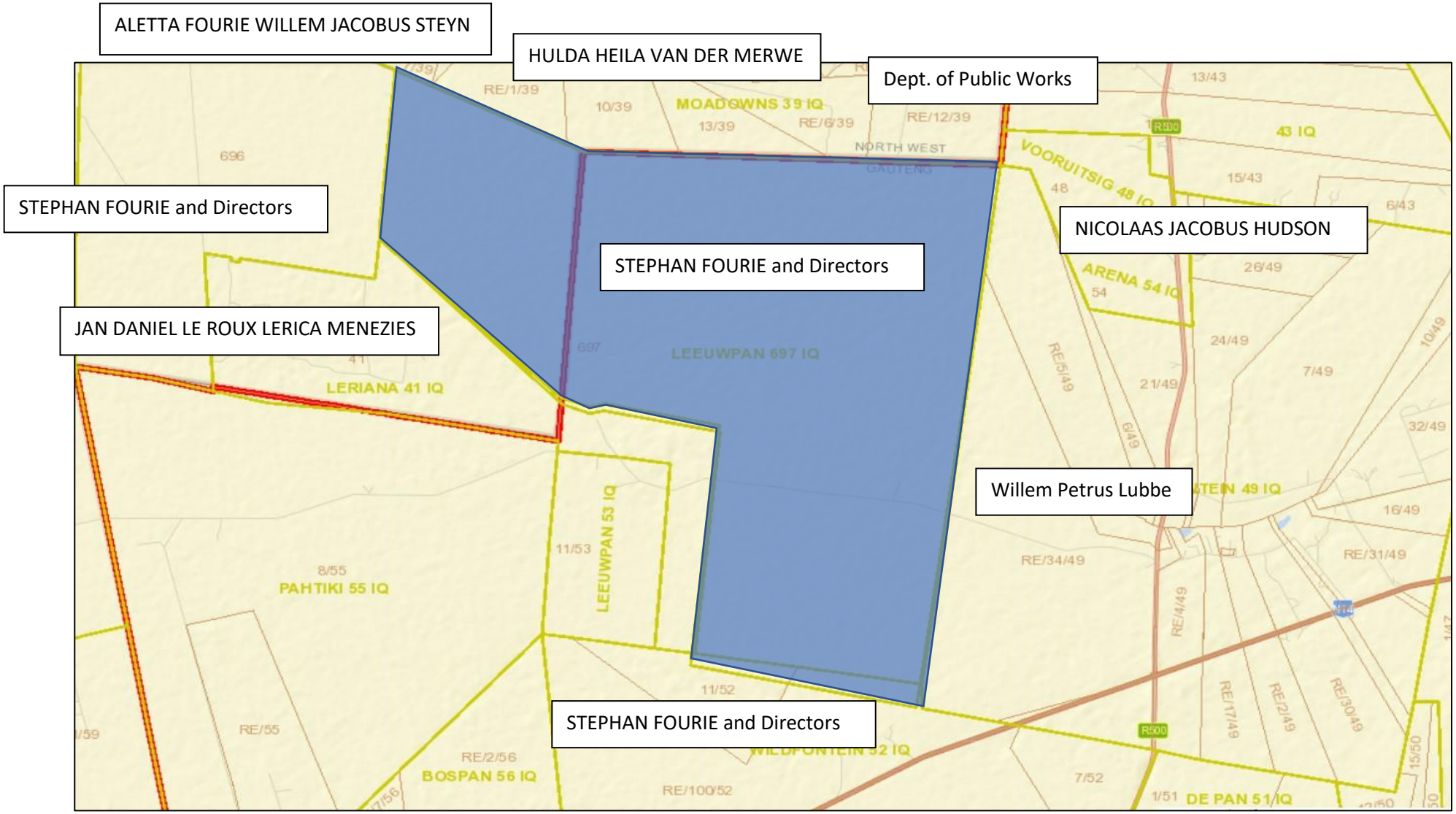


Figure 5.4: Affected properties (Blue) in Relation to Surrounding Properties

5.2.3 Registered I&APs

I&APs include all stakeholders who deem themselves affected by the proposed activity. According to Regulation 43(1) "*A registered interested and affected party is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application*."

This report is the Draft Scoping Report which has been made available to all potential and/or registered I&APs and State Departments. They have been provided with a copy of the Draft Scoping Report and have been requested to provide written comments on the report within 30 days. All issues identified during this review period will be documented and compiled into a Comments and Response Report to be included as part of the Final Scoping report.

All comments received during the release of the BID for the 30-day review and comment period have been included in this report as Appendix C5, Appendix C6 and Appendix C7 to provide I&APs an opportunity to confirm that their comments raised during the initial public participation phase has been included and considered as part of the EIA process.

5.2.4 Issues Raised by I&APs and Consultation Bodies

Any comments received during the circulation of the DSR will be summarised in the final Scoping Report. The full wording and original correspondence are included in Appendix C6.

5.3 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PREFERRED ALTERNATIVE

The following sections provide general information on the biophysical and socio-economic attributes associated with the preferred alternative (i.e., the location of the development footprint within the affected property).

5.3.1 Biophysical Environment

The biophysical environment is described with specific reference to geology, soils, agricultural potential, vegetation and landscape features, climate, biodiversity, heritage features (in terms of archaeology and palaeontology), the visual landscape and the social environment to be affected. A number of specialists were consulted to assist with the compilation of this chapter of the report – refer to the table 1.1.

However, due to the fact that the area proposed for development (i.e. the development footprint) exclusively consists of land used for grazing, limited sensitive areas from an ecological, heritage or conservation point have been identified. These features are described in more detail below.

5.3.1.1 Climate

This vegetation type experiences summer rainfall with very dry winters. It is characterised by a Mean Annual Precipitation (MAP) of approximately 500 - 650 mm. Temperatures are high in summer and severe frosts infrequently occurs during the winter months.

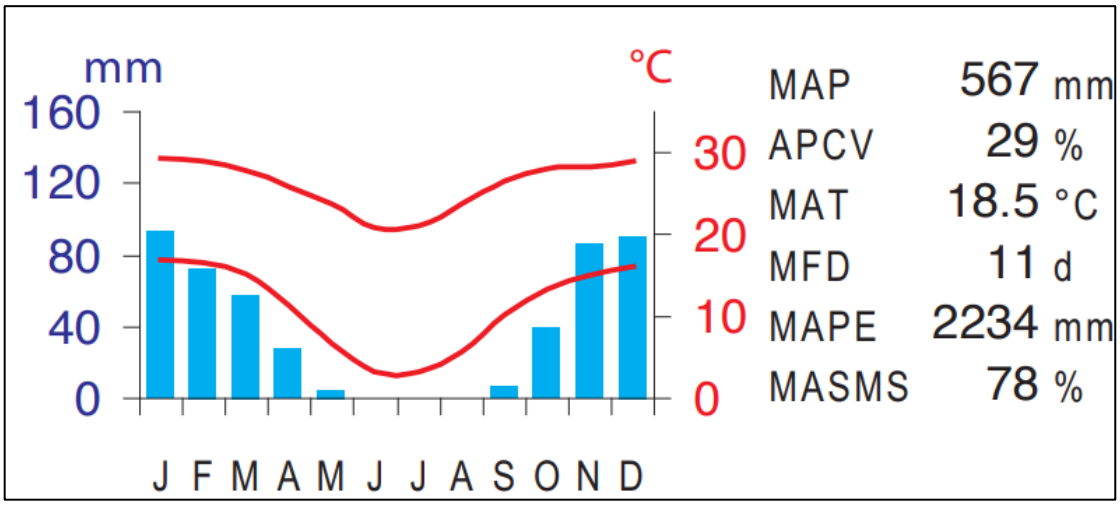


Figure 5.5: Summarised climate for the region (Mucina & Rutherford, 2006)

5.3.1.2 Geology

According to the Heritage and Palaeontological Impact Assessment (Appendix E5), The geology of the proposed Bonsmara Solar Power Plant near Carletonville in Gauteng is depicted on the1: 250 000 West Rand 2626 (1986) Geological Map (Council for Geosciences, Pretoria). The site is underlain by Precambrian dolomites and associated marine sedimentary rocks that are allocated to the Malmani Subgroup (Chuniespoort Group, Transvaal Supergroup). The Malmani Subgroup in this area is undifferentiated. The PalaeoMap of the South African Heritage Resources Information System (SAHRIS) indicates that the Palaeontological

Sensitivity of the Malmani Subgroup is Very High (Almond and Pether, 2009; Almond et al., 2013).

5.3.1.3 Soils and Agricultural Potential

According to the Soil Site Verification Report (attached in Appendix E4), the following land potential level have been determined;

- Land potential level 5 (this land potential level is characterised by restricted potential. Regular and/or moderate to severe limitations due to soil, slope, temperatures or rainfall).

Fifteen land capabilities have been digitised by (DALRRD, 2017) across South Africa, of which ten potential land capability classes are located within the proposed footprint area's assessment area, including;

- Land Capability 6 to 8 (Low to Moderate Sensitivity); and
- Land Capability 9 to 10 (Low to Moderate Sensitivity).

The land capability sensitivity (DAFF, 2017) indicates a range of sensitivities expected throughout the project focus area. The proposed project area falls within the "Low - Moderate" to "Moderate High" sensitivities (Figure 5.6). The baseline soil findings and the DFFE (2023) agricultural theme concur for most areas with "Low Moderate" to "Moderate High" sensitivities. Crop field areas with a high agricultural land capability were identified within the project development footprint. The dominant soil forms within the project area are Hutton and Mispah soil forms. The dominant Hutton soil form is associated with "Moderate to Moderate High" land capability sensitivity. The land capability sensitivity for other soil form found within the project area includes the Avalon is classified as "Moderate to Moderate High". However, the other areas with the dominant Mispah soil form are characterised with "Low to Moderate" land capability sensitivity, indicating a very low agricultural potential in those areas. Following the verified baseline finding the area can be categorised with "Moderately high" sensitivities. The climatic conditions of the project area will also have an impact on the land capability and land potential of moderately high sensitivity areas. Areas with active cultivated fields or high potential lands can be treated as no-go areas. The stakeholders can also obtain consent for use of those areas or engage with the landowners for appropriate compensation for use of these areas for the for the project.

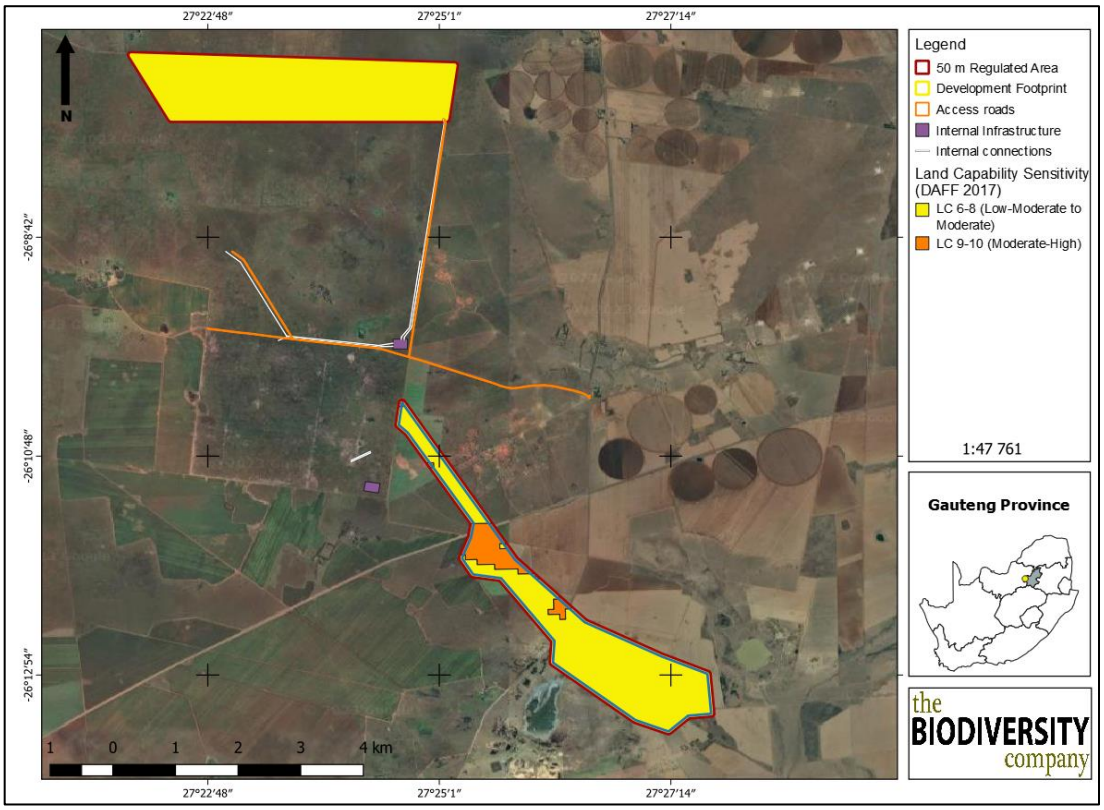


Figure 5.6: Land capability of the proposed Bonsmara SPP

The baseline soil findings and the DFFE (2023) agricultural theme concur with each other on most areas. The Hutton and Avalon soil forms are categorised with "Moderate to Moderate High" land capability sensitivity. Other soil forms found within the project area, including Mispah, are categorised with a "Low – Moderate" land capability sensitivity. Therefore, following the verified baseline findings, the proposed project area can be categorised with "Medium" land potential. In addition, factors such as topography and the harsh climatic conditions will also reduce the area's agricultural potential. .

5.3.1.4 Terrestrial Biodiversity

The Terrestrial Ecology Site Sensitivity Verification Report (attached in Appendix E1) covers the entire Pluto PV Cluster Project Area, which includes the farm Leeuwpan 697 (within which the proposed four SPP areas will be developed - Angus, Bonsmara, Simbra and Tuli) and all proposed powerline corridors to the nearby Pluto substation (Figure 5.7).

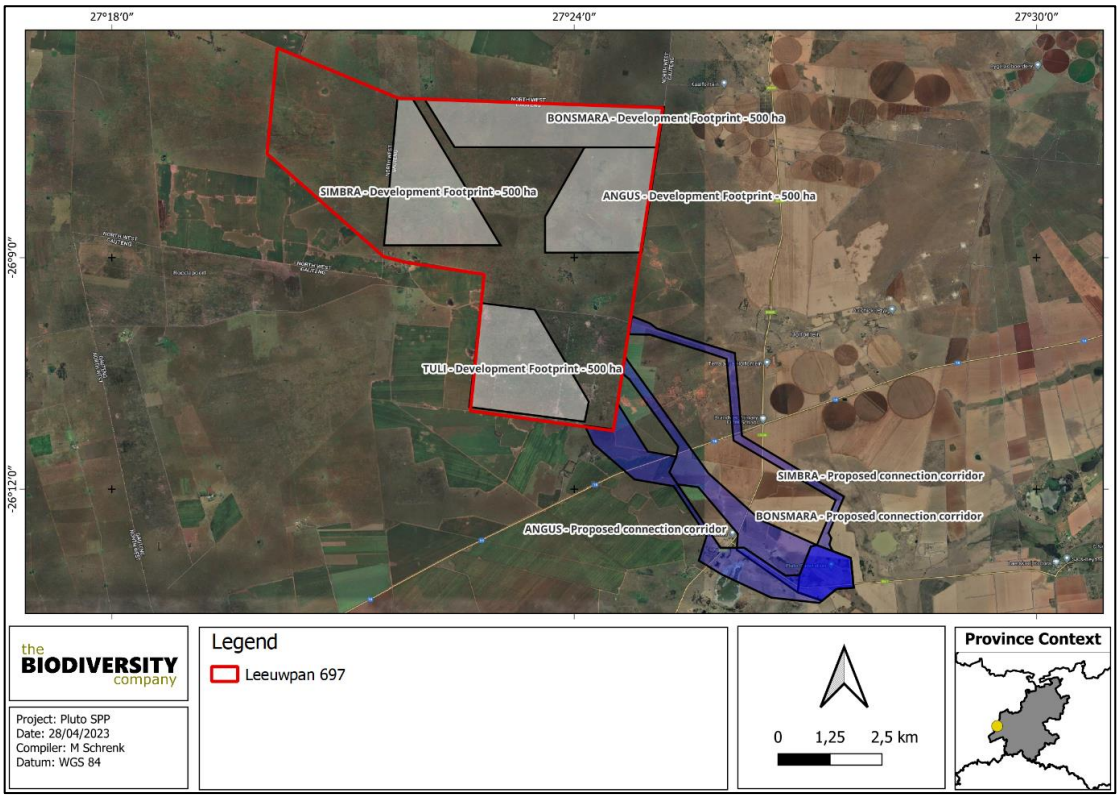


Figure 5.7: Areas considered as part of the Terrestrial Ecology Site Sensitivity Verification Report

The following is deduced from the National Web-based Environmental Screening Tool Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended):

- Terrestrial Biodiversity Theme sensitivity is Very High and Low for the PAOI, with the possibility of a CBA, ESA and Protected Areas Expansion (Figure 5.8);
- Plant Species Theme sensitivity is Medium and Low for the PAOI (Figure 5.9). Up to four sensitive species could potentially occur in the PAOI.
- Animal Species Theme sensitivity is Low, Medium and High for the PAOI (Figure 5.10); and

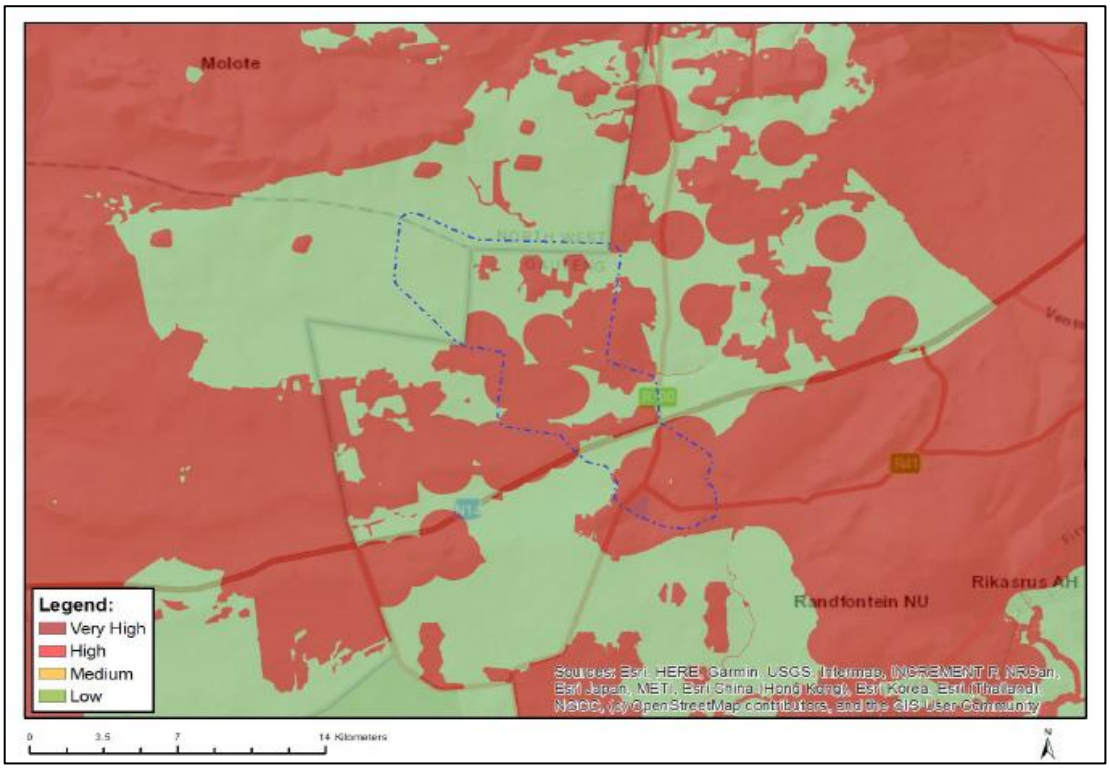


Figure 5.8: Terrestrial Biodiversity Theme Sensitivity according to the DFFE Screening Tool.

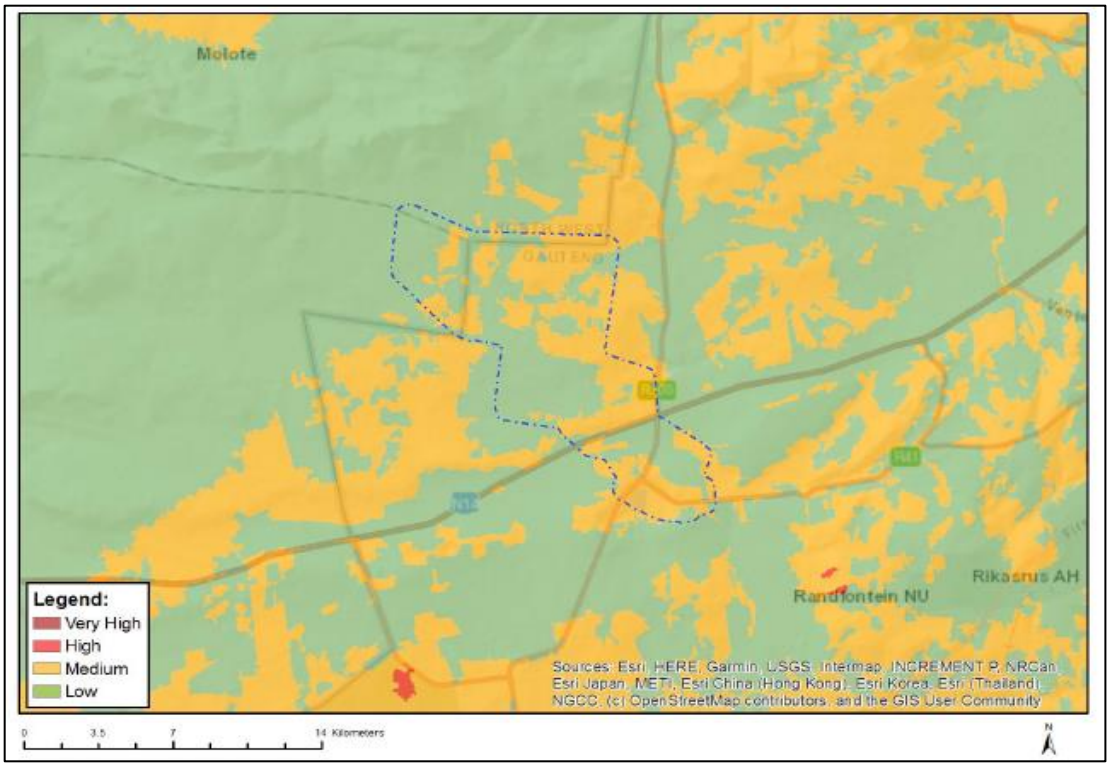


Figure 5.9: Plant Species Theme Sensitivity according to the DFFE Screening Tool.

