DRAFT SCOPING REPORT

24 March 2020

THE PROPOSED KGALALELO SOLAR POWER PLANT NEAR OLIFANTSHOEK, NORTHERN CAPE PROVINCE

ENVIRONAMICS

PROJECT DETAIL

DEA Reference No.	**:**	To be obtained
Project Title	**:**	Proposed Kgalalelo Solar Power Plant near Olifantshoek, Northern Cape Province
Authors	**:**	Mrs. Carli Otte Ms. Christia van Wyk
Client	**:**	Kgalalelo Solar Power Plant (RF) (Pty) Ltd.
Report Status	**:**	Draft Scoping Report
Submission date	**:**	24 March 2020

When used as a reference this report should be cited as: Environamics (2020) Draft Scoping Report: Proposed Kgalalelo Solar Power Plant near Olifantshoek, Northern Cape Province.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

PLATES

APPENDICES

GLOSSARY OF TERMS AND ACRONYMS

BA	Basic Assessment
BAR	Basic Assessment Report
DEA	Department of Environmental Affairs
DM	District Municipality
DoE	Department of 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
TLM	Tsantsabane Local Municipality
kV	Kilo Volt
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
PPP	Public Participation Process

PV	Photovoltaic
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 Energy's (DoE) 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 DoE (Integrated Resource Plan Update 2010-2030). In terms of the Integrated Resource Plan Update (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.

To contribute towards this target and to stimulate the renewable energy industry in South Africa, the need to establish an appropriate market mechanism was identified, and the Renewable Energy IPP Procurement (REIPPP) process was announced in August 2012, with the intention of DoE to purchase renewable energy from IPPs to be delivered to the national under a 20-year Power Purchase Agreement to be signed with Eskom. The establishment of the REIPPP process in South Africa provides the opportunity for an increased contribution towards the sustained growth of the renewable energy sector in the country, the region and internationally, and promote competitiveness for renewable energy with conventional energies in the medium- and long-term.

In response to the above, Kgalalelo Solar Power Plant (RF) (Pty) Ltd. is proposing the development of a photovoltaic solar facility and associated infrastructure for the purpose of commercial electricity generation on an identified site located on the Remaining Extent of the

farm Ruby Vale No. 266, Registration Division Gordonia, Northern Cape Province (refer to Figure 1 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 2378 kWh/m²/annum.

EXECUTIVE SUMMARY

Like many other small and developing municipalities in the country, the Tsansabane Local Municipality faces a number of challenges in addressing the needs and improving the lives of the community (IDP, 2019). The Tsansabane Local Municipality's (TLM) Integrated Development Plan (IDP, 2019) identifies the mission of the municipality as to strengthen partnerships to improve the provision of services through the effective and efficient management of the municipality's resources (TLM, 2019:58). For this reason the IDP reports on the strategic objectives of the TLM by identifying the six (6) key performance areas (KPAs) of the TLM (TLM, 2019:57–58), which include: physical infrastructure and energy efficiency, social and community development, financial sustainability, institutional excellence, economic development and growth; and good governance and public participation. The IDP does not explicitly deal with renewable energy development, but the Tsantsabane IDP does however have development imperatives that relate to the proposed project that will produce sufficient energy to support industry at competitive prices and investment in public infrastructure focusing on transport, energy and water.

In response to the above Kgalalelo Solar Power Plant (RF) (Pty) Ltd. intends to develop a photovoltaic solar facility and associated infrastructure on the Remaining Extent of the farm Ruby Vale No. 266, Registration Division Gordonia, Northern Cape Province situated within the Tsansabane Local Municipality area of jurisdiction with a capacity of up to 150 MW. The town of Postmasburg is located approximately 46km east and the town of Olifantshoek is located approximately 35km north-northeast of the proposed development (refer to Figure 1 and 2 for the locality and regional map). The total footprint of the project will approximately be 300 hectares (including supporting infrastructure on site). 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. agricultural potential, 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).

The Environmental Impact Assessment (EIA) Regulations, 2014 (as amended in 2017) determine that an environmental authorisation is required for certain listed activities, which might have detrimental effects on the environment. The following activities have been identified with special reference to the proposed development and are listed in the EIA Regulations:

- Activity 11(i) (GN.R. 983): *"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 28(ii) (GN.R. 983): *"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 1 (GN.R. 984): *"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 14 (GN.R. 984): *"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."*

Being listed under Listing Notice 1 and 2 (Regulation 983 & 984) implies that the development is considered as potentially having a significant impact on the environment. Subsequently a 'thorough assessment process' is required as described in Regulations 21-24. Environamics has been appointed as the independent consultant to undertake the EIA on Kgalalelo Solar Power Plant's behalf.

Regulation 21 of the EIA Regulations requires that a scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping. The potential positive and negative impacts associated with the proposed activity have been identified. The potentially most significant environmental impacts associated with the development are briefly summarized below:

Impacts during the construction phase:

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 the impacts on the fauna and flora, soils, geology, existing services infrastructure, traffic impacts and socio-economic impacts such as the provision of temporary employment.

Impacts during the operational phase:

During the operational phase the study area 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 impacts on the fauna and flora, soils, geology, the increased consumption of water, visual impacts and dangerous goods hazards as part of battery storage facility (catching fire, exploding or leaking dangerous pollutants). The provision of sustainable services delivery also needs to be confirmed. The operational phase will have a direct positive

impact through the provision of employment opportunities for its duration, and the generation of income to the local community. Additional electricity will also be generated from a clean, renewable resource.

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. The decommissioning phase will result in the loss of permanent employment. However, skilled staff will be eminently employable and a number of temporary jobs will also be created during the decommissioning phase.

Cumulative impacts:

Cumulative impacts could arise as other similar projects are constructed in the area. According to the Energy Blog's database no solar PV plants have been granted preferred bidder status within a radius of 50km of the proposed Kgalalelo PV plant. However, according to the Department's database approximately four (4) solar PV plants have been proposed in relative close proximity to the proposed activity. Environamics and other environmental consultants are also in the process of applying for Environmental Authorisation for one (1) additional PV project on the Remaining Extent of Portion 2 of the farm Ruby Vale 266.

The potential for cumulative impacts may therefore exist. The Draft Scoping Report includes a detailed 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: loss or fragmentation of indigenous natural fauna and flora, loss or fragmentation of habitats, generation of waste, temporary employment opportunities, impact of construction workers on local communities, and an influx of job seekers and traffic impacts. Cumulative impacts (-Medium) during the operational phase relate to: visual intrusion, soil erosion, generation of additional electricity, the establishment of a community trust and the development of infrastructure for the generation of clean, renewable energy. 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 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

Regulations No. 982, 983, 984 and 985 (as amended in 2017) promulgated in terms of Section 24(5) and 44 of the National Environmental Management Act, (107 of 1998) determine that an EIA process should be followed for certain listed activities, which might have a detrimental impact on the environment. According to Regulation No. 982 the purpose of the Regulations is: *"…to regulate the procedure and criteria as contemplated in Chapter 5 of the Act relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to environmental impact assessment, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto*".

The EIA Regulations No. 983 and 984 outline the activities for which EIA should apply. The following activities with special reference to the proposed activity are listed in the EIA Regulations:

Table 1.1: Listed activities [1]

Relevant notice:	**Activity No (s)**	**Description of each listed activity as per project description**:
GNR. 983 (as amended in 2017)	Activity 11(i)	• *"The development of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."* • Activity 11(i) is triggered since the proposed photovoltaic solar facility will transmit and distribute

[1] Please refer to Table 6.2 for a detailed description of the relevant aspects of the development that will apply to each specific listed activity.

		electricity of 132 kilovolts outside an urban area.
GNR. 983 (as amended in 2017)	Activity 28(ii)	• *"Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 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 since portions of the farm has been previously cultivated and the property will be rezoned to "special" land use.
GNR. 984 (as amended in 2017)	Activity 1	• *"The development of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more."* • Activity 1 is triggered since the proposed photovoltaic solar facility will generate up to 150 MW electricity.
GNR. 984 (as amended in 2017)	Activity 14	• *"The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres."* • *A utility scale battery storage facility, which consist of dangerous goods, up to 1120 cubic metres of batteries will be installed for certain alternatives. This activity will thus be triggered. The battery storage facility will cover an area of up to 1ha.*

Being listed under Listing Notices 1 and 2 (Regulation 983 & 984) implies that the proposed activity is considered as potentially having a significant impact on the environment. Subsequently a 'thorough assessment process' is required as described in Regulations 21-24. According to Appendix 2 of Regulation 982 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 report is the Draft Scoping Report to be submitted to the Department of Environmental Affairs. According to Regulation 982 all registered I&APs and relevant State Departments must be allowed the opportunity to review the scoping report. The Draft Scoping Report will be made available to I&APs and all relevant State Departments. They will be requested to provide written comments on the report within 30 days of receiving it. All issues identified during the review period will be documented and compiled into a Comments and Response Report to be included as part of the Final Scoping Report.

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: Carli Otte

Postal Address: PO Box 6484, Baillie Park, 2526

Telephone: 086 762 8336 (f) 082 220 8651 (Cell)

Electronic Mail: carli@environamics.co.za

Regulation 13(1)(a) and (b) determines that an independent and suitably qualified and experienced EAP should conduct the EIA. 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 EIA is also summarized in the curriculum vitae included as part of Appendix A.

1.3 DETAILS OF SPECIALISTS

Table 1.2 provides information on the specialists that have been appointed as part of the EIA process. Regulation 13(1)(a) and (b) determines that an independent and suitably qualified, experienced 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, copies of their declarations are attached as Appendix H to this report[2]. The expertise of the specialists is also summarized in their respective reports.

[2] The original declarations of independence will be submitted with the final scoping report.

Table 1.2: Details of specialists

Study	Prepared by	Contact Person	Postal Address	Tel	e-mail
Avifaunal Study	Birds & Bats Unlimited	Dr. Rob Simmons	Constantia Cape Town 8010	Tel: 021 794 8671 Cell: 082 780 0133	rob.simmons@uct.ac.za
Ecological Fauna and Flora Habitat Survey	Environmental Research Consulting	A. Götze	P. O. Box 20640 Noordbrug 2522	Cell: 082 789 4669	albie.erc@gmail.com
Threatened or Protected Species Count	Phala Environmental Consultants	Johan Botha	7a Burger Street Potchefstroom 2531	Tel: 082 316 7749	johan@phala-environmental.co.za
Heritage Impact Assessment	J van Schalkwyk Heritage Consultant	J van Schalkwyk	62 Coetzer Avenue Monument Park 0181	Cell: 076 790 6777	jvschalkwyk@mweb.co.za
Paleontological Study	BM Geological Services	Dr. Barry Millsteed	P.O. Box 13755 Hatfield 0028	Cell: 079 626 9976 Fax: 086 678 5358	E-mail: bmgeoserv@gmail.com
Agricultural & Soils Impact Assessment	Johann Lanz Soil Scientist	Johann Lanz	P. O. Box 6209 Uniedal Stellenbosch 7612	Tel: 021 866 1518 Cell: 082 927 9018	johann@johannlanz.co.za
Brief Geotechnical study	Johann Lanz Soil Scientist	Johann Lanz	P. O. Box 6209 Uniedal Stellenbosch 7612	Tel: 021 866 1518 Cell: 082 927 9018	johann@johannlanz.co.za

Visual Impact Assessment	Phala Environmental Consultants	Johan Botha	7a Burger Street Potchefstroom 2531	Tel: 082 316 7749	johan@phala-environmental.co.za
Social Impact Assessment	Leandri Kruger Research & SIA Consultant	Mrs. L. Kruger	27 Tuscan Views Ditedu Ave 51 Potchefstroom 2520	Cell: 082 447 1455	leandrihildebrandt@gmail.com
Traffic Impact Assessment	BVi Consulting Engineers Western Cape (Pty) Ltd	Dirk van der Merwe	Block B2, Edison Square C/O Edison Way & Century Avenue Century City 7441	Cell: 084 232 4696 Fax: 021 527 7001 Tel: 021 527 7000	dirkvdm@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. 982 (as amended in 2017). Table 1.3 provides a summary of the EIA process and future steps to be taken. It can be confirmed that to date:

- A site visit was conducted with the developer on 20 November 2019 to discuss the proposed development and assess the site.
- The public participation process was initiated on 20 November 2019 and all I&APs were requested to submit their comments by 4 February 2020.

It is envisaged that the Draft Scoping Report will be submitted to the Department in March 2020 and that the Final Scoping Report will be accepted by the Department in June 2020. The EIA process should be completed within approximately nine months of submission of the Draft Scoping Report, i.e. by December 2020 – see Table 1.3.

Table 1.3: Project schedule

Activity	**Prescribed timeframe**	**Timeframe**
Site visit	-	20 Nov. 2019
Appoint Avifaunal Specialist	6 Months	Dec. 2019
Initial Public participation (BID)	30 Days	Dec. 2019 – 4 Feb. 2020
Conduct specialist studies	-	Dec. 2019 – Feb. 2020
Submit application form and DSR	-	23 March 2020
Public participation (DSR)	30 Days	24 March – 27 April 2020
Submit FSR	-	April 2020
Department acknowledges receipt	10 Days	April/ May 2020
Department approves/reject	43 Days	June 2020
Avifaunal Specialist Final report	6 Months	June 2020
Public participation (submission of DEIR)	30 Days	Aug. 2020
Submission of FEIR & EMPr	-	Aug. 2020

Department acknowledges receipt	10 Days	Aug./ Sept. 2020
Decision	107 Days	Dec. 2020
Department notifies of decision	5 Days	Dec. 2020
Registered I&APs notified of decision	14 Days	Dec. 2020
Appeal (Period excluding 15 Dec. 2020 – 5 Jan. 2021)	20 Days	Dec. 2020/ Jan. 2021

1.5 STRUCTURE OF THE REPORT

This report is structured in accordance with the prescribed contents stipulated in Appendix 2 of Regulation No.982 (as amended in 2017). It consists of seven 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	Pages
Appendix 2. (1) - A scoping report must contain all the information that 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 to be undertaken through the environmental impact assessment process, and must include-			
(a)	details of -	1	14-22
	(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	23-29
	(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	30-48
(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	49-51
(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	52-80
	(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;		
	(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	81-112
	(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; (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;		
(h)	a plan of study for undertaking the environmental impact assessment process to be undertaken, including-	8	113-129
	(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.		
(i)	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;		
(j)	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;		
(k)	where applicable, any specific information required by the CA; and	N/A	-
(l)	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 activity entails the development of a photovoltaic solar facility and associated infrastructure on the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266, Registration Division Gordonia, Northern Cape Province situated within the Tsansabane Local Municipality area of jurisdiction. The proposed development is located in the Northern Cape Province in the northern central interior of South-Africa (refer to Figure 2 for the regional map). The town of Olifantshoek is located approximately 35km north-northeast of the proposed development (refer to Figure 1 for the locality map).

The project entails the generation of up to 150MW electrical power through photovoltaic (PV) panels. The total footprint of the project will approximately be 300 hectares at the preferred site or 300 hectares on the alternative site (including supporting infrastructure on site) – refer to table 2.1 for general site information. The property on which the facility is to be constructed will be leased by Kgalalelo Solar Power Plant (RF) (Pty) Ltd. from the property owner, Wilhelm Uys Trust, for the life span of the project (minimum of 20 years).

Table 2.1: General site information

Description of affected farm portion	The Remaining Extent of Portion 2 of the farm Ruby Vale No. 266, Registration Division Gordonia, Northern Cape Province
21 Digit Surveyor General codes	C02800000000026600002
Title Deed	T1919/1998
Photographs of the site	Refer to the Plates
Type of technology	Photovoltaic solar facility
Structure Height	Panels ~5m, buildings ~ 4m and power lines ~32m Battery storage facility ~8m height
Battery storage	100 MWh battery storage facility
Surface area to be covered	Approximately 300 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 located in order to capture the most sun.
Laydown area dimensions	Assessed 300 hectares
Generation capacity	Up to 150MW
Expected production	165-205 GWh per annum

The site is located in a rural area and is bordered by farms. The site survey revealed that the site currently consists of grazing for cattle, sheep and goats– refer to plates 1-21 for photographs of the development area. The property on which the development is to be established is owned by Wilhelm Uys Trust.

2.2 ACTIVITY DESRIPTION

The proposed development will trigger the following activities:

Table 2.2: Listed activities [3]

Relevant notice:	**Activity No (s)**	**Description of each listed activity as per project description**:
GNR. 983 (as amended in 2017)	Activity 11(i)	• *"The development of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."* • Activity 11(i) is triggered since the proposed photovoltaic solar facility will transmit and distribute electricity of 132 kilovolts outside an urban area.
GNR. 983 (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 since the farm has been previously cultivated and the property will be re-zoned to "special".
GNR. 984 (as amended in 2017)	Activity 1	• *"The development of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more."* • Activity 1 is triggered since the proposed photovoltaic solar facility will generate up to 150 megawatts electricity.
GNR. 984 (as amended in 2017)	Activity 14	• *"The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres."* • A utility scale battery storage facility, which consist of dangerous goods, up to 1120 cubic metres of batteries will be installed for certain alternatives. This activity will thus be triggered. The battery storage facility will cover an area of up to 1ha and will be assessed through an risk assessment during the EIA phase.

[3] Please refer to Table 6.2 for a detailed description of the relevant aspects of the development that will apply to each specific listed activity.

GNR. 984 (as amended in 2017)	Activity 14	• *"The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres."* • *A utility scale battery storage facility, which consist of dangerous goods, up to 1120 cubic metres of batteries will be installed for certain alternatives. This activity will thus be triggered. The battery storage facility will cover an area of up to 1ha.*

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 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 were reasonably possible. A short access road will be constructed to link the site with the R31 Provincial Road. 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 layer 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 150MW, 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.

- Wiring to 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.

- 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 on the site to step the voltage up to 132kV, after which the power will be evacuated into the national grid. Whilst Kgalalelo 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 Lewensaar 275/50kV Substation. The installed capacity will be up to 150MW.

- 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 – The following auxiliary buildings with basic services including water and electricity will be required on site:

    - Office (~16m x 9.85m);

    - Switch gear and relay room (~25m x 14m);

    - Staff lockers and changing room (~21.7m x 9.85m); and

    - Security control (~11.8m x 5.56m)

- Battery storage - 100 MW Battery Storage Facility with a maximum height of 8m and a maximum volume of 1,120 m3 of batteries (dangerous goods) and associated operational, safety and control infrastructure.

