



# DRAFT ENVIRONMENTAL IMPACT REPORT

for

## GAETSEWE SOLAR

on

Portions 2 of the Farm Legoko 460 and Grid connection on Farm  
Sekgame No.461

In terms of the

National Environmental Management Act (Act No. 107  
of 1998, as amended) & 2014 Environmental Impact  
Regulations

Prepared for Applicant: K2018091758 (SOUTH AFRICA) (Pty) Ltd.

Date: 4 December 2018

Author of Report: Dale Holder

**Author Email:** [dale@cape-eaprac.co.za](mailto:dale@cape-eaprac.co.za)

Report Reference: GAM534/04

Department Reference: 14/12/16/3/2/1083

**Cape EAPrac**  
Cape Environmental Assessment Practitioners

Tel: +27 44 874 0365 PO Box 2070, George 6530  
Fax: +27 44 874 0432 17 Progress Street, George

[www.cape-eaprac.co.za](http://www.cape-eaprac.co.za)




## DOCUMENT TRACKING

### DOCUMENT HISTORY

REVISION	DATE	AUTHOR
Pre Application Scoping Report	13 June 2018	Dale Holder
Draft Scoping Report	26 July 2018	Dale Holder
Final Scoping Report	04 September 2018	Dale Holder
Draft Environmental Impact Report	04 December 2018	Dale Holder

### APPROVAL FOR RELEASE

NAME	TITLE	SIGNATURE
Dale Holder	Senior Environmental Practitioner	

### DISTRIBUTION

DISTRIBUTION LIST
Department of Environmental Affairs
Atlantic Energy Partners
Registered I&AP's

### SUBMISSION AND CORRESPONDENCE

SUBMISSION / CORRESPONDENCE	DATE
Pre Application Scoping Report submitted	13 June 2018
Pre Application Scoping Report Acknowledged	02 July 2018
Comment on Pre Application Scoping Report	<sup>1</sup> None Recieved
Application form Submitted	11 July 2018
Application form Acknowledged	26 July 2018
Draft Scoping Report Submitted	27 July 2018
Draft Scoping Report Acknowledged	08 August 2018
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Final Scoping Report Submitted	04 September 2018
Final Scoping Report Acknowledged	Not Recieved
Final Scoping Report Accepted	19 October 2018
Draft Environmental Impact Report Submitted	04 December 2018
Draft Environmental Impact Report Acknowledged	Pending

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<sup>1</sup> The DEA confirmed via email that the pre application draft scoping reports would only be processed on receipt of an application.

**APPOINTED ENVIRONMENTAL ASSESSMENT PRACTITIONER:**

Cape EAPrac Environmental Assessment Practitioners

PO Box 2070

George

6530

Tel: 044-874 0365

Fax: 044-874 0432

**Report written & compiled by:** Dale Holder (Ndip Nature Conservation), who has over 15 years' experience as an environmental practitioner.

**Registrations:** Director, Louise-Mari van Zyl (MA Geography & Environmental Science [US]; Registered Environmental Assessment Practitioner with the Interim Certification Board for Environmental Assessment Practitioners of South Africa, EAPSA). Ms van Zyl has over fifteen years' experience as an environmental practitioner.

**PURPOSE OF THIS REPORT:**

Stakeholder Review and Comment

**APPLICANT:**

K2018091758 (SOUTH AFRICA) (Pty) Ltd.

**CAPE EAPRAC REFERENCE NO:**

GAM534.07

**DEPARTMENT REFERENCE:**

14/12/16/3/2/1083

**SUBMISSION DATE:**

04 December 2018

# DRAFT ENVIRONMENTAL IMPACT REPORT

in terms of the

National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended & Environmental Impact Regulations 2014

## GAETSEWE SOLAR

### Portion 2 of the Farm Legoko 460 and Grid connection on Farm Sekgame No.461

Submitted for:

#### Stakeholder Review & Comment

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Cape Environmental Assessment Practitioners