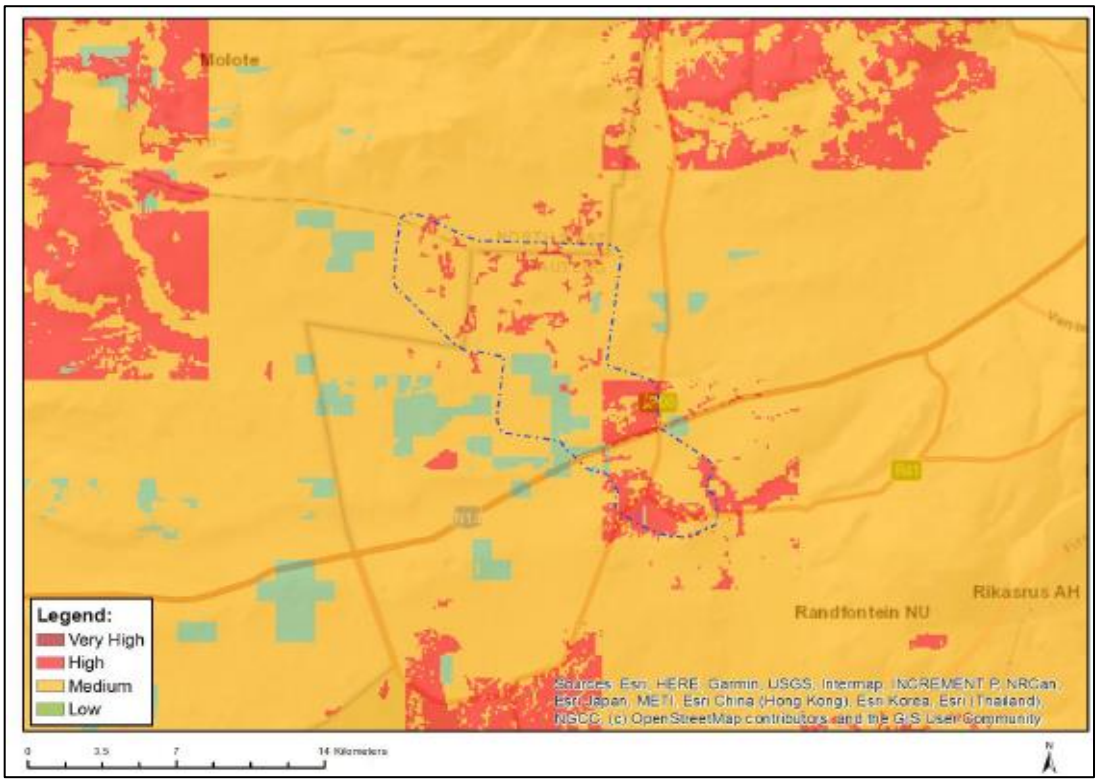


Figure 5.10: Animal Species Theme Sensitivity according to the DFFE Screening Tool.

The site assessment was undertaken in April 2023, which constitutes a late wet-season survey. The different habitat types within the Project Area of Influence (PAOI) were delineated and identified based on observations during the field assessment, and available satellite imagery. These habitat types were assigned Ecological Importance (EI) categories based on their ecological integrity, conservation value, the presence of species of conservation concern and their ecosystem processes.

Three (3) different terrestrial habitat types were delineated within the PAOI, (**Error! Reference source not found.** 5.1). Based on the sensitivity criteria, all habitats within the PAOI were allocated a sensitivity category. The sensitivities of the habitat types delineated are illustrated in Figure 5.1.

The Site Sensitivity Verification largely disputes the very high terrestrial biodiversity theme sensitivity as indicated in the Screening Tool (Figure 5.8). Only one habitat type, the rocky outcrops, was assigned a high sensitivity.

Table 5.1: Summary of habitat types delineated within the Project Area and the assigned EI values.

Habitat Type	Description	Ecosystem Processes and Services	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Site Ecological Importance (SEI) Guidelines for interpreting SEI in the context of the proposed development activities
Developed	Developed, cleared, or agricultural land. No longer ecologically functional in any meaningful sense.	Some connectivity and foraging for common fauna species.	**Medium** Confirmed or highly likely occurrence of populations of Near Threatened (NT) species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. Any area of natural habitat of threatened ecosystem type with status of VU. Presence of range-restricted species. > 50% of receptor contains natural habitat with potential to support SCC.	**Medium** Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types. Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential.	**Medium**	**High** Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) returning to a site once the disturbance or impact has been removed.	**Low** Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Degraded Dolomite Grassland	Moderately undulating sections of rocky grassland. Semi – to fully functional CBA and ESA habitat. Important for supporting key ecosystem services and providing habitat connectivity.	Foraging habitat for fauna species. Erosion control and nutrient cycling. Grazing land. Carbon sequestration and nectar	**Medium** Confirmed or highly likely occurrence of populations of Near Threatened (NT) species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. Any area of natural habitat of threatened ecosystem type with status of VU.	**High** Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types. Good habitat connectivity, with potentially functional ecological corridors and a regularly used road network	**Medium**	**Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the	**Medium** Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.

Habitat Type	Description	Ecosystem Processes and Services	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Site Ecological Importance (SEI) Guidelines for interpreting SEI in the context of the proposed development activities
	Portions of this unit have been subject to historical overgrazing and some current indigenous weed invasion – however these areas of the habitat exist in a state of recovery.	resources for pollinators. Important movement corridors for all types of fauna.	Presence of range-restricted species. > 50% of receptor contains natural habitat with potential to support SCC.	between intact habitat patches. Only minor current negative ecological impacts, with no signs of major past disturbance and good rehabilitation potential.		disturbance or impact has been removed.	
Rocky Outcrops	Prominent to low outcrops of dolomite and granite rock, and other similarly important micro-habitat features. Some features overlap with provincial CBA sites.	Important foraging and nesting habitat for many unique and niche-habitat flora and fauna species, including numerous reptile species and possible flora and fauna SCC.	**Medium** Confirmed or highly likely occurrence of populations of Near Threatened (NT) species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. Any area of natural habitat of threatened ecosystem type with status of VU. Presence of range-restricted species. > 50% of receptor contains natural habitat with potential to support SCC.	**High** Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types. Good habitat connectivity, with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts, with no signs of major past disturbance and good rehabilitation potential.	**Medium**	**Low** Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) returning to a site once the disturbance or impact has been removed.	**High** Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.

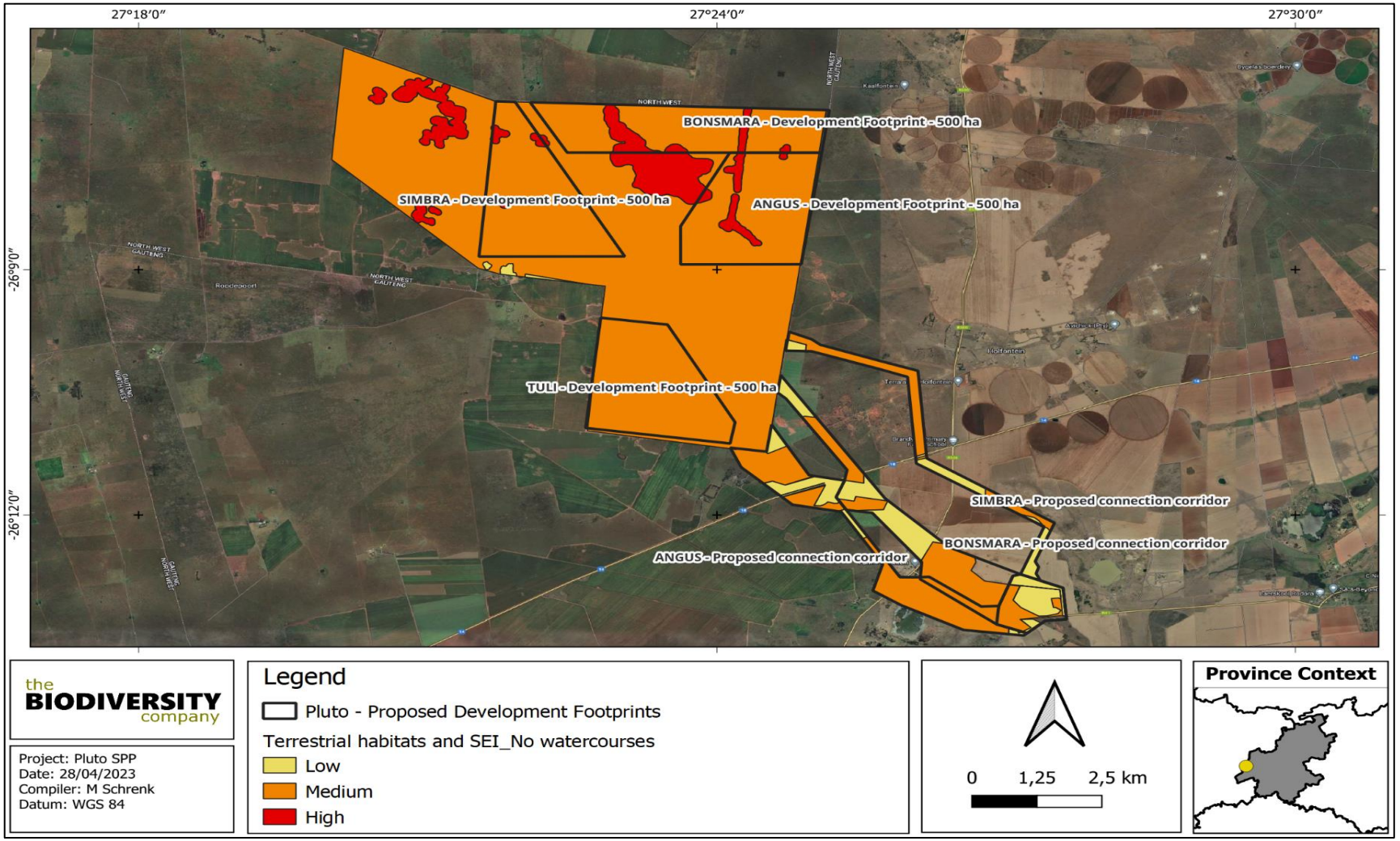


Figure 5.11: Map illustrating the Site Ecological Importance of the total Project Area

Screening Tool Comparison

The allocated sensitivities for each of the relevant themes are either disputed or validated for the overall PAOI in Table 5.2 below. A summative explanation for each result is provided as relevant. The specialist-assigned sensitivity ratings are based largely on the SEI process followed in the previous section, and consideration is given to any observed or likely presence of SCC or protected species.

Table 5.2 Summary of the screening tool vs specialist assigned sensitivities.

Screening Tool Theme	Screening Tool	Specialist	Tool Validated or Disputed by Specialist - Reasoning
Animal Theme	Low-High	Medium	Disputed – Only the rocky outcrop habitat and specific portions of connective habitat maybe supportive of sensitive species.
Plant Theme	Low-Medium	Medium	Validated – No SCC were recorded but there is potential for them to occur, especially within the rocky outcrop habitat.
Terrestrial Theme	Low-Very high	Medium-High	Disputed – Certain habitat sensitivities are regarded as high, while others are medium and low. Minimal significant habitat fragmentation was present. Although large scale pioneer species and weed invasion was evident, there is important functionality.

5.3.1.5 Wetlands and Riparian Features

According to the Wetland Baseline and Impact Assessment Assessment (Appendix E1), the proposed area overlaps within the Grassland Biome (Mucina & Rutherford, 2006). Biomes are further divided into bioregions, which are spatial terrestrial units possessing similar biotic and physical features, and processes at a regional scale. The study site overlaps with the Dry Highveld Grassland Bioregion. The vegetation type associated with the study site is the Carletonville Dolomite Grassland (Gh 15) vegetation type.

The following species are important in the Carletonville Dolomite Grassland vegetation type:

Graminoids: *Aristida congesta , Brachiaria serrata, Cynodon dactylon, Digitaria tricholaenoides , Diheteropogon amplectens, Eragrostis chloromelas, E. racemosa, Heteropogon contortus, Loudetia simplex, Schizachyrium sanguineum, Setaria sphacelata, Themeda triandra, Alloteropsis semialata subsp. eckloniana, Andropogon schirensis, Aristida canescens, A. diffusa, Bewsia biflora, Bulbostylis burchellii, Cymbopogon caesius, C. pospischilii, Elionurus muticus, Eragrostis curvula, E. gummiflua, E. plana, Eustachys paspaloides, Hyparrhenia hirta, Melinis nerviglumis, M. repens subsp. repens, Monocymbium ceresiiforme, Panicum coloratum, Pogonarthria squarrosa, Trichoneura grandiglumis, Triraphis andropogonoides, Tristachya leucothrix, T. rehmannii.*

Herbs: *Acalypha Bonsmaratata, Barleria macrostegia, Chamaecrista mimosoides, Chamaesyce inaequilatera, Crabbea Bonsmaratifolia, Dianthus mooiensis, Dicoma anomala, Helichrysum caespititium, H. miconiifolium, H. nudifolium var. nudifolium, Ipomoea ommaneyi, Justicia anagalloides, Kohautia amatymbica, Kyphocarpa Bonsmaratifolia, Ophrestia oblongifolia, Pollichia campestris, Senecio coronatus, Vernonia oligoceBonsmara.*

Geophytic Herbs: *Boophone disticha, Habenaria mossii.*

Low Shrubs: *Anthospermum rigidum subsp. pumilum, Indigofera comosa, Pygmaeothamnus zeyheri var. rogersii, Searsia magalismontana, Tylosema esculentum, Ziziphus zeyheriana.*

Geoxylic Suffrutices: Elephantorrhiza elephantina, Parinari capensis subsp. capensis.

Conservation Status

According to Mucina and Rutherford (2006), this vegetation type is classified as Vulnerable (VU). The national target for conservation protection for both these vegetation types is 24%, but only a small extent is conserved in statutory (Sterkfontein Caves — part of the Cradle of Humankind World Heritage Site, Oog Van Malmanie, Abe Bailey, Boskop Dam, Schoonspruit, Krugersdorp, Olifantsvlei, Groenkloof) and in at least six private conservation areas. Almost a quarter already transformed for cultivation, by urban sprawl or by mining activity as well as the building of the Boskop and Klerkskraal Dam

South African Inventory of Inland Aquatic Ecosystems

This spatial dataset is part of the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) which was released as part of the National Biodiversity Assessment (NBA) 2018. National Wetland Map 5 (NWM5) includes inland wetlands and estuaries, associated with river line data and many other data sets within the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) 2018.

According to the NBA 2018 and NWM5, three wetland types are expected to overlap with the 500m regulatory area (PAOI). These are Depressions, Seeps and an Unchannelled Valley Bottom wetland (see Figure 5.12).

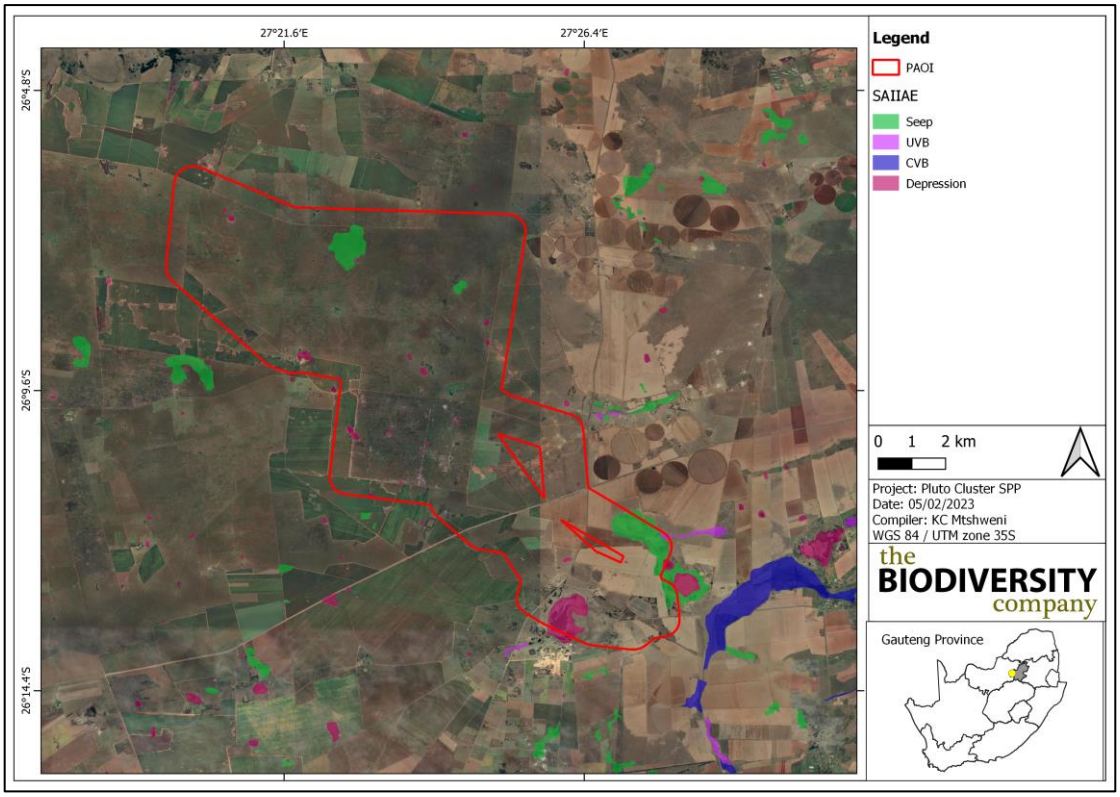


Figure 5.12: SAIIAE wetlands located within 500 m regulated area (PAOI)

National Freshwater Ecosystem Priority Areas (NFEPA)

The National Freshwater Ecosystem Priority Areas (NFEPA) database forms part of a comprehensive approach for the sustainable and equitable development of South Africa's scarce water resources. This database provides guidance on how many rivers, wetlands and estuaries, and which ones, should remain in a natural or near-natural condition to support the water resource protection goals of the NWA. This directly applies to the NWA, which feeds into Catchment Management Strategies, water resource classification, reserve determination, and the setting and monitoring of resource quality objectives (Nel *et al*. 2011). The NFEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's biodiversity goals (Act No.10 of 2004) (NEM:BA), informing both the listing of threatened freshwater ecosystems and the process of bioregional planning provided for by this Act (Nel *et al.,* 2011).

According to Nel *et al.* (2011), four wetland types are expected to overlap with the 500m regulatory area (PAOI). These are Depressions, Channelled Valley Bottoms, a Seep and a Flat (see Figure 5.13).

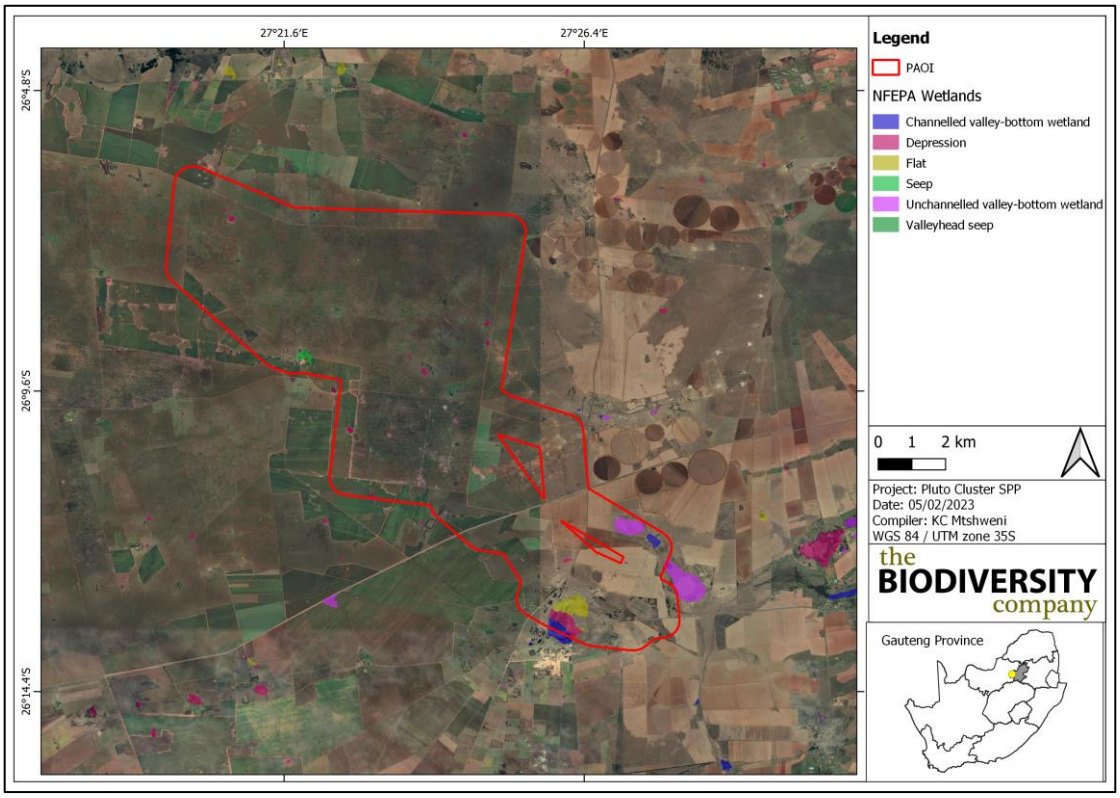


Figure 5.13: NFEPA wetlands located within 500 m regulated area (PAOI).

Wetland Delineation and Description

The wetland areas were delineated in accordance with the DWAF (2005) guidelines. Eight (8) HGM unit was identified within the 500 m regulated area (PAOI), namely, seven (7) Depression (HGM 1 – HGM 7) wetlands, and a Seep wetland (HGM 8) (refer to Figure 5.14). These systems differ from one another regarding ecological importance and sensitivity, modification, ecological state, impacts and the general setting.

HGM 1 was located within cultivated fields, next to a farm house. The wetland was observed to be inundated at the time of assessment and dominated by alien wetland plants and naturalized exotic weeds such as *Phragmites australis, Typha capensis, Verbena bonariensis Targeted minuta Eucalyptus camaldulensis* and *Bidens Pilosa* amongst others wetland plants (*Cyperus spp*).

HGM 2 was observed to be located within short shrubland vegetation dominated by *Tarchonanthus camphoratus* and tall graminoid species. The depression was observed to be partly inundated, particularly at the impacted areas (berm and cattle trampling). It was observed to be dominated by *Nidorrella resedifolia, Tagetes minuta, Schoenoplectus sp, Cyperus spp* and terrestrial graminoid species.

HGM 3 and HGM 4 were observed to be similar in plant composition (Rushes), impacts (Cattle trampling) and topographical setting. Due to the relatively flat topographical setting of the depressions, these systems are mainly fed by surface input (rain and runoff) and surface-subsurface water exchange. Evidence of historic mining was observed around these wetland systems. Both wetlands were saturated and dominated by tall graminoids and rushes of the *Juncus* genus.

HGM 5 was observed to be the most impacted site based on alien plant species composition, water odour, water colour and substrate disturbance. These observations may be a result of the depressions locations within a cultivated field and the stockpiles which were dumped inside the depression. Runoff from the fields and stockpiles was observed to accumulated within this depression.

HGM 6 was observed to be a large pan presenting high ecological importance based on the high faunal and floral diversity observed on site. This depression was dominated by a variety of hydrophytes and water loving plants. This depression was observed to be laterally fed by springs, UVBs and a large seep (HGM8) which was observed to be connected to the pan. The pan was however located downstream of mining activities, extensive cultivation, and was observed to be impacted by cattle moving through the system.