- Roads – Access will be obtained via a gravel road off the R385 Provincial Road. An internal site road network will also be required to provide access to the solar field and associated infrastructure. The access and internal roads will be constructed within a 25 meter corridor.

- Fencing - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm.

2.4 LAYOUT DESCRIPTION

The layout plan will follow the limitations of the site and aspects such as environmentally sensitive areas, roads, fencing and servitudes on site will be considered – refer to figure 6 for the draft layout plan. 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, transmission lines and perimeter fences). Limited features of environmental significance exist on site. A final layout plan will be included as part of the Environmental Impact Report.

2.5 SERVICES PROVISION

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 from the local municipality. The Department of Water Affairs has been asked to confirm the water resource availability in the relevant catchment management area in order to ensure sustainable water supply. A full assessment of the application for water use authorisation will only be undertaken in the event that the project proponent has been appointed as a preferred bidder by the Department of Energy.

The site falls within the D73C quaternary drainage region, this drainage region falls under Zone A, which refers to the amount of water that may be taken from the ground water resource per hectare, per annum. According to the Revision of General Authorisations in terms of Section 39 of the National Water Act of 1998 (Act No. 36 of 1998), Zone A indicates that no water may be abstracted from a ground water resource without applying for a Water Use License.

The estimated maximum amount of water required during construction is 200m³ per month during the 12 months of construction. The estimated maximum amount of water required during the facility's 20 years of production is 4200m³ per annum. The majority of this usage is for the cleaning of the solar panels. Since each panel requires approximately 2 liters of water for cleaning, the total amount of 460 000 panels will require 920 000 liters per wash. 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). This totals approximately 4,200,000 liters per annum for washing, and allows 200,000 liters per annum (or 548 liters per day) for toilet use, drinking water, etc. This totals to approximately 4 200m^3 of water required per annum. Drinking water supplied will comply with the SANS:241 quality requirements and it is noted that the Tsansabane Local Municipality remains the Water Service Authority in that area of jurisdiction.

Generally, the water supply does not require the construction of a reverse osmosis plant. This is however dependant on the quality of the water, or what the mineral content is. Should a reverse osmosis plant be required, brine (the excess minerals) will be formed during the filtration process that will be stored and then removed. Determining baseline water quality

conditions is important in order to appropriately manage incidents in the future. The quality of the water will however only undergo testing if the project is selected as preferred bidder by the Department of Energy. Water saving devices and technologies such as the use of dual flush toilets and low-flow taps, the management of storm water, the capture and use of rainwater from gutters and roofs should be considered by the developer. Furthermore, indigenous vegetation will be used during landscaping and the staff will be trained to implement good housekeeping techniques.

Portable chemical toilets will be utilized, that will be serviced privately or by the local municipality. Waste will be disposed at a licensed waste site (such as Kathu, Hotazel, Kuruman, Aggeneys, Britstown or Upington). The construction- and hazardous waste will be removed to 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) was requested in a letter dated, 3 March 2020 to formally confirm that it has the capacity to provide the proposed development with these services for the lifetime of the project (20 years) – refer to Appendix I. To date no feedback has been received.

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 Environmental Affairs (DEA) as well as comments from local and district authorities. Moreover, it is significant to note that they also inform strategic decision making reflected in 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 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
- New Growth Path Framework
- Northern Cape Provincial Development and Resource Management Plan/ Provincial Spatial Development Framework (PSDF) (2012)

- Strategic Environmental Assessment (SEA) for wind and solar PV Energy in South Africa (2014)
- ZF Mgcawu District Municipality Final Integrated Development Plan 2019/2020 for 2017-2022
- Tsansabane Local Municipality Integrated Development Plan revised draft of 2018/19-2019/20-2020/21.

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 National Environmental Management Act (Act No. 107 of 1998)	National and Provincial Department of Environmental Affairs	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. The mandate for EIA lays with the National Environmental Management Act (107 of 1998) and the EIA

			Regulations No. 982, 983, 984, and 985 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. This EIA was triggered by activity 11(i) and 28(ii) listed in Regulation R983 and activities 1 and 15 listed in Regulation R984 which requires a 'scoping and environmental impact assessment process.'
The National Energy Act (Act No. 34 of 2008)	Department of Minerals 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).
The National Water Act (Act No. 36 of 1998)	Department of Water Affairs (DWA)	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. The site falls within the D73C quaternary drainage region, this drainage region falls under Zone A,

			which refers to the amount of water that may be taken from the ground water resource, per hectare. According to the Revision of General Authorisations in terms of Section 39 of the National Water Act of 1998 (Act No. 36 of 1998), Zone C indicates that no water may be abstracted from a ground water resource without applying for a Water Use License.
National Environmental Management: Waste Act (Act No. 59 of 2008)	Department of Environmental Affairs (DEA)	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) determine 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.
National Environment Management: Air Quality Act (Act No. 39 of 2004)	Department of Environmental Affairs (DEA)	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 (Act No. 25 of 1999)	South African Heritage Resources Agency (SAHRA)	1999	The Act aims to introduce an integrated and interactive system for the management of the heritage resources, to promote good government 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-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 and all relevant documents will be submitted for their comments and approval.
Conservation of Agricultural Resources Act (Act No. 85 of 1983)	National and Provincial Government	1983	The objective of the Act is to provide for control over the utilization 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 in order to confirm that the proposed development is not located on high potential agricultural land and to approve the long term lease agreement.

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 Minerals 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 White Paper on Renewable Energy	Department of Minerals and Energy	2003	This White Paper on Renewable Energy supplements the *White Paper on Energy Policy*, which recognizes 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).
Integrated Resource Plan (IRP) for South Africa	Department of Minerals 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, 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 Kgalalelo SEF. 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 has been updated and were open for comments until March of 2017. The new IRP of 2019 was formally published in October 2019. The draft IRP of 2018 was open for comments until the end of October 2018. For the revision scenario analysis were conducted and the results thereof are included in the draft IRP of 2018. 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 consideration 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 recognizes renewable technologies' potential to diversify the electricity mix, create new industries and job opportunities and localize across the value chain (RSA, 2019:13).
Northern Cape Provincial Development and Resource Management Plan	Northern Cape Provincial Government	2012	The Northern Cape Provincial Spatial Development Framework (further referred to as the PSDF) of 2012 in compliance with the Northern Cape Planning and Development Act 7 of 1998 (Chapter IV, Section 14), aims to "*ensure that the use and allocation of the province's resources, both renewable and non-renewable, are informed by a set of integrated and coordinated policies, objectives, implementation strategies, programmes and, where appropriate, projects aimed at:* • *setting and monitoring, where appropriate, measurable standards with regard to, amongst other, public access to health, safety, amenities, education and economic opportunity;* • *ensuring that the supply of public infrastructure is directed towards meeting the required standards in a prioritised, coordinated, sustainable and cost-effective way, in terms of capital and maintenance expenditure;* • *ensuring the protection and sustainable utilisation of land, water and air where these are important for the maintenance of ecologically-sensitive systems or processes, areas of biological diversity, public health or public amenities;* • *providing an investment and expenditure programme coordinated with budgetary cycles and*

capable of securing financial and other resources from National Government and any other funding agencies as well as public/private sector partnerships; and

- *informing and guiding the preparation and implementation of district and local municipal infrastructure management plans and land development plans*" (PSDF 2012:4).

The PSDF mainly aims to build a prosperous, sustainable growing provincial economy to firstly improve social development and to eradicate poverty. The PSDF adopted the International Union for Conservation of Nature's (IUCN) mission as their main goal. This goal states that essential ecological processes are being maintained, that natural resources are being preserved and utilised in a sustainable manner, that the use of the biosphere are managed while also maintaining its potential for future generations.

The PSDF of 2012 highlights that renewable energy sources such as solar thermal and wind, comprise 25% of the Northern Cape's energy generation capacity by the year 2020, and should be progressively phased in as appropriate into the province. The PSDF further sets out energy objectives, which include the following:

- To promote the development of renewable energy supply schemes;
- To enhance the efficiency of Eskom's power station at the Vanderkloof power station;
- Reinforce additional electricity supply especially renewable energy projects; and
- Develop and implement innovative energy technologies to improve access to reliable, sustainable and affordable energy services. Also recognize that the objective should be to obtain sustainable economic growth.

Lastly, the PSDF notes that the Northern Cape need to develop large-scale renewable energy supply schemes in order to address the growing demand in energy and to promote a green economy in the province.

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 need 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.
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 stretches 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's aim is to "*expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development*" (RSA, 2012:20).
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 is viable changes in the character and structure of production, in order to create a more inclusive, greener economy on 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 and investment of renewable energy technologies like solar (RSA, 2011b). In this regard it will also assist creating

			employment opportunities over the medium- and long-term.
Strategic Environmental Assessment (SEA) for wind and solar PV Energy in South Africa	Department of Environmental Affairs	2014	The Department of Environmental Affairs (DEA) 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 was 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 thus 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 proposed site does not fall within a REDZs.
ZF Mgcawu District Municipality Final Integrated Development	ZF Mgcawu District Municipality	2019/ 2020 for 2017-	It is the mission The ZF Mgcawu District Municipality Final Integrated Development Plan 2019/2020 for 2017–2022 (further referred to as the Plan) states that its mission is to be a centre of excellence in providing quality basic services to support local municipalities in the ZDM (ZDM, 2019:10). The core values according to the plan include:

Plan (IDP)	2022	- The commitment to the development of people; - The integrity in the performance of the municipality's duty; - Respecting their natural resources; - Transparency in accounting for their actions; - Consultation on a regular basis to ensure the quality of service delivery; - Ensuring professionalism in the work environment; and - The efficient spending and responsible utilization of the assets of the municipality (ZDM, 2019:10). The plan further outlines the strategic objectives of the ZDM as follows (ZDM, 2019:11–12): - To monitor and determine the housing backlogs in the district and to eradicate infrastructure and sanitation backlogs; - To assess and provide targeted support improving institutional capacity and service delivery capabilities of category B-municipalities; - To promote environmental health and safety of communities in the ZDM through the proactive prevention, mitigation, identification and management of environmental health services, fire and disaster risks; - To promote safety of communities in the ZDM through the proactive prevention, mitigation, identification and management of fire and disaster risks; - To facilitate the development of sustainable regional land use, economic, spatial and environmental planning frameworks that will support and guide the development of a diversified, resilient and sustainable district economy; - To market, develop and co-ordinate tourism in the ZDM by promoting a green Kalahari tourism brand; - To assess and monitor the status of infrastructure needs and requirements of Category B-municipalities; and

			- To ensure efficient business operations and to fulfill the assurance statutory requirements of the ZDM. The strategic objectives above guided the priority issues identified for each area given in the Plan. It is however noteworthy that the same strategic objectives are reflected in the previous IDPs as well. The issues that were highlighted that relates to the proposed project is firstly the development of infrastructure, and secondly the possibility of renewable energy for the development of new buildings.
Tsansabane Local Municipality Integrated Development Plan (IDP) Revised draft	Tsansabane Local Municipality	2018/19-2019/20-2020/21	The IDP is a strategic, inclusive municipal plan that outlines the community's development objectives, which includes a policy framework that guides management in decision making processes of the financial planning and budgeting for the TLM (TLM, 2019:8). It is the TLM's mission to strengthen partnerships to improve the provision of services through the effective and efficient management of the municipality's resources (TLM, 2019:58). For this reason the IDP reports on the strategic objectives of the TLM by identifying the six (6) key performance areas (KPAs) of the TLM (TLM, 2019:57–58). KPA 1: Physical infrastructure and energy efficiency; KPA 2: Social and community development; KPA 3: Financial sustainability; KPA 4: Institutional excellence; KPA 5: Economic development and growth; and KPA 6: Good governance and public participation.

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)[4]
- 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
- DEAT, (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
- Jerkins, A.R., Ralston-Paton, S. and Smit-Robinson, H.A. (2017). Best practice guidelines for assessing and monitoring the impact of solar power generating facilities on birds in southern Africa.

[4] 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.

3.6 CONCLUSION

The EIA was undertaken in accordance with the EIA Regulations (as amended in 2017) published in GNR 982, 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 Kgalalelo SEF. 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. 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 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 is 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 generations in South Africa is allocated to renewable energy applications. On District and Local level not much attention is given explicitly to renewable sources like PV solar energy, however the documents reviewed do make provision for energy efficiency in improving the quality of lives in terms of efficient physical infrastructure. At Provincial, District and Local level the policy documents support the applications of renewables. The Northern Cape Provincial Development and Resource Management Plan/ Provincial Spatial Development Framework (PSDF) of 2012 indicated that the development of renewable energy applications such as solar energy facilities, could be some of the means in which the Northern Cape can benefit from economically.

The review of the relevant policies and documents related to the energy sector thus indicate that renewables like solar energy and the establishment of solar energy facilities are supported on all spheres of Government. The proposed Kgalalelo 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 for the proposed development including 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 Word 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 (CDIAC, 2013).

The primary rationale for the proposed solar 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 the Department of Energy (DoE) (Integrated Resource Plan 2010-2030). In terms of the Integrated Resource Plan (IRP), approximately 8.4GW of the renewable energy mix is planned to be the new installed capacity generated from solar PV technologies over the next thirty years.

The establishment of the photovoltaic solar facility will significantly contribute to achieving this objective and will also address some of the objectives identified by the Tsansabane Local Municipality's Integrated Development Plan such as ensuring economic growth in the region and creating long term employment.

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 Northern Cape 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.
- 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 a more sustainable energy mix and the reduction of South Africa's GHG emissions by approximately 34% below the current emissions baseline by 2020.
- 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 CO2 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 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 power plant. 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 453 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 limitations, the site has limited suitability for cultivated crops, and viable agricultural land use is limited to grazing only. The moisture availability class 6 classification, with high variability of rainfall is a very severe limitation to agriculture, which makes any cultivation without irrigation completely non-viable. The very sandy soils, with very limited water holding capacity are a further limitation. The project area is classified with a predominant land capability evaluation value of 5 (limited agricultural potential), with some patches of 6. These factors render the site unsuitable for any kind of mainstream cultivation without irrigation, and limit it to low density grazing only. The long-term grazing capacity of the site is 15 hectares per large stock unit. The proposed development in this specific area will generate alternative land use income through rental for 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.

5 DESCRIPTION OF ENVIRONMENTAL ISSUES

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

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

(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 –

(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.

An initial site assessment (refer to Appendix G1) was conducted by the developer on the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266 and the farm was found favorable due to its proximity to grid connections, solar radiation, ecology and relative flat terrain. Some parts of the farm have been deemed less suitable for the proposed development such as areas with a high density of protected tree species. These factors were then taken into consideration and avoided as far as possible. The site selection also took the site geology, land capability, water availability and land use into consideration before deciding on the specific site. One alternative site on the farm has been identified (Subsolar, 2019).

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. The description provided in section 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 land uses. Should the proposed activity not proceed, the site will remain unchanged and will continue to be used for grazing for cattle, sheep and goats (refer to the photographs of the site). However, it should be noted that the grazing capacity of the farm has been severely restricted by the recent draught conditions. Moisture availability is classified into 6 categories across the country and the site falls into the driest 6th category, which is labelled as a very severe limitation to agriculture. Furthermore, the potential opportunity costs in terms of alternative land use income through rental for energy facility and the supporting social and economic development in the area would be lost if the status quo persist.

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 Kgalalelo Solar Power Plant (RF) (Pty) Ltd. in the Olifantshoek/Postmasburg area to potentially establish solar facilities. From a local perspective, the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266 is preferred due to its suitable climatic conditions, topography (i.e. in terms of slope), environmental conditions (i.e. agricultural potential, ecological sensitivity 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).

The proposed development falls within an area used for grazing and the site is therefore considered to have limited environmental sensitivity as a result. The new land capability mapping divides land capability into 15 different categories with 1 being the lowest and 15 being the highest. Values below 8 are generally not suitable for production of any cultivated crop. The project area is classified with a predominant land capability evaluation value of 5, with some patches of 6. The limitations to agriculture are predominantly climate related. The moisture availability class 6 classification, with high variability of rainfall is a very severe limitation to agriculture, which makes any cultivation without irrigation completely non-viable. The very sandy soils, with very limited water holding capacity are a further limitation. These factors render the site unsuitable for any kind of mainstream cultivation without irrigation, and limit it to low density grazing only. The long-term grazing capacity of the site is 15 hectares per large stock unit.

Two possible sites were identified on the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266. These sites are referred to as the preferred site and the alternative site. Some limited sensitive features occur on both sites. Provision was made to assess both the preferred and the alternative site which are both ~300 hectares in extent – refer to figure 7.

The size of the site makes provision for the exclusion of any sensitive environmental features that may arise as a result of the EIA proses.