Tel: 044 874 0365 PO Box 2070

Fax: 044 874 0432 17 Progress Street

Web: [www.cape-eaprac.co.za](http://www.cape-eaprac.co.za) George 6530

## REPORT DETAILS

Title:	Draft Environmental Impact Report for Gaetsewe Solar Energy Facility
Purpose of this report:	<p>A Pre Application Scoping report was available to all registered and potential Interested and Affected Parties (I&amp;AP's) prior to the submission of a formal application to the competent authority, the National Department of Environmental Affairs (DEA). A formal application was submitted to the DEA and the Scoping report as once again made available for review and comment. All comments received on both the pre-application scoping and draft scoping report were submitted to the DEA as part of the Final Scoping Report. The DEA accepted the final scoping report and plan of Study for EIA on 19 October 2018.</p> <p>This Draft Environmental Impact Report Report forms part of a series of reports and information sources that are being provided during the Environmental Impact Assessment (EIA) for the proposed Gaetsewe Solar Energy Facility in the Northern Cape Province. This is the third report in the series that that forms part of the environmental process. Registered I&amp;APs will be given an opportunity to comment on the following reports as part of this environmental process:</p> <ul style="list-style-type: none"> <li>- Pre Application Scoping Report,</li> <li>- Draft Scoping Report,</li> <li>- Draft Environmental Impact Assessment Report, and</li> <li>- Draft Environmental Management Programme</li> </ul> <p>In accordance with the regulations, the objective of the environmental impact assessment process is to, through a consultative process—</p> <p>(a) 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;</p> <p>(b) 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;</p> <p>(c) 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;</p> <p>(d) 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;</p> <p>(e) identify the most ideal location for the activity within the development footprint of the approved site as contemplated in the accepted scoping report based on the lowest level of environmental sensitivity identified during the assessment;</p> <p>(f) 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;</p> <p>(g) identify suitable measures to avoid, manage or mitigate identified impacts; and</p> <p>(h) identify residual risks that need to be managed and monitored.</p> <p>The Pre Application Scoping Report was available to all stakeholders for a 30 day review &amp; comment period, <u>13 June 2018 – 16 July 2018</u>. The Scoping report was available for a further 30 day comment period extending from <u>27 July – 27 August 2018</u>. This Draft Environmental Impact Report is available for a 30 comment period, extending from <u>04 December 2018 – 25 January 2019</u>.<sup>2</sup></p> <p>All comments received during this comment period will be included in the Final Environmental Report that will be submitted to the competent authority for decision making.</p>
Prepared for:	K2018091758 (SOUTH AFRICA) (Pty) Ltd
Published by:	Cape Environmental Assessment Practitioners (Pty) Ltd. (Cape EAPrac)

<sup>2</sup> During a telephonic conversation with Mr Muhammad Essop of the DEA on 29 November 2018, it was confirmed that the PPP period can be straddled over the December Shutdown period, as long as the reckoning of days take this period into account.

Authors:	Mr Dale Holder
Reviewed by:	Ms Melissa Mackay
Cape EAPrac Ref:	GAM534/07
DEA Case officer & Ref. No:	Ms Makhosi Yeni 14/12/16/3/2/1083
Date:	04 December 2018
To be cited as:	<i>Cape EAPrac</i> , 2018. Draft Environmental Impact Report for the proposed Gaetsewe Solar Energy Facility. Report Reference: GAM534/04. George.

## TECHNICAL CHECKLIST

The following technical checklist is included as a quick reference roadmap to the proposed project.

Company Details		
Company profile	Name and details of Developer	K2018091758 (SOUTH AFRICA) (Pty) Ltd is a renewable energy developer, proposing the development of the Gaetsewe Solar Energy Facility
Site Details		
Size of the site	Description and Size in hectares of the affected property.	Portion 2 of the Farm 460 Legoko. Proposed Grid Connection on Farm Sekgame 461 Total Property Size: 856.53ha
Development Footprint	This includes the total footprint of PV panels, auxiliary buildings, onsite substation, inverter stations and internal roads.	The total footprint of the Gaetsewe Solar Energy Facility will not exceed 212ha
Technology Details		
Capacity of the facility	Capacity of facility (in MW)	Export Capacity (AC) of 75MW,
Solar Technology selection	Type of technology	PV with fixed, single or double axis tracking technology.
	Capacity and dimensions of the PV field	75 MW (AC) yield. PV Panel Footprint of approximately 200ha with a total project Footprint of not more than 212ha .
	Structure height	PV Structures not more than 4m
	Surface area to be covered (including associated infrastructure such as roads)	Less than 212 ha.
	Structure orientation	Fixed-tilt in north-facing orientation, or mounted on horizontal axis tracking from east to west
	Laydown area dimensions	Approximately 2-5ha of laydown area will be required (the laydown areas will not exceed 5ha.)
Grid Connection Details		
Grid connection	Substation to which project will connect.	The project intends connecting to the National Grid via the proposed Sekgame Switching Station. The Sekgame Switching Station is situated approximately 5km south of the existing Ferrum Substation. The option to loop into the new 132kV network currently proposed by Eskom (Kuruman 66 kV upgrade) will also be investigated.
	Capacity of substation to connect facility	Sekgame 132 kV Switching Station. The Ferrum Substation is physically constrained in terms access, however currently has in excess of 500 MW capacity to evacuate generated power. It is understood from Eskom that the Sekgame Switching Station will interconnect with Ferrum MTS and allow IPP's to connect.