HGM 7 was observed to be located within extensive cultivation activities and historic mining areas. The system was observed to be saturated during the site visit, with inundation being observed at old mining pits located within the wetland system. The edges of this system were observed to be dominated by alien invasive plant species owing to the adjacent agricultural activities. Plants such as *Phragmites australis* and *Tyhpa capensis* were observed around the old mining pits while the rest of the system was dominated by rushes, *Schoenoplectus spp, Cyperus spp* and wetland grasses (*Paspalum sp* and *Echinochloa sp*).

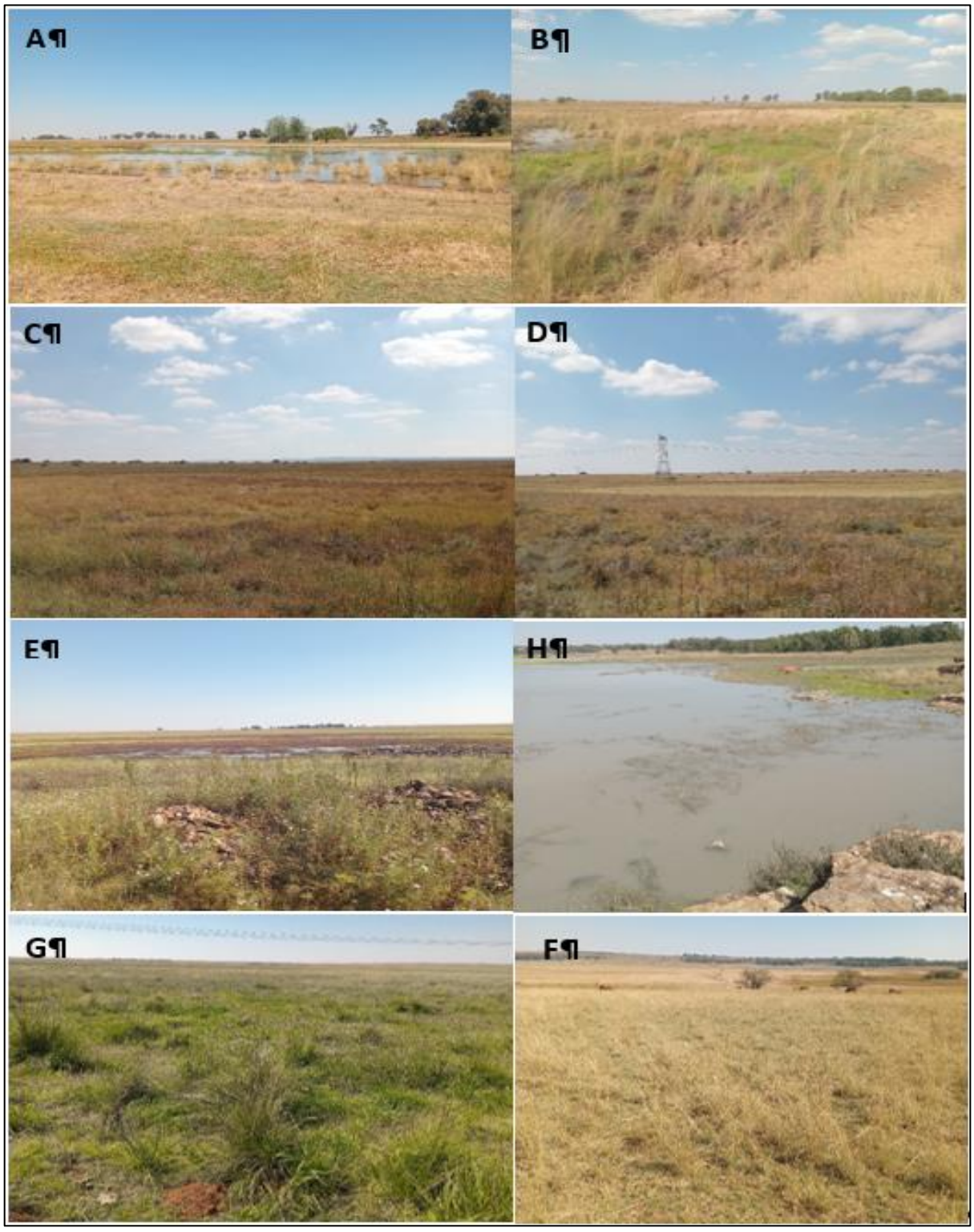


Figure 5.14: Photographical evidence of the various wetlands identified withing the project area of influence. A) HGM 1, B) HGM 2, C) HGM 3, D) HGM 4, E) HGM 5, F) HGM 6, G) HGM 7, H) HGM 8.

5.3.1.6 Avifauna

According to the Avifauna Site Sensitivity Verification Report (Appendix E2), the avifauna Site Ecological Importance (SEI) for the proposed development was determined to be 'Very High, 'Medium' or 'Very Low' depending on the habitat. SABAP2 data indicate that 408 avifauna species are expected for the PAOI and surrounds. Of these, 22 are considered SCC and include those listed in Table 5.3. The species listed have a high likelihood of occurrence within the POAI.

Table 5.3: Threatened avifauna species that are expected to occur within the project area.

Scientific Name	Common Name	Regional*	Global+
Anthropoides paradiseus	Blue Crane	NT	VU
Falco biarmicus	Lanner Falcon	VU	LC
Falco vespertinus	Red-footed Falcon	NT	VU
Gyps coprotheres	Cape Vulture	EN	VU
Polemaetus bellicosus	Martial Eagle	EN	EN
Sagittarius serpentarius	Secretarybird	VU	EN

The different habitat types within the PAOI were delineated and identified based on observations during the field assessment and available satellite imagery. These habitat types were assigned Site Ecological Importance (SEI) categories based on their ecological integrity, conservation value, the presence of species of conservation concern. Three habitat types were delineated within the Project Area: Water Resource, Degraded Grassland and Modified habitat. Their respective SEI and the corresponding mitigation guidelines are summarised in Table 5.4 and visually illustrated in Figure 5.15.

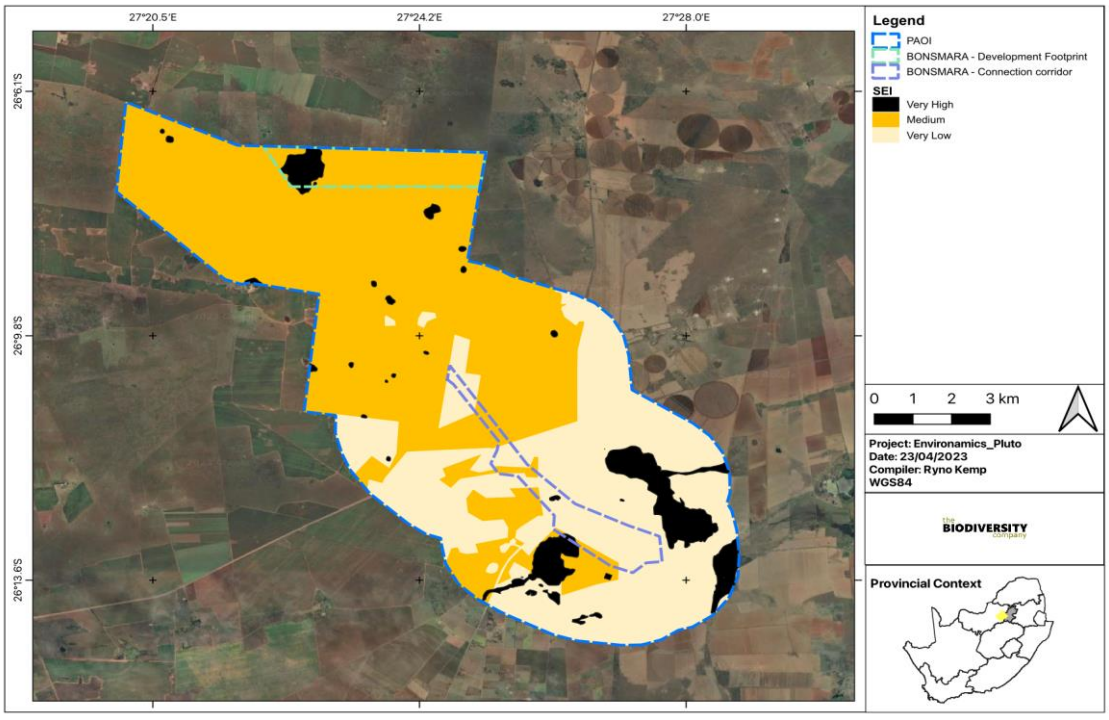


Figure 5.15: Avifauna Site Ecological Importance (SEI)

Table 5.4: Summary of Avifauna Site Ecological Importance (SEI) for the proposed project Area

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance	Site Ecological Importance (SEI) Guidelines for interpreting SEI in the context of the proposed development activities
Water Resource	High Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km^2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A.	High Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types	**High**	Ver Low Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring.	**Very High**	Avoidance mitigation – no destructive development activities should be considered. Applicable buffer may be added
Degraded Grassland	Medium Confirmed or highly likely occurrence of populations of Near Threatened (NT) species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals.	High Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types	**Medium**	Medium Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) returning to a site once the disturbance or impact has been removed.	**Medium**	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities
Modified Habitat	Low No confirmed or highly likely populations of SCC.	Low Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area.	**Low**	Very High Habitat that can recover rapidly	**Very Low**	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

Screening Tool Comparison

Table 5.5 provides a comparison between the Environmental Screening Tool and the specialist determined Site Ecological Importance (SEI). The specialist-assigned sensitivity ratings are based largely on the SEI process followed in the previous section, and consideration is given to any observed or likely presence of SCC. Due to the distinctive habitats within the Project Area, these were compared separately.

Table 5.5 : Summary of the Screening Tool Sensitivity versus the Specialist assigned Site Ecological Importance (SEI) for the proposed Solar Power Plant (SPP) Project Area

Screening Tool Theme	Screening Tool	Habitat	Specialist	Tool Validated or Disputed by Specialist - Reasoning
Animal Theme	High	Water Resource	Very High	Validated – Habitat has been altered but has the potential to provide breeding sites for African Grass Owls, African Marsh Harriers and Pallid Harriers. Furthermore, it provides the potential to house various other water SCC.
		Degraded Grasslands	Medium	Validated – Habitat has been severely altered with limited potential to support SCC.
		Modified Habitat	Very low	Validated – Habitat is generally intact and possesses low resilience to impacts.

5.3.2 Cultural and Heritage Aspects

According to the Heritage and Palaeontological Impact Assessment (Appendix E5), the area proposed for development is located approximately 20km north of Carletonville within the Merafong Municipality. Carletonville was developed by various mining companies from 1937 onwards, but was not officially incorporated until 1959, and was subsequently recognised as a provincial town in 1967. Surrounding Carletonville are a number of privately owned gold-mining township villages and contractor labour quarters established by the mining companies on land owned by the mines. The area surrounding Carletonville is dominated by a cultural landscape that is shaped and defined by the historic and on-going mining activities associated with the Witwatersrand. A detailed archaeological background of the area is provided by Du Pisanie and Nel (2012, SAHRIS NID 104305) and is therefore not repeated here. It is suffcient to note that no significant Early, Middle or Later Stone Age sites are known from this broader area, however sites representing the Iron Age occupation of the region are present in the broader context. Birkholtz and Groenewald (2016, SAHRIS NID 369805) completed an HIA on a property located immediately south of the area proposed for development. They describe the broader areas as “The overall study area can be described asgenerally undulating with a number of extensive pans located within this area… While the overall study area is mostly utilised for agricultural activities, the proposed development bulk sample area that was assessed in the field is characterised by agricultural fields (maize), a large number of small livestock camps associated with stud farming (cattle) as well as Eskom power lines.” The N14 is an historic scenic route that runs between Ventersdorp and Pretoria and is likely based on the original wagon route used for this journey. This route is located approximately 1.5km south of the Tuli PV Footprint area. In general, for the development of PV infrastructure and its associated grid connection infrastructure, it is preferred for such development to be clustered with existing development, such as mining or residential development, in order to

reduce the perception of urban and infrastructure sprawl across an otherwise agricultural landscape.

Birkholtz and Groenewald (2016) go on to note that examples of published excavated archaeological sites from the general surroundings of the study area include the Later Stone Age and Iron Age sites located along the Magaliesberg Mountains and sites of international palaeoanthropological significance such as Sterkfontein and Kromdraai, both located within the Cradle of Humankind World Heritage Site located approximately 33km north-east of the study area. Birkholtz and Groenewald (2016) note that the nearest published excavated archaeological site to the present study area is the underground cavern system known as Lepalong, that was used as shelter by the Kwena ba Modimosa ba Mmatau during the turmoil of the Difaqane/Mefaqane. According to Birkholtz and Groenewald (2016), oral histories indicate that Lepalong was occupied from 1827 into the 1830s (Reid & Lane, 2003). Lepalong is located some 25km south-west of the study area.

According to Du Pisanie and Nel (2016, SAHRIS NID 356134), “With the onset of the Transvaal and South African Wars, Gatsrand became a strategic location for British troops who occupied Potchefstroom. This region was located in close proximity to the Western Railway, which provided a tactical advantage. To exploit and protect this advantage, three blockhouses were constructed on the farms Driefontein 113 IQ and Driefontein 355 IQ. These structures were not identified during the pre-disturbance survey and it is assumed that they no longer exist. The next major event to take place in this region was the discovery of gold, which facilitated the establishment of several towns from the 1920s, an increase in population and an increase in services. Early mines established include Venterspost (1934), Libanon (1936), West Driefontein (1945), East Driefontein (1968) and later Kloof (1968). Shaped by these events and activities the study area has through time transformed into a historic mining landscape.” In their Heritage Impact Assessment located nearby, Du Pisanie and Nel (2016, SAHRIS NID 356134) identified a number of heritage resources, the majority of which were determined to be not conservation worthy. The nature of the resources identified include burials and burial grounds (graded IIIA) as well as historic and modern farm structures. Similar resources are likely to be present within the proposed development areas.

Site Survey

During the site assessment 38 observations were made during the survey and ruins from the mid-1950s onwards dominated the recordings which reflect the changing circumstances and fortunes of farming and mining in the area. Old mining diggings were recorded on Leeuwpan farm, but these were not rated as having conservation worthy significance given that a variety of better sites representative of the industrial archaeology of mining in the area can be found to the south near Carletonville. A large modern graveyard with graves from the 1980s into the 21st century was located in the road reserve at the sand mining entrance near De Pan and the possibility of unmarked graves near the ruins and informal settlements clustered around the farms should be taken into account in the planning of the PV infrastructure. The overall heritage sensitivity of the area is very low given that the majority of the farms were built since the 1950s and have intensively transformed the landscape for maize and cattle agriculture servicing the major metropolitan area of Johannesburg. Refer to Figure 5.16, 5.17 and 5.18.

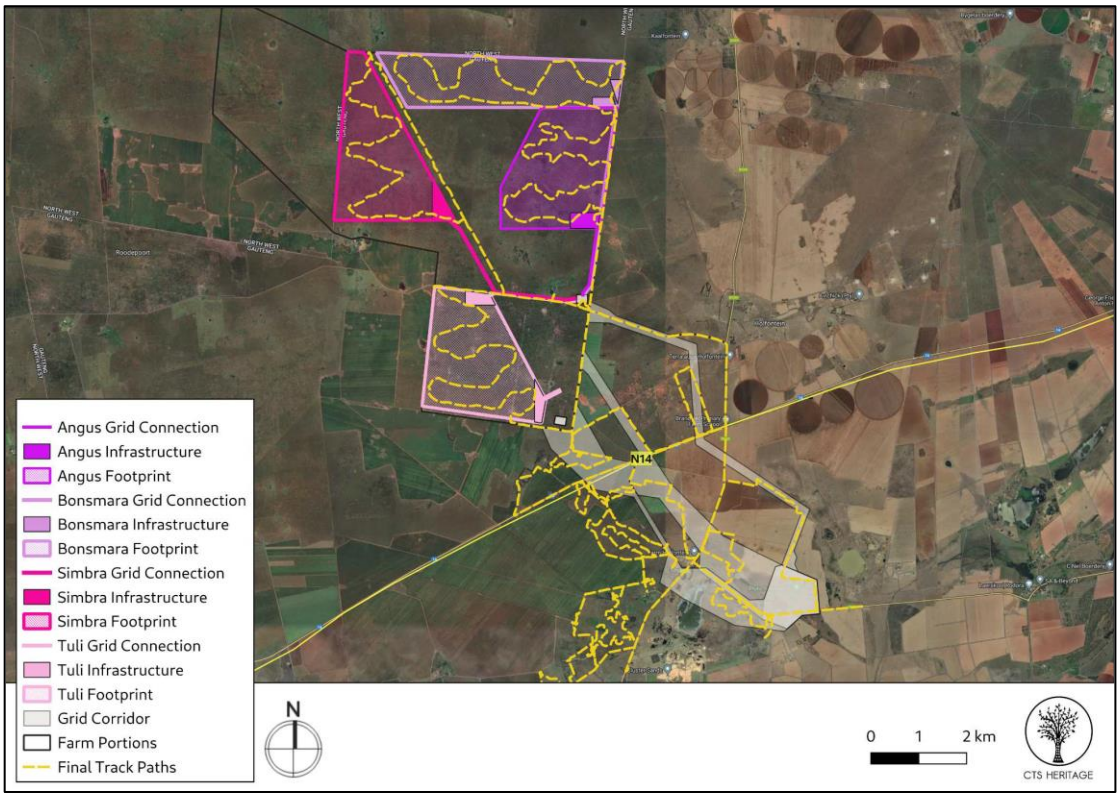


Figure 5.16: Track log of heritage survey.

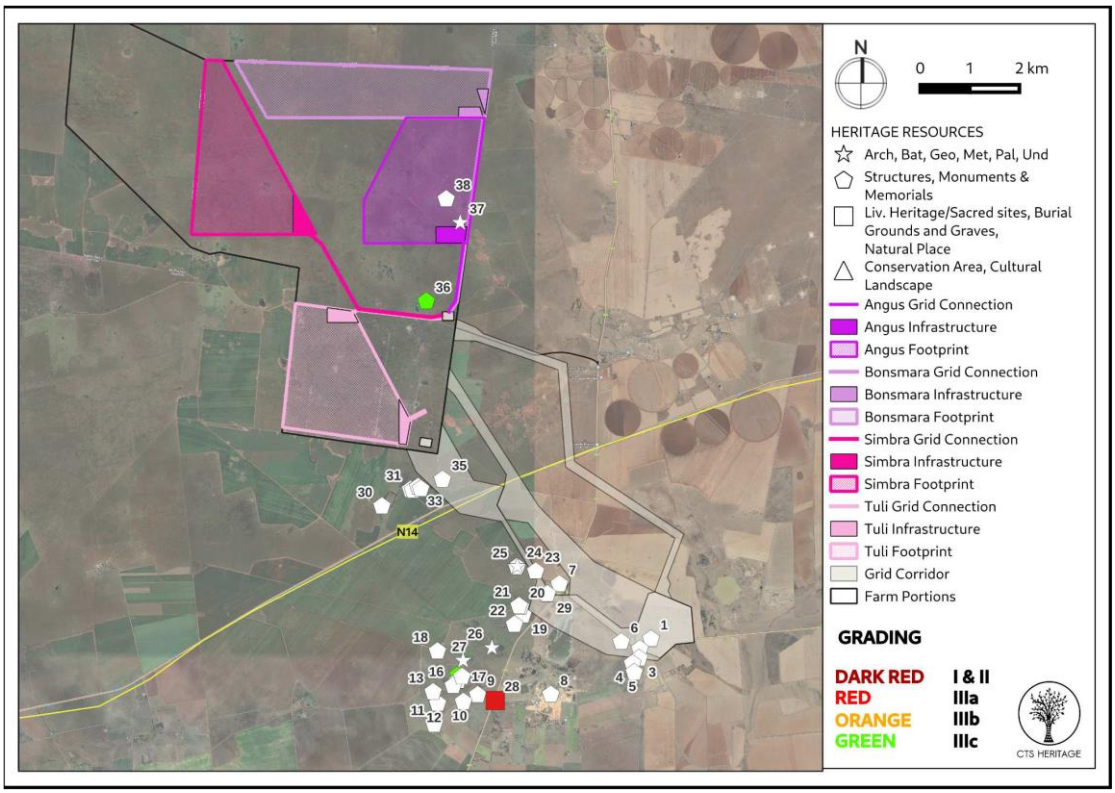


Figure 5.17: Map indicating all heritage features identified within the project area

The majority of the heritage observations made within the development area relate to the historic mining and agricultural occupation of the broader area. Most of these observations

relate to structures and ruins of structures that have been determined to have no cultural value. These have been determined to be Not Conservation-Worthy and are not considered further here.

Three heritage resources that have cultural value were identified in this assessment. Sites 014 and 036 relate to structures and have been graded IIIC for their contextual heritage value. Neither of these structures is located within any of the areas proposed for development and as such, it is not anticipated that any of these structures will be negatively impacted by the proposed development of either the SPPs or their electronic grid infrastructure.

Site 028 represents a modern graveyard (1980's) with a number of human remains interred here. Due to the high levels of social and spiritual value associated with human remains, graveyards are accorded high levels of local significance and as such, are graded IIIA. Although Site 028 is located far from the area proposed for development and as such, is unlikely to be directly impacted by the development, a 100m buffer around this site is recommended to ensure that no indirect impact takes place to this significant site. Bonsmara SPP is unlikely to impact any of the identified heritage sites on the Farm Leeuwpan No. 697.

5.3.3 Paleontological Aspects

According to the Heritage and Palaeontological Impact Assessment (Appendix E5), the Updated Geology (Council of Geosciences) confirms the geology and indicates that the proposed development is underlain by the Malmani Subgroup. The Malmani Subgroup carbonates of the Transvaal Basin comprise of an assortment of stromatolites (microbial laminates), ranging from supratidal mats to intertidal columns and large subtidal domes (Eriksson et al. 2006). Stromatolites are layered mounds, columns and sheet-like sedimentary rocks. These structures were originally formed by the growth of layer upon layer of cyanobacteria, a single-celled photosynthesizing microbe. Cyanobacteria are prokaryotic cells (simplest form of modern carbon-bases life). Stromatolites are first found in Precambrian rocks and are known as the earliest known fossils. These algae photosynthesised in the low oxygen atmosphere and deposited layer upon layer of calcium sulphate, magnesium sulphate and calcium carbonate as well as other compounds to form these domes. Researchers have examined and classified the stromatolite structures but seldomly find preserved algal cells. The oxygen atmosphere that we depend on today was generated by numerous cyanobacteria photosynthesizing during the Archaean and Proterozoic Era. Stromatolites and oolites from the Transvaal Supergroup have been described by various authors (Eriksson and Altermann, 1998). Detailed descriptions of South African Archaean stromatolites are available in the literature (Altermann, 2001; Buick, 2001; and Schopf, 2006). The Malmani stromatolites literature includes articles by Truswell and Eriksson (1972, 1973, 1975), Eriksson and MacGregor (1981), Eriksson and Altermann (1998), Sumner (2000), Schopf (2006).