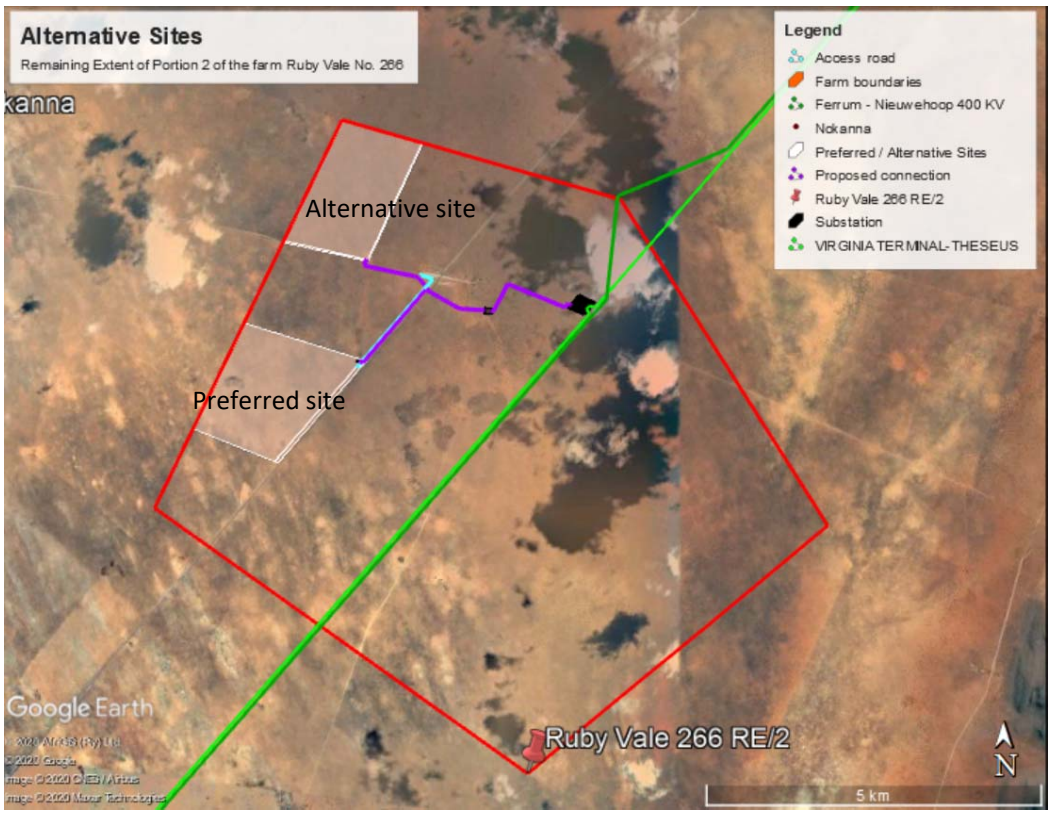


Figure 7: Location alternatives on the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266

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 – Kgalalelo Solar Power Plant (RF) (Pty) Ltd. is part of a portfolio of solar PV projects throughout South Africa. Kgalalelo 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 the Olifantshoek/Postmasburg area – refer to figure 8.

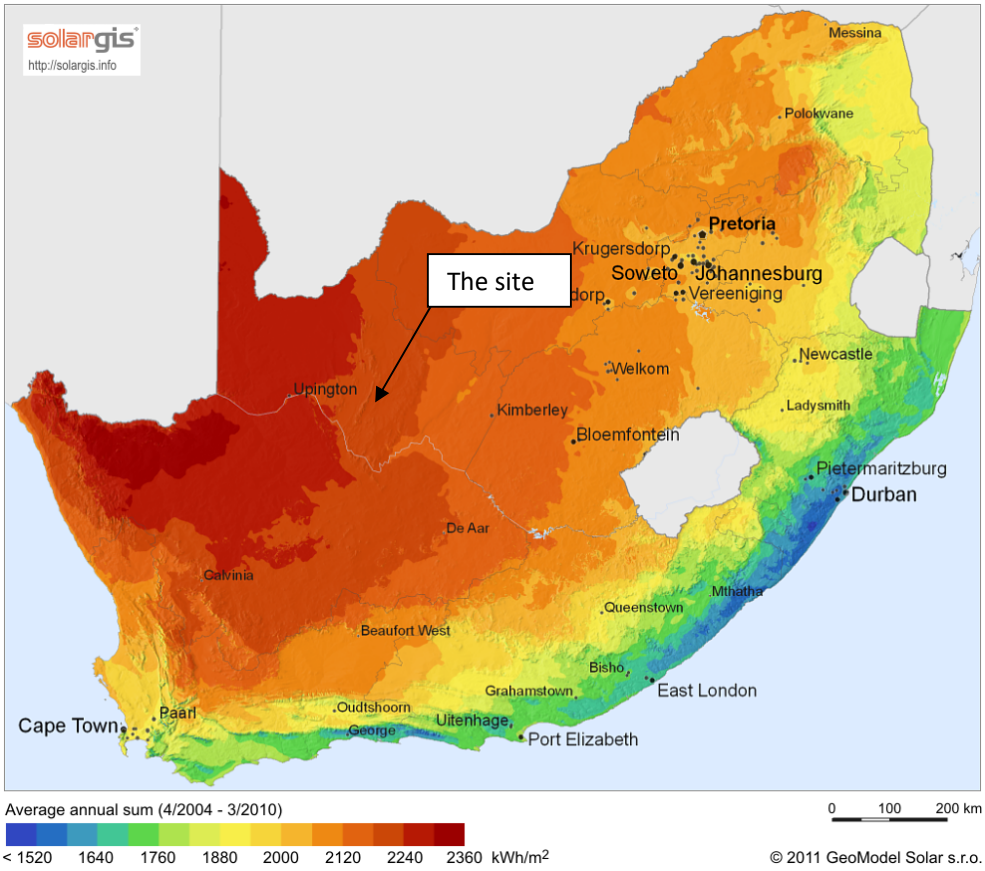


Figure 8: Horizontal irradiation for South Africa (SolarGIS, 2011)

The technology furthermore entails low visual impacts, have relatively low water requirements, is a simple and reliable type of technology and all of 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. 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 in the proposed project area. While the irradiation values are high enough to generate sufficient solar power, the water constraints render this alternative not feasible. Therefore, this alternative will not be considered further in this report.

5.1.4 Technical alternatives

The technical alternatives relate to the power lines and the option of including a battery storage facility on the site.

5.1.4.1 Power lines

It is expected that generation from the facility will tie in with the Lewensaar 2715/50kV Substation. This is the only alternative that is being considered for the power line since it follows the shortest route. The 132kV overhead transmission line is the only preferred alternative for the applicant due to the following reasons:

Overhead Transmission Lines - Overhead lines are less costly to construct than underground lines. Therefore, the preference with overhead lines is mainly on the grounds of 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 Northern Cape Province are less likely to cause damage and faults on the proposed overhead transmission 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 caused by overhead transmission lines include visual intrusion and threats to sensitive habitat (where applicable).

Underground Transmission Lines - Underground cables have generally been used where it is impossible to use overhead lines for example because of space constraints. Underground cables are oil cooled and are also at risk of groundwater contamination. Maintenance is also very 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 storage facility

It is proposed that a nominal 100 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 1,120m3 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.

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. The layout plan will be submitted as

part of the EIA Report, indicating the preferred location and placement of infrastructure on site for the proposed development. It is envisaged that the following environmental features will need to be considered:

- How to accommodate any protected tree or plant species.

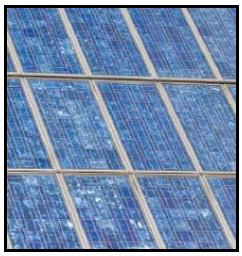
5.1.6 Technology alternatives

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, thin film or bifacial PV panels. 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.



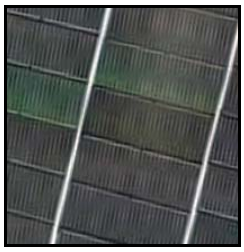
- Poly-crystalline Silicon – poly-crystalline panels use solar cells that are cut from multifaceted silicon crystals. They are less uniform in appearance than mono-crystalline cells, resembling pieces of shattered glass. These are the most common solar panels on the market, being less expensive than 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).

Bifacial panels:

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, 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.

Traditional solar panels use an opaque backsheet. By comparison, bifacial solar panels either have a clear/reflective backsheet 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 more 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.

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
- The characteristics of the potentially affected parties

Since the scale of anticipated impacts is low, the low environmental sensitivity of the site and the fact that no conflict was foreseen between potentially affected parties, no additional public participation mechanisms were considered at this stage of the process. The following actions have already been taken:

- 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 English in the local newspaper (Kalahari Bulletin) on the 12 December 2019 (see Appendix B) 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 by 4 February 2020.

- Site notices

  Site notices were placed on site in English on 20 November 2019 to inform surrounding communities and immediately adjacent landowners of the proposed development. I&APs were given the opportunity to raise comments by 31 January 2020. Photographic evidence of the site notices is included in Appendix C.

- Direct notification of identified I&APs

  Identified I&APs, including key stakeholders representing various sectors, were directly informed of the proposed development via an email on 12 December 2019 and were requested to submit comments by 4 February 2019. For a complete list of stakeholder details see Appendix D and for proof of correspondence see Appendix E. The consultees included:

- Northern Cape Department of Environmental Affairs and Nature Conservation
- The Department of Energy
- The Department of Water Affairs
- The National Department of Agriculture
- The South African Heritage Resources Agency (SAHRA)
- The Provincial Heritage Resources Agency (PHRA), Northern Cape
- Passenger Rail Agency of South Africa (PRASA)
- South African National Roads Agency (SANRAL)
- SENTECH
- Department of Communications
- The Northern Cape Department of Mineral Resources
- Transnet
- ESKOM
- National Energy Regulator of South Africa (NERSA)
- The Wildlife and Environment Society of South Africa (WESSA)
- The Municipal Manager at the John ZF Mgcawu District Municipality
- The Municipal Manager at the Tsansabane Local Municipality
- The Local Councilor at the Tsansabane Local Municipality
- The Civil Aviation Authority (CAA)
- The Northern Cape Department of Public Works, Roads and Transport
- Square Kilometre Array (SKA)
- Leads 2 Business – Melanie Miles
- Land Owner – Mr. H. Uys
- Tsantsabane Unemployment Forum
- AMDA Developments
- Tenant – Mr. Swart
- Kalkpan 639 RE – G. Maritz
- Ruby Vale 266 portion 1 – B. Bredenkamp
- Nokanna - T. Rhyneke
- B Creative – Ms. Snyman
- Private – Mr. Uys
- Rete Properties – Mr. Moake and Mr. Belang

It was expected from I&APs to provide their inputs and comments by 4 February 2020. No comments have been received to date.

- <u>Direct notification of surrounding land owners and occupiers</u>

Written notices were also provided to surrounding land owners and occupiers via email on 12 December 2019. The Tsansabane Local Municipality and other local property owners were contacted to obtain the contact details of the surrounding land owners. Six farmer's contact details could be obtained – refer to figure 9. The surrounding land owners were given the opportunity to raise comments by 4

February 2020. To date no comments have been received from surrounding land owners. For a list of surrounding land owners see Appendix D.

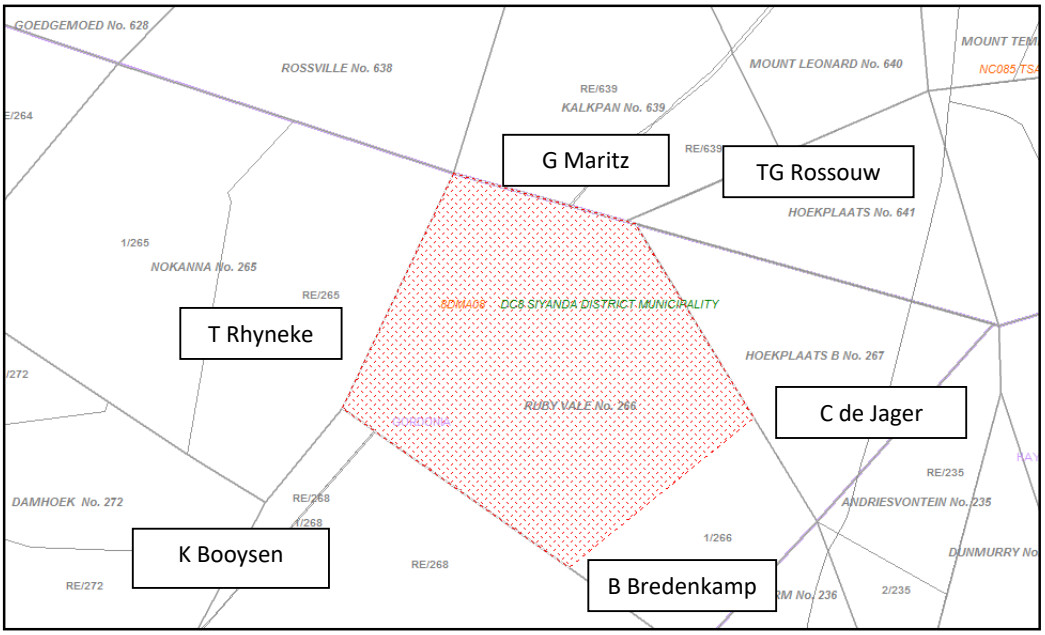


Figure 9: Surrounding Land Owners

5.2.2 Consultation process

Regulation 41 requires that the municipality, relevant ward councillor and 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 D and E.

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 and will be made available to:

- Northern Cape Department of Environmental Affairs and Nature Conservation
- The Department of Energy
- The Department of Water Affairs
- The National Department of Agriculture
- The South African Heritage Resources Agency (SAHRA)
- The Provincial Heritage Resources Agency (PHRA), Northern Cape

- Passenger Rail Agency of South Africa (PRASA)
- South African National Roads Agency (SANRAL)
- SENTECH
- Department of Communications
- The Northern Cape Department of Mineral Resources
- Transnet
- ESKOM
- National Energy Regulator of South Africa (NERSA)
- The Wildlife and Environment Society of South Africa (WESSA)
- The Municipal Manager at the John ZF Mgcawu District Municipality
- The Municipal Manager at the Tsansabane Local Municipality
- The Local Councilor at the Tsansabane Local Municipality
- The Civil Aviation Authority (CAA)
- The Northern Cape Department of Public Works, Roads and Transport
- Square Kilometre Array (SKA)
- Leads 2 Business – Melanie Miles
- Land Owner – Mr. H. Uys
- Tsantsabane Unemployment Forum
- AMDA Developments
- Tenant – Mr. Swart
- Kalkpan 639 RE – G. Maritz
- Ruby Vale 266 portion 1 – B. Bredenkamp
- Nokanna - T. Rhyneke
- Meidekop – K. Booysen
- Hoekplaats 641 RE – T. G. Rossouw
- Hoekplaats B 267 RE – C. de Jager
- B Creative – Ms. Snyman
- Private – Mr. Uys

They will be provided with a copy of the Draft Scoping Report and will be 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.

5.2.4 Issues raised by I&APs and consultation bodies

To date no comments have been received.

5.3 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PREFERRED ALTERNATIVE

The following sections provide general information on the biophysical and socio-economic attributed associated with the preferred alternative.

5.3.1 Biophysical environment

The biophysical environment is described with specific reference to geology, soils, agricultural potential, vegetation and landscape features, climate, biodiversity and the visual landscape. A number of specialists were consulted to assist with the compilation of this chapter of the report – refer to the Table 1.2. However, due to the fact that the area proposed for development exclusively consists of land used for grazing, nothing of note was identified from an ecological or conservation point of view on the site apart from a number of protected tree species.

5.3.1.1 Geology, soils and agricultural potential

The geology is red to flesh-coloured wind-blown sand and surface limestone of Tertiary to Recent age. A few rock outcrops of white, grey and pink quartzite with subordinate brown subgreywacke occur. The preferred site and the alternative site share underlying geology (refer to the brief geotechnical assessment in Appendix H1). The entire site comprises deep, largely unconsolidated sands. It is not known at what depth below surface any other material would be encountered. The foundations for mounting structures will need to be erected in sand. None of the following occur on the site:

- Shallow water table (less than 1.5m deep)
- Sinkhole or doline areas.
- Seasonally wet soils (often close to water bodies)
- Unstable rocky slopes or steep slopes with loose soil
- Dispersive soils (soils that dissolve in water)
- Soils with high clay content (clay fraction more than 40%)
- Any other unstable soil or geological feature

Soils across the site are susceptible to wind erosion. The geotechnical conditions are assessed, as suitable for the development of a solar energy facility. Because soil conditions are fairly uniform across the site, there are no more and less suitable parts of the project area for development.

According to the Agriculture and Soils Impact Assessment (attached in Appendix H5) there are two land types across the site, namely Ah1 in the west and Ae5 in the east. Soils of both land types are very similar and are almost entirely deep, well-drained, very sandy red and yellow of the Hutton and Clovelly soil forms. These soils fall into the Oxidic soil group according to the classification of Fey (2010). The field investigation confirmed that the entire site comprises deep, very sandy, mostly red soils. The soils are classified as having low to moderate susceptibility to water erosion, but because of their sandy texture are classified as highly susceptible (class 1a) (land type Ah1) and susceptible (class 2b)(land type Ae5) to wind erosion.

The significance of all agricultural impacts is influenced by the fact that the site has climate limitations, as well as soil limitations, making it unsuitable for cultivation and the land is solely used for cattle grazing. The new land capability mapping divides land capability into 15 different categories with 1 being the lowest and 15 being the highest. Values below 8 are

generally not suitable for production of any cultivated crop. The project area is classified with a predominant land capability evaluation value of 5, with some patches of 6. The limitations to agriculture are predominantly climate related. The moisture availability class 6 classification, with high variability of rainfall is a very severe limitation to agriculture, which makes any cultivation without irrigation completely non-viable. The very sandy soils, with very limited water holding capacity are a further limitation. These factors render the site unsuitable for any kind of mainstream cultivation without irrigation, and limit it to low density grazing only. The long-term grazing capacity of the site is 15 hectares per large stock unit.

5.3.1.2 Vegetation and landscape features

The two sites differ slightly in terms of landscape features and habitat characteristics. In terms of vegetation type both the sites fall within the Gordonia Plains Shrubland vegetation type which are described by Mucina and Rutherford (2006) as 'least threatened' – refer to the figure 4 vegetation map. The landscape is characterized by flat plains with virtually no dunes. The vegetation is dominated by open grasslands with occasional Rhigozum trichotomum and Grewia flava shrubs, sometimes including Vachellia haematoxylon and scattered individuals of Vachellia erioloba. Dominant trees and tall shrubs include the aforementioned four species as well as Senegalia mellifera subsp. detinens.

Two broad Vegetation Units (VU's) were recorded and are described in the sections below (Figure 10). The two VU's are:

- VU 1: Vachellia erioloba – Senegalia mellifera semi-closed woodland
- VU 2: Vachellia haematoxylon – Schmidtia pappophoroides open plains

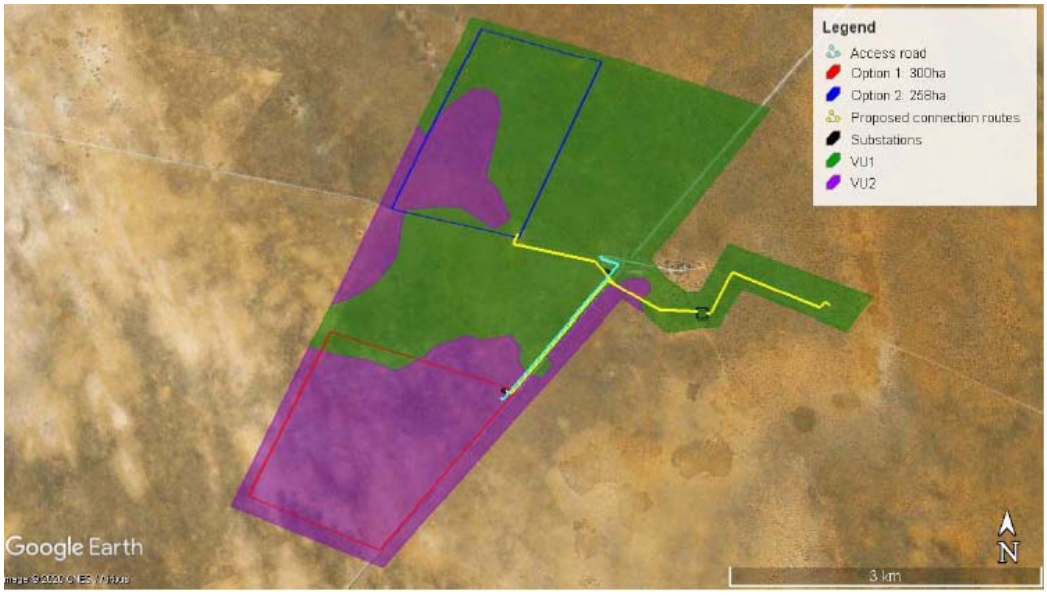


Figure 10: Image depicting the two vegetation units recorded in the study area

Seventy-six (76) plant species are recorded on the POSA data base of SANBI for the relevant QDS 2822BA, the study area is situated in. This list contains species at least two or three

different vegetation types. A total of only 103 plant species (from 39 plant families and 85 genera) were recorded in the study area during the 2016 study and indicates moderate species diversity. Due to extensive drought conditions during the current study only 39 plant species could be positively identified. The description of the plant species diversity and subsequently the vegetation units, will therefore be based on the data from the 2016 study.

Red Data, Protected and Endemic Plant Species

According to the Ecological Fauna & Flora Habitat Survey (refer to Appendix H2) thirteen plant species of specific conservation significance were recorded in the study area during the study period. One of these species is listed as a Threatened or Protected Species (ToPS) by the National Environmental Management: Biodiversity Act's (Act No. 10 of 2004) list of ToPS as published in Government Gazette no. 36375 of 16 April 2013 (NEMBA ToPS, 2013). Two are listed by Raimondo et al (2009) in the South African Red Data list as Declining species. Three trees are included in the protected tree species list as published in the National Forests Act (Act no.84 of 1998) (NFA, 1998), and eight of the twelve are listed as protected and two as specially protected by the Northern Cape Nature Conservation Act (Act no. 9 of 2009) (NCNCA, 2009).

Due to the high numbers of nationally protected trees (NFA, 1998) (i.e. Vachellia erioloba, V. haematoxylon and Boscia albitrunca) the individual positions of these species were not individually geo-referenced during this study. Instead a number of belt transects were conducted in each different VU to determine the density at which these species occur in the study area and just beyond.

Figure 11: Examples of Vachellia erioloba, V. haematoxylon and Boscia albitrunca

Fourteen (14) belt transects of 100 x 40 m (4000 m2) were conducted in the area (8 in VU1 and 6 in VU2) and only the numbers of the three nationally protected trees were considered. All specimens of these species within the belt transect were counted and noted together with the height of each specimen. Differentiation was made between specimens higher than 2 m (> 2 m) and those shorter than 2 m but not less than 1 m (< 2 m = 1 m). Specimens shorter than 1 m were not counted.

The calculated number of specimens of, for example, Vachellia haematoxylon in Option 1, VU2, is 495. This number of specimens is the sum of the V. haematoxylon shrubs (1 to < 2 m) i.e. 203, and the trees (> 2 m) i.e. 293. The total calculated number of V. haematoxylon specimens (trees + shrubs) occurring on the Option 1 site is 2340. To calculate the number of specimens of any one of the three species for any given surface area, the surface area (in

ha) is multiplied with the average species density/ha of the relevant species and VU. – refer to Table 5.1.

Table 5.1: Protected tree species frequency, density/ha & number of specimens per VU

Kgagelelo SPP			*Acacia erioloba*			*Acacia haematoxylon*			*Boscia albitrunca*		
		VU	1 to <2 m	>2 m	Total	1 to <2 m	>2 m	Total	1 to <2 m	>2 m	Total
			Average species frequency (as counted on 4000 m²)								
		1	1.9	4.5	6.4	1.3	1.8	3.0	0.3	0.4	0.6
		2	1.7	1.2	2.8	1.5	2.2	3.7	0.2	0.2	0.3
			Average species density / ha								
		1	4.69	11.25	15.9	3.13	4.38	7.5	0.63	0.94	1.6
		2	4.17	2.92	7.1	3.75	5.42	9.2	0.42	0.42	0.8
	VU area (ha)		**Number of specimens per VU**								
OPTION 1	**17**	**1**	80	191	271	53	74	128	11	16	27
	283	**2**	1179	825	2005	1061	1533	2594	118	118	236
	Total:				**2276**			**2722**			**262**
OPTION 2	**161**	**1**	755	1811	2566	503	704	1208	101	151	252
	91	**2**	379	265	645	341	493	834	38	38	76
	Total:				**3211**			**2042**			**327**

The preferred site has approximately 5 260 and the alternative site 5 580 trees on protected tree species on site. It is strongly advised that once the exact position of development activities and infrastructure has been planned and finalized that a full population study of each affected area be done to determine the population size and extent of these and possibly other protected species within the study area and the relevant appropriate action is then taken. A species count for threatened or protected species were conducted, which lists and estimates the number of protected plant species recorded in the area – refer to Appendix H10.

Exotic Plant Species

During the study the alien invasive woody species *Prosopis glandulosa* var. *torreyana* was recorded in the study area. According to Hoffman *et al* (1999) (in Mucina & Rutherford, 2006) *P. glandulosa* is one of the 12 agriculturally most important invasive alien plants in South Africa. According to the Conservation of Agricultural Resources Act (Act No. 43 of 1983) (CARA, 1983) in Henderson (2001) and the National Environmental Management Biodiversity Act's 2014 list of proposed weeds and invaders (NEMBA, 2014), this species is classified as an alien invader species. P. glandulosa was the only exotic species to be recorded during the time of this study.

Threatened and Protected Ecosystems

No ecosystems that are threatened and in need of protection according to the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) was recorded in or in the vicinity of the study area.

5.3.1.3 Climate

According to Mucina and Rutherford (2006) rainfall peaks in summer and autumn with very dry winters. The mean annual precipitation (MAP) ranges of 344 mm with frequent to frost in winter. Mean maximum and minimum temperatures for the area in question are 35.9°C in December and -3.3°C in July, respectively.

Fthenakis and Yu (2014) published a paper on the *Analysis of the Potential for a Heat Island Effect in large Solar Farms.* The study focused on the effect on global climate due to the albedo change from widespread installations of solar panels and found that the air temperature at 2.5m of the ground in the centre of the simulated solar farm selection was 1.9°C higher than the ambient air temperature, but that it declined to the ambient temperature at the height of 5 to 18m of the ground. The data also showed a clear decline in air temperature (within 0.3°C) 300m away from the solar farm. The solar panels also cool completely at night, and it is thus unlikely that a heat island effect could occur. The simulations also showed that the access roads between the solar fields allow for substantial cooling, and therefore, it is unlikely that an increase of size of the solar farm will affect the temperature of the surroundings.

5.3.1.4 Biodiversity

The primary cause of loss of biological diversity is habitat degradation and loss (IUCN, 2004; Primack, 2006). In the case of this study special attention was given to the identification of sensitive species or animal life and birds on site. The following section will discuss the state of biodiversity on the site in more detail.

5.3.1.4.1 Avifaunal

The Avifaunal Study (refer to Appendix H3) indicate that the grass cover is highly variable depending on rain and grazing pressure and was sparse in during the site visit. Bird habitat in the region consists mainly of bush-thickened Acacia mellifera, Camelthorn A. erioloba and less often Shepherd trees Boscia albitrunca. Open ground was sometimes grassland (and grazed) and sometimes supported dense patches of Rhigozum shrubs. Taller trees and those growing near farm reservoirs are regularly used by passerine birds as nest sites, perch sites (for foraging) and for shade and roosting in the hottest times of day. Artificial habitats are provided by landowners in the form of windmills, farm reservoirs and transmission lines, and pylons that bisect the site. The pylons provide perch and roost sites for both vultures and raptors, and nest sites for Sociable Weavers.

The Birds and Renewable Energy Specialist Group (BARESG) of Birdlife South Africa/EWT produced a South African bird sensitivity map (refer to figure 12). The area proposed for the

Kgalalelo Solar PV falls in five pentads. None of these pentads have a sensitivity score greater than 277 suggesting a low overall avian sensitivity ranking for the area, on a scale that peaks at ~1000.

Figure 12: Bird sensitivity map for Kgalalelo PV

This Kalahari sand habitat, held only 33 avian species in or around Ruby Vale farm, of which five were collision prone (Cape Vulture Gyps coprotheres, White-backed Vulture G. africanus, Kori Bustard Ardeotis kori, Lanner Falcon Falco biarmicus, Northern Black Korhaan Afrotis afroides). The first four species are also red-listed, and two occur in the top 10 collision-prone species list for solar farms. A limitation of the study was the lack of SABAP atlas records for this site, so the specialist added their own records from 2016 when a Martial Eagle Polemaetus bellicosus was found on site and then added this to the records. Total species richness simultaneously increased to 64 bird species.

Of the ten priority species recorded in our data set, four were raptorial species including the two Endangered vultures and Vulnerable eagle species that may all be susceptible to collisions, more so with the associated infra-structure (power line connections). The Passage Rate of the priority collision-prone species recorded on Ruby Vale over two days was high at 2.1 birds per hour.

No wetland or other Red Data species were recorded over the proposed solar farm, and only the potential impact of Yellow-billed Hornbills attacking their own reflections in highly reflective PV panels or Sociable Weavers building their ever-expanding nests on the panels would need to be managed by the developers. A further 6 months' monitoring, covering the dry season, is to be undertaken on the Ruby Vale sites to determine the presence and passage rates of each priority species through the site. This will allow a complete understanding of the avian species at risk and avoid impacts to collision-prone species that occur there.

5.3.1.4.2 Ecological (faunal species)

The Ecological Fauna and Flora Habitat Survey (refer to Appendix H2) confirms that the sites fall within the Eastern Kalahari Bushveld Bioregion of the Savanna Biome (Rutherford et al. 2006). Livestock and wildlife ranching dominate the immediate surrounds and human habitations are few and far between. Neither permanent nor semi-permanent water bodies were identified from satellite images or after ground-truthing the sites. Topography is more or less homogeneous throughout the study site with no radical changes in slope. Both sites (Options 1 & 2) are visibly degraded due to extreme overgrazing, which is seriously enhanced by the current drought conditions. The soil is mostly sandy with an apparent absence of rockiness on the soil surface. The site of Option 1 seems to be slightly more degraded and Option 2 has more large trees.

Literature research revealed that no animals were restricted or endemic to the area. Some species listed, for example Brown Hyaena (Hyaena brunnea) due to frequent human activity, have a low likelihood of occurring within the site, but are nonetheless listed if their habits, habitat requirements and estimated distribution ranges agree with the study findings. Greater Kudu (Tragelaphus strepsiceros) and Eland (Taurotragus oryx) have been included as the livestock fencing would not stop them entering and exiting the site. The likelihood of any amphibians occurring on the site is low due to the complete lack of local water bodies. No physical records of the protected butterflies occurring in the site exist, but have been included as their entire distribution ranges have not yet been confirmed. Further, both butterfly species are endemic to the region; have habitat preferences corresponding with habitat characteristics of the alternative site and the larval host plant of Linda's Hairtail (Anthene lindae) is Vachellia erioloba, which occurs in both sites. Overall butterfly species richness is expected to be low compared to other South African vegetation types.

5.3.1.5 Visual landscape

According to the Visual Impact Assessment (attached as Appendix H4) the proposed development is located in an area with relatively low significance in elevation, meaning that the site is not located on a mountain, at the foot of a mountain or in an area with a significant difference in elevation, except to the east where the Langeberge mountain range can be seen. The preferred site is located at an above mean sea level (amsl) of approximately 1179m at the highest elevation and at an amsl of 1161m at the lowest elevation. The alternative site is located at an above mean sea level (amsl) of approximately 1186m at the highest elevation and at an amsl of 1170m at the lowest elevation. The landform described above is unlikely to limit visibility. Areas within 5km from the proposed development might have a clear view of the proposed development without taking existing screening into account.

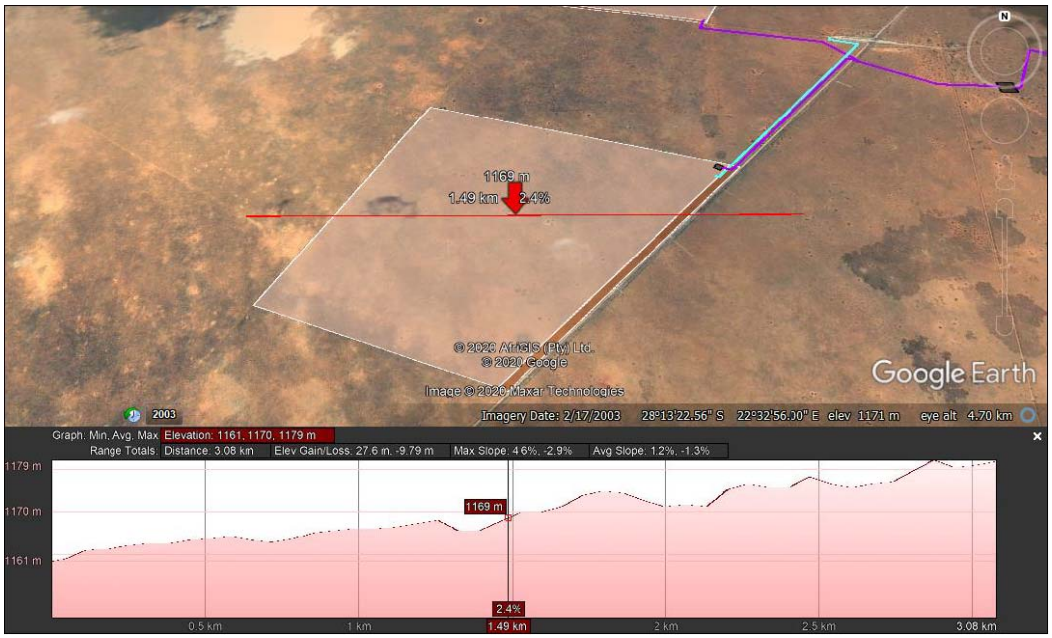


Figure 13: Elevation transect of the preferred PV site taken from west to east

The only receptors likely to be impacted by the proposed development are the nearby farmsteads and people travelling on the D3300 gravel road and Sishen-Saldannah railway line. Due to the close proximity to one another, the visual impacts for both the Preferred and Alternative site is identical, the VIA will therefore not play a role in determining which site is more suitable from an environmental perspective.

5.3.2 Description of the socio-economic environment

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

5.3.2.1 Socio-economic conditions

According to the social impact assessment (refer to Appendix H8), the development of the Kgalalelo Solar Plant (SP) has a variety of associated socio-economic benefits. The anticipated capital expenditure value of the proposed project on completion will be approximately R1.1–1.9 Billion. In terms of employment the construction phase will employ approximately 60 new skilled, 220 low-skilled and 120 semi-skilled employment opportunities over a period of 18 – 24 months. The operational phase however, will employ approximately 3 new skilled, 40 low-skilled and 10 semi-skilled employment opportunities over a period of 20 years.

The Tsansabane Local Municipality is situated within the ZF Mgcawu District Municipality of the Northern Cape Province. The TLM (2019:26) reports that the population of the TLM municipal area according to the 2011 Census data is 35 093 people. The Integrated Development Plan (IDP) (TLM, 2019:28) reports that although there is a slight increase in the number of people obtaining a Matric qualification (since 2001), as well as an increase in the number of people with higher education qualifications, the figures are still very low,

resulting in a very low probability of employment. However, the unemployment rate drastically decreased (15% decrease) from 4466 in the year 2001 to 3795 in the year 2011, while the employment rate increased by 69% in the year 2011 (TLM, 2019:29). Despite the increase in employment, the level of economically inactive members is still very high, and poverty remains a major socio-economic concern in this municipal area (TLM, 2019:30).

In terms of the economic sector, the IDP of 2018/2019 reported that the mining sector is the biggest contributor to the GDP with a contribution of 74% (R3.9 billion), while the tertiary sector contributed 4% and 20% respectively (TLM, 2019:32). The report further provides a literature review of macro-economic environments, but ail to provide detail of the macro-economic environment of the TLM. The areas of economic investment and development potential of the TLM include: the agricultural sector; manufacturing; utilities and construction, wholesale and retail trade; and government/ community services. Nothing in terms of the tourism sector was reported on in this IDP.

5.3.2.2 Cultural and heritage aspects

Special attention was given to the identification of possible cultural or heritage resources on site. The initial site investigation concluded that there are no obvious heritage resources located on the site earmarked for development. However, a Heritage Impact Assessment (HIA) has been conducted to ensure that there would be no impact on cultural or historical features as a result of the proposed activity.

According to the HIA (attached as Appendix H6) the cultural landscape qualities of the region essentially consist of a two components. The first is a rural area in which the human occupation is made up of a pre-colonial (Stone Age) occupation. The second and a much later component is a colonial (farmer) one, with very limited urban component consisting of a number of smaller towns, most of which developed during the last 100 years or less.

Stone Age

Occupation of the region took place during the Stone Age. Most of this, however, seems to date to the Early Stone Age and centres in the areas where there are hills, e.g. to the east and south. For example, in the vicinity of Kathu, Beaumont & Morris (1990) and Dreyer (2007) identified to occurrence of extensive Early Stone Age occupation.

Less obvious in its presence are the Later Stone Age sites, some of which are indicated by Beaumont & Vogel (1984). They equate these sites, some which occur in the larger region, with Cape Coastal pottery associated with amorphous LSA (herders) or Wilton (hunter-gatherers) in the period 100 BC to AD 1900.