The Malmani Subgroup succession is about 2 km-thick and consists of a series of formations of oolitic and stromatolitic carbonates (limestones and dolomites), black carbonaceous shales and minor secondary cherts. The Malmani Dolomites also consist of historic lime mines, and palaeocave fossil deposits. Dolomite (limestone rock) forms in warm, shallow seas from slow gathering remainders of marine microorganisms and fine-grained sediment. Dolomites of the Malmani Subgroup has a higher magnesium content than other limestones. These materials

contain high levels of calcium carbonate and are often referred to as carbonates. Currently very few palaeontologists study stromatolites but geologists find the stromatolites interesting because they reveal the change from a reducing environment (that is an oxygen-poor) to an oxidizing environment (oxygen--rich). This transition is known as the Great Oxygen Event (Eroglu et al., 2017).

5.3.4 Visual Landscape

Visual impacts occur when changes in the landscape are noticeable to viewers looking at the landscape from their homes or from parks and conservation areas, highways and travel routes, and important cultural features and historic sites.

5.3.4.1 Visual Receptors

Visual Receptors can be defined as "Individuals, groups or communities who are subject to the visual influence of a particular project".

Possible visual receptors identified within the 10km radius from the proposed development, which due to use could be sensitive to landscape change. They include:

- **Area Receptors** which include:
  - A small number of smallholdings.
- **Linear Receptors** which include:
  - N14 National Road.
  - R500 regional road.
  - R41 regional road.
- **Point Receptors** which include:
  - Homesteads on farms.
  - Lodging facilities.

5.3.4.2 Zone of Theoretical Visibility

A Zone of Theoretical Visibility (ZTV) is a Geographic Information System (GIS)-generated tool to identify the likely (or theoretical) extent of visibility of a development. The tool used in this model does not take existing screening into account but only the above mean sea level of the landscape.

Table 5.6: ZTV Assumptions

Radius	Impact Magnitude
0-1km	Very High
1-3km	High
3-5km	Medium
5-10km	Low

Table 5.7. below reflects the visibility rating in terms of proximity on sensitive receptors from the Solar Power Plant (SPP) within a 10 km radius. ***The exact location and layout of the Bonsmara SPP and grid connection will be determined once other specialist studies, such as those related to wetlands, ecology, and avifauna, identify sensitive areas. Therefore, the***

Visibility Rating below serves only as a preliminary estimate of the SPP and grid connection's rating. The entire EIA footprint (Pluto Cluster EIA footprint) was used.

Table 5.7: ZTV rating in terms of proximity from the SPP

Radius	Visual Receptors	Visibility rating in terms of proximity
0-1km	- Three homesteads on farms - Koppie Street **Visibility Coverage: 91.33%**	Very High
1-3km	- Two homesteads on farms - R500 regional road - N14 National Road **Visibility Coverage: 54.13%**	High
3-5km	- Nine homesteads on farms - N14 National Road **Visibility Coverage: 44.8%**	Medium
5-10km	- 26 homesteads on farms - N14 National Road - R41 regional road **Visibility Coverage: 23.28%**	Low

Refer to Figures 5.19 Zone of Theoretical Visibility (ZTV). This map indicates all areas that are in direct line of site of the proposed development up to a distance of 10 km as per Table 5.7 above.

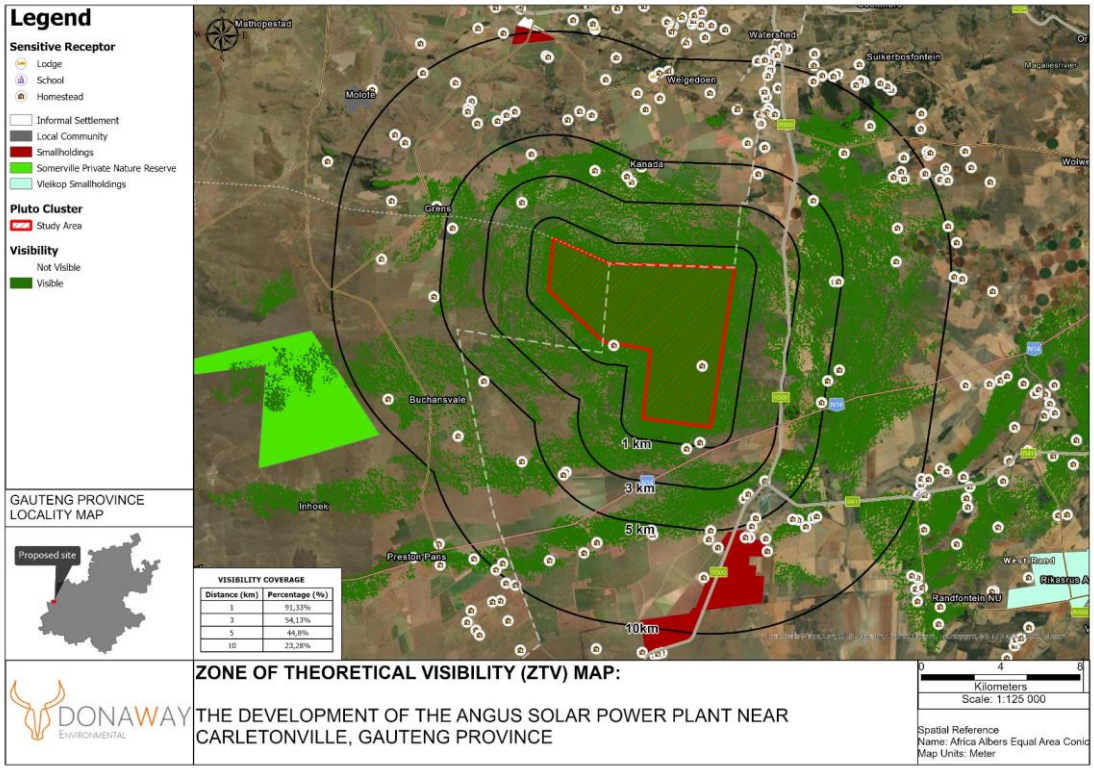


Figure 5.18: Zone of Theoretical Visibility (ZTV) of the SPP, Satellite View

Table 5.8. below reflects the visibility rating in terms of proximity on sensitive receptors from the Powerline (PL) within a 10 km radius.

Table 5.8: ZTV rating in terms of proximity from the PL

Radius	Visual Receptors	Visibility rating in terms of proximity
0-1km	- 10 homesteads on farms - N14 National Road - R500 regional road - R41 regional road **Visibility Coverage: 98.52%**	Very High
1-3km	- Six homesteads on farms - N14 National Road - R500 regional road - R41 regional road - Smallholdings **Visibility Coverage: 85.27%**	High

3-5km	- Nine homesteads on farms - N14 National Road - R500 regional road - R41 regional road - Smallholdings - One primary school **Visibility Coverage: 58.31%**	Medium
5-10km	- 36 homesteads on farms - N14 National Road - R500 regional road - R41 regional road **Visibility Coverage: 37.23%**	Low

Refer to Figure 5.20: Zone of Theoretical Visibility (ZTV). This map indicates all areas that are in direct line of site of the proposed power line up to a distance of 10 km as per Table 5.8. above.

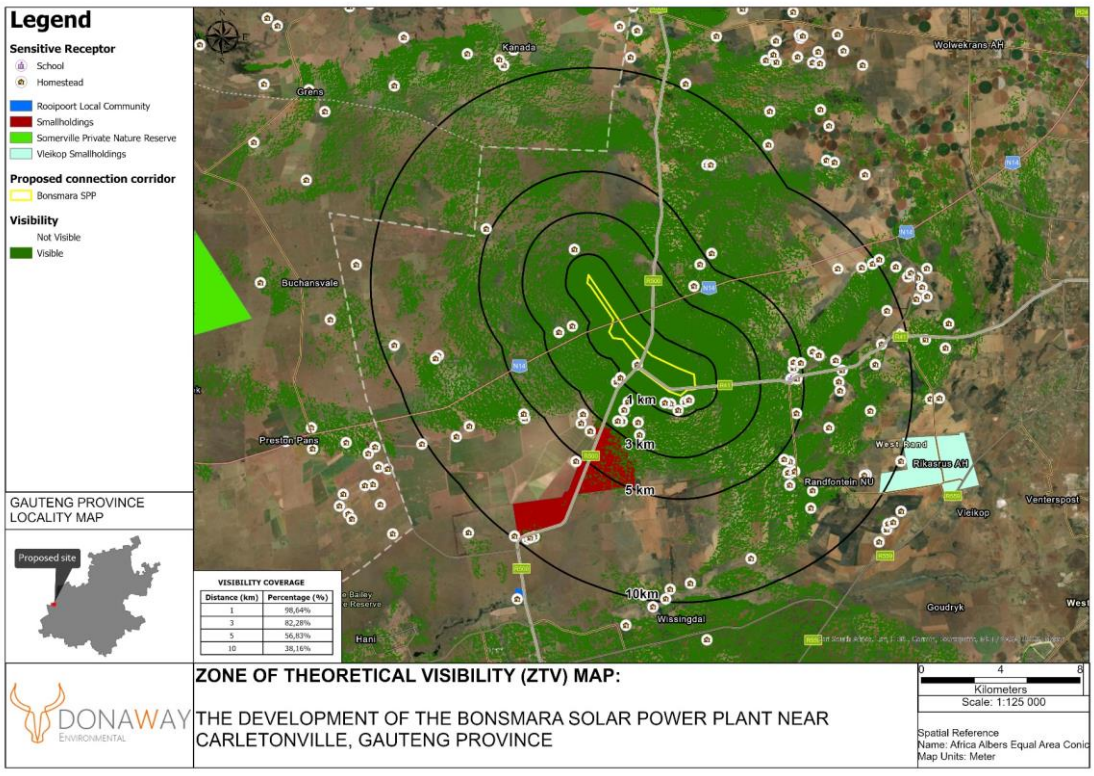


Figure 5.19: Zone of Theoretical Visibility (ZTV) of the Power Line, Satellite View

The only receptors likely to be impacted by the proposed development are the nearby property owners and nearby roads. However, a large part of the visual landscape is still reflecting a farming and intensive mining landscape with a much lower visual quality.

5.3.5 Traffic Consideration

According to the Traffic Impact Assessment (Appendix E7), it is proposed that the existing unsurfaced farm roads to the west of the R500 are used to access the Bonsmara PV SPP site as shown in Figure 2.3.

Though the proposed access roads all form part of an existing access road system (to the surrounding farms), it is important that the geometry complies with the minimum standards as detailed in Annexure A. This may likely be a requirement as part of the wayleave application approval of the Merafong Local Municipality, West Rand District Municipality and Gauteng Department of Roads and Transport.

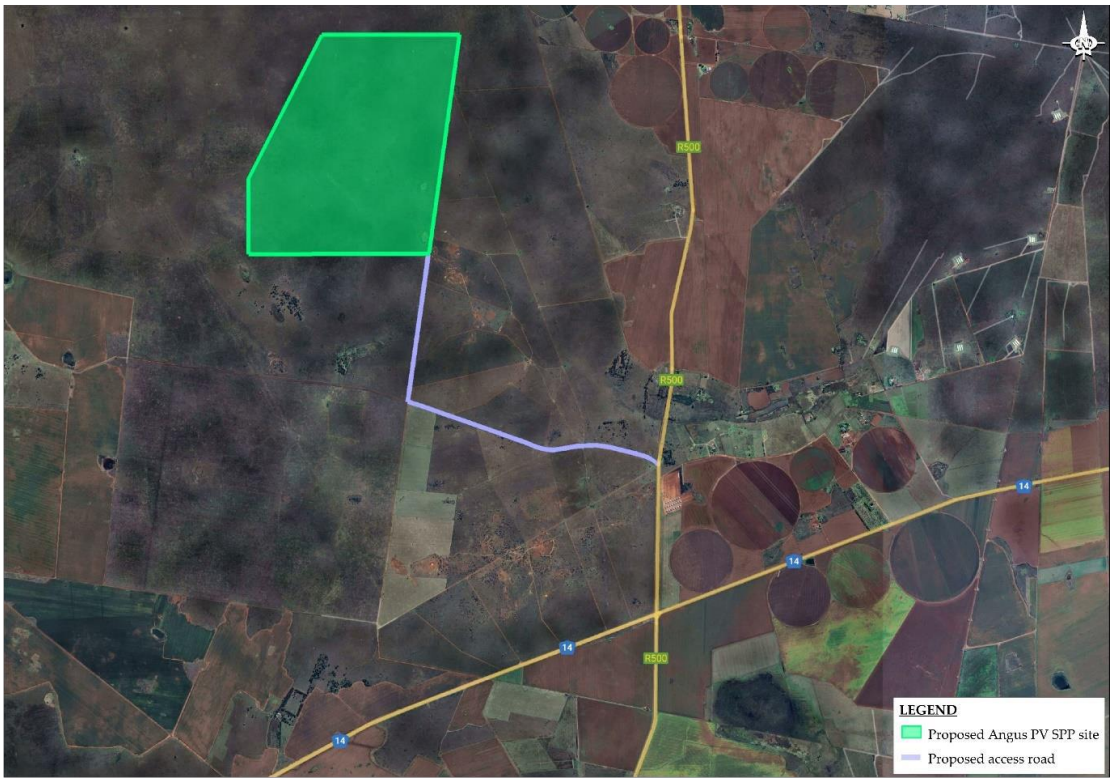


Figure 5.20: Proposed access via the R500

Two (2) possible ports of entry have been identified from where the solar panel technology and large electrical components will be transported, namely: Durban (647 km) and Richards Bay (675 km). It is recommended that the Port of Durban is the preferred port of entry as this route is the shorter of the two routes. The regional routes indicated in the analysis would need to be confirmed by freight carriers as suitable for the sensitive normal loads. The final decision on the selected route would be based on a combination of cost, distance and road condition at the time of transport. It is anticipated that these components would be imported and transported from the preferred harbour (Port of Durban is recommended) as abnormal loads. It would then be assembled in Johannesburg and transported to the proposed development site (also as abnormal loads).

Cement will be sourced from local manufacturers within the town of Carletonville. All other civil construction materials, needed for concrete and wearing course, will be obtained commercially. Furthermore, it is anticipated that construction personnel and labour would originate from the neighbouring towns such as Carletonville. These trips are classified as local trips as vehicles will not be travelling over a (comparably) long distance

It is anticipated that some route clearing may be needed with certain portions of the route already cleared for other renewable energy projects. In addition, temporary widening of intersections along the route may also be required in order to simplify the turning movements of the abnormal load vehicles.

5.3.6 Description of the Socio-Economic Environment

The socio-economic environment is described with specific reference to social, economic, heritage and cultural aspects.

5.3.6.1 Socio-Economic Conditions

According to the Social Impact Assessment (Appendix E7), Gauteng is the smallest of South Africa's provinces, covering an area of 18 178km² or approximately 1.4% of the total surface area of South Africa. It is bordered by the Gauteng, North West, Limpopo and Mpumalanga provinces. While being the smallest province, it is also the most populous, being home to 13 399 725 people – 24.1% of the national population. Gauteng lies on the highest part of the interior plateau on the rolling plains of South Africa's Highveld.

Its capital is Johannesburg, and it also contains the city of Pretoria, as well as the East Rand, West Rand and Vaal areas.

Gauteng continues to serve as the economic engine room of the country and the subcontinent, responsible for over 34.8% of the country's GDP. Gauteng is the powerhouse of South Africa and the heart of its commercial business and industrial sectors. The most important sectors contributing to GDP are finance, real estate and business services; manufacturing; and general government services. Gauteng is also the financial services capital of Africa. More than 70 foreign banks have their head offices here, as do at least the same number of South African banks, stockbrokers and insurance giants.

The major gold and diamond mining houses all have their headquarters in Johannesburg, the biggest being Anglo American and De Beers. Gold mining constitutes 80% of Gauteng's mineral production output.

Gauteng is divided into three metropolitan municipalities, the City of Ekurhuleni, City of Johannesburg and City of Tshwane Metropolitan Municipalities, as well as two district municipalities, which are further subdivided into six local municipalities.

West Rand District Municipality

The West Rand District Municipality is a Category C municipality located in the west of the Gauteng Province. The West Rand extends from Randfontein (the seat of the district) in the

west to Roodepoort in the east, and includes the town of Krugersdorp. It is bordered by Bojanala Platinum to the north-west, City of Tshwane to the north-east, City of Johannesburg to the east, Sedibeng to the south-east, and Dr Kenneth Kaunda to the south-west. It comprises three local municipalities: Merafong, Mogale and Rand West Cities.

The municipality is situated relatively closely to the hub of economic activity in Gauteng, and is traversed by major national roads, namely the N12 and N14. Its main contribution lies primarily within the mining sector, however, areas such as Krugersdorp fulfil a residential function for many people working in Johannesburg. The West Rand remains the poorest region contributing to Gauteng's GDP.

The Cradle of Humankind falls under the jurisdiction of Mogale City and Merafong City, and forms part of the World Heritage Site.

The main economic sectors include Manufacturing (22%), mining (19%), community services (19%), finance (16%), trade (10%), transport (6%), construction (4%).

In 2011 the Municipality had a population of 820 995 with a dependency ratio of 39.2 By 2016 the population has increased to 838 594 and the dependency ratio was reduced to 39.4.

Merafong City Local Municipality

The Merafong City Local Municipality is a Category B municipality situated within the West Rand District in the Gauteng Province. It is the largest of three municipalities in the district, making up almost half of its geographical area. It is situated about 65km from Johannesburg and is serviced by a number of major roads, including the N12 from Johannesburg to Cape Town and the N14, which is the main road between Gauteng and Mahikeng (previously Mafikeng) via Ventersdorp. Its boundaries enclose some of the richest gold mines in the world.

Formerly a cross-border municipality, the entire municipality was transferred to the North West Province following the abolition of cross-border municipalities by an amendment to the South African Constitution in 2005. The municipality was part of the North West Province from 2005 to 2009, when it was reincorporated into the Gauteng Province by another amendment to the Constitution, following often violent protests in the township of Khutsong.

Merafong's historical development is closely knit with the discovery of rich gold deposits in the early 1930s. Fochville is the oldest town in the region and was declared a town in 1951. The town Carletonville was named after Guy Carleton Jones, an engineer from the Gold Fields Ltd mining company, who played a prominent role in the discovery of the West Wits gold field, of which Carletonville forms a part. The mining company decided, in November 1946, to establish the town. Carletonville was proclaimed in 1948 and attained Town Council Status on 1 July 1959.

Wedela is situated between Western Deep Levels and Elandsrand mine. The town's name is derived from the prefixes of the two mines: the ‘Wed-' from Western Deep Levels and the ‘-ela' from Elandsrand. Wedela was established as a mining village in December 1978 by Harry Oppenheimer, and municipal status was granted to the town on 1 January 1990.

There are three towns in the municipality, namely Carletonville, Fochville, Wedela

The main economic sectors in the municipality are Mining (50.7%), trade (9.7%), finance and business services (9.9%), community services (9.2%), general government (9.1%).

5.4 SITE SELECTION MATRIX

Due to the nature of the proposed development, the location of the solar PV facility is largely dependent on technical and environmental factors such as solar irradiation, climatic conditions, topography of the site, access to the grid and capacity of the grid. Studies of solar irradiation worldwide indicate that the Gauteng Province has a high potential for the generation of power from solar.

The receptiveness of the site to PV Development includes the presence of optimal conditions for the sitting of a solar energy facility due to high irradiation values and optimum grid connection opportunities (i.e., the grid connection points are located within the affected property which minimizes the length of power line development and consolidates the overall impacts and disturbance of the project within the affected property). The Farm Leeuwpan No. 697, where the project is proposed to be located is considered favorable and suitable from a technical perspective due to the following characteristics:

- Climatic conditions: Climatic conditions determine if the project will be viable from an economic perspective as the solar PV facility is directly dependent on the annual direct solar irradiation values of a particular area. Gauteng receives high averages of direct normal and global horizontal irradiation, daily. This is an indication that the regional location of the project includes a low number of rainy days and a high number of daylight hours experienced in the region. Global Horizontal Radiation of ~2118 kWh/m^2/year is relevant in the area.

- Topographic conditions: The surface area on which the proposed facility will be located has a favourable level topography, which facilitates work involved with construction and maintenance of the facility and ensures that shadowing on the panels do not occur. The topographic conditions, which are favourable, minimizes the significance of the impact that will occur during the clearing and leveling of the site for the construction activities.

- Extent of the site: A significant portion of land is required to evacuate the prescribed 250 MW and space is a constraining factor in PV facility installations. Provision was made to assess a larger area than is required for the facility to make provision for any other environmental or technical constraints that may arise and avoiding those areas.

Larger farms are sought after to make provision for any constraints imposed by the Department of Agriculture on the extent of land that may be used for such facilities per farm, as well as the opportunities presented for the avoidance of sensitive environmental features present. The Farm Leeuwpan No. 697, and the development footprint assessed therein is considered to provide an opportunity for the successful construction and operation of a solar PV facility with a capacity of 250 MW, as well as opportunities for the avoidance and mitigation of impacts on the affected environment and sensitive environmental features.

- Site availability and access: The land is available for lease by the developer. Reluctant farm owners or farmers over capitalizing hamper efforts to find suitable farms. Access will be obtained via a public gravel road off of the R500 regional road to the east of the site.

- Grid connection: In order for the PV facility to connect to the national grid the facility will have to construct an on-site substation, collector substation, Eskom switching station and a power line from the project site to connect to the Eskom grid. Available grid connections are becoming scarce and play a huge role when selecting a viable site.

- Environmental sensitivities: From an environmental perspective the proposed site is considered highly desirable due to limited environmental sensitivities in terms of geology, and soils, agricultural potential, vegetation and landscape features, climate, biodiversity and the visual landscape – refer to Section 5.3.1 of this report. The area proposed for development consists of land used for agriculture activities, but depression and seep wetlands are located in close proximity to the development footprint, and parts of the site are within a CBA 2 or an ESA.

It is evident from the discussion above that The Farm Leeuwpan No. 697 may be considered favourable and suitable in terms of the site and environmental characteristics. As mentioned previously, no alternative areas on the property have been considered for the placement of the development footprint as the assessed development footprint avoids areas that are under cultivation within the affected property. The development footprint of this project will cover a significant portion of the farm; however, provision will be made to exclude any sensitive areas from the facility layout to be developed within the development footprint. This will be assessed in detail at the EIA phase.

5.5 CONCLUDING STATEMENT ON ENVIRONMENTAL ATTRIBUTES

When considering the information provided by the specialists with regards to the site selection criteria, the site is identified as preferred due to the fact that the opportunities presented on the site to develop the project in such a way which avoids the areas and features (including the associated buffers) of environmental sensitivity.

Therefore, development of the 250 MW Bonsmara Solar Power Plant on the Farm Leeuwpan No. 697 is the preferred option.

The draft layout considers technical constraints as a part of this scoping process. Where specific features of environmental sensitivity are identified by the independent specialists as part of the Scoping Phase, these areas and the associated required buffers will be considered

by the developer during the EIA phase to ensure that the facility layout is appropriate considering the sensitive features present. Refer to Figure J for the draft layout proposed for development.

6 DESCRIPTION OF THE IMPACTS AND RISKS

This section aims to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (...) must include-

(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-

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

(cc) can be avoided, managed or mitigated;

(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;

(vii) positive and negative impacts that the proposed activity and alternatives will have on

the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

(viii) the possible mitigation measures that could be applied and level of residual risk;

6.1 SCOPING METHODOLOGY

The contents and methodology of the scoping report aims to provide, as far as possible, a user-friendly analysis of information to allow for easy interpretation.