Iron Age

Early Iron Age occupation did not take place in the region and seems as if the earliest people to live settled lives here were those of Tswana-speaking origin (Tlhaping and Tlharo) that settled mostly to the north and a bit to the west of Kuruman. However, they continued spreading westward and by the late 18th century some groups occupied the Langeberg region. With the annexation of the Tswana areas by the British in 1885, the area became

known as British Betchuana Land. A number of reserves were set up for these people to stay in. In 1895 the Tswana-speakers rose up in resistance to the British authority as representedby the government of the Cape Colony. They were quickly subjected and their land was taken away, divided up into farms and given out to white farmers to settle on (Snyman 1986).

Historic period

Many early explorers, hunters, traders and missionaries travelled through the area on their way to Kuruman on what was to become known as the "missionary road". Anderson, Burchell, Harris, Holub, Lichtenstein and Moffat are but a few of the better-known names to pass through here.

In 1902 Olifatnshoek got its first permanent inhabitant, Edward Finnis and in 1903 Michael Colley opened a shop. The slow growth of Olifantshoek can be attributed to the fact that for many years Deben (Dibeng) was the main seat of the church in the region and local people preferred to go there.

Although prospecting for minerals, especially diamonds occurred in the area and some knowledge was available on the iron deposits, it was only during the 1940s that the extent of the iron and manganese deposits were established, this was followed by the establishment of towns such as Sishen (1952) and Kathu in 1972.

Site specific review

As this is a very isolated region, very little information exists about it. One of the older maps of the region (Fig. 8), dating to 1914, shows an area with no development, apart from a few tracks crossing in different directions, described as "fair going", "very seldom used". According to Mr Uys, the farm owner, oral traditional has it that some graves occur at this point. This tradition is largely based on the fact that this is one of the very few places where few large pieces of stone occur on the farm (Van Schalkwyk 2016). However, nothing definite could be identified. The location of this possible feature is indicated simply because of its proximity to the power line. Fortunately, it is far away enough not to be impacted on by the proposed development.

Some poorly formed stone tools, classified as side- and end scrapers, dating to the Middle Stone Age was identified near the alternative site – refer to Figure 14. The material seems to originate from the other side of the farm boundary, on the farm Nokana, on what seems to have been a low outcrop of quartzite. It is possible that due to the long exposure of these artefact on the surface, it was spread out over a sizable area, which allowed some to be included on the Ruby Vale side of the fence. Due to the height of the fence, it was impossible to investigate the site in more detail, but it is anticipated that there would be a good number more tools and flakes on the other side of the fence. This site is located a few metres outside the study area on the adjacent farm and theoretically there would therefore be no impact on it by the proposed development.

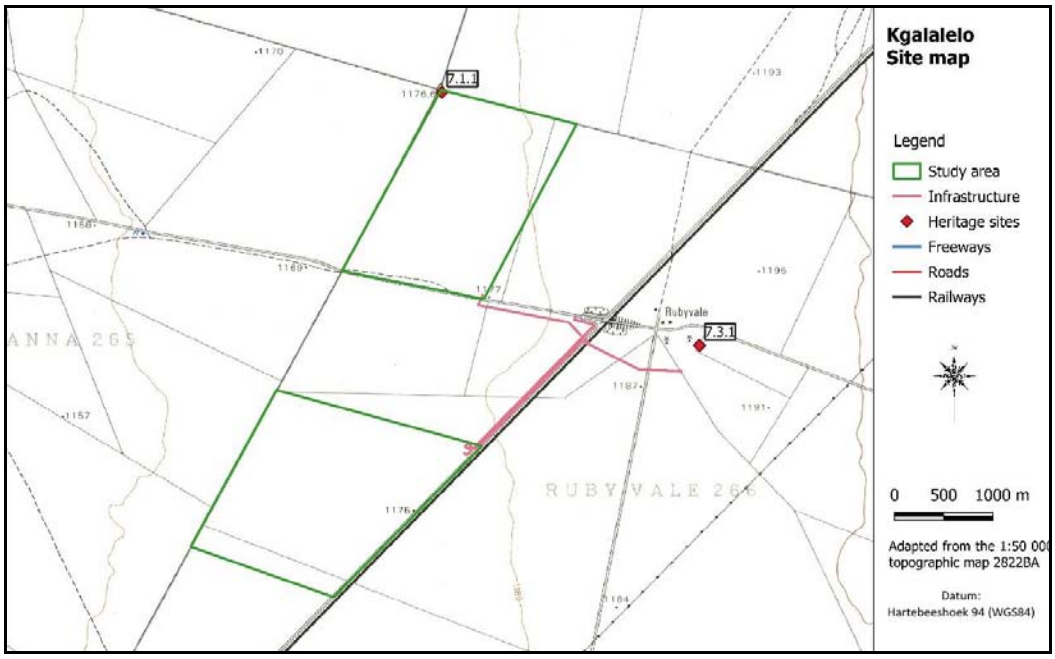


Figure 14: Heritage sites near Kgalalelo PV Solar Power Plant

Palaeontology

The Palaeontological Sensitivity Map (SAHRIS) indicate that the study area (refer to figure 15) has a moderate sensitivity of fossil remains to be found and therefore a desktop palaeontological required.

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

Figure 15: Palaeontological sensitivity

According to the palaeontological heritage impact assessment (refer to Appendix H7) the project area is underlain by Palaeoproterozoic strata of the Brulsand Subgroup, Volop Group, Oliphantshoek Supergroup. It is the outcrop of this unit that forms the areas of topographically elevated land to the north and south of the project area. The combined outcrop of the Brulsand Subgroup and stratigraphically older Matsap Subgroup (Volop Group, Oliphantshoek Supergroup) strata form the Langberg to the east of the project area. The area underlying the planned infrastructure consists of unconsolidated, superficial Cainozoic regolith of the Kalahari Group (probably the Gordonia Formation).

No fossils are known to occur within the strata of the Olihantshoek Supergroup. Indeed, no fossils are known in any terrestrially deposited strata of Palaeoproterozoic age in South Africa. Stromatolite fossils older than the Oliphantshoek Supergroup strata do exists in the country, but these all occur in marine strata. In addition, the age of the unit predates the development of multicellular life anywhere on Earth and, accordingly, the unit is considered unfossiliferous.

Diagenetic calcrete may underly the Kalahari Group, and crop out in the interdune areas. The Kalahari Group strata are known to be fossiliferous, although in the case of the Gordonia Formation fossils are not common. Diagenetic calcrete may underly Gordonia Formation sands or crop out in interdune areas; the calcretes are unfossiliferous. The bedrock strata underlying the entire area are unfossiliferous. The Brulsand Subgroup strata are also unfossiliferous. While the Gordonia Formation may not be commonly fossiliferous, it is important to consider the fossil potential of the underlying bedrock (which may cop out in the interdune areas) when assessing the impact of a project upon the fossil heritage of an area.

5.3.2.3 Traffic consideration

Access to the facility will be obtained from the D3300 local gravel road (refer to the traffic impact assessment attached as Appendix H9). Ready access to the site exists. Internal site road networks to provide access to the Solar Power Plant and its associated infrastructure will be required. All roads will be located within a 25m corridor in order to accommodate heavy vehicles. The D3300 is currently underutilised and can accommodate greater volumes of traffic as the majority of the traffic is residents of surrounding farms.

A formal application for the access point on Road N14 will need to be lodged with the South African National Roads Agency SOC Limited (SANRAL). The formalisation of the access point to the standard, will in all probability be a requirement as part of the wayleave approval. The photovoltaic (PV) equipment and relevant components will be transported to the farm Ruby Vale No. 266 over a distance of 980km or 1090km from either the Cape Town- or Durban harbours respectively. The vehicles used to transport the photovoltaic (PV) equipment are standard container trucks and not abnormal load vehicles. No obstacles (e.g. Low overhead services, cattle grids, narrow bridges, etc.) are expected, as these routes are travelled by the same type of vehicle throughout.

The proposed Kgalalelo PV solar power plant will generate additional traffic on the surrounding road network in two distinct phases, namely the construction phase and the operational phase. The following traffic load figures are expected:

Construction period:

Approximately 300 staff members will be transported to site on a daily basis, most probably from Olifantshoek. It is expected that minibus-taxis will be used to transport the above-mentioned staff. This translates to approximately 20 minibus-taxis travelling to and from site daily. These trips are expected to be peak hour trips.

Heavy delivery vehicles will be used to transport the equipment and construction materials to the proposed solar power plant, during the construction phase. A total of sixteen (16) trips (32 return trips) is expected to be generated as a result of this development. It must be noted that these trips will be daily trips and not necessarily peak hour trips.

A summary of the additional trips generated by the development of the Kgalalelo PV solar power plant is provided in the table 5.2 below:

Table 5.2: Trip generation

ROUTE DESCRIPTION	TOTAL DELIVERY TRIPS	TOTAL COSNTRUCTION VEHICLE TRIPS	TOTAL CONSTRUCTION PHASE TRIPS
Cape Town to Olifantshoek via N14	22 vpd	10 vpd	32 vpd
Durban to Olifantshoek via N14	22 vpd	10 vpd	32 vpd
Commuter traffic	-	-	20 vpd

Operational phase:

The operational phase of this project is not expected to generate significant traffic volumes. The typical day-to-day activities will probably only be service vehicles undertaking general maintenance at the site. The following traffic figures are expected during the operational phase of this project:

- An average of six (6) light vehicles to a maximum of 15 light vehicles daily.
- Four (4) minibus-taxi trips daily for permanent staff transport.

5.4 SITE SELECTION MATRIX

Due to the nature of the proposed development, the location of the 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 Northern Cape has a huge 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. The Remaining Extent of Portion 2 of the farm Ruby Vale No. 266 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 energy facility is directly dependent on the annual direct solar irradiation values of a particular area. The Northern Cape receives the highest average of direct normal and global horizontal irradiation in the country, 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 ~2240 kWh/m^2/year is relevant in the area.

- Topographic conditions: The surface are 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.

- Extent of the site: A significant portion of land is required to evacuate the prescribed 150MW 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. The Remaining Extent of Portion 2 of the Farm Ruby Vale No. 266 is 5 735,5192 hectares in extent.

- 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 from the D3300 gravel road.

- Grid connection: In order for the PV facility to connect to the national grid (Lewensaar 275/50kV Substation) the facility will have to construct an on-site 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. Due to the fact that the area proposed for development exclusively consists of land used for grazing, nothing of note was identified from an ecological or conservation point of view on the site apart from a number of protected trees on site.

It is evident from the discussion above the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266 may be considered favourable and suitable in terms of these site characteristics. The challenge was therefore to identify the preferred location for the proposed development within the boundaries of the farm. Table 5.3 presents the site selection matrix with a comparison between the two alternative locations on the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266 based on the information provided by the specialists.

Table 5.3: Site selection matrix

For ease of reference the favourability of the sites are colour-coded as follow:

Favourable	A	Mostly favourable	B	Mostly not favourable	C	Not favourable	D

Site selection criteria	Preferred site	Alternative site	Comments / Discussion
Location	A	A	• Both sites are located in an area with a Global Horizontal Radiation of ~2240 kWh/m2/year.
Grid connection	A	A	• Both sites are able to connect to the Lewensaar 275/50kV Substation. • The preferred and alternative site will be able to connect to the Lewensaar 275/50kV Substation in close proximity to the site and both will require a short power line to be constructed.
Site access	A	A	• Access to both alternatives will be easily obtained from the D3300 Gravel Road.
Geology & soils	A	A	• The field investigation confirmed that the entire site comprises deep, very sandy, mostly red soils. Because soil conditions are fairly uniform across the site, there are no more and less suitable parts of the project area for development.
Landscape features	A	A	• The preferred site is located at an above mean sea level (amsl) of approximately 1179m at the highest elevation and at an amsl of 1161m at the lowest elevation. The alternative site is located at an above mean sea level (amsl) of approximately 1186m at the highest elevation and at an amsl of 1170m at the lowest elevation.

Visual impacts	A	A	• Due to the close proximity to one another, the visual impacts for both the Preferred and Alternative site is identical, the VIA will therefore not play a role in determining which site is more suitable from an environmental perspective.
Agricultural potential	A	A	• Due to the low agricultural impact of the development and the uniformity of agricultural conditions in the area, there is no material difference between the agricultural impact of the preferred versus the alternative site, and both alternatives are considered acceptable.
Cultural & heritage features	A	B	• Some poorly formed stone tools, classified as side- and end scrapers, dating to the Middle Stone Age was identified near the alternative site.
Vegetation	B	B	• Both sites have a large number of *Boscia albitrunca, Acacia Erioloba and Acacia Erioloba.* • The preferred site has approximately 5 260 and the alternative site 5 580 trees on protected tree species on site.
Water features	A	A	• No water features are present on either of the sites.
Biodiversity	A	A	• From a faunal, floral and general ecological point of view, both options may be acceptable for the proposed development.
Avifaunal	B	B	• Since the sites are similar when considering the habitat characteristics, the potential impact on avifaunal species will be similar.
Overall RATING	**A**	**B**	

5.5 CONCLUDING STATEMENT ON ALTERNATIVES

When considering the information provided by the specialists with regards to the site selection criteria and the comparison presented in Table 5.3, it is clear that the sites are very similar but that the preferred site is most suitable due to the fact that it will require a shorter grid connection route (power line).

In conclusion the preferred alternative entails the development of the 150MW Kgalalelo Photovoltaic Solar Energy facility on the following location on the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266 – refer to Figure 16:

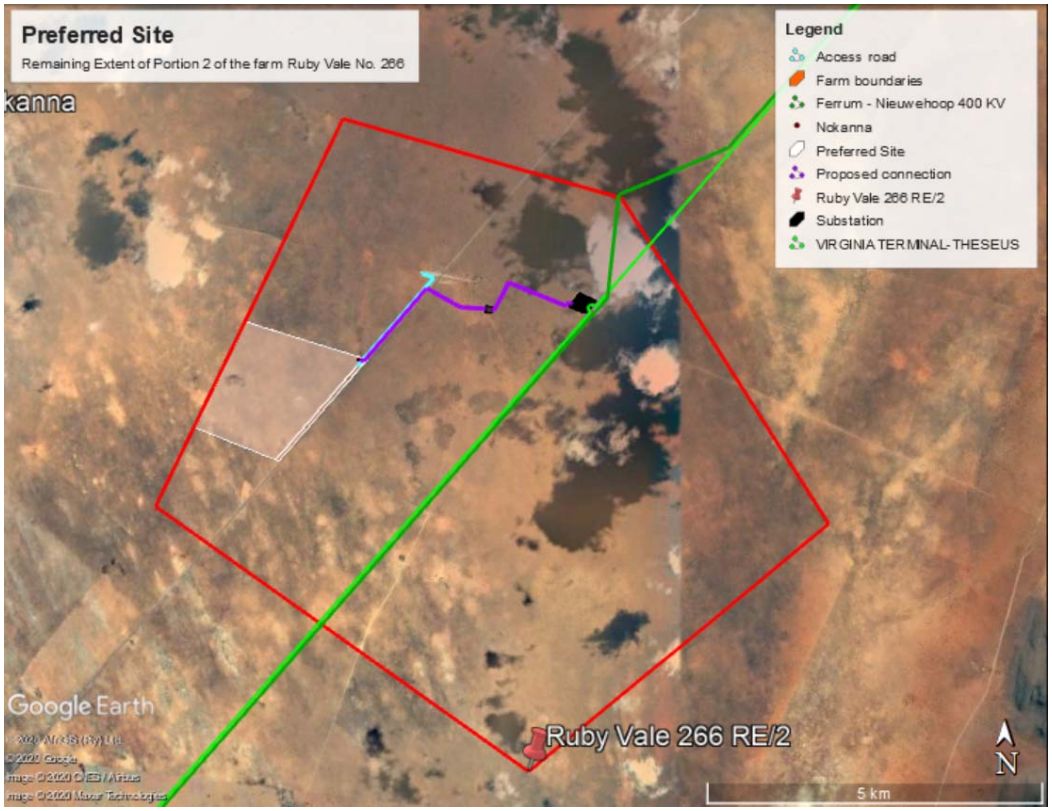


Figure 16: Preferred site on the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266

The preferred layout on the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266 will be included as part of the Environmental Impact Report (EIR). It may be concluded that this is the only location that will be assessed in further detail.

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 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;

(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;

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 the potentially most significant impacts.

6.1.1 Checklist analysis

The independent consultant conducted a site visit on 20 November 2019. 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		✕		None.
II. A conservation or open space area		✕		None.
III. An area that is of cultural importance		✕		None.
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		✕		None.
X. Bird nesting sites	✕			The Avifaunal Study (refer to Appendix H3) states that taller Acacia trees and those growing near farm reservoirs are regularly used by passerine birds as nest sites (e.g. Sociable Weavers nest in them), and for perch sites for shade and roosting in the hottest times of day.
XI. Red data species	✕			The Avifaunal Study (refer to Appendix 3) identified four species that are red listed: Cape Vulture Gyps coprotheres, White-backed Vulture G. africanus, Kori Bustard Ardeotis kori, Lanner Falcon Falco biarmicus.
XII. Tourist resort		✕		None.
2. Will the project potentially result in potential?				
I. Removal of people		✕		None.

II. Visual Impacts	✕			The VIA (refer to Annexure H5) confirmed that the visual impact of a low-lying PV facility post mitigation is a "*Negative Low"* impact.
III. Noise pollution		✕		Construction activities will result in the generation of noise over a period of months. The noise impact is unlikely to be significant.
IV. Construction of an access road	✕			Access will be obtained via the D330 gravel road off the R385.
V. Risk to human or valuable ecosystems due to explosion/fire/ discharge of waste into water or air.	✕			Dangerous goods hazards as part of battery storage facility (catching fire, exploding or leaking dangerous pollutants).
VI. Accumulation of large workforce (>50 manual workers) into the site.	✕			Approximately 400 employment opportunities will be created during the construction phase of the 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 4 200m³ per annum.
VIII. Job creation	✕			Approximately 453 employment opportunities will be created during the construction and operational phases.
IX. Traffic generation	✕			It is estimated that a total of sixteen (16) trips (32 return trips) will be generated as a result of this development over the 12 Month construction period.
X. Soil erosion	✕			The site will need to be cleared or graded to a limited extent, 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.

XI. Installation of additional bulk telecommunication transmission lines or facilities		✕		None.
3. Is the proposed project located near the following?				
I. A river, stream, dam or wetland	✕			None.
II. A conservation or open space area		✕		None.
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		✕		None.

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 **Annexure G** 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	Possible Mitigation	Possible mitigation measures	Level of residual	
CONSTRUCTION PHASE															
<u>Activity 11(i) (Regulation 983)</u>: *"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."* <u>Activity 28(ii) (Regulation 983):</u> *"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."* <u>Activity 1 (Regulation 984):</u> *"The development of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more."*	<u>Site clearing and preparation</u> Certain areas of the site will need to be cleared of vegetation and some areas may need to be levelled. <u>Civil works</u> 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	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	• Loss or fragmentation of habitat for faunal and floral species. • Loss of indigenous faunal and floral species diversity. • Loss of faunal and floral species of conservation significance.		-	L	L	D	RR	ML	Yes	- Site clearing must take place in a phased manner, as and when required. - The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be confined to the fenced off area and minimised where possible. - No trapping or snaring to fauna on the construction site should be allowed. - Also refer to the mitigation measures listed in the Ecological Fauna and Flora Habitat Survey & Avifaunal Study.	L	Ecological Fauna and Flora Habitat Survey & Avifaunal Study
			Avifauna	• Collision with PV itself from birds perceiving the panels as open water.			L	L	Pr	PR	ML	Yes	- Bird scaring techniques including rotating prisms and experimental use of	L	Avifaunal Study

	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 layer where vehicles will pass.			• Disturbance by construction and maintenance activities. • Displacement through habitat removal and construction work. • Direct collision with the power line network.									Torri lines are used if birds are found to impact the PV panels. - The solar panels are constructed as far as possible from water points that could attract any wetland species. - All power lines must be marked with bird diverters to reduce the possible impact risk for the bustards and raptorial species.		
	<u>Transportation and installation of PV panels into an Array</u> 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. <u>Wiring to the Central Inverters</u> Sections of the PV array would be wired to central inverters which have a maximum rated power of 2000kW each. The inverter is a pulse width mode inverter that converts DC electricity to alternating electricity (AC) at grid frequency.		Air	• Air pollution due to the increase of traffic of construction vehicles.	-		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	-
			Soil	• Loss of topsoil in disturbed areas, causing a decline in soil fertility. • Soil Erosion caused by alteration of the surface characteristics.		-	S	M	Po	PR	ML	Yes	- Areas which are not to be constructed on within two months must not be cleared to reduce erosion risks. - The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent. - Vehicles and equipment shall be serviced regularly to avoid the contamination of soil from oil and hydraulic	M	Soil, Land Capability and Agricultural Potential Study

													fluid leaks etc. - Also refer to the mitigation measures listed in the Agricultural and Soils Impact Assessment (attached as Appendix H5).		
			Geology	• Erodible soil. • Hard/compact geology. If the bedrock occurs close to surface it may present problems when driving solar panel columns. • Instability due to soluble rock. • Areas subject to seismic activity.		-	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 areas also getting compacted. - If an activity will mechanically disturb below surface in any way, then any available topsoil should first be stripped from the entire surface and stockpiled for re-spreading during rehabilitation.	L	Brief Geotechnical Study
			Existing services infrastructure	• The use of water. • Generation of waste that needs to be accommodated at a licensed landfill site. • Generation of sewage that needs to be accommodated by the local sewage plant.		-	L	S	D	PR	ML	Yes	-	L	Confirmation from the Local Municipality
			Ground water	• Pollution due to construction vehicles.	-		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	L	-

													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 (e.g. screen and casing lengths, diameters, total depth, etc). - Sampling of monitoring boreholes should be done according to recognised standards.		
			Surface water	• Increase in storm water run-off. • Pollution of water sources due to soil erosion.									- Silt fences should be used to prevent any soil entering the stormwater drains. - New stormwater construction must be developed strictly according to specifications from engineers in order to ensure efficiency. - Any hazardous substances must be stored at least 200m from any of the water bodies on site. - Also refer to the mitigation measures listed in the Ecological Fauna and Flora Habitat Survey & Avifaunal Study.		
					-		S	S	Pr	BR	ML	Yes		M	-
		SOCIO-ECONOMIC ENVIRONMENT	Local unemployment rate	• The creation of local employment and business opportunities, skills development and training. • Technical support to local		+	P	S	D	I	N/A	Yes	- Where reasonable and practical, Life's service providers should appoint local contractors and implement a 'locals first'	L	Social Impact Assessment

				farmers and municipalities.									policy, especially for semi and low-skilled job categories.		
			Visual landscape	• Potential visual impact on residents of farmsteads and surrounding informal settlements and motorists in close proximity to proposed facility.	-		L	S	D	CR	NL	Yes	Dust suppression will play an important role to minimise the visibility of dust. - Contractors must avoid using roads not relevant to the project. - Good housekeeping should be implemented. - Proper rehabilitation of disturbed areas	L	Visual Impact Assessment
			Traffic volumes	• Increase in construction vehicles on existing roads.	-		P	S	Pr	CR	NL	Yes	The development may commence without influencing the levels-of-service for the local road network.	L	Traffic Impact Assessment
			Health & Safety	• Air/dust pollution. • Road safety. • Impacts associated with the presence of construction workers on site and in the area. • Influx of job seekers to the area. • Increased safety risk to farmers, risk of stock theft and damage to farm infrastructure associated with presence of construction workers on the site. • Increased risk of veld fires.		-	L	S	Pr	PR	ML	Yes	- Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. - It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site. - Also refer to the mitigation measures listed in the Social Impact Assessment (attached as	M	Social Impact Assessment

													Appendix H8).		
			Noise levels	• The generation of noise as a result of construction vehicles, the use of machinery such as drills and people working on the site.	-		L	S	D	CR	NL	Yes	- During construction care should be taken to ensure that noise from construction vehicles and plant equipment does not intrude on the surrounding residential areas. - Plant equipment such as generators, compressors, concrete mixers as well as vehicles should be kept in good operating order and where appropriate have effective exhaust mufflers.	L	-
			Tourism industry	• Since there are no tourism facilities in close proximity to the site, the proposed 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	• No potential cultural or heritage resources were identified on or around the site.		-	S	S	Po	I	ML	Yes	- Any discovered artifacts shall not be removed under any circumstances. - Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. - Permits shall be obtained from the SAHRA should the proposed site affect any world heritage sites or if any heritage sites are to be destroyed or altered.	L	Heritage Impact Assessment & Palaeontological Heritage Assessment

OPERATIONAL PHASE															
Activity 14 (GNR984): *"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."*	The key components of the proposed project are described below: • PV Panel Array - To produce 115MW, 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. • Wiring to 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. • 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 on the site to step the voltage up to	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	• Loss or fragmentation of habitat for faunal and floral species. • Loss of indigenous faunal and floral species diversity. • Loss of faunal and floral species of conservation significance. • Loss or fragmentation of habitats.		-	S	L	D	PR	ML	Yes	- Indigenous vegetation must be maintained and all exotics removed as they appear and disposed of appropriately. - Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction. - Implement an Avifauna Monitoring plan. - Also refer to the mitigation measures listed in the Ecological Fauna and Flora Habitat Survey & Avifaunal Study.	M	Ecological Fauna and Flora Habitat Survey & Avifaunal Study
			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
			Soil	• Loss of agricultural land use caused by direct occupation of land by the energy facility footprint. • Loss of topsoil in disturbed areas, causing a decline in soil fertility. • Soil Erosion caused by alteration of the surface characteristics.		-	L	L	D	PR	ML	Yes	- An effective system of run-off control should be implemented, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. - Another important measure is to avoid stripping land surfaces of existing vegetation by only allowing vehicles to travel on existing roads and not create new roads. - Also refer to the	M	Soil, Land Capability and Agricultural Potential Study

	132kV, after which the power will be evacuated into the national grid. Whilst Life Solar Power Plant has not yet received a cost estimate letter from Eskom, it is expected that generation from the facility will tie in with Lewensaar 275/50kV substation. The Project will inject up to 100MW into the Substation. The installed capacity will be up to approximately 115MW. • <u>Supporting Infrastructure</u> – Auxiliary buildings with basic services such as water and electricity will be constructed on the site and will have an approximate footprint 820m². Other supporting infrastructure includes voltage and current regulators and protection circuitry. • <u>Battery storage</u> - 100 MW Battery Storage Facility with a maximum height of 8m and a maximum volume of 1,120 m3 of batteries (dangerous goods) and associated operational, safety and control infrastructure. • <u>Roads</u> – Access will be obtained via the D3300 local gravel road. An internal site road network will also be required to provide access to the solar field and associated infrastructure. All site roads will be constructed											mitigation measures listed in the Agricultural and Soils Impact Assessment (attached as Appendix H5).		
			Geology	• Collapsible soil. • 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. • Instability due to soluble rock. • Steep slopes or areas of unstable natural slopes. • Areas subject to seismic activity. • Areas subject to flooding.		-	S	S	Po	PR	ML	Yes	- Surface drainage should be provided to prevent water ponding. - Mitigation measures proposed by the detailed engineering geological investigation should be implemented.	L	Geotechnical Study
			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 municipal sewerage system and the local sewage plant. • Increased consumption of water. Approximately 4 200 000 liters of water per annum will be required for the operation of the solar plant.		-	P	L	D	I	ML	Yes	- Waste has to be accommodated at a licensed landfill site. - Water saving devices will be implemented	M	Confirmation from the Local Municipality
			Ground water	• 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	-		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	L	-

	within a 25 m corridor. • Fencing - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm.			water supplies.								sides) to prevent accidental discharge to groundwater.		
			Surface water	• Increase in storm water runoff. The development will potentially result in an increase in storm water run-off that needs to be managed to prevent soil erosion. • 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	Pr	PR	ML	Yes	- The storm water management plan must include the construction of appropriate design measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows.	L	-
		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	• Job creation. Security guards will be required for 24 hours every day of the week and general laborers will also be required for the cleaning of the panels. • Skills development.		+	L	L	D	I	N/A	Yes	- Where reasonable and practical, service providers should implement a 'locals first' policy, especially for semi and low-skilled job categories.	N/A	Social Impact Assessment
			Visual landscape	• Change in land-use/sense of place. The site is characterized by open veldt with a rural agricultural sense of place. The use of the area for the construction and operation of the PV plant will result in the area not being used for livestock grazing anymore. • Potential visual impact on residents of farmsteads and travellers in close proximity to proposed facility.		-	L	L	D	PR	ML	Yes	- Screening should be implemented by means of vegetation in conjunction with security fencing. - Security lighting should make use of down-lights to minimise light spill, and motion detectors where possible so that lighting at night is minimised. - Care should be taken with the layout of the security lights to prevent motorists on the dirt road from being blinded by lights at the approach to the site.	M	Visual Impact Assessment

			Battery storage – hazardous substance	• Batteries, as with most electrical equipment, can be dangerous and may catch fire, explode or leak dangerous pollutants if damaged, possibly injuring people working at the facility or polluting the environment. •		-	L	L	D	PR	ML	Yes	- The facility must be designed and management properly, and the batteries must be handled in the manner prescribed by the manufacturer. - It is recommended that some special management actions be provided to reduce the risk of an incident and manage an incident should one ever occur.	M	Risk Assessment
			Traffic volumes	• The proposed development will not result in any traffic impacts during the operational phase.	-		L	L	Po	CR	NL	Yes	-	L	Traffic Impact Assessment
			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	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
			Tourism industry	• Enhance tourism in the area. The facility may become an attraction or a landmark within the region that people would want to come and see.	+		P	L	Po	I	N/A	Yes	-	N/A	-
			Heritage resources	• It is not foreseen that the proposed activity will impact on heritage resources or vice versa.	-		S	L	Po	PR	ML	Yes	-	L	-
			Electricity supply	• Generation of additional electricity. The facility will generate electricity that will be fed into the grid.	+		I	L	D	I	N/A	Yes	-	N/A	-
			Local community	• The establishment of a Community Trust.		+	L	L	Pr	I	N/A	Yes	- The project owner, in consultation with the TLM, should investigate the options for the establishment of a	N/A	Social Impact Assessment

													Community Development Trust.		
			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>Dismantling 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> The biophysical environment will be rehabilitated.	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	• Re-vegetation of exposed soil surfaces to ensure no erosion in these areas.	+		S	L	Po	N/A	N/A	Yes	- Re-vegetation of affected areas must be made a priority to avoid erosion.	N/A	-
			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	-
			Soil	• Soil degradation, including erosion. • Disturbance of soils and existing land use (soil compaction). • Physical and chemical degradation of the soils by construction vehicles (hydrocarbon spills).		-	S	S	Pr	PR	M	Yes	- Re-vegetation of affected areas must be made a priority to avoid erosion.	M	Agricultural and Soils Impact Assessment
			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 need to be accommodated at a licensed landfill site. • Generation of sewage that need to be accommodated by the municipal sewerage system and the local sewage plant. • Increase in construction		-	L	S	D	I	NL	Yes	-	L	-

				vehicles.											
			Ground water	• Pollution due to construction vehicles.	-		S	S	Pr	CR	ML	Yes	-	L	-
			Surface water	• Increase in storm water run-off. • Pollution of water sources due to soil erosion.	-		L	S	Pr	PR	ML	Yes	- Removal of any historically contaminated soil as hazardous waste. - Removal of hydrocarbons and other hazardous substances by a suitable contractor to reduce contamination risks. - Removal of all substances which can result in groundwater (or surface water) contamination.	M	-
		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	• Loss of employment.		-	L	L	Po	PR	NL	Yes	- Life should ensure that retrenchment packages are provided for all staff retrenched when the facility is decommissioned.	M	Social Impact Assessment
			Visual landscape	• Potential visual impact on visual receptors in close proximity to proposed facility.	-		L	S	D	CR	NL	Yes	- Locate laydown and storage areas in zones of low visibility i.e. behind tall trees or in lower lying areas.	L	Visual Impact Assessment
			Traffic volumes	• Increase in construction vehicles.	-		L	S	Pr	CR	NL	Yes	- Movement of heavy construction vehicles through residential areas should be timed to avoid peak morning and evening traffic periods. - In addition, movement of heavy construction vehicles through residential areas should not take place over weekends.	L	Traffic Impact Assessment
			Health & Safety	• Air/dust pollution. • Road safety. • Increased crime levels. The	-		L	S	Pr	PR	ML	Yes	- Demarcated routes to be established for construction vehicles to ensure the safety of	L	-

				presence of construction workers on the site may increase security risks associated with an increase in crime levels as a result of influx of people in the rural area.									communities, especially in terms of road safety and communities to be informed of these demarcated routes. - Where dust is generated by trucks passing on gravel roads, dust mitigation to be enforced. - Any infrastructure that would not be decommissioned must be appropriately locked and/or fenced off to ensure that it does not pose any danger to the community.		
			Noise levels	• The generation of noise as a result of construction vehicles, the use of machinery and people working on the site.	-		L	S	D	CR	NL	Yes	- The decommissioning phase must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development.	L	-
			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	• It is not foreseen that the decommissioning phase will impact on any heritage resources.		-	S	S	Pr	PR	ML	Yes	-	L	Heritage & Palaeontological Impact Assessment

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;	-	
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) (Regulation 983): *"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 28(ii) (Regulation 983): *"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 1 (Regulation 984): *"The development of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more."*

During the construction phase minor negative impacts are foreseen over the short term. The latter refers to a period of months. The potentially most significant impacts relate to the impacts on the fauna and flora, soils, geology, existing services infrastructure, traffic impacts, socio-economic impacts such as the provision of temporary employment and other economic benefits, and the impacts on health and safety and heritage resources.

6.2.2 Impacts during the operational phase

During the operational phase the study area 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 activity (amongst other related to the generation of renewable energy) will have various potential impacts on the biophysical and socio-economic environment:

- Activity 14 (Regulation 984): "*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."*

The negative impacts are generally associated with impacts on the fauna and flora, soils, geology, the pressure on existing services infrastructure, visual impacts and dangerous goods hazards as part of battery storage facility (catching fire, exploding or leaking dangerous pollutants). The provision of sustainable services delivery also needs to be confirmed. The operational phase will have a direct positive impact through the provision of employment opportunities for its duration, and the generation of income to the local community.

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. The decommissioning phase will however potentially result in impact on soils, 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.

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 (as amended in 2017) determine that cumulative impacts, "*in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities*." Cumulative impacts can be incremental, interactive, sequential or synergistic. 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 G. 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 50km radius surrounding the proposed development – refer to figure 17 below.

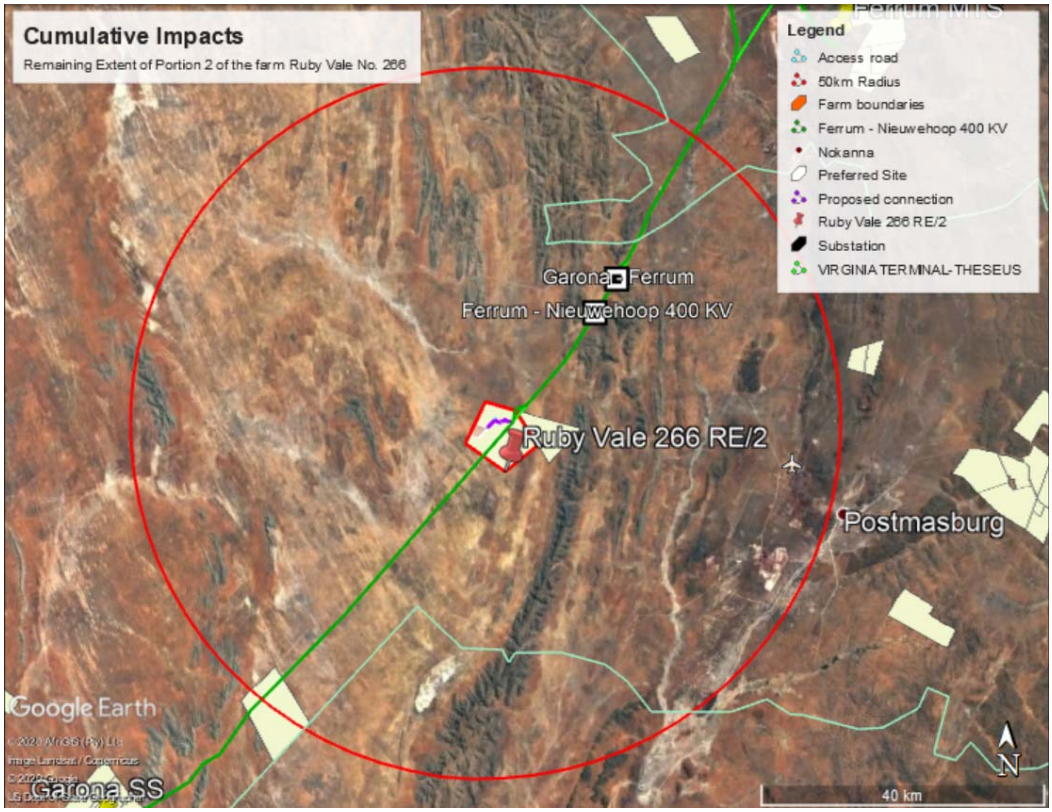


Figure 17: Geographic area of evaluation

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 50km would generally confine the potential for cumulative effects within this particular environmental landscape. The geographic area includes projects located within the Northern Cape 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 socioeconomic 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.