- Checklist (see section 6.1.1): The checklist consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts.
- Matrix (see section 6.1.2): The matrix analysis provides a holistic indication of the relationship and interaction between the various activities, development phases and the impact thereof on the environment. The method aims at providing a first order cause and effect relationship between the environment and the proposed activity. The matrix is designed to indicate the relationship between the different stressors and receptors which leads to specific impacts. The matrix also indicates the specialist studies that have been conducted to address potentially the most significant impacts.

6.1.1 Checklist analysis

The independent consultant conducted a site visit on 28 February 2023. The site visit was conducted to ensure a proper analysis of the site-specific characteristics of the study area. Table 6.1 provides a checklist, which is designed to stimulate thought regarding possible consequences of specific actions and so assist scoping of key issues. It consists of a list of structured questions related to the environmental parameters and specific human actions.

They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts. The table highlights certain issues, which are further analysed in matrix format in section 6.2.

Table 6.1: Environmental checklist

QUESTION	YES	NO	Un-sure	Description
1. Are any of the following located on the site earmarked for the development?				
I. A river, stream, dam or wetland	×			Eight (8) HGM unit was identified within the 500 m regulated area (PAOI), namely, seven (7) Depression (HGM 1 – HGM 7) wetlands, and a Seep wetland (HGM 8).
II. A conservation or open space area	×			The majority of the site is located within 'Other Natural Areas', with sections within an Important Area (CBA2) as per the Gauteng Conservation Plan.
III. An area that is of cultural importance		×		No sites, features or objects of cultural significance were identified on the project site.
IV. Site of geological significance		×		None.
V. Areas of outstanding natural beauty		×		None.
VI. Highly productive agricultural land		×		None.
VII. Floodplain		×		None.
VIII. Indigenous Forest		×		None.
IX. Grass land	×			According to the Terrestrial Ecology Sensitivity Verification (Appendix E1), the site is currently mostly a degraded grasslands and some rocky outcrop features.
X. Bird nesting sites		×		The Avifauna Sensitivity Verification Report (refer to Appendix E2) does not make any reference to nesting sites on the area earmarked for the development.

XI. Red data species		×		The Avifauna Sensitivity Verification Report (refer to Appendix E2) did not record any Red Data Species on site but indicated that some species of conservation concern may occur on site.
XII. Tourist resort		×		None.
2. Will the project potentially result in potential?				
I. Removal of people		×		None.
II. Visual Impacts	×			The VIA (refer to Appendix E4) confirmed that the significance of the visual impact will be a "Negative Low Impact". The only receptors likely to be impacted by the proposed development are the nearby property owners and nearby roads.
III. Noise pollution		×		Construction activities will result in the generation of noise over a period of months. However, there are mines located directly adjacent to the site. The noise impact is therefore insignificant in comparison to the noise generated by the mine and will only be temporary in nature
IV. Construction of an access road	×			Access will be obtained from a public gravel road off of the R500 regional road to the east of the site. The road will need to be upgraded.
V. Risk to human or valuable ecosystems due to explosion/fire/ discharge of waste into water or air.		×		None.
VI. Accumulation of large workforce (>50 manual workers) into the site.	×			Approximately 800 employment opportunities will be created during the construction and 15 - 70 employment opportunities during the operation phase of the SPP project.

VII. Utilisation of significant volumes of local raw materials such as water, wood etc.	×			The estimated maximum amount of water required during the facility's 20 years of production is approximately 4200m³ per annum.
VIII. Job creation	×			Approximately 800 employment opportunities will be created during the construction and 15 - 70 employment opportunities during the operational phases for the SPP.
IX. Traffic generation	×			It is estimated that 42 trips per day will be generated over the 12-18 month construction period for the SPP.
X. Soil erosion	×			The site will need to be cleared or graded, which may potentially result in a degree of dust being created, increased runoff and potentially soil erosion. The time that these areas are left bare will be limited to the construction phase, since vegetation will be allowed to grow back after construction. No existing areas of erosion was identified.
XI. Installation of additional bulk telecommunication transmission lines or facilities	×			There is existing Eskom infrastructure in the area.
3. Is the proposed project located near the following?				
I. A river, stream, dam or wetland	×			Eight (8) HGM unit was identified within the 500 m regulated area (PAOI), namely, seven (7) Depression (HGM 1 – HGM 7) wetlands, and a Seep wetland (HGM 8).
II. A conservation or open space area	×			The majority of the site is located within 'Other Natural Areas', with sections within an Important Area (CBA2) as per the Gauteng Conservation Plan.
III. An area that is of cultural importance		×		None.
IV. A site of geological significance		×		None.

V. An area of outstanding natural beauty		✕		None.
VI. Highly productive agricultural land		✕		None.
VII. A tourist resort		✕		None.
VIII. A formal or informal settlement	✕			The town of Carletonville is located approximately 17 km south of the proposed development.

6.1.2 Matrix analysis

The matrix describes the relevant listed activities, the aspects of the development that will apply to the specific listed activity, a description of the environmental issues and potential impacts, the significance and magnitude of the potential impacts and possible mitigation measures. The matrix also highlights areas of particular concern (see Table 6.2) for more in-depth assessment during the EIA process. An indication is provided of the specialist studies being conducted and which informed the initial assessment. Each cell is evaluated individually in terms of the nature of the impact, duration and its significance – should no mitigation measures be applied. This is important since many impacts would not be considered insignificant if proper mitigation measures were implemented.

In order to conceptualise the different impacts, the matrix specify the following:

- **Stressor**: Indicates the aspect of the proposed activity, which initiates and cause impacts on elements of the environment.
- **Receptor**: Highlights the recipient and most important components of the environment affected by the stressor.
- **Impacts**: Indicates the net result of the cause-effect between the stressor and receptor.
- **Mitigation**: Impacts need to be mitigated to minimise the effect on the environment.

Please refer to **Appendix E** (specialist studies) for a more in-depth assessment of the potential environmental impacts.

Table 6.2: Matrix analysis

For ease of reference the significance of the impacts is colour-coded as follow:

Low significance	Medium significance	High significance	Positive impact

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY		POTENTIAL IMPACTS		SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS							MITIGATION OF POTENTIAL IMPACTS			SPECIALIST STUDIES / INFORMATION
			Receptors	Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk	
CONSTRUCTION PHASE															
Activity 11(i) (GN.R. 327): *"The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."* Activity 12(ii)(c) (GN.R. 327): *"The development of (ii) infrastructure or structures with a physical footprint of 100 square metres or more; (c) within 32 meters of a watercourse measured from the edge of a watercourse."* Activity 24 (ii) (GN.R 327): *"The development of a road (ii) with reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters."* Activity 27 (GN.R. 327): *"The clearance of an area of 1 hectares or more, but less than*	Site clearing and preparation Certain areas of the site will need to be cleared of vegetation and some areas may need to be levelled. Civil works The main civil works are: • Terrain levelling if necessary– Levelling will be minimal as the potential site chosen is relatively flat. • Laying foundation- The structures will be connected to the ground through cement pillars, cement slabs or metal screws. The exact method will depend on the detailed geotechnical analysis. • Construction of access and inside roads/paths – existing paths will be used were reasonably possible. Additionally, the turning circle for trucks will also be taken into consideration.	BIOPHYSICAL ENVIRONMENT	Indigenous natural vegetation	• Loss, degradation or fragmentation of vegetation through direct clearing		-	S	P	D	IR	SL	Yes	- See Table 6.3	M	Terrestrial Ecology Site Sensitivity Verification (Appendix E1)
			Air	• Air pollution due to the increase of traffic of construction vehicles and the undertaking of construction activities.	-		S	S	D	CR	NL	Yes	- Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.	L	-
			Geology	• Collapsible soil. • Seepage. • Active soil (high soil heave). • Erodible soil. • Hard/compact geology. If the bedrock occurs close to surface it may present problems when driving solar panel columns.	-	-	S	S	Pr	CR	NL	Yes	- The most effective mitigation will be the minimisation of the project footprint by using the existing roads in the area and not create new roads to prevent other	L	-

20 hectares of indigenous vegetation…" Activity 28(ii) (GN.R. 327): *"Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."* Activity 56 (ii) (GN.R 327): "*The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres…"* Activity 1 (GN.R. 325): *"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more..."* Activity 15 (GN.R. 325): *"The clearance of an area of 20 hectares or more of indigenous vegetation..."* *Activity 4 (c)(iv) (GN.R 324):* *"The development of a road wider than 4 metres with a reserve less than 13,5 metres within (c) the Gauteng province, (iv) Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support*	Transportation and installation of PV panels into an Array The panels are assembled at the supplier's premises and will be transported from the factory to the site on trucks. The panels will be mounted on metal structures which are fixed into the ground either through a concrete foundation or a deep-seated screw. Wiring to the Central Inverters Sections of the PV array will be wired to central inverters. The inverter is a pulse width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency.			• The presence of undermined ground. • Instability due to soluble rock. • Steep slopes or areas of unstable natural slopes. • Areas subject to seismic activity.								areas also getting compacted. - Retention of vegetation where possible to avoid soil erosion.		
			Existing services infrastructure	• Generation of waste that need to be accommodated at a licensed landfill site. • Generation of sewage that need to be accommodated by the local sewage plant. • Increase in construction vehicles on existing roads.	-		L	S	D	PR	ML	Yes	-	L	Confirmation from the Local Municipality
			Groundwater	• Pollution due to construction vehicles and the storage and handling of dangerous goods.	-		S	S	Pr	CR	ML	Yes	- A groundwater monitoring programme (quality and groundwater levels) should be designed and installed for the site. - Monitoring boreholes should be securely capped, and must be fitted with a suitable sanitary seal to prevent surface water flowing down the outside of the casing. - Full construction details of monitoring boreholes must be recorded when they are drilled. - Sampling of monitoring boreholes should be done according to recognised standards.	L	-

Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans." *<u>Activity 10 (c)(iv) (GN.R 324):</u>* *"The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres (c) the Gauteng province, (iv) Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans."* *<u>Activity 12 (c)(ii) (GN.R 324):</u>* *"The clearance of an area of 300 square metres or more of indigenous vegetation (c) in the Gauteng Province, (ii) within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans."* *<u>Activity 14(ii)(c)(c)(iv) (GN.R 324):</u> "The development of (ii) infrastructure or structures with a physical footprint of 10 square metres or more, where such development occurs (c) within 32 metres of a watercourse, measured from the edge of a watercourse, (c) within the Gauteng Province, within (iv) sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng*			Aquatic Ecology	• Loss of habitat containing protected species or Species of Special Concern • Activities resulting in physical disturbance of aquatic systems which provide ecosystem services, especially where new crossings are made, or large hard engineered surfaces are placed within the buffer zones. • Loss can also include a functional loss, through change in vegetation type via alien encroachment, reducing aquatic biodiversity.	-		L	L	Pr	IR	NL	Yes	- See Table 6.3	L	Wetland Baseline and Risk Assessment (Appendix E1)
			General Environment (risks associated with BESS)	• Mechanical breakdown / Exposure to high temperatures • Fires, electrocutions and spillage of toxic substances into the surrounding environment. • Spillage of hazardous substances into the surrounding environment. • Soil contamination – leachate from spillages which could lead to an impact of the productivity of soil forms in affected areas. • Water Pollution – spillages into surrounding watercourses as well as groundwater. • Health impacts – on the surrounding communities, particularly those relying on watercourses (i.e., rivers, streams, etc) as a primary source of water.		-	S	M	Pr	PR	ML	Yes	- Operators are trained and competent to operate the BESS. Training should include the discussion of the following: - Potential impact of electrolyte spills on groundwater; - Suitable disposal of waste and effluent; - Key measures in the EMPr relevant to worker's activities; - How incidents and suggestions for improvement can be reported. - Training records should be kept on file	L	-

Conservation Plan or in bioregional plans." *<u>Activity 18 (c)(iv):</u> "The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre (c) in the Gauteng Province within (iv) sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans."*				• Generation of hazardous waste									and be made available during audits. - Battery supplier user manuals safety specifications and Material Safety Data Sheets (MSDS) are filed on site at all times. - Compile method statements for approval by the Technical/SHEQ Manager for the operation and management and replacement of the battery units / electrolyte for the duration of the project life cycle. Method statements should be kept on site at all times. - Provide signage on site specifying the types of batteries in use and the risk of exposure to hazardous material and electric shock. Signage should also specify how electrical and chemical fires should be dealt with by first responders, and the potential risks to first responders (e.g., the inhalation of toxic fumes, etc.). - Firefighting equipment should readily be available at		

														the BESS area and within the site. - Maintain strict access control to the BESS area. - Ensure all maintenance contractors / staff are familiar with the supplier's specifications. - Undertake daily risk assessment prior to the commencement of daily tasks at the BESS. This should consider any aspects which could result in fire or spillage, and appropriate actions should be taken to prevent these. - Standard Operating Procedures (SOPs) should be made available by the Supplier to ensure that the batteries are handled in accordance with required best practices. - Spill kits must be made available to address any incidents associated with the flow of chemicals from the batteries into the surrounding environment. - The assembly of the batteries on-site should be avoided as		

														far as possible. Activities on-site for the BESS should only be limited to the placement of the container wherein the batteries are placed. - Undertake periodic inspections on the BESS to ensure issues are identified timeously and addressed with the supplier where relevant. - The applicant in consultation with the supplier must compile and implement a Leak and Detection Monitoring Programme during the project life cycle of the BESS. - Batteries must be strictly maintained by the supplier or suitably qualified persons for the duration of the project life cycle. No unauthorised personnel should be allowed to maintain the BESS. - Damaged and used batteries must be removed from site by the supplier or any other suitably qualified professional for recycling or appropriate disposal.		

													- The applicant should obtain a cradle to grave battery management plan from the supplier during the planning and design phase of the system. The plan must be kept on site and adhered to.		
		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	• Job creation. • Business opportunities. • Skills development.		+	L	S	D	CR	NL	Yes	- See Table 6.3	M	Social Impact Assessment (Appendix E7)
			Economic multiplier effects	• Significance of the impact from the economic multiplier effects from the use of local goods and services.		+	P	S	Pr	CR	NL	Yes	- See Table 6.3	M	Social Impact Assessment (Appendix E7)
			Improvements on shared infrastructure	• Investment into upgrading and maintain shared infrastructure such as roads and stormwater infrastructure on farms may benefit farming operations	+		P	S	Pr	CR	NL	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E7)
			Potential loss of productive farmland	• The potential loss in productive farmland during the construction phase, due to factors such as the construction of roads, the preparation of foundations, power lines, offices etc.	-		S	S	Pr	BR	ML	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E7)
			Influx of jobseekers and change in population in the study area.	• In-migration of labourers in search of employment opportunities, and a resultant change in population, and increase in pressure on local resources and social networks, or existing services and infrastructure	-		L	P	Pr	IR	SL	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E7)

			Safety and security impacts	• Temporary increase in safety and security concerns associated with the influx of people during the construction phase	-		L	S	Pr	CR	NL	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E7)
			Daily living and movement patterns	• Temporary increase in traffic disruptions and movement patterns during the construction phase.		-	P	S	Pr	PR	ML	Yes	- See Table 6.3	M	Social Impact Assessment (Appendix E7)
			Nuisance impacts (noise and dust)	• Nuisance impacts in terms of temporary increase in noise and dust, and wear and tear on access roads to the site.	-		L	S	D	CR	NL	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E7)
			Increased risk of potential veld fires	• The potential loss of livestock, crops, and farmsteads in the area. • This also includes the damage and loss of farm infrastructure and the threatening of human lives that are associated with the increased risk of veld fires	-		L	S	Pr	PR	SL	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E7)
			Sense of place	• Intrusion impacts from construction activities will have an impact on the area's "sense of place".	-		L	S	D	PR	NL	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E7)
			Visual landscape	• Visual impact of construction activities on sensitive visual receptors in close proximity to the SEF	-		L	S	D	PR	ML	Yes	- See Table 6.3	L	Visual Impact Assessment (Appendix E4)
			Visual landscape	• Visual impact of construction activities on sensitive visual receptors in close proximity to the power line	-		L	S	Pr	PR	ML	Yes	- See Table 6.3	L	Visual Impact Assessment (Appendix E4)
			Traffic volumes	• Increase in development trips for the duration of the construction Phase • Associated noise, dust and exhaust pollution	-		L	M	D	CR	NL	Yes	- See Table 6.3	L	Traffic Impact Assessment (Appendix E8)
			Tourism industry	• Since there are no sensitive tourism facilities in close	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

				proximity to the site, the proposed activities will not have an impact on tourism in the area.											
			Heritage resources	• As no sites, features or objects of cultural historic significance have been identified in the project area, there would be no impact as a result of the proposed development	+		S	S	U	CR	NL	N/A	- For the current study, as no sites, features or objects of cultural significance were identified, no mitigation measures are proposed.	L	Heritage Impact Assessment (Appendix E6)
			Paleontological Heritage	• Construction stage Bonsmara Solar Power Plant • Destroy or permanently seal-in fossils at or below the surface that are then no longer available for scientific study	-		S	P	-	IR	CL	N/A	N/A	L	Paleontological Impact Assessment (Appendix E7)
			Paleontological Heritage	• Construction stage powerline • Loss of fossil heritage • Destroy or permanently seal-in fossils at or below the surface that are then no longer available for scientific study	-		S	P	-	IR	CL	N/A	N/A	L	Paleontological Impact Assessment (Appendix E7)
OPERATIONAL PHASE															
Activity 11(i) (GN.R. 327): *"The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."* Activity 12(ii)(c) (GN.R. 327): *"The development of (ii) infrastructure or structures with a physical footprint of 100 square metres or more; (c) within 32 meters of a*	The key components of the proposed project are described below: • PV Panel Array - To produce 250 MW, the proposed facility will require numerous linked cells placed behind a protective glass sheet to form a panel. Multiple panels will be required to form the solar PV arrays which will comprise the PV	BIOPHYSICAL ENVIRONMENT	Vegetation	• Establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors	-		S	L	Pr	BR	ML	Yes	- See Table 6.4	L	Terrestrial Biodiversity Impact Assessment (Appendix E2)
			Air quality	• The proposed development will not result in any air pollution during the operational phase.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Geology	• Collapsible soil. • Active soil (high soil heave). • Erodible soil. • Hard/compact geology. If the bedrock occurs close to	-		S	S	Po	PR	ML	Yes	- Surface drainage should be provided to prevent water ponding. - Mitigation measures proposed by the	L	-

watercourse measured from the edge of a watercourse." Activity 1 (GN.R 325): *"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more."* Activity 10 (c)(iv) (GN.R 324): *"The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres (c) the Gauteng province, (iv) Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans."*	facility. The PV panels will be tilted at a northern angle in order to capture the most sun or using one-axis tracker structures to follow the sun to increase the yield. • Connection to the grid - Connecting the array to the electrical grid requires transformation of the voltage from 480V to 33kV to 132kV. The normal components and dimensions of a distribution rated electrical substation will be required. Output voltage from the inverter is 480V and this is fed into step up transformers to 132kV. An onsite substation will be required to step the voltage up to 132kV, after which the power will be evacuated into the national grid. It is expected that generation from the facility will tie in with a newly proposed collector substation to be connected to the existing Pluto 400/275/22kV MTS, it may also be required to create a 132KV feeder bay and transformation at Pluto MTS in order to connect the collector substation at the MTS with a single or double circuit 132KV connection line. The Project will inject up to 250MW into the National Grid.			surface it may present problems when driving power line columns. • The presence of undermined ground. • Instability due to soluble rock. • Steep slopes or areas of unstable natural slopes. • Areas subject to seismic activity. • Areas subject to flooding.									detailed engineering geological investigation should be implemented.		
			Groundwater	• Leakage of hazardous materials. The development will comprise of a distribution substation and will include transformer bays which will contain transformer oils. Leakage of these oils can contaminate water supplies.	-		L	L	Po	PR	ML	Yes	- All areas in which substances potentially hazardous to groundwater are stored, loaded, worked with or disposed of should be securely bunded (impermeable floor and sides) to prevent accidental discharge to groundwater.	L	-
			Aquatic Ecology	• Potential spread of alien vegetation	-		L	L	Pr	IR	NL	Yes	- See Table 6.4	L	Aquatic Ecological Assessment (Appendix E1)
		SOCIAL/ECONOMIC	Employment opportunities and skills development	• The creation of employment opportunities and skills development opportunities during the operation phase for the country and local economy.		+	P	L	Pr	BR	NL	Yes	- See Table 6.4	M	Social Impact Assessment (Appendix E7)
			Development of non-polluting, renewable energy infrastructure	• Development of non-polluting, renewable energy infrastructure		+	I	L	D	CR	ML	No	- N/A	M	Social Impact Assessment (Appendix E7)
			Loss of agricultural land	• Loss of agricultural land and overall productivity as a result of the operation of	-		S	L	Pr	PR	SL	Yes	- See Table 6.4	L	Social Impact Assessment (Appendix E7)

	• Supporting Infrastructure – The following auxiliary buildings including a gate house, ablutions, workshops, storage and warehousing areas, site offices and a control centre. The project requires the need for both temporary and permanent laydown areas • Roads – Access will be obtained via a public gravel road off of the R500 regional road to the east of the site. An internal site road network will also be required to provide access to the solar field and associated infrastructure. • Fencing - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm. Fencing with a height of 2.5 meters will be used.		and overall productivity	the proposed project on an agricultural property.												
			Contribution to LED and social upliftment	• Contribution to LED and social upliftment during the operation of the project		+	I	L	D	PR	NL	Yes	- See Table 6.4	H	Social Impact Assessment (Appendix E7)
			Impact on tourism	• The potential impact on tourism due to the establishment of the Bonsmara Solar Power Plant SEF	- / +		L	L	Pr	CR	NL	Yes	- See Table 6.4	L	Social Impact Assessment (Appendix E7)
			Sense of place	• Visual impacts and sense of place impacts associated with the operation phase of Bonsmara Solar Power Plant SEF.	-		L	L	Pr	CR	ML	Yes	- See Table 6.4	L	Social Impact Assessment (Appendix E7)
			Increase in household earnings	• The creation of employment opportunities and skills development opportunities during the operation phase for the households involved in the project would create an opportunity for an increasement in household earnings.		+	P	L	Pr	BR	NL	Yes	- See Table 6.4	M	Social Impact Assessment (Appendix E7)
			Visual landscape	• Visual impact on sensitive visual receptors within a 1km radius from the SEF	-		L	L	D	PR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E4)
			Visual landscape	• Visual impact on sensitive receptors within a 1km radius from the power line	-		L	L	Pr	PR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E4)
			Visual landscape	• Visual impact on sensitive visual receptors between a 1km and 3km radius from the SEF	-		L	L	Pr	PR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E4)
			Visual landscape	• Visual impact on sensitive receptors between a 1km and 3km radius from the power line	-		L	L	Pr	PR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E4)