7.3 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 2022 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.

7.4 OTHER PROJECTS IN THE AREA

7.4.1 Existing projects in the area

According to the DEA's database five 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 50 km radius of the study area

Site name	Distance from study area	Proposed generating capacity	DEA reference	EIA process	Project status
Tirisano Solar Power Plant (RF) (Pty) Ltd.	1km	150MW	To be obtained	Scoping and EIA	In process
Life Solar Power Plant (RF) (Pty) Ltd.	1 km	115 MW	14/12/16/3/3/2/933	Scoping and EIA	Approved
Lutzburg Solar Power Plant (RF) (Pty) Ltd.	1 km	115 MW	14/12/16/3/3/2/938	Scoping and EIA	Approved
Jasper Power Company	5 km	75 MW	12/12/20/2649	Scoping and EIA	Approved
Inyanga Energy Project	43 km	75 MW	12/12/20/2583	Scoping and EIA	Approved

It is unclear whether other projects not related to renewable energy is or has been constructed in this area. In general, development activity in the area is focused on agriculture. Agriculture in the area is primarily associated with cattle grazing. It is quite possible that future solar farm development may take place within the general area. The next section of this report will aim to evaluate the potential for solar projects for this area in the foreseeable future.

7.4.2 Projects in the foreseeable future

As part of the SEA for Wind and Solar Energy in South Africa, the CSIR and the DEA mapped the location of all EIA applications submitted within South Africa. According to this database approximately 32 applications have been submitted for renewable energy projects within the geographical area of investigation. The majority of these projects are located in close proximity to Kathu and Postmasburg.

Environamics is also in the process of applying for Environmental Authorisation for the proposed Tirisano Solar Plant near Olifantshoek, Northern Cape Province.

7.5 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. The following sections present their findings.

7.5.1 Geology

The desk top geotechnical study (refer to Appendix H1) confirmed that based on the available information a fatal flaw cannot be identified that may prematurely terminate the development of the proposed solar farm. Soils on the site are predominantly deep, very sandy soils (Hutton soil form) but also include shallower soils on underlying rock, most prominent across the west to south of the alternative site. The soils have a generally low water holding capacity. The site should be regarded as suitable for the proposed development and no cumulative impacts are foreseen.

7.5.2 Soil, Land Capability and Agricultural Potential

The Soil, Land Capability and Agricultural Potential Study (refer to Appendix H5) confirmed that the potential cumulative agricultural impact of importance is a regional loss or degradation of agricultural land, with a consequent decrease in agricultural production. The defining question for assessing the cumulative agricultural impact is this: What level of loss of agricultural land is acceptable in the area, and will the loss associated with the proposed development, cause that level in the area to be exceeded?

The projects within a 50km radius will have the same agricultural impacts in an almost identical agricultural environment. In quantifying the cumulative impact, the area of land taken out of agricultural grazing as a result of all of the projects above will amount to a total of approximately 1,200 hectares. This is calculated using the industry standards of 2.5 and 0.3 hectares per megawatt for solar and wind energy generation respectively, as per DEA (2015). The 5 applications listed in Appendix 2 of the specialist study amount to a generation capacity of 1,200 megawatts. As a proportion of the area within a 50km radius (approximately 785,300 ha), this amounts to only 0.15% of the surface area. That is well within an acceptable limit in terms of loss of low potential agricultural land, of which there is no scarcity in the country. This is particularly so when considering that in order for South Africa to achieve its renewable energy generation goals, agriculturally zoned land will need to be used for renewable energy generation. It is far more preferable to incur a cumulative loss of agricultural land in a region such as the one being assessed, which has no cultivation potential, and low grazing capacity, than to lose agricultural land that has a higher potential, and that is much scarcer, to renewable energy development elsewhere in the country. The limits of acceptable agricultural land loss are therefore far higher in this region than in regions with higher agricultural potential.

It should also be noted that there are few land uses, other than renewable energy, that are competing for agricultural land use in this area. The cumulative impact from developments, other than renewable energy, is therefore low.

Due to all of the considerations discussed above, the cumulative impact of loss of agricultural land use is assessed as having low significance. In terms of cumulative impact, therefore, the development can be authorised.

7.5.3 Ecology

The Ecological Fauna and Flora Habitat Survey (refer to Appendix H2) confirmed that 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. 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.

If for instance 300 ha of natural habitat for a protected tree species is locally destroyed and in the process 4,000 individual specimens of this species is destroyed, looking at this scenario from a cumulative impact perspective, if another five such developments take place in similar habitat within a short distance from each other, an estimated 20,000 specimens of this species will be cumulatively lost, which may then have a regional detrimental impact on the gene pool of that particular species as well as other species that are dependent on its presence in the ecosystem.

Currently limited data exists to measure and monitor the cumulative impact that the proposed type of development will have on a local and/or regional scale. Research in this regard is therefore urgently proposed. From a cumulative point of view, the study identified six similar projects proposed within a ±50 km radius. Three of the identified projects are still in the scoping and EIA-phase and no impact has yet been made by them. If all are eventually approved and constructed it will have a local cumulative effect, but others are too far off to have any significant cumulative environmental impact on a biodiversity level at this point in time.

The most significant cumulative impacts that may occur are the loss of habitat for terrestrial plant and animal species, local habitat transformation and fragmentation, and the loss of plant and animal species of conservation significance. As mitigation for these and any other cumulative impacts it is also proposed that where practically possible, a buffer of at least 100m (preferably more) of natural vegetation be left undisturbed surrounding this type of development in order to promote and preserve the flow of ecosystem services and gene pools along these corridors as well as the necessary habitat for threatened, protected or other habitat sensitive species.

7.5.4 Birds

The cumulative impacts related to avifauna are those that will impact the general avian communities in and around the Kgalalelo solar development, mainly by other solar farms and associated infrastructure. This will happen via the same factors identified in the avifaunal impact assessment viz: collision, avoidance and displacement.

Given the general assumption that footprint size and bird impacts are linearly related for CSP solar farms, a starting point in determining cumulative impacts is to determine:

- the number of bird displaced per unit area, by habitat destruction, or disturbed or displaced by human activity;
- the number of birds killed by collision with the structures on site;
- the number of birds killed by collision with infrastructure leading away from the site;
- the number of birds killed by flying through the solar flux of CSP tower sites.

Five renewable energy farms of various sizes were identified within 50 km of Kgalalelo Solar Power. Because there are no post-construction mortality data or displacement data for any of these aspects in South Africa, it is a futile exercise to attempt to put any figures to the cumulative Impacts for birds in and around the solar sites. Once the data is collected and published (or released to other specialists) for a minimum of a year's monitoring, we can then quantify this aspect. On present data we cannot even guesstimate the cumulative impact.

7.5.5 Social Impact Assessment

The Social Impact Assessment (refer to Appendix H8) indicate that the proposed Kgalalelo SEF has the potential to result in a significant positive cumulative impact. The establishment of the proposed SEF coupled with the establishment of a number of proposed renewable energy facilities in the region will have the potential to make a positive socio-economic contribution to the province as well as the TLM. Additionally, a positive cumulative impact on the local economy of the region will include the creation of local employment opportunities, skills and training development opportunities, downstream business opportunities and more movement will also be made toward the use of renewables. The local communities can also socially benefit from the establishment of a Community Trust, providing that is managed effectively.

The relevant issues that need to be taken into consideration when it comes to the impacts on rural sense of place is:

- Combined visibility (if two or more renewable energy facilities are visible from one location);
- Sequential visibility (seeing two or more renewable energy facilities along a road or trail);

- The perceived or actual change in the land use across a region;
- The loss of characteristic of the environment; and
- The visual compatibility of renewable energy facilities in the same vicinity.

It is further noted that cumulative impacts need to be considered in relation with dynamic and static viewpoints, and that aesthetic perception regarding the sense of place, are a key determinant of people's attitudes and is subjective of matter.

The potential social impact associated with the establishment of an solar energy facility will have a visual impact on the environment and its surroundings, however the impact on the sense of place is likely to be low. The proposed Kgalalelo Solar Facility might slightly be visible from the gravel road entrance to the sites, but the impact hereof on the sense of place is likely to be low. Additionally, the transmission grid connection to the Eskom Lewensaar substation is also linked to visual impact and the areas sense of place. However, the potential social impacts associated with the grid connection is also likely to be low. The potential negative impact of the proposed development on the areas' sense of place still needs to be considered, because of South Africa's strong attachment to land and the number of solar energy facility's increasing. A number of solar energy facilities have been proposed in the province, thus environmental authorities need to take this into account for cumulative impacts when evaluating the applications.

It is evident that there is a considerable number of renewable energy facility applications in this region of the Northern Cape Province. The establishment of such a number of renewable energy facilities may potentially place pressure on local services delivery of the local municipalities. Although the impact is likely to be low, the mitigation measures given below should be addressed to keep this cumulative impact low.

7.5.6 Visual

The Visual Impact Assessment (refer to Appendix H4) confirmed that the construction of the 150MW PV facility and the 132kV evacuation line may increase the cumulative visual impact together with existing electricity infrastructure on the site should any of the other PV facilities be constructed. Dust will be the main factor to take into account.

7.5.7 Heritage

The Heritage Impact Assessment (Refer to Appendix H6) concluded that the cultural heritage profile of the larger region is very limited and consists of isolated findspots of Stone Age (MSA) tools, farmsteads and burial sites. Consequently, the cumulative impact of the proposed development is viewed to be low.

The Palaeontological Impact Assessment (Refer to Appendix H7) states that the calculation of cumulative effects for palaeontological resources is problematic to calculate. The process of addressing cumulative effect is inherently different for palaeontology compared to other areas of investigation. Unless fossils are identified in outcropping rocks their presence/abundance in unexposed bedrock is a matter of informed assumption. It is also often the case that a project (e.g., an open-cast mine) will impact upon rock strata that do

not crop out and no insight into their palaeontological resources will be gained from a site visit. Thus, even if a site investigation has been conducted, an accurate assessment of the quantum of palaeontological materials in the geological strata of the area will remain open to supposition. Any assessment of the fossil content of a rock unit based on a desktop assessment is even more uncertain.

Clearly, the geological strata in the surrounding region will not be assessed during that site investigation, and probably will not have been the subject of intense investigation by a palaeontologist. It is also possible to make the comparison that most areas investigated as part of a project's impact assessment process are directly observable/measurable at the Earth's surface. However, most fossil specimens that will be present in the rock strata underlying a project will not be observable at surface, but rather are enclosed in the bedrock and will be unobservable at the time of the compilation of an impact assessment report.

In the case of this proposed project it is possible to make the observation that the Gordonia Formation is not richly fossiliferous, and the rocks of the Brulsand Subgroup and diagenetic calcrete (if present) are assessed as being unfossiliferous. To the proceeding observations it should be added that it is evident there is negligible industrial of agricultural development of the surrounding region. Accordingly, there would be little in the form of regional negative impacts. The potential for the project to add significantly to negative impacts upon the palaeontological heritage of the wider region must be low and, as such, the project is assessed as having a negligible cumulative impact.

7.5.8 Traffic

The traffic impact assessment (refer to Appendix H9) summarised the expected trips generated by the development of the Life-, Lutzburg-, Tirisano- and Kgalalelo Solar PV plants, along with the background traffic on each of the major roadways. It became apparent that the cumulative additional trips will not greatly influence the immediate or wider road network. On both routes, the maximum ADT of 4900 vpd is not exceeded and the cumulative additional trips will not initiate a change in the LOS. Therefore, no mitigation measures will be necessary.

7.6 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.

7.6.1 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 22 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		
Loss or fragmentation of indigenous natural fauna and flora	The loss of habitat on-site has the potential to add to the cumulative impacts that habitat loss in the region is having on avifauna. Other projects will also constitute the removal of more protected tree species and may have a regional impact.	- Medium
Avifauna	Development of multiple solar energy facilities in this region may have cumulative impacts on birds, this will happen via the same factors identified here viz: collision, avoidance and displacement.	- Medium
Loss or fragmentation of habitats	The developments are located in an area with numerous protected plant and tree species as well as Red Data Bird species. Removal of large areas of these habitats may have a significant effect on loss of habitats.	- Medium
Soil erosion	The largest risk factor for soil erosion will be during the operational phase when storm water run-off from the surfaces of the photovoltaic panels could cause erosion. Should these impacts occur, there may be a cumulative impact on storm water runoff in the study area. The specialist rated the cumulative impact of soil erosion as negligible.	- Low
Impacts of the geology on the proposed development	A fatal flaw cannot be identified that may prematurely terminate the development of the proposed solar farm.	N/A
Generation of waste	An additional demand for landfill space	- Medium

	could result in significant cumulative impacts if services become unstable or unavailable, which in turn would negatively impact on the local community.	
Employment opportunities	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.	+ Medium
Visual intrusion	The construction of the PV plant and 132kV evacuation line may increase the cumulative visual impact together with farming and mining activities and people using the gravel road adjacent to site. Dust will be the main factor to take into account.	- Low
Increase in construction vehicles	If damage to roads is not repaired, then this will affect the farming and mining activities in the area and result in higher maintenance costs for vehicles of locals and other road users. The costs will be borne by road users who were no responsible for the damage. However, the roads to be used from either Durban and Cape Town should be able to accommodate the construction vehicle traffic.	- Negligible
Impact of construction workers on local communities & influx of job seekers	Impacts on family and community relations that may, in some cases, persist for a long period of time. Also in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.	- Medium
Risk to safety, livestock and farm infrastructure.	If fire spreads to neighbouring properties, the effects will be compounded. Negligible cumulative effects, provided losses are	- Negligible

	compensated for.	
Increased risks of grass fires.	The risk of grass fires can be mitigated and managed.	- Negligible
Operational Phase		
Loss of agricultural land	It is preferable to incur a higher cumulative loss in a region with low agricultural potential, than to lose agricultural land with a higher production potential elsewhere in the country. Because of the very low agricultural potential of the site considered in this report, its contribution to any cumulative impact is low.	- low
Change in land use	Overall loss of farmland could affect the livelihoods of the affected farmers, their families, and the workers on the farms and their families. The impacts can however be mitigated via relocation of farm workers and disturbed areas can be rehabilitated after the construction phase.	- Low
Visual intrusion	The operation of the PV plant and 132kV evacuation line may increase the cumulative visual impact together with the existing Eskom power infrastructure, mining in the area and agricultural infrastructure.	- Low
Consumption of water	An additional demand on water sources could result in a significant cumulative impact with regards to the availability of water.	- Medium
Generation of additional electricity	The evacuation of generated electricity into the Eskom grid will strengthen and stabilize the grid (especially in the local area).	+ Low
Establishment of a community trust	Promotion of social and economic development and improvement in the overall well-being of the community.	+ Medium
Change in the sense of place	The construction of the solar plant and associated infrastructure will increase the	- Low

	cumulative change in the sense of place due to industrial type infrastructure that is being proposed and the existing mining infrastructure in the region.	
Development of infrastructure for the generation of clean, renewable energy	Reduce carbon emissions via the use of renewable energy and associated benefits in terms of global warming and climate change.	+ Medium
Decommissioning Phase		
Visual intrusion	The decommissioning of the PV plant and 132kV evacuation line may increase the cumulative visual impact together with farming and people using the existing gravel roads adjacent to site. Dust and housekeeping will be the main factors to take into account.	- Low
Generation of waste	An additional demand on municipal services could result in significant cumulative impacts with regards to the availability of landfill space.	- Medium

7.7 CONCLUSION

This chapter of the Scoping Report addressed the cumulative environmental effects of the construction, operation and decommissioning project phases. 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:

- <u>Cumulative effects during construction phase:</u>
- Loss or fragmentation of indigenous natural fauna and flora (- Medium)
- Loss or fragmentation of habitats (- Medium)
- Generation of waste (- Medium)
- Temporary employment (+ Medium)
- Impact of construction workers on local communities & influx of job seekers (- Medium)
- Traffic impacts (- Medium)

- <u>Cumulative effects during the operational phase:</u>
- Consumption of water (- Medium)

- Establishment of a community trust (+ Medium)
- Development of infrastructure for the generation of clean, renewable energy (+ Medium)

➢ Cumulative effects during the decommissioning phase:

- Generation of waste (- Medium)

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 -

(h) 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 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 focus 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 programme (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 development footprint on the approved site as contemplated in the accepted scoping report;
- Identify the location of the development footprint within the approved site as contemplated in the accepted scoping report based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- Determine the—
    - (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 development footprint of the approved site as contemplated in the accepted scoping report 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 development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity;
- Identify suitable measures to avoid, manage or mitigate identified impacts; 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 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 site layout plan that will be compiled once the low – medium areas of sensitivity have been indicated by all 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 development footprint on the approved site as contemplated in the accepted scoping report.

8.3.3 Compilation of Environmental Impact Report

A Draft EIR will be compiled to meet the content requirements as per Appendix 3 of GNR982 of the EIA Regulations (as amended in 2017) and will also include an Environmental Management Programme containing the aspects contemplated in Appendix 4 of GNR982.

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 R982. 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 public review 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 National Department of Environmental Affairs (DEA).