			Visual landscape	• Visual impact on sensitive visual receptors within a 3km and 5km radius from the SEF	-		L	L	Pr	PR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E4)
			Visual landscape	• Visual impact on sensitive receptors between a 3km and 5km radius from the power line	-		L	L	Pr	PR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E4)
			Visual landscape	• Visual impact on sensitive visual receptors within a 5-10km radius from the SEF	-		L	L	Po	PR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E4)
			Visual landscape	• Visual impact on sensitive receptors within a 5-10km radius from the power line	-		L	L	Po	PR	NL	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E4)
			Visual landscape	• Visual impacts of lighting at night on sensitive visual receptors in close proximity to the proposed facility	-		L	L	Po	CR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E4)
			Visual landscape	• Visual impacts of glint and glare as a visual distraction and possible air travel hazard	-		L	L	U	CR	NL	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E4)
			Visual landscape	• Visual impacts on sense of place associated with the operational phase of the SEF	-		L	L	Pr	PR	SL	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E4)
			Visual landscape	• Visual impacts and sense of place impacts associated with the operation phase of the PL	-		L	L	Po	CR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E4)
			Traffic volumes	• Slight increase in trips due to permanent staff on site. • Increase in trips around twice a year for transport of water to site for the cleaning of solar panels (water source to be clarified – borehole or transported to site / size of water tankers if water is to be delivered on site).	-		L	S	Pr	CR	NL	Yes	- See Table 6.4	L	Traffic Impact Assessment (Appendix E8)

			Health & Safety	• The proposed development will not result in any health and safety impacts during the operational phase.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-	N/A	N/A
			Noise levels	• The proposed development will not result in any noise pollution during the operational phase.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Heritage resources	• As no sites, features or objects of cultural historic significance have been identified in the project area, there would be no impact as a result of the proposed development	+		S	S	U	CR	NL	N/A	For the current study, as no sites, features or objects of cultural significance were identified, no mitigation measures are proposed.	L	Heritage Impact Assessment (Appendix E6)
			Electricity supply	• Generation of additional electricity. The power line will transport generated electricity into the grid.	+		I	L	D	I	N/A	Yes	-	N/A	-
			Electrical infrastructure	• Additional electrical infrastructure. The proposed solar facility will add to the existing electrical infrastructure and aid to lessen the reliance of electricity generation from coal-fired power stations.	+		I	L	D	I	N/A	Yes	-	N/A	-
DECOMMISSIONING PHASE																
-	<u>Dismantlement of infrastructure</u> During the decommissioning phase the Solar PV Energy facility and its associated infrastructure will be dismantled. <u>Rehabilitation of biophysical environment</u>	BIOPHYSICAL ENVIRONMENT	Vegetation	• Loss and disturbance of natural vegetation due to the removal of infrastructure and need for working sites	-		S	P	Pr	PR	ML	Yes	- See Table 6.5	L	Terrestrial Biodiversity Impact Assessment (Appendix E2)
			Vegetation	• Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors	-		S	L	Pr	BR	ML	Yes	- See Table 6.5	L	Terrestrial Biodiversity Impact Assessment (Appendix E2)

	The biophysical environment will be rehabilitated.		Air quality	• Air pollution due to the increase of traffic of construction vehicles.	-		S	S	D	CR	NL	Yes	- Regular maintenance of equipment to ensure reduced exhaust emissions.	L	-
			Geology	• It is not foreseen that the decommissioning phase will impact on the geology of the site or vice versa.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Existing services infrastructure	• Generation of waste that needs to be accommodated at a licensed landfill site. • Generation of sewage that needs to be accommodated by the municipal sewerage system and the local sewage plant. • Increase in construction vehicles.	-		L	S	D	I	NL	Yes	-	L	-
			Groundwater	• Pollution due to construction vehicles.	-		S	S	Pr	CR	ML	Yes	-	L	-
			Aquatic Ecology	• Loss of habitat containing protected species or Species of Special Concern • Activities resulting in physical disturbance of aquatic systems which provide ecosystem services, especially where new crossings are made, or large hard engineered surfaces are placed within the buffer zones. • Loss can also include a functional loss, through change in vegetation type via alien encroachment, reducing aquatic biodiversity.	-		L	L	Pr	IR	NL	Yes	- See Table 6.3	L	Aquatic Ecological Assessment (Appendix E1)
			Aquatic Ecology	• Loss of CBAs or potential areas with conservation potential	-		L	L	Pr	IR	NL	Yes	- See Table 6.3	L	Aquatic Ecological

				• Activities resulting in physical disturbance of aquatic systems which provide ecosystem services, especially where new crossings are made, or large hard engineered surfaces are placed within the buffer zones and have been included in any Critical Biodiversity Areas											Assessment (Appendix E1)
			Aquatic Ecology	• Loss of riparian and or wetland habitat • During construction/decommissioning, complete clearing of the PV panel areas, as well any ancillary structures (offices and substations) will be required, which may impact the aquatic function or any corridors or connections between aquatic systems. However, these areas can be avoided by the proposed layout.	-		L	L	Pr	IR	NL	Yes	- See Table 6.3	L	Aquatic Ecological Assessment (Appendix E1)
			Aquatic Ecology	• Changes to the hydrological regime and increase potential for erosion • Activities resulting in physical disturbance of aquatic systems which provide ecosystem services, especially where new crossings are made, or large hard engineered surfaces are placed within the buffer zones and have been included in any Critical Biodiversity Areas	-		L	L	Pr	IR	NL	Yes	- See Table 6.3	L	Aquatic Ecological Assessment (Appendix E1)
			Aquatic Ecology	• Changes to surface water quality characteristics	-		L	L	Pr	IR	NL	Yes	- See Table 6.3	L	Aquatic Ecological

				• During construction or decommissioning, earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. • Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. • This can result in possible deterioration in aquatic ecosystem integrity and species diversity.											Assessment (Appendix E1)
			Traffic volumes	• Increase in development trips for the duration of the construction Phase • Associated noise, dust and exhaust pollution	-		L	M	D	CR	NL	Yes	- See Table 6.3	L	Traffic Impact Assessment (Appendix E8)
			Tourism industry	• Since there are no tourism facilities in close proximity to the site, the decommissioning activities will not have an impact on tourism in the area.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Heritage resources	• As no sites, features or objects of cultural historic significance have been identified in the project area, there would be no impact as a result of the proposed development	+		S	S	U	CR	NL	N/A	For the current study, as no sites, features or objects of cultural significance were identified, no mitigation measures are proposed.	L	Heritage Impact Assessment (Appendix E6)

Nature of the impact:	(N/A) No impact	(+) Positive Impact (-)	Negative Impact	
Geographical extent:	(S) Site;	(L) Local/District;	(P) Province/Region;	(I) International and National

Probability:	(U) Unlikely;	(Po) Possible;	(Pr) Probable;	(D) Definite	
Duration:	(S) Short Term;	(M) Medium Term;	(L) Long Term;	(P) Permanent	
Intensity / Magnitude:	(L) Low;	(M) Medium;	(H) High;	(VH) Very High	
Reversibility:	(CR) Completely Reversible;	(PR) Partly Reversible;	(BR) Barely Reversible;	(IR) Irreversible	
Irreplaceable loss of resources:	(IR) Irreversible	(NL) No Loss;	(ML) Marginal Loss;	(SL) Significant Loss;	(CL) Complete Loss
Level of residual risk:	(L) Low;	(M) Medium;	(H) High;	(VH) Very High	-

6.2 KEY ISSUES IDENTIFIED

From the above it is evident that mitigation measures should be available for potential impacts associated with the proposed activity and development phases. The scoping methodology identified the following key issues which should be addressed in more detail in the EIA report.

6.2.1 Impacts During the Construction Phase

During the construction phase the following activities will have various potential impacts on the biophysical and socio-economic environment:

- Activity 11(i) (GN.R. 327): *"The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."*
- Activity 12(ii)(c) (GN.R. 327): "*The development of (ii) infrastructure or structures with a physical footprint of 100 square metres or more; (c) within 32 meters of a watercourse measured from the edge of a watercourse."*
- Activity 24 (ii) (GN.R 327): *"The development of a road (ii) with reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters."*
- Activity 27 (GN.R. 327): *"The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation…"*
- Activity 28(ii) (GN.R. 327): *"Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."*
- Activity 56 (ii) (GN.R 327): "*The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres…"*
- Activity 1 (GN.R. 325): *"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more..."*
- Activity 15 (GN.R. 325): *"The clearance of an area of 20 hectares or more of indigenous vegetation..."*
- Activity 4 (c)(iv) (GN.R 324): "*The development of a road wider than 4 metres with a reserve less than 13,5 metres within (c) the Gauteng province, (iv) Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans."*
- Activity 10 (c)(iv) (GN.R 324): *"The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres (c) the Gauteng province, (iv) Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans."*

- Activity 12 (c)(ii) (GN.R 324): *"The clearance of an area of 300 square metres or more of indigenous vegetation (c) in the Gauteng Province, (ii) within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans."*
- Activity 14(ii)(c)(c)(iv) (GN.R 324): "*The development of (ii) infrastructure or structures with a physical footprint of 10 square metres or more, where such development occurs (c) within 32 metres of a watercourse, measured from the edge of a watercourse, c) within the Gauteng Province, within (iv) sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans."*
- Activity 18 (c)(iv) (GN.R 324): *"The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre (c) in the Gauteng Province within (iv) sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans."*

During the construction phase temporary negative impacts are foreseen over the short term. Table 6.3 summarizes the potentially most significant impacts and the mitigation measures that are proposed during the construction phase.

Table 6.3: Impacts and the mitigation measures during the construction phase

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
Terrestrial Ecology Site Sensitivity Verification Report (Appendix E1)	Loss, degradation or fragmentation of vegetation through direct clearing	Negative High	Negative Low	• **Avoidance (High SEI Areas):** No development activities should be considered for High SEI habitat units. An associated buffer should also be incorporated into the development planning (minimum 50 m). Avoidance is recommended for the delineated rocky outcrop areas and accompanying buffers. • **Minimisation (High SEI Areas):** Any development in these areas will lead to the direct destruction and loss of portions of functional habitat. Guidelines for development in high sensitivity areas require avoidance mitigation as much as possible. This must include concerted efforts to avoid these sensitive areas where feasible, and disturbances must be kept to an absolute minimum. Changes must be made to project infrastructure design to limit the amount of area/habitat impacted in relation to the title deed area (for example 10%). The minimisation of the disturbance footprint is also considered to be avoidance, this will include brush cutting beneath panels as opposed to the complete clearance of vegetation. Limited development activities of low-medium impact acceptable, followed by appropriate restoration activities. The infrastructure layout should consider habitat connectivity to avoid fragmentation, and technology alternatives should opt to retain vegetation under the PV. Offset mitigation may be required for high impact activities.

				• **Minimisation and restoration mitigation (Medium SEI Areas):** Any development activities of medium impact acceptable followed by appropriate restoration activities. • **Minimisation and restoration mitigation (Low SEI Areas):** Any development activities of medium-high impact acceptable followed by appropriate restoration activities.
Avifauna Site Sensitivity Verification Report (Appendix E2)	Displacement of priority avian species, habitat loss, noise and dust pollution.	Negative High	Negative Medium	• Indigenous herbaceous and graminoid vegetation should be maintained under the solar panels to ensure biodiversity and to prevent soil erosion. Environmental Officer (EO) to provide supervision and oversight of vegetation clearing activities. • Avoidance of 'Very High' SEI water resources, including appropriate buffers, once confirmed. • Compile and implement a Rehabilitation Plan from the onset of the project. • Consult a fire expert and compile and implement a Fire Management Plan to minimise the risk of veld fires around the project site. • A Solid Waste Management Plan must be developed and implemented to avoid impacts to surrounding habitats. • Bird Flappers and diverters must be placed along the entire length of powerlines and must be placed at 5 m intervals. Recommended bird diverters such as flapping devices (dynamic devices) and thickened wire spirals (static devices) that increase the visibility of the lines should be fitted along the entire length of overhead lines. In addition, surrounding Eskom lines needs to mitigate as the cumulative impact is high. An injured Gyps coprotheras (Cape Vulture) was found and admitted to VulPro for rehabilitation due to Power line collision.

				• Applying covers on phases or grounds where adequate separation is not feasible. Examples of covers include insulator/conductor covers, bushing covers, arrester covers, cut-out covers, and jumper wire covers.
				• Fencing mitigations:
				  ○ Top 2 strands must be smooth wire.
				  ○ Routinely retention loose wires.
				  ○ Minimum 30 cm between wires.
				• Environmental Awareness Training for all staff and contractors. Hunting of species must be made a punishable offence. This is especially pertinent to avifauna SCC.

	Displacement of resident avifauna through increased disturbance (Power Line)	Negative Medium	Negative Low	• It is difficult to mitigate against the loss of habitat since clearing of vegetation (or habitat) will be required for the infrastructure associated with the project. The grid connection infrastructure occurs predominantly on habitat types of medium sensitivity. The best practicable mitigation will be to consolidate infrastructure (e.g., proposed powerline) to areas where existing impacts occur (e.g., placing the proposed powerline alongside existing powerlines). • All road networks must be planned with care to minimise dissection or fragmentation of important avifaunal habitat type. Where possible, the use of existing roads is encouraged.
Wetland Baseline and Risk Assessment (Appendix E1)	Direct disturbance / degradation / loss to wetland soils or vegetation due to the construction of the solar facility.	Negative Medium	Negative Low	• Clearly demarcate the construction footprint and restrict all construction activities to within the proposed infrastructure area. • When clearing vegetation, allow for some vegetation cover as opposed to bare areas. • Minimize the disturbance footprint and the unnecessary clearing of vegetation outside of this area.

				• Use the wetland shapefiles to signpost the edge of the wetlands closest to site. Place the sign 25 m from the edge (this is the buffer zone). Label these areas as environmentally sensitive areas, keep out. • Educate staff and relevant contractors on the location and importance of the identified wetlands through toolbox talks and by including them in site inductions as well as the overall master plan. • All activities (including driving) must adhere to the 25 m buffer area. • Promptly remove / control all alien and invasive plant species that may emerge during construction (i.e. weedy annuals and other alien forbs) must be removed. • All alien vegetation along the transmission servitude should be managed in terms of the Regulation GNR.1048 of 25 May 1984 (as amended) issued in terms of the Conservation of Agricultural Resources Act, Act 43 of 1983. By this Eskom is obliged to control. • Landscape and re-vegetate all denuded areas as soon as possible.
	Increased erosion and sedimentation.	Negative Medium	Negative Low	• Limit construction activities near (< 50m) wetlands to winter (as much as possible) when rain is least likely to wash concrete and sand into the wetland. Activities in black turf soils can become messy during the height of the rainy season and construction activities should be minimised during these times to minimise unnecessary soil disturbances. • Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash. • No activities are permitted within the wetland and associated buffer areas. • Landscape and re-vegetate all unnecessarily denuded areas as soon as possible.

	Potential contamination of wetlands with machine oils and construction materials.	Negative Low	Negative Low	• Make sure all excess consumables and building materials / rubble is removed from site and deposited at an appropriate waste facility. • Appropriately stockpile topsoil cleared from the project area. • Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g. concrete) in such a way as to prevent them leaking and entering the wetlands. • No activities are permitted within the wetland and associated buffer areas.
Visual Impact Assessment (Appendix E4)	Visual impact of construction activities on sensitive visual receptors in close proximity to the SEF	Negative Medium	Negative Low	Planning: • Retain and maintain natural vegetation immediately adjacent to the development footprint. Construction: • Ensure that vegetation is not unnecessarily removed during the construction phase. • Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e., in already disturbed areas) where possible. • Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. • Ensure that rubble, litter, etc. are appropriately stored (if it can't be removed daily) and then disposed of regularly at a licenced waste site. • Reduce and control dust during construction by utilising dust suppression measures. • Limit construction activities between 07:00 and 18:00, where possible, in order to reduce the impacts of construction lighting. • Rehabilitate all disturbed areas immediately after the completion of construction work and maintain good housekeeping.
	Visual impact of construction activities on sensitive visual receptors to the PL.	Negative Low	Negative Low	

Social Impact Assessment (Appendix E7)	The creation of direct and indirect employment opportunities during the construction phase of the project	Low Positive	Medium Positive	Enhancement: • A local employment policy should be adopted to maximise opportunities made available to the local labour force. • Labour should be sourced from the local labour pool, and only if the necessary skills are unavailable should labour be sourced from (in order of preference) the greater Merafong City LM, West Rand DM, Gauteng Province, South Africa, or elsewhere. • Where feasible, training and skills development programmes should be initiated prior to the commencement of the construction phase. • As with the labour force, suppliers should also as far as possible be sourced locally. • As far as possible local contractors that are compliant with Broad-Based Black Economic Empowerment (B-BBEE) criteria should be used. • The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.
	Significance of the impact from the economic multiplier effects from the use of local goods and services.	Low Positive	Medium Positive	Enhancement: • It is recommended that a local procurement policy is adopted to maximise the benefit to the local economy. • A database of local companies, specifically Historically Disadvantaged Individuals (HDIs) which qualify as potential service providers (e.g., construction companies, security companies, catering companies, waste collection companies, transportation companies etc.) should be created and companies listed thereon should be invited to bid for project-related work where applicable. • Local procurement is encouraged along with engagement with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods and products from local suppliers where feasible.

	Investment into upgrading and maintain shared infrastructure such as roads and stormwater infrastructure on farms may benefit farming operations	Low Positive	Low Positive	Enhancement: • The project would contribute to an upgrade in the shared infrastructure of the LM as well as in the maintenance of this infrastructure. • The LM would be encouraged to participate in this maintenance and upgrade where it would be feasible for them to be involved. • A database of local companies, specifically Historically Disadvantaged Individuals (HDIs) which qualify as potential service providers (e.g., construction companies, security companies, catering companies, waste collection companies, transportation companies etc.) should be created (or sourced from the local Municipality, where available) and companies listed thereon should be invited to bid for project-related work where applicable and this would include the maintenance of this shared infrastructure.
	The potential loss in productive farmland during the construction phase, due to factors such as the construction of roads, the preparation of foundations, power lines, offices etc	Negative Medium	Negative Low	• The proposed site for the Bonsmara Solar Power Plant SEF needs to be fenced off prior to the construction phase and all construction related activities should be confined in this fenced off area. • Game grazing on the proposed site need to be relocated • All affected areas, which are disturbed during the construction phase, need to be rehabilitated prior to the operational phase and should be continuously monitored by the Environmental Control Officer (ECO). • Implement, manage and monitor a grievance mechanism for the recording and management of social issues and complaints. • Mitigation measures from the Agricultural and Soil Report, should also be implemented.
	In-migration of labourers in search of employment opportunities, and a	Negative Medium	Negative Low	• Develop and implement a local procurement policy which prioritises “locals first” to prevent the movement of people into the area in search of work.

	resultant change in population, and increase in pressure on local resources and social networks, or existing services and infrastructure			• Engage with local community representatives prior to construction to facilitate the adoption of the locals first procurement policy. • Provide transportation for workers (from Carletonville and surrounds) to ensure workers can easily access their place of employment and do not need to move closer to the project site. • As far as possible, working hours should be kept between daylight hours during the construction phase, and / or as any deviation that is approved by the relevant authorities. • Compile and implement a grievance mechanism. • Appoint a Community Liaison Officer (CLO) to assist with the procurement of local labour. • Prevent the recruitment of workers at the project site. • Implement, manage and monitor a grievance mechanism for the recording and management of social issues and complaints. • Establish clear rules and regulations for access to the proposed site. • Appoint a security company and implement appropriate security procedures to ensure that workers do not remain onsite after working hours. • Inform local community organisations and policing forums of construction times and the duration of the construction phase. • Establish procedures for the control and removal of loiterers from the construction site.
	Temporary increase in safety and security concerns associated with the influx of people during the construction phase	Negative Medium	Negative Low	• As far as possible, working hours should be kept within daylight hours during the construction phase, and / or as any deviation that is approved by the relevant authorities. • Provide transportation for workers to prevent loitering within or near the project site outside of working hours.

				• The perimeter of the construction site should be appropriately secured to prevent any unauthorised access to the site. The fencing of the site should be maintained throughout the construction period. • The appointed EPC Contractor must appoint a security company to ensure appropriate security procedures and measures are implemented. • Access in and out of the construction site should be strictly controlled by a security company appointed to the project. • A CLO should be appointed as a grievance mechanism. A method of communication should be implemented whereby procedures to lodge complaints are set out for the local community to express any complaints or grievances with the construction process. • The EPC Contractor should implement a stakeholder management plan to address neighbouring farmer concerns regarding safety and security. • The project proposed must prepare and implement a Fire Management Plan; this must be done in conjunction with surrounding landowners. • The EPC Contractor must prepare a Method Statement which deals with fire prevention and management.
	Temporary increase in traffic disruptions and movement patterns during the construction phase.	Negative Medium	Negative Medium	• All vehicles must be road worthy, and drivers must be qualified, obey traffic rules, follow speed limits and be made aware of the potential road safety issues. • Heavy vehicles should be inspected regularly to ensure their road worthiness. • Provision of adequate and strategically placed traffic warning signs, that have to be maintained for the duration of the construction phase, and control measures along the R501 and R500 roads to warn road

				users of the construction activities taking place for the duration of the construction phase. Warning signs must be always visible, especially at night. • Implement penalties for reckless driving to enforce compliance to traffic rules. • Avoid heavy vehicle activity during "peak" hours (when children are taken to school, or people are driving to work). • The developer and EPC Contractor must ensure that all fencing along access roads is maintained in the present condition or repaired if disturbed due to construction activities. • The developer and EPC Contractor must ensure that the roads utilised for construction activities are either maintained in the present condition or upgraded if disturbed due to construction activities. • The EPC Contractor must ensure that damage / wear and tear caused by construction related traffic to the access roads is repaired before the completion of the construction phase. • A method of communication must be implemented whereby procedures to lodge complaints are set out for the local community to express any complaints or grievances with the construction process.
	Nuisance impacts in terms of temporary increase in noise and dust, and wear and tear on access roads to the site	Negative Medium	Negative Low	• The movement of heavy vehicles associated with the construction phase should be timed to avoid weekends, public holidays, and holiday periods where feasible. • Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.

				• Ensure all vehicles are road worthy, drivers are qualified and are made aware of the potential noise and dust issues. • A CLO should be appointed, and a grievance mechanism implemented.
	The potential loss of livestock, crops, and farmsteads in the area. This also includes the damage and loss of farm infrastructure and the threatening of human lives that are associated with the increased risk of veld fires	Negative Medium	Negative Low	• A firebreak should be implemented before the construction phase. The firebreak should be controlled and implemented around the perimeters of the project site. • Adequate fire-fighting equipment should be provided and readily available on site and all staff should be trained in firefighting and how to use the fire-fighting equipment. • No staff (except security) should be accommodated overnight on site and the contractor should ensure that no open fires are allowed on site. The use of cooking or heating implements should only be used in designated areas. • Contractors need to ensure that any construction related activities that might pose potential fire risks, are done in the designated areas where it is also managed properly. • Precautionary measures need to be taken during high wind conditions or during the winter months when the fields are dry. • The contractor should enter an agreement with the local farmers before the construction phase that any damages or losses during the construction phase related to the risk of fire and that are created by staff during the construction phase, are borne by the contractor.
	Intrusion impacts from construction activities will have an impact on the area's "sense of place".	Negative Medium	Negative Low	• Implement mitigation measures identified in the Visual Impact Assessment (VIA) prepared for the project. • Limit noise generating activities to normal daylight working hours and avoid weekends and public holidays.

				• The movement of heavy vehicles associated with the construction phase should be timed to avoid weekends, public holidays, and holiday periods where feasible. • Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. • All vehicles must be road-worthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits. • Communication, complaints, and grievance channels must be implemented and contact details of the CLO must be provided to the local community in the study area.
Traffic Impact Assessment (Appendix E8)	Increase in development trips for the duration of the construction Phase Associated noise, dust and exhaust pollution	Negative Medium	Negative Low	• Stagger component delivery to site. • Reduce the construction period. • Stagger the construction Phase. • The use of mobile batch plants and quarries in close proximity to the site would decrease the impact on the surrounding road network • Staff and general trips should occur outside of peak traffic periods as much as possible. • Maintenance of haulage routes. • Design and maintenance of internal roads. • Provide two access points to the site to split construction vehicle trips.

6.2.2 Impacts During the Operational Phase

During the operational phase the site will serve as a solar plant. The potential impacts will take place over a period of 20 – 25 years. During the operational phase the following activities will have various potential impacts on the biophysical and socio-economic environment:

- Activity 11(i) (GN.R. 327): *"The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."*
- Activity 14 (GNR 327): *"The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres."*
- Activity 1 (GN.R 325): *"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more."*
- Activity 10 (c)(iv) (GN.R 324): *"The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres (c) the Gauteng province, (iv) Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans."*

During the operational phase minor negative impacts are foreseen over the long term. The latter refers to at least a 20-year period. Table 6.4 summarizes the potentially most significant impacts and the mitigation measures that are proposed during the operational phase.

Table 6.4: Impacts and the mitigation measures during the operational phase

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
Terrestrial Ecology Site Sensitivity Verification Report (Appendix E1)	Continued destruction of Habitats. Establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors	Negative Medium	Negative Low	• Mitigation measures proposed for the construction phase should be implemented. • Additional mitigation measures will be provided with the submission of the Environmental Impact Report.
Avifauna Site Sensitivity Verification Report (Appendix E2)	Electrocution, collisions, fencing, chemical pollution	Negative Medium	Negative Low	• Avoidance mitigation (Very High SEI Areas) – no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e., last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains. • Minimisation and restoration mitigation (Medium SEI Areas) – Any development activities of medium impact acceptable, followed by appropriate restoration be activities. • Minimisation mitigation (Very Low SEI Habitats) – medium to high impact development activities are acceptable and restoration activities may not be required.

Wetland Baseline and Risk Assessment (Appendix E1)	Potential for increased stormwater runoff leading to Increased erosion and sedimentation.	Negative Medium	Negative Low	• Design and Implement an effective stormwater management plan. • Promote water infiltration into the ground beneath the solar panels. • Release only clean water into the environment. • Stormwater leaving the site should not be concentrated in a single exit drain but spread across multiple drains around the site each fitted with energy dissipaters (e.g. slabs of concrete with rocks cemented in). • Re-vegetate denuded areas as soon as possible. • Regularly clear drains. • Minimise the extent of concreted / paved / gravel areas. • A covering of soil and grass (regularly cut and maintained) below the solar panels is ideal for infiltration. If not feasible then gravel is preferable over concrete or paving. • Avoid excessively compacting the ground beneath the solar panels.
	Potential for increased contaminants entering the wetland systems.	Negative Medium	Negative Low	• Where possible minimise the use surfactants to clean solar panels and herbicides to control vegetation beneath the panels. If surfactants and herbicides must be used do so well prior to any significant predicted rainfall events.
Visual Impact Assessment (Appendix E4)	Visual impact on sensitive visual receptors within a 1km radius from the SEF	Negative Medium	Negative Low	Planning: • Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint. • Where insufficient natural vegetation exists next to the property, a 'screen' can be planted if the landowner requests additional mitigation. This can be done using endemic, fast growers that are water efficient.

				Operations: • Maintain general appearance of the facility as a whole.
	Visual impact on sensitive receptors within a 1km radius from the power line	Negative Medium	Negative Low	Planning: • Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint. Operations: • Maintain general appearance of the power line corridor. • Screening can be established near sensitive receptors, upon request, rather than to mitigate the impact at the source.
	Visual impact on sensitive visual receptors between a 1km and 3km radius from the SEF	Negative Medium	Negative Low	Planning: • Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint. • Where insufficient natural vegetation exists next to the property, a 'screen' can be planted if the landowner requests additional mitigation. This can be done using endemic, fast growers that are water efficient. Operations: • Maintain general appearance of the facility as a whole.
	Visual impact on sensitive receptors between a 1km and 3km radius from the power line.	Negative Medium	Negative Low	Planning: • Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint. Operations: • Maintain general appearance of the power line corridor. • Screening can be established near sensitive receptors, upon request, rather than to mitigate the impact at the source.

	Visual impact on sensitive visual receptors within a 3km and 5km radius from the SEF	Negative Medium	Negative Low	Planning: • Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint. • Where insufficient natural vegetation exists next to the property, a 'screen' can be planted if the landowner requests additional mitigation. This can be done using endemic, fast growers that are water efficient. Operations: • Maintain general appearance of the facility as a whole.
	Visual impact on sensitive receptors between a 3km and 5km radius from the power line.	Negative Low	Negative Low	Planning: • Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint. Operations: • Maintain general appearance of the power line corridor. • Screening can be established near sensitive receptors, upon request, rather than to mitigate the impact at the source.
	Visual impact on sensitive visual receptors within a 5-10km radius from the SEF	Negative Low	Negative Low	Planning: • Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint. • Where insufficient natural vegetation exists next to the property, a 'screen' can be planted if the landowner requests additional mitigation. This can be done using endemic, fast growers that are water efficient. Operations: • Maintain general appearance of the facility as a whole.

	Visual impact on sensitive receptors within a 5-10km radius from the power line	Negative Low	Negative Low	Planning: • Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint. Operations: • Maintain general appearance of the power line corridor. • Screening can be established near sensitive receptors, upon request, rather than to mitigate the impact at the source.
	Visual impacts of lighting at night on sensitive visual receptors in close proximity to the proposed facility	Negative Medium	Negative Low	Planning & Operation As far as practically possible: • Shield the source of light by physical barriers (walls, vegetation etc.) • Limit mounting heights of lighting fixtures, or alternatively use footlights or bollard level lights. • Make use of minimum lumen or wattage in fixtures. • Make use of down-lighters, or shield fixtures. • Make use of low-pressure sodium lighting or other types of low impact lighting. • Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes. • The use of night vision or thermal security cameras are very effective and can replace security lighting entirely.
	Visual impacts of glint and glare as a visual distraction and possible air travel hazard	Negative Low	Negative Low	• No mitigation measures are required.

	Visual impacts on sense of place associated with the operational phase of the SEF	Negative Medium	Negative Low	• It is believed that renewable energy resources are essential to the environmental well- being of the country and planet (WESSA, 2012). Aesthetic issues are subjective, and some people find solar farms and their associated infrastructure pleasant and optimistic while others may find it visually invasive; it is mostly perceived as symbols of energy independence; and local prosperity. • The subjectivity towards the project in its entirety can be influenced by creating a "Green Energy" awareness campaign, educating the local community and potentially tourists on the benefits of renewable energy. This can be achieved by also hosting an 'open day' where the local community can have the opportunity to view the completed project which may enlist a sense of pride in the renewable energy project in their area. • Implement good housekeeping measures.
	Visual impacts and sense of place impacts associated with the operation phase of the PL.	Negative Low	Negative Low	• It is believed that renewable energy resources are essential to the environmental well- being of the country and planet (WESSA, 2012). Aesthetic issues are subjective, and some people find solar farms and their associated infrastructure pleasant and optimistic while others may find it visually invasive; it is mostly perceived as symbols of energy independence; and local prosperity. • The subjectivity towards the project in its entirety can be influenced by creating a "Green Energy" awareness campaign, educating the local community and potentially tourists on the benefits of renewable energy. This can be achieved by also

				hosting an 'open day' where the local community can have the opportunity to view the completed project which may enlist a sense of pride in the renewable energy project in their area. • Implement good housekeeping measures.
Social Impact Assessment (Appendix E7)	The creation of employment opportunities and skills development opportunities during the operation phase for the country and local economy	Positive Low	Positive Medium	Enhancement: • It is recommended that local employment policy is adopted to maximise the opportunities made available to the local community. • The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. • Vocational training programs should be established to promote the development of skills.
	Development of non-polluting, renewable energy infrastructure	Positive Medium	Positive Medium	• N/A
	Loss of agricultural land and overall productivity as a result of the operation of the proposed project on an agricultural property	Negative Medium	Negative Low	• The proposed mitigation measures for the construction phase should have been implemented at this stage. •
	Contribution to LED and social upliftment during the operation of the project	Positive Medium	Positive High	Enhancement: • A CNA must be conducted to ensure that the LED and social upliftment programmes proposed by the project are meaningful.

				• Ongoing communication and reporting are required to ensure that maximum benefit is obtained from the programmes identified, and to prevent the possibility for such programmes to be misused. • The programmes should be reviewed on an ongoing basis to ensure that they are best suited to the needs of the community at the time (bearing in mind that these are likely to change over time).
	The potential impact on tourism due to the establishment of the Bonsmara Solar Power Plant SEF	Positive/Negative Low	Positive/Negative Low	• Due to the extent of the project no viable mitigation measures can be implemented to eliminate the visual impact of the PV panels, but the subjectivity towards the PV panels can be influenced by creating a "Green Energy" awareness campaign, educating the local community and tourists on the benefits of renewable energy. Tourists visiting the area should be made aware of South Africa's movement towards renewable energy. This might create a positive feeling of a country moving forward in terms of environmental sustainability.
	Visual impacts and sense of place impacts associated with the operation phase of Bonsmara Solar Power Plant SEF	Negative Low	Negative Low	• To effectively mitigate the visual impact and the impact on sense of place during the operational phase of the proposed Bonsmara Solar Power Plant SEF, it is suggested that the recommendations made in the Visual Impact Assessment (specialist study) should be followed in this regard.
	The creation of employment opportunities and skills development opportunities during the operation phase for the households involved	Positive Low	Positive Medium	Enhancement: • It is recommended that local employment policy is adopted to maximise the opportunities made available to the local community.

	in the project would create an opportunity for an increasement in household earnings			• With the recruitment of the local community for job creation and increasement in household earnings will automatically be seen in the area surrounding the development.
Traffic Impact Assessment (Appendix E8)	Slight increase in trips due to permanent staff on site. Increase in trips around twice a year for transport of water to site for the cleaning of solar panels (water source to be clarified – borehole or transported to site/size of water tankers if water is to be delivered on site)	Negative Low	Negative Low	• Source on-site water supply if possible. • Utilise cleaning systems for the panels needing less vehicle trips. • Schedule trips for the provision of water for the cleaning of panels outside peak traffic times as much as possible.

6.2.3 Impacts During the Decommissioning Phase

The physical environment will benefit from the closure of the solar facility since the site will be restored to its natural state. Table 6.5 provides a summary of the impacts during the decommissioning phase. The decommissioning phase will however potentially result in impact on soils, pressure on existing service infrastructure, surface water and the loss of permanent employment. Skilled staff will be eminently employable, and a number of temporary jobs will also be created in the process. Decommissioning of a PV facility will leave a positive impact on the habitat and biodiversity in the area as the area will be rehabilitated to its natural state.

Table 6.5: Impacts and the mitigation measures during the decommissioning phase

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
Wetland Baseline and Risk Assessment (Appendix E1)	Degradation of wetland vegetation and proliferation of alien and invasive species	Negative Low	Negative Low	• See mitigation for the impacts on direct loss, disturbance and degradation of wetlands and spread of alien and invasive plants. • Control should continue for a minimum of three years following decommissioning.
	Increased bare surfaces, runoff and potential for erosion	Negative Low	Negative Low	• See mitigation for increased bare surfaces, runoff and potential for erosion and increased sediment loads during construction
Traffic Impact Assessment (Appendix E8)	Increase in development trips for the duration of the construction Phase Associated noise, dust and exhaust pollution	Negative Medium	Negative Low	• Refer to construction mitigation measures (Table 6.3)

7 CUMULATIVE EFFECTS ASSESSMENT

This section aims to address the requirements of Section 2 of the NEMA to consider cumulative impacts as part of any environmental assessment process.

7.1 INTRODUCTION

The EIA Regulations (2017) determine that cumulative impacts, "*in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities*." Cumulative impacts can be incremental, interactive, sequential or synergistic. EIAs have traditionally failed to come to terms with such impacts, largely as a result of the following considerations:

- Cumulative effects may be local, regional or global in scale and dealing with such impacts requires coordinated institutional arrangements;
- Complexity - dependent on numerous fluctuating influencing factors which may be completely independent of the controllable actions of the proponent or communities; and
- Project level investigations are ill-equipped to deal with broader biophysical, social and economic considerations.

Despite these challenges, cumulative impacts have been afforded increased attention in this Scoping Report and for each impact a separate section has been added which discusses any cumulative issues, and where applicable, draws attention to other issues that may contextualise or add value to the interpretation of the impact – refer to Appendix E. This chapter analyses the proposed project's potential cumulative impacts in more detail by: (1) defining the geographic area considered for the cumulative effects analysis; (2) providing an overview of relevant past and present actions in the project vicinity that may affect cumulative impacts; (3) presenting the reasonably foreseeable actions in the geographic area of consideration; and (4) determining whether there are adverse cumulative effects associated with the resource areas analysed.

The term "Cumulative Effect" has for the purpose of this report been defined as: the summation of effects over time which can be attributed to the operation of the project itself, and the overall effects on the ecosystem of the project area that can be attributed to the project and other existing and planned future projects.

7.2 GEOGRAPHIC AREA OF EVALUATION

The geographic area of evaluation is the spatial boundary in which the cumulative effects analysis was undertaken. The spatial boundary evaluated in this cumulative effects analysis generally includes an area of a 30km radius surrounding the proposed development – refer to Figure 7.1 below.

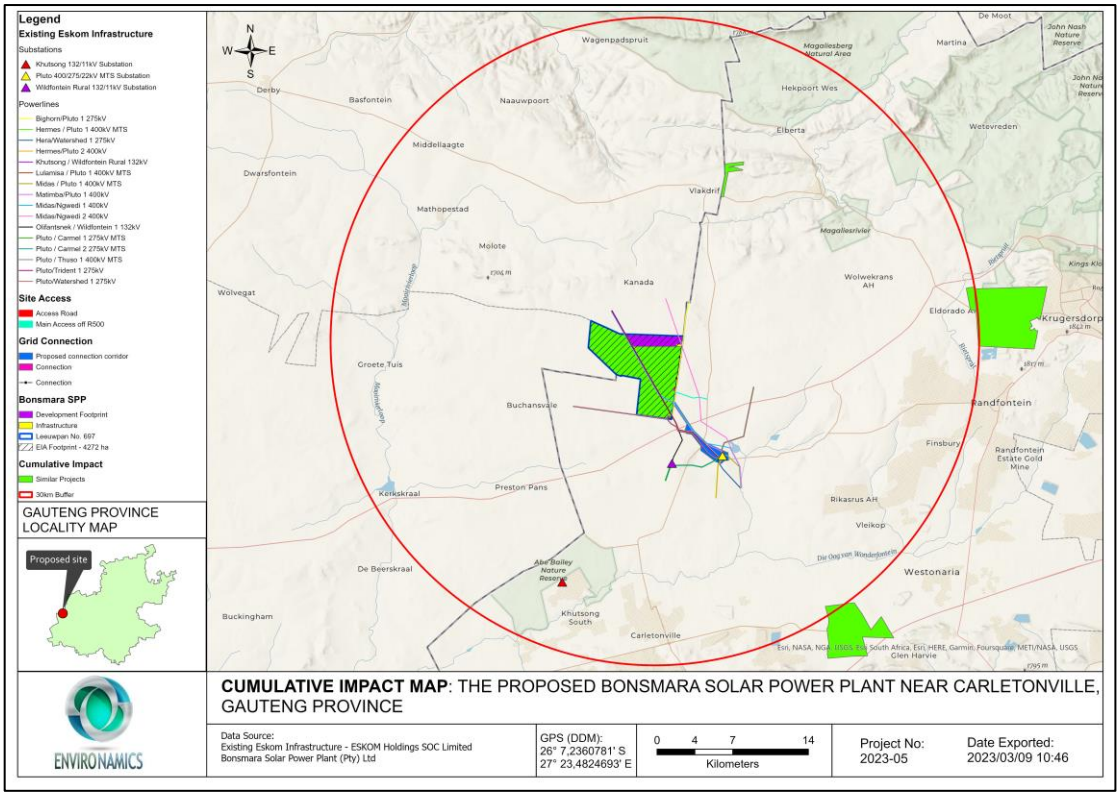


Figure 7.1: Geographic area of evaluation with utility-scale renewable energy generation sites and power lines

The geographic spread of PV solar projects, administrative boundaries and any environmental features (the nature of the landscape) were considered when determining the geographic area of investigation. It was argued that a radius of 30km would generally confine the potential for cumulative effects within this particular environmental landscape. The geographic area includes projects located within the Gauteng Province. A larger geographic area may be used to analyse cumulative impacts based on the specific temporal or spatial impacts of a resource. For example, the socio-economic cumulative analysis may include a larger area, as the construction workforce may draw from a much wider area. The geographic area of analysis is specified in the discussion of the cumulative impacts for that resource where it differs from the general area of evaluation described above.

7.2.1 Temporal Boundary of Evaluation

A temporal boundary is the timeframe during which the cumulative effects are reasonably expected to occur. The temporal parameters for this cumulative effects analysis are the anticipated lifespan of the proposed project, beginning in 2025 and extending out at least 20 years, which is the minimum expected project life of the proposed project. Where

appropriate, particular focus is on near-term cumulative impacts of overlapping construction schedules for proposed projects in the area of evaluation.

7.3 OTHER PROJECTS IN THE AREA

7.3.1 Existing Projects in the Area

According to the DFFE's database and desktop analysis, eight (08) solar PV plant applications have been submitted to the Department within the geographic area of investigation - refer to Table 7.1.

Table 7.1: A summary of related projects that may have a cumulative impact, in a 30 km radius of the study area

Site name	Distance from study area	Proposed generating capacity	DEFF reference	EIA process	Project status
Portion 3 (Portion Of Portion 2 Of The Farm Rietpoort 395	14.5km	15 MW	12/12/20/2330	BAR	Approved
Portion 64 (A Portion Of Portion 1) Of The Farm Waterval 174	28km	25 MW	12/12/20/2537	Scoping and EIA	Approved
Portion 57 (A Portion Of Portion 1) Of The Farm Waterval 174	27.5KM	70 MW	12/12/20/2539	Scoping and EIA	In process
Portion 1, 2, 4, 5 and 6 of the Farm Uitval 280	25.6km	200 MW	14/12/16/3/3/2/919	Scoping and EIA	In process
Farm Brickvale 161	27.3km	19.9 MW	14/12/16/3/3/1/636	BAR	In process
Tuli Solar Power Plant	0km	250MW	To be obtained	Scoping and EIA	In process
Angus Solar Power Plant	0km	250MW	To be obtained	Scoping and EIA	In process

Simbra Solar Power Plant	0km	250MW	To be obtained	Scoping and EIA	In process

It is unclear whether other projects not related to renewable energy is or has been constructed in this area, and whether other projects are proposed. In general, development activity in the area is focused on agriculture and mining. It is quite possible that future solar farm development may take place within the general area.

7.4 SPECIALIST INFORMATION ON CUMULATIVE EFFECTS

In line with the Terms of Reference (ToR) provided as part of the scoping report, specialists were asked to, where possible, take into consideration the cumulative effects associated with the proposed development and other projects which are either developed or in the process of being developed in the local area – refer to Figure 7.2 for process flow. The following sections present their findings. The following sections present their findings.

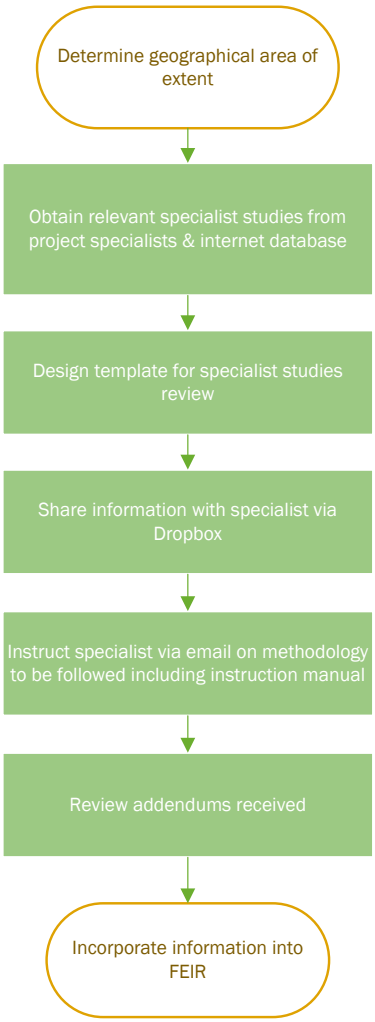


Figure 7.2: Process flow diagram for determining cumulative effects

7.4.1 Soil, Land Capability and Agricultural Potential

The cumulative impact of a development is the impact that development will have when its impact is added to the incremental impacts of other past, present or reasonably foreseeable future activities that will affect the same environment. It is important to note that the cumulative impact assessment for a particular project, like what is being done here, is not the same as an assessment of the impact of all surrounding projects. The cumulative assessment for this project is an assessment only of the impacts associated with this project, but seen in the context of all surrounding impacts. It is concerned with this project's contribution to the overall impact, within the context of the overall impact. But it is not simply the overall impact itself.

The most important concept related to a cumulative impact is that of an acceptable level of change to an environment. A cumulative impact only becomes relevant when the impact of the proposed development will lead directly to the sum of impacts of all developments causing an acceptable level of change to be exceeded in the surrounding area. If the impact of the development being assessed does not cause that level to be exceeded, then the cumulative impact associated with that development is not significant.

The potential cumulative agricultural impact of importance is a regional loss (including by degradation) of future agricultural production potential. The defining question for assessing the cumulative agricultural impact is this:

What level of loss of future agricultural production potential is acceptable in the area, and will the loss associated with the proposed development, when considered in the context of all past, present or reasonably foreseeable future impacts, cause that level in the area to be exceeded?

Department of Forestry, Fisheries and the Environment (DFFE) requires compliance with a specified methodology for the assessment of cumulative impacts. This is positive in that it ensures engagement with the important issue of cumulative impacts. However, the required compliance has some limitations and can, in the opinion of this author, result in an over-focus on methodological compliance, while missing the more important task of effectively answering the above defining question.

All of these projects have the same agricultural impacts in a similar agricultural environment, and therefore the same mitigation measures apply to all.

As previously indicated, the proposed development poses a low risk in terms of causing soil degradation because it can be fairly easily and effectively prevented by standard best practice soil degradation control measures, as recommended and included in the EMPr of the EIA Report. If the risk for each individual development is low, then the cumulative risk is also low.

Due to all of the considerations discussed above, the cumulative impact of loss of agricultural land use will not have an unacceptable negative impact on the agricultural production capability of the area. The proposed development is therefore acceptable in terms of cumulative impact, and it is therefore recommended that it is approved. The transformation that has taken place.