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	Description of the impact	Specialist studies / technical information
Construction of the PV Solar facility	• Impacts on the fauna and flora	Refer to table 6.2	Ecological Fauna and Flora Habitat Survey & Avifauna study
	• Impacts on agricultural potential (soils)	Refer to table 6.2	Soil, Land Capability and Agricultural Potential Study
	• Impacts associated with the geology of the site	Refer to table 6.2	Brief Geotechnical study
	• Impacts on existing services infrastructure	Refer to table 6.2	Confirmation from the Local Municipality

	• Temporary employment, impacts on health and safety	Refer to table 6.2	Social Impact Assessment
	• Impacts on heritage resources	Refer to table 6.2	Heritage Impact Assessment & Palaeontological Heritage Assessment
	• Impacts on Traffic	Refer to Table 6.2	EAP to assess traffic impacts
Operation of the PV Solar facility	• Impacts on the fauna and flora	Refer to table 6.2	Ecological Fauna and Flora Habitat Survey & Avifauna study
	• Impacts on agricultural potential (soils)	Refer to table 6.2	Soil, Land Capability and Agricultural Potential Study
	• Impacts associated with the geology of the site	Refer to table 6.2	Geotechnical study as part of soil study
	• Increased consumption of water	Refer to table 6.2	EAP assessment
	• Pressure on existing services infrastructure	Refer to table 6.2	Confirmation from the Local Municipality
	• Visual Impact	Refer to table 6.2	Visual Impact Assessment
	• Provision of employment & generation of income for the local community	Refer to table 6.2	Social Impact Assessment
	• Dangerous goods hazards as part of battery storage facility (catching fire, exploding or leaking dangerous pollutants)	Refer to table 6.2	Risk Assessment
Decommissioning of the PV Solar facility	• Impacts on agricultural potential (soil)	Refer to table 6.2	Soil, Land Capability and Agricultural Potential Study
	• Socio-economic impacts (loss of employment)	Refer to table 6.2	Social Impact Assessment
Cumulative Impacts	• Cumulative biophysical impacts resulting from similar developments in close proximity to the	Refer to table 6.2	EAP assessment

	proposed activity.		

8.4.1 Specialist studies

Based on the initial descriptions of potential environmental impacts or aspects, 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:

- Brief geotechnical report: To determine whether the geotechnical conditions at the site are favorable for the development and construction of a solar PV plant.
- Heritage report: To determine whether the proposed activity will impact on any heritage or archeological artifacts.
- Ecological fauna and flora habitat survey: To determine what the impact of the proposed activity will be on the ecology (fauna and flora) in the area.
- Avifaunal Study: To determine what the impacts of the proposed activity will have on the bird (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, Land Capability and Agricultural Potential Study: 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.
- Paleontological Assessment: To determine the impacts on paleontological resources.
- Traffic Impact Assessment: To determine the how the proposed development will impact traffic volumes.
- Dangerous goods hazards as part of battery storage facility: To determine management measures to avoid potential hazards associated with the battery storage facility.

8.4.2 Terms of reference for specialist studies

Specialists in their field of expertise have considered baseline data and identified and assessed impacts according to predefined rating scales. Specialists have also suggested optional or essential ways in which to mitigate negative impacts and enhance positive impacts. Further, specialists have, where possible, taken 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 results of these specialist studies have been integrated into the Draft Scoping Report (DSR). The Terms of Reference (ToR) or general requirements proposed for the inputs are presented below and stakeholders are encouraged to comment and provide input on these.

8.4.2.1 General Requirements

Specialists' reports must comply with Appendix 6 of GNR982 (as amended in 2017) 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.

8.4.2.2 Proposed ToR for the geotechnical study

The geotechnical study will present the findings of a preliminary evaluation of the geotechnical conditions at the proposed Kgalalelo solar farm project, the investigation should be carried according to standard practice codes and guidelines. The aims of the investigation will be to:

- Verify the underlying geology and soil cover by means of limited surface mapping.
- Assessing the suitability of the area with regard to the proposed development, based on the available geological- and geotechnical information.
- Identify the general constraints and required precautionary measures that may be required for the proposed development from a planning perspective.
- Make recommendations on the most-, intermediately- and least suitable portions of the project area with regard to the proposed development.

It must be noted that this investigation is requested for planning purposes only and will not be utilized for detailed design and construction. The following actions will be excluded from this investigation:

- Detailed flood line delineation.
- Detailed slope analysis.
- Soil mechanical analysis and sampling for laboratory analysis.

8.4.2.3 Proposed ToR for the heritage assessment

The Heritage Impact assessment was undertaken for the site in accordance with the requirements of Section 38(3) of the NHRA. The scope of work for this study will consist of:

- A desk-top investigation of the area, in which all available literature, reports, databases and maps were studied; and
- A visit to the proposed development area.

The objectives were to:

- Identify possible archaeological, cultural and historic sites within the proposed development area;
- Document (GPS coordinates and map) all sites, objects and structures identified on the candidate sites;
- Evaluate the potential impacts of construction, operation and maintenance of the proposed development on archaeological, cultural and historical resources;
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance; and
- Consider relevant guidelines.

8.4.2.4 Proposed ToR for the ecological fauna and flora habitat survey

The proposed ToR for the ecological fauna and flora habitat survey is as follows:

- Provide a detailed fauna and flora habitat survey;
- Provide a detailed habitat survey of possible threatened or localised plant species, vertebrates and invertebrates;
- Take count and map the location (and provide coordinates) of any protected species or sensitive habitats found on site.
- Record possible host plants or food plants of fauna such as butterflies;

- Evaluate the conservation importance and significance of the site with special emphasis on the current status of threatened species;
- Conduct a literature investigation of possible species that may occur on site;
- Identify potential ecological impacts on fauna and flora that could occur as a result of the development;
- An assessment of the potential direct and indirect impacts resulting from the proposed development during the construction, operation and decommission phases; and
- Make recommendations to reduce or minimise impacts, should the development be approved.

8.4.2.5 Proposed ToR for the visual impact assessment

The proposed ToR for this Visual Impact Assessment is as follows:

- Conduct a desktop review of available information that can support and inform the specialist study;
- Describe the receiving environment and the visual absorption for the proposed project;
- Conduct a field survey to determine the actual or practical extent of potential visibility of the proposed development;
- Conduct a photographic survey of the landscape surrounding the development;
- Identify issues and potential visual impacts for the proposed project, to be considered in combination with any additional relevant issues that may be raised through the public consultation process;
- Identify possible cumulative impacts related to the visual aspects for the proposed project;
- Assess the potential impacts, both positive and negative, associated with the proposed project for the construction, operation and decommissioning phases;
- Identify management actions to avoid or reduce negative visual impacts; and to enhance positive benefits of the project; and
- Use mapping and photo-montage techniques as appropriate.

8.4.2.6 Proposed ToR for the soil, land capability and agricultural potential study

The purpose of the soil, land capability and agricultural potential study will be to determine the soil forms and current land capability of the area where the proposed project will be situated. The objectives of this study will be to:

- Describe the soils (distribution, types, depth, surface features, suitability for agriculture, physical and chemical characteristics, fertility, erodability, dry land production potential and irrigation potential);
- Determine the pre-development land capability;
- Determine the present land use;
- Conduct an Impact Assessment for the soils and land capability which will feed into the overall Environmental Impact Assessment;
- Propose mitigation measures for the impacts to form part of the Environmental Management Program; and
- Compile a soil, land capability and agricultural potential report to meet the Department of Agriculture's requirements and to encompass the findings of the desktop assessment, soil survey, agricultural evaluation and impact assessment.

The soil assessment must include the following as per DEAs requirements:

- Identification of the soil forms present on site;
- The size of the area where a particular soil form is found;
- GPS reading of soil survey points;
- The depth of the soil at each survey point;
- Soil colour;
- Limiting factors;
- Clay content; and
- Slope of the site.

8.4.2.7 Proposed ToR for avifaunal study

The Avifaunal Study should include the following:

- Desktop analysis of existing literature and data;
- Site visit during dry season;
- Site visit during wet season;
- Identification of high risk species, particularly Red listed and other priority species that might be impacted by the proposed activity;
- Description of assessment of the significance of likely impacts on priority avifauna;
- Mitigation measures to reduce the envisaged impacts on birds.

8.4.2.8 Proposed ToR for the Paleontological Assessment

The scope of work for this study will consist of:

- A desktop investigation of the area, in which all geological maps, published scientific literature, previous paleontological impact studies in the same region and the author's field of experience (consultation with professional colleagues as well as examination of institutional fossil collections and data) should be studied and used.
- Based on the outcome of the desktop study and the comments obtained from SAHRA, the need for a field assessment must be determined. The desktop investigation must be supplemented with a field assessment if required.
- Assess the potential impacts, based on a supplied methodology.
- Describe mitigation measures to address impacts during the construction, operation and decommissioning stages.
- Describe cumulative impacts of the project on paleontological resources in both the local study area regional study area and the proponent's plans to manage those effects.
- Supply the client with geo-referenced GIS shape files of any sensitive areas.

8.4.2.9 Proposed ToR for the Social Impact Assessment

The terms of reference for the social impact assessment (SIA) are as follow:

- Provide a description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed facility;
- Provide a description and assessment of the potential social issues associated with the proposed facility; and
- Identify enhancement and mitigation aimed at maximising opportunities and avoiding and or reducing negative impacts.

The key activities in the SIA process as embodied in the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February 2007) will include:

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

- Assessing and documenting the significance of social impacts associated with the proposed intervention; and
- Identifying alternatives and mitigation measures.

In this regard the study should involve:

- Review of demographic data from the Census Survey;
- Review of relevant planning and policy frameworks for the area;
- Site specific information collected during the site visit to the area and interviews with key stakeholders;
- Review of information from similar projects; and
- Identification of social issues associated with the proposed project.

8.4.2.10 Proposed ToR for the Traffic Impact Assessment

The terms of reference for the traffic impact assessment are as follow:

- Provide a description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed facility;
- Provide a description and assessment of the potential traffic issues associated with the proposed facility; and
- Identify enhancement and mitigation aimed at maximising opportunities and avoiding and or reducing negative impacts.

The traffic impact assessment should focus on the aspects stated below:

- Location of the Site (Nearest numbered road indicated)
- Trip generation during construction and operation of the plant
- Probable Haulage Routes (National and Provincial Routes will be utilised)
- Site Access Route (from a National roadway)
- Affected Communities
- Cumulative Impact Assessment

8.4.2.11 Expected deliverables

The specialist is expected to prepare a report that addresses the scope of the work as set out above. The report should be prepared in a suitable font (such as Arial 11) and submitted to

Environamics in draft form. If accepted by Environamics and the client an electronic copy should be provided for submission to the Department.

8.5 METHOD OF ENVIRONMENTAL ASSESSMENT

The environmental assessment aims to identify the various possible environmental impacts that could results 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.

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 authorisation 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 GNR982 (as amended in 2017).
- 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:
  - Impacts on the fauna and flora
  - Impacts on soil
  - Impacts associated with the geology of the site
  - Impacts on existing services infrastructure
  - Temporary employment and other economic benefits
  - Impacts on heritage resources
- Impacts during the operational phase:
  - Impacts on the fauna and flora
  - Impacts associated with the soil
  - Impacts associated with the geology of the site
  - Increased consumption of water
  - Increase in employment and other economic benefits
  - Visual impacts
  - Generation of income to the Local Community
  - Pressure on existing services infrastructure and water sources.
  - Impacts on heritage resources
  - Additional electricity generation
  - Dangerous goods hazards as part of battery storage facility (catching fire, exploding or leaking dangerous pollutants)

- Impacts during the decommissioning phase:
    - Loss of permanent employment and the creation of temporary employment
    - Impacts on soil
    - Impacts on heritage resources
- Cumulative impacts resulting from similar developments in close proximity to the proposed activity.

The latter issues will be addressed in more detail in the EIA report. The EAP thus recommended 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 find the report in order and eagerly await your final decision in this regard.

Mrs Carli Otte
Environamics Environmental Consultants

10 REFERENCES

ANON. nd. Guidelines for Environmental Impact Assessments. http://redlist.sanbi.org/eiaguidelines.php

ACTS *see* SOUTH AFRICA

BODEN, T.A., G. MARLAND, and R.J. ANDRES. 2011. Global, Regional, and National Fossil-Fuel CO2 Emissions. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., U.S.A.

BOTHA, A. J. 2020. The proposed Kgalalelo Solar Power Plant near Olifantshoek, Northern Cape Province. Visual Impact Assessment.

CONSTITUTION *see* SOUTH AFRICA. 1996.

DEPARTMENT OF ENERGY (DoE). Integrated Resource Plan 2010-2030

DEPARTMENT OF MINERALS AND ENERGY (DME). 2003. White Paper on Renewable Energy.

DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES. 2017. National land capability evaluation raster data layer, 2017. Pretoria.

FIRST SOLAR. 2011. PV Technology comparison.

GOTZE A. R. 2020. Faunal and Floral Habitat Diversity Assessment for the proposed Kgalalelo Solar Power Plant on the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266, Registration Division Gordonia, Northern Cape Province.

INTERNATIONAL FINANCE CORPORATION (IFC). 2012. International Finance Corporation's Policy on Environmental and Social Sustainability.

IFC & WORLD BANK GROUP. 2007. Environmental, Health, and Safety General Guidelines.

KRUGER L. 2020. Social Impact Assessment for Kgalalelo Solar Power Plant (RF) (Pty) Ltd.

LANZ, J. 2020. Agricultural and Soils Impact Assessment for Proposed Kgalalelo Solar Plant near Olifantshoek, Northern Cape Province. Scoping Phase Report.

LANZ, J. 2020. Brief Geotechnical Study for Proposed Kgalalelo Solar Power Plant near Olifantshoek, Northern Cape Province.

MILLSTEED, B.D. 2020. Desktop Palaeontological Heritage Impact Assessment Report on the site of a Proposed Solar Power Farm to be located along the Western Margin of the Farm Ruby Vale 266 Re Ptn 2, near Olifantshoek, Northern Cape Province.

MILLSTEED, B.D. 2020. Desktop Palaeontological Heritage Impact Assessment Report on the site of a Proposed Solar Power Farm to be located along the North-western Margin of the Farm Ruby Vale 266 Re Ptn 2, near Olifantshoek, Northern Cape Province.

MUCINA, L. AND RUTHERFORD, M.C. 2006. The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

NORTHERN CAPE PROVINCIAL GOVERNMENT. 2012. Northern Cape Provincial Development and Resource Management Plan. Pretoria: Government Printer.

NERSA. 2009. South Africa Renewable Energy Feed-in Tariff (REFIT) – Regulatory Guidelines.

SANBI. 2016. Guidelines for Environmental Impact Assessments. [Web:] http://redlist.sanbi.org/eiaguidelines.php. Date of access: 26 April 2016.

SIMMONS, R. 2020. Scoping analysis for the proposed Kgalalelo Solar PV, Olifantshoek: Avian Assessment.

SOLARGIS. 2011. Global Horizontal Irradiation (GHI). [Web:] http://solargis.info/doc/71 [Date of access: 7 May 2014].

SOUTH AFRICA(a). 1998. The Conservation of Agricultural Resources Act, No. 85 of 1983. Pretoria: Government Printer.

SOUTH AFRICA. 1996. Constitution of the Republic of South Africa as adopted by the Constitutional Assembly on 8 May 1996 and as amended on 11 October 1996. (B34B-96.) (ISBN: 0-260-20716-7.)

SOUTH AFRICA(a). 1998. The National Environmental Management Act, No. 107 of 1998. Pretoria: Government Printer.

SOUTH AFRICA(b). 1998. The National Water Act, No. 36 of 1998. Pretoria: Government Printer.

SOUTH AFRICA. 1999. The National Heritage Resources Act, No. 25 of 1999. Pretoria: Government Printer.

SOUTH- AFRICA. 2003. White Paper on Renewable Energy of 2003.

SOUTH AFRICA. 2004. The National Environment Management: Air Quality Act, No. 39 of 2004. Pretoria: Government Printer.

SOUTH AFRICA(a). 2008. The National Energy Act, No. 34 of 2008. Pretoria: Government Printer.

SOUTH AFRICA(b). 2008. The National Environmental Management: Waste Act, No. 59 of 2008. Pretoria: Government Printer.

SOUTH AFRICA. 2011a. Integrated Resource Planning for Electricity for South Africa of 2010-2030.

SOUTH AFRICA. 2011b. New Growth Path Framework.

SOUTHAFRICA. 2012. National Infrastructure Plan of South Africa.

SOUTH AFRICA. 2014. Regulations in terms of Chapter 5 of the National Environmental Management Act, 1998. (GNR. 893, 894, 895 and 896. 2014.). Pretoria: Government Printer.

SOUTH AFRICA. 2017. Amended regulations in terms of Chapter 5 of the National Environmental Management Act, 1998. (GNR. 326, 327, 325 and 324. 2017.). Pretoria: Government Printer.

SOUTH AFRICA. Minister in the Presidence: Planning (2009). *Medium Term Strategic Framework. – A Framework to guide Governments Programme in the Electoral Mandate Period 2009-2014*.

SOUTH- AFRICA. 2019. Integrated Resource Plan 2019.

SOUTH- AFRICA. (Undated). National Development Plan of 2030.

SWINGLER, S. 2006. Statistics on Underground Cable in Transmission networks, Final Report of CIGRE Working Group B1.07.

TSANTSABANE LOCAL MUNICIPALITY (TLM). 2019. Tsantsabane Local Municipality Integrated Development Plan. Revised Draft 2018/19-2019/20-2020/21. http://tsantsabane.gov.za/wp-content/uploads/2019/06/Revised-draft-19_20.pdf.

VAN DER MERWE, D. 2020. Traffic Impact Study for the Transportation of Solar Energy Equipment to the Kgalalelo Solar Power Plant near Olifantshoek, Northern Cape Province.

VAN SCHALKWYK, J. 2016. Cultural Heritage Impact Assessment for the Development of the Proposed Life Solar Plant on the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266, Registration Division Kuruman, Northern Cape Province.

WORLD BANK GROUP. 2006. The Equator Principles.

ZF MGCAWU DISTRICT MUNICIPALITY (ZDM). 2019. ZF Mgcawu District Municipality Final Integrated Development Plan 2019/2020 for 2017-2022. https://www.zfm-dm.co.za/index.php/idp?task=document.viewdoc&id=974.