7.4.2 Ecology

The cumulative impacts, from an ecological point of view, are those that will impact the natural faunal and floristic communities and habitats surrounding the proposed solar development, mainly by other similar developments and their associated infrastructure in its direct vicinity. As more and more similar developments occur in the direct vicinity of the currently proposed development, habitat losses and fragmentation will occur more frequently and populations of threatened, protected or other habitat specific species (both faunal and floral) will be put under increasing pressure through competition for suitable habitat. Fragmentation of habitats prevent the natural flow of ecosystem services and may have a detrimental effect on the gene pool of a species, which may lead to the loss of a population of such a species on fragmented portions. Through a development, such as the one proposed for the study area, natural habitat is totally transformed and although some vegetation cover generally returns to these areas, microhabitats are totally destroyed, and the area will probably never again be able to function without some human maintenance and management.

The cumulative impact of the solar project in the project area should all the projects be approved and developed are as follows:

The cumulative impact on the natural ecosystems (fauna and flora) would be moderate considering that large sections of the area for development has already been degraded through agricultural activities (crop cultivation, overgrazing etc.).

The moderate cumulative impacts are however dependent on the strict implementation of mitigation measures and monitoring during the construction, operational and decommissioning phases of the solar developments.

7.4.3 Avifauna Impact Assessment

The the cumulative impacts, when considering the existing transformation of the threatened habitats to croplands and mining, in addition to the prevalence of planned solar developments, that increase the cumulative risks and, therefore, warrant mitigations. Mitigating the cumulative impacts would require limiting the impact of Bonsmara SPP to an absolute minimum, which is not necessarily feasible but should be pursued. The mitigations to reduce cumulative impacts involve limiting the disturbance footprint (overall size), limiting human activity and noise throughout the project life, disturbing as little natural vegetation as possible, retaining the natural vegetation beneath the panels and around infrastructure, limiting the extent and width of roadways, reducing the speeds that vehicles travel, and then thoroughly rehabilitating the entire footprint back to natural grassland after decommissioning. Despite some residual and cumulative impacts, there is no objection, from an avifaunal perspective to the development of the proposed SPP development.

7.4.4 Social Impact Assessment

The Social Impact Assessment (refer to Appendix E6) indicate that from a social impact point of view the project represents an important development opportunity for the communities surrounding Bonsmara SPP. Should it be approved, it will not only supply the national grid with much needed clean power but will also provide a number of opportunities for social

upliftment. The cumulative impacts for each of the potential social impacts were assessed throughout the report. The most significant cumulative social impacts are both positive and negative: the community will have an opportunity to better their social and economic well-being, since they will have the opportunity to upgrade and improve skills levels in the area, but impacts on family and community relations may, in some cases, persist for a long period of time. Also, in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.

7.4.5 Visual

The Visual Impact Assessment (refer to Appendix E3) confirmed that the construction and operation of the PV facility may increase the cumulative visual impact together with farming activities, dust on gravel roads, existing Eskom power line infrastructure and new projects, mines in the area and other proposed solar power facilities in the area. The significance of the visual impacts can only be determined once projects have been awarded preferred bidder status. However, taking into account the already disturbed visual surrounds due to extensive mining activities in the area and all the positive factors of such a development including economic factors, social factors and sustainability factors, the visual impact of this proposed development will be insignificant and is suggested that the development commence, from a visual impact point of view.

7.4.6 Heritage

The Heritage Impact Assessment (Refer to Appendix E5) concluded that from a review of available databases, publications, as well as available heritage impact assessments done for the purpose of developments in the region, it was determined that the Bonsmara SPP is in an area with a very low presence of heritage sites and features.

The cultural heritage profile of the larger region is very low. Most frequently found are farmsteads, formal and informal burial sites. For this review, heritage sites located in urban areas have been excluded.

Heritage resources are sparsely distributed on the wider landscape with highly significant (Grade 1) sites being rare. Because of the low likelihood of finding further significant heritage resources in the proposed for development and the generally low density of sites in the wider landscape the overall cumulative impacts to heritage are expected to be of generally low significance before mitigation.

7.4.7 Paleontology

According to the Palaeontological Impact Assessment (refer to Appendix E5), based on the SAHRIS website, the only palaeontological heritage assessments (PIAs) available for this region (Almond 2015, Brink undated, Groenewald 2013b, Millsteed 2013b) are all at desktop level with no field data. The cumulative Impacts of the area will include approved electrical facilities within a 30 km radius of the project site. As the mentioned MTS and Powerlines and corridors are all underlain by similar geology the Impact on these developments will be similar. The

Palaeontological Significance of the proposed Bonsmara SPP is rated as Low, and the cumulative Impacts will thus also be Low Negative.

7.4.8 Traffic

According to the Traffic Impact Assessment (refer to Appendix E8) depending on the timing of the other nearby renewable energy projects, where construction in particular could overlap, traffic impact will increase accordingly. It should be noted that the volume of traffic is related to the specific development stage, logistics planning and development size.

The construction period for other renewable energy projects is relatively short (between 12 and 18 months), where traffic flow will vary during the construction period. It is assumed that 50% of these projects' construction periods would likely coincide with the Bonsmara SPP construction period. This additional traffic, however, will be widely dispersed and easily accommodated on the surrounding road network. In addition, the traffic impact of the operational and maintenance periods will be low/ negligible, and it is also unlikely that the decommissioning of these projects will coincide with each other.

In conclusion, the cumulative impact and significance of the various nearby renewable energy projects is considered to have a low/ negligible impact and therefore no corrective measures will be required.

7.5 IMPACT ASSESSMENT

Following the definitions of the term, the "residual effects on the environment", i.e., effects after mitigation measures have been put in place, combined with the environmental effects of past, present and future projects and activities will be considered in this assessment. Also, a "combination of different individual environmental effects of the project acting on the same environmental component" can result in cumulative effects.

7.5.1 Potential Cumulative Effects

The receptors (hereafter referred to as Valued Ecosystem Components (VECs) presented in Section 6 (refer to the matrix analysis) have been examined alongside other past, present and future projects for potential adverse cumulative effects. A summary of the cumulative effects discussed are summarized in Table 7.2. There have been specific VECs identified with reference to the Solar Project (Table 6.2), which relates to the biophysical and socio-economic environments. Table 7.2 indicates the potential cumulative effects VECs and the rationale for inclusion/exclusion.

Table 7.2: Potential cumulative effects for the proposed project

	Valued Ecosystem Components (VECs)	Rationale for Inclusion / Exclusion	Level of Cumulative Effect
Construction Phase			

Wetland Baseline and Risk Assessment	Impacts on the aquatic resources of the area	The cumulative impact assessment considers the combined impact of the remaining and other renewable projects within a 30km radius, that are also in the development phase and the associated grid lines on the aquatic resources. The rating below is based on the premise that important or sensitive features will be avoided by the various projects, while the mitigations proposed will ensure that the form and or function of downstream areas remain intact.	- Low
Social Impact Assessment	An increase in employment opportunities, skills development and business opportunities with the establishment of more than one SEF	The establishment of several SEFs under the REIPPP Programme in the area has the potential to have a positive cumulative impact on the area in the form of employment opportunities, skills development and business opportunities. The positive benefits will be enhanced if local employment policies are adopted, and local services providers are utilised by the developers to maximise the project opportunities available to the local community.	+ Medium
	Negative impacts and change to the local economy with an in-migration of labourers, businesses and jobseekers to the area.	While the development of a single solar power project may not result in a major influx of people into an area, the development of three other projects may have a cumulative impact on the in-migration and movement of people. In addition, the fact that the project is proposed within an area characterised by good levels of solar irradiation suitable for the development of commercial solar energy facilities implies that the surrounding area is likely to be subject to considerable future applications for PV energy facilities. Levels of unemployment, and the low level of earning potential may attract individuals to the area in search of better employment opportunities and higher standards of living. It is exceedingly difficult to control an influx of people into an area, especially in a country where unemployment rates are high. It is therefore important that the project proponent implement and maintain strict adherence with a local employment policy in order to reduce the potential of such an impact occurring.	- Medium

Traffic Impact Study	Further increase of development trips during construction phase if the developments listed in Table 7.1 will be constructed at the same time as the proposed Bonsmara Solar Power Plant.	It is noted that it is unlikely that all developments will be constructed at the same time. However, for the event that the developments have similar construction periods, it is recommended to agree on a delivery schedule between the respective projects.	- Medium
Operational Phase			
Visual Impact Assessment	Cumulative visual impacts related to the SEF and PL.	The anticipated cumulative visual impact for the SEF and power line are expected to include the change in sense of place, as well as the precedent being set for SEFs in the area where currently there is only a precedent for agricultural and mining related activities. Further construction and operation of the SEF in the area is likely to have a negative impact.	- Medium
Decommissioning Phase			
General	Generation of waste	During the decommissioning of the facility waste will be generated that will need to be disposed of where recycling and re-use is not available. This may lead to pressure on waste disposal facilities in the area.	- Medium

7.6 CONCLUSION

This chapter of the Scoping Report addressed the cumulative environmental effects of the construction, operation and decommissioning project phases to be further assessed as part of the EIA Phase. The information to date has shown that no significant adverse residual impacts are likely. However, cumulative impacts could arise as other similar projects are constructed in the area.

The potential most significant cumulative impacts relate to:

- Cumulative effects during construction phase:
  - Impacts on the aquatic resources of the area (- Low)
  - Impacts of employment opportunities, business opportunities and skills development (+ Medium)
  - Impact with large-scale in-migration of people (- Medium)

- Further increase of development trips during construction phase if the developments (-Medium)

➢ Cumulative effects during the operational phase:

- Visual intrusion (- Medium)

➢ Cumulative effects during the decommissioning phase:

- Generation of waste (- Medium)

The cumulative impact for the proposed development is medium to low and no high, unacceptable impacts related to the project are expected. Considering the extent of the project and information presented in section 7 of this report, it can be concluded that the cumulative impacts will not result in large scale changes and impacts on the environment.

Photovoltaic solar energy technology is a clean technology which contributes toward a better-quality environment. The proposed project will contribute to local economic growth by supporting industry development in line with provincial and regional goals and ensuring advanced skills are drawn to the Gauteng Province. No cumulative impacts with a high residual risk have been identified.

In terms of the desirability of the development of sources of renewable energy therefore, it may be preferable to incur a higher cumulative loss in such a region as this one (where the landscape has already experienced degradation), than to lose land with a higher environmental value elsewhere in the country.

8 PLAN OF STUDY FOR EIA

This section aims to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (...) must include -

(i) a plan of study for undertaking the EIA process to be undertaken, including-

(i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;

(ii) a description of the aspects to be assessed as part of the EIA process;

(iii) aspects to be assessed by specialists;

(iv) a description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;

(v) a description of the proposed method of assessing duration and significance;

(vi) an indication of the stages at which the competent authority will be consulted;

(vii) particulars of the public participation process that will be conducted during the EIA process; and

(viii) a description of the tasks that will be undertaken as part of the EIA process;

(ix) identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

8.1 INTRODUCTION

This section gives a brief outline of the Plan of Study for EIA (PoSEIA) and the tasks that will be undertaken and the anticipated process to meet the objectives for the EIA phase. The approach to the EIA is to focus on those key issues identified for the preferred alternative. This will ensure that the EIA focuses on the most significant impacts and in the process save time and resources.

8.2 ANTICIPATED OUTCOMES OF THE IMPACT ASSESSMENT PHASE

The purpose of the EIA phase is to assess issues identified in the scoping phase and will include an environmental management program (EMPr). The EMPr will provide information on the proposed activity and the manner in which potential impacts will be minimized or mitigated. The EIA report will comply with Appendix 3 and will:

- Determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- Describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- Identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- Determine the—
    - (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
    - (ii) degree to which these impacts-
        - (aa) can be reversed;
        - (bb) may cause irreplaceable loss of resources, and
        - (cc) can be avoided, managed or mitigated;
- Identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- Identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- Identify suitable measures to avoid, manage or mitigate identified impacts; and
- Identify residual risks that need to be managed and monitored.

8.3 TASKS TO BE UNDERTAKEN

The following sections describe the tasks that will be undertaken as part of the EIA Phase of the process.

8.3.1 Project Description

Further technical and supporting information will be gathered to provide a more detailed project description. This will include a detailed and finalised site layout plan that will be compiled once the areas of sensitivity identified in this Scoping Report have been confirmed by the specialists.

8.3.2 Consideration of Alternatives

The following project alternatives will be investigated in the EIR:

- Design/Layout alternatives: In terms of the actual layout of the proposed PV plant which will only be assessed for the preferred site alternative. A draft facility layout is included in Figure J.

8.3.3 Compilation of Environmental Impact Report (EIR)

A Draft EIR will be compiled to meet the content requirements as per Appendix 3 of GNR. 326 of the EIA Regulations (as amended) and will also include a draft Environmental Management Programme containing the aspects contemplated in Appendix 4 of GNR326. The Generic EMPr for overhead electricity transmission and distribution infrastructure and the Generic EMPr for the development of the associated substation infrastructure for transmission and distribution of electricity as per Government Notice 435, which were published in Government Gazette 42323 on 22 March 2019, will also be included in the Draft EIR.

8.3.4 Public Participation

All registered I&APs and relevant State Departments will be given the opportunity to review the Draft Environmental Impact Report in accordance with Regulation R326. A minimum of 30 days commenting period will be allowed and all stakeholders and I&APs will be given an opportunity to forward their written comments within that period. All issues identified during this 30-day review and comment period will be documented and compiled into a Comments and Response Report to be included as part of the Final EIR to be submitted to the DFFE for decision-making on the Application for Environmental Authorisation.

8.4 ASPECTS ASSESSED

Table 8.1 below provides a summary of the aspects that have been assessed. The aspects are also linked to specialist information obtained.

Table 8.1: Aspects assessed

Aspects	Potential impacts	Specialist studies / technical information
Construction of the PV Solar facility	• Impacts on the flora and fauna	Animal Species Compliance Statement; Plant Species Compliance Statement; Terrestrial Biodiversity Impact Assessment; and Avifauna Impact Assessment
	• Wetlands and riparian areas	Wetland Baseline and Risk Assessment
	• Impacts on agricultural potential (soils)	Soil and Agricultural Assessment
	• Impacts associated with the geology of the site	Desktop Geotechnical Assessment
	• Impacts on existing services infrastructure	Confirmation from the Local Municipality
	• Temporary employment, impacts on health and safety	Social Impact Assessment
	• Impacts on heritage resources	Heritage Impact Assessment and Paleontological Impact Assessment
Operation of the PV Solar facility	• Impacts on the flora and fauna	Animal Species Compliance Statement; Plant Species Compliance Statement; Terrestrial Biodiversity Impact Assessment; and Avifauna Impact Assessment
	• Wetlands and riparian areas	Wetland Baseline and Risk Assessment
	• Impacts on agricultural potential (soils)	Soil and Agricultural Assessment

	• Impacts associated with the geology of the site	Desktop Geotechnical Assessment
	• Increased consumption of water	Confirmed volumes to be provided by the Applicant
	• Pressure on existing services infrastructure	Confirmation from the Local Municipality
	• Visual Impact	Visual Impact Assessment
	• Provision of employment and generation of income for the local community	Social Impact Assessment
Decommissioning of the PV Solar facility	• Impacts on the flora and fauna	Animal Species Compliance Statement; Plant Species Compliance Statement; Terrestrial Biodiversity Impact Assessment; and Avifauna Impact Assessment
	• Socio-economic impacts (loss of employment)	Social Impact Assessment
Cumulative Impacts	• Cumulative biophysical impacts resulting from similar developments in close proximity to the proposed activity.	All independent specialist studies results to be considered and analysed by the EAP

8.4.1 Specialist Studies

Based on the initial descriptions of potential environmental impacts or aspects (refer to Table 6.2), specialists have been subcontracted to assess the potential impacts that may be significant. The specialist studies assess impacts on both the social and the biophysical environment and also help in identifying ways that can help to mitigate the envisaged impacts. The following specialist studies have been included to address the potentially most significant impact as identified during the scoping phase – refer to Table 6.2:

- Geotechnical report: To determine whether the geotechnical conditions at the site are favorable for the development and construction of a solar PV plant.
- Heritage Impact Assessment: To determine whether the proposed activity will impact on any heritage or archeological artifacts.
- Terrestrial Biodiversity Impact Assessment: To determine what the impact of the proposed activity will be on the ecosystem.

- Animal Species Compliance Statement: To determine what the impact of the proposed activity will be on the faunal community.
- Plant Species Compliance Statement: To determine what the impact of the proposed activity will be on the flora community.
- Wetland Baseline and Risk Assessment: To determine the impact of the proposed activity on the wetlands present on The Farm Leeuwpan No. 697.
- Avifauna Impact Assessment: To determine what impacts the proposed activity will have on the birds (avifauna) in the area.
- Visual Impact Assessment: To determine to what extent the proposed activity will be visually intrusive to the surrounding communities or other receptors.
- Soil and Agricultural Assessment: To determine how the proposed activity will impact on soil and agricultural resources.
- Social Impact Assessment: To determine how the proposed activity will impact on the socio-economic environment.
- Palaeontological Impact Assessment: To determine the impacts on palaeontological resources.
- Traffic Impact Assessment: To determine the impacts on road users on long haul routes and roads around the project area.

8.4.2 Terms of Reference for Specialist Studies

Specialists in their field of expertise will consider baseline data and identify and assess impacts according to predefined rating scales (section 8.5). Specialists will also suggest optional or essential ways in which to mitigate negative impacts and enhance positive impacts. Further, specialists will, where possible, take into consideration the cumulative effects associated with this and other projects which are either developed or in the process of being developed in the local area. The specialist is reminded to follow the latest DFFE protocols.

The results of these specialist studies have been integrated into the draft Scoping Report. The general requirements proposed for the inputs are presented below and specialists are encouraged to comment and provide input on these. The Terms of Reference (ToR) for each specialist study are include as Appendix E9 to the report.

8.4.3 General Requirements

Specialists' reports must comply with Appendix 6 of GNR. 326 published under sections 24(5), and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and whereby the following are to be included:

- The details of-
    - the specialist who prepared the report; and

- the expertise of that specialist to compile a specialist report including a curriculum vitae;

- A declaration that the specialist is independent in a form as may be specified by the competent authority;
- An indication of the scope of, and the purpose for which, the report was prepared;
    - An indication of the quality and age of base data used for the specialist report;
    - A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;
- The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;
- A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;
- Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;
- An identification of any areas to be avoided, including buffers;
- A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;
- A description of any assumptions made and any uncertainties or gaps in knowledge;
- A description of the findings and potential implications of such findings on the impact of the proposed activity, or activities;
- Any mitigation measures for inclusion in the EMPr;
- Any conditions for inclusion in the environmental authorisation;
- Any monitoring requirements for inclusion in the EMPr or environmental authorisation;
- A reasoned opinion-
    - whether the proposed activity, activities or portions thereof should be authorised;
        - regarding the acceptability of the proposed activity or activities; and
    - if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;

- A description of any consultation process that was undertaken during the course of preparing the specialist report;
- A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and
- Any other information requested by the competent authority.

In addition to the above, specialists are expected to:

- Review the Scoping Report, with specific reference to the Comments and Response Report to familiarize with all relevant issues or concerns relevant to their field of expertise;
- In addition to the impacts listed in the Scoping Report, identify any issue or aspect that needs to be assessed and provide expert opinion on any issue in their field of expertise that they deem necessary in order to avoid potential detrimental impacts;
- Assess the degree and extent of all identified impacts (including cumulative impacts) that the preferred project activity and its proposed alternatives, including that of the no-go alternative, may have;
- Identify and list all legislation and permit requirements that are relevant to the development proposal in context of the study;
- Reference all sources of information and literature consulted; and
- Include an executive summary to the report.

8.5 METHOD OF ENVIRONMENTAL ASSESSMENT

The environmental assessment aims to identify the various possible environmental impacts that could result from the proposed activity. Different impacts need to be evaluated in terms of its significance and in doing so highlight the most critical issues to be addressed.

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e., site, local, national or global whereas intensity is defined by the severity of the impact e.g., the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in Table 8.2.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

8.5.1 Impact Rating System

Impact assessment must take account of the nature, scale and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the project phases:

- planning
- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance should also be included. The rating system is applied to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact the following criteria is used:

Table 8.2: The rating system

NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.

2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not

		occur in such a way or such a time span that the impact can be considered indefinite.
INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/ component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
REVERSIBILITY		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.

IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects
SIGNIFICANCE		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity. The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.		
Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.

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

8.6 CONSULTATION WITH THE COMPETENT AUTHORITY

Consultation with the competent and commenting authorities will continue throughout the duration of impact assessment phase. The authorities will also comment on whether they deem it necessary to conduct additional specialist studies other than what is proposed already in this PoSEIA. On-going consultation will include:

- Submission of the Final EIR following a 30-day public review period (and consideration of comments received).
- Arrangements will be made to discuss the report with the Environmental Officer responsible for the project during the review period, where required.

9 CONCLUSION

This Draft Scoping Report is aimed at identifying the 'scope' of the EIA that will be conducted in respect of the activity for which authorization is being applied for. It can be concluded that:

- The scoping phase complied with the specifications set out in Regulations 21 and Appendix 2 of GNR326.
- All key consultees have been consulted as required by the Regulations 39 to 44.

Based on the contents of the report the following key environmental issues were identified which need to be addressed in the EIA report:

- Impacts during construction phase:
  - Direct habitat destruction (- Medium)
  - Habitat Fragmentation (- Medium)
  - Impact on the characteristics of the watercourse (- Medium)
  - Creation of direct and indirect employment opportunities (+ Medium)
  - Economic multiplier effects from the use of local goods and services (+ Medium)
  - Impacts on daily living patterns (- Medium)
- Impacts during the operational phase:
  - Habitat destruction and fragmentation (- Medium)
  - Displacement of priority avian species from important habitats (- Medium)
  - Impact on the characteristics of the watercourse (- Medium)
  - Creation of employment opportunities and skills development. (+ Medium)
  - Development of non-polluting, renewable energy infrastructure. (+ Medium)
  - Contribution to LED and social upliftment (+ High)
- Impacts during the decommissioning phase:
  - Improvement of habitat through revegetation / succession over time (+ Medium)
- Cumulative biophysical impacts resulting from similar development in close proximity to the proposed activity.

No fatal flaws or impacts of a high significance has been identified to be associated with the proposed development. The issues identified will be addressed in more detail in the EIA report as part of the EIA Phase.

Considering the technical constraints present within the development footprint, the Applicant has proposed a draft facility layout which considers these aspects, and thereby aim to avoid any direct impact on these features. The draft layout will be further assessed and optimised as part of the EIA Phase of the project to ensure that the development footprint within the affected property is appropriate from an environmental perspective, and thereby avoids the present sensitive environmental features and areas as identified by the independent specialists, Refer to Figure J for the draft layout proposed for development.

The EAP therefore recommends that:

The scoping report be approved after which the EIA process, as required by Regulations 23 to 24 may commence.

We trust that the Department of Forestry, Fisheries and the Environment find the report in order and we eagerly await your comments in this regard.

Mr. Herman Alberts
Environamics Environmental Consultants

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