Power line/s	Number of overhead power lines required	1x132kV distribution line from the on-site facility substation to the proposed Sekgame Switching Station..
	Route/s of power lines	Alternative grid connection options are under investigation. Please refer to the layout plans and report attached in Appendix D.
	Voltage of overhead power lines	132kV.
	Height of the Power Line	<32m
	Servitude Width	Maximum of 31m – 51m
<b>Auxiliary Infrastructure</b>		
Other infrastructure	Additional Infrastructure	Auxiliary buildings of approximately 1 ha. The functions within these buildings include (but are not limited to) gate house, ablutions, workshops, storage and warehousing area, site offices, substation and control centre.  Perimeter Fencing not exceeding 5m in height.
	Details of access roads	The main access road will not exceed 6m in width and the internal road will not exceed 5m in width.
	Extent of areas required for laydown of materials and equipment	Approximately 2-5ha of laydown areas will be required (Laydown areas will not exceed 5ha).

## PREFERRED ALTERNATIVE

The following description provides the summary of the preferred alternative as identified in this Environmental Process.

Preferred site	Latitude	Longitude
North-West Corner	27°45'10.75"S	23° 5'15.30"E
North-East Corner	27°45'12.00"S	23° 6'34.92"E
South-West Corner	27°46'09.09"S	23° 6'22.00"E
South-East Corner	27°46'9.44"S	23° 6'34.50"E
Substation	27°45'12.85"S	23° 5'21.36"E
Powerline (Preferred 132kV self-build to Sekgame)		
Start	27°45'12.85"S	23° 5'21.36"E
Middle	27°46'38.44"S	23° 4'35.77"E
End	27°46'34.85"	23°03'56.39"

for the proposed 75 MW **Gaetsewe Solar** PV energy facility and associated infrastructure located on the Portion 2 of the farm 460 Legoko and Farm Sekgame No.461, Kuruman RD in the Gamagara Local Municipality within the John Taolo Gaetsewe District municipality in the Northern Cape Province, hereafter referred to as "the property".

The **Gaetsewe Solar** PV energy facility is to consist of solar photovoltaic (PV) technology with fixed, single or double axis tracking mounting structures, with a net generation (contracted) capacity of 75MWAC (Megawatts - Alternating Current), as well as associated infrastructure, which will include:

- On-site switching-station / substation;
- Auxiliary buildings (gate-house and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.);
- Inverter-stations, transformers and internal electrical reticulation (underground cabling);
- Access and internal road network;
- Laydown area;

- Overhead 132kV electrical distribution line / grid connection connecting to the authorised Sekgame switching station;
- Rainwater tanks; and
- Perimeter fencing and security infrastructure.

## TECHNICAL DETAILS FOR THE PREFERRED ALTERNATIVE:

Component	Description/ Dimensions
Location of the site	Approximately 7km South East of Kathu
PV Panel area	200ha with a total project footprint of approximately 212ha
SG Codes	C0410000000004600002
Preferred Site access	Access to the site will be at the existing access road from the N14 and along the western boundary of Portion 2 of farm 460 Legoko.
Export capacity	75 MW
Proposed technology	PV with fixed, single or double axis tracking technology.
Height of installed panels from ground level	PV Structures not more than 4m
Width and length of internal roads	Main internal road - width: 6m, length: 17 km Secondary internal roads – width: 5m, length: 11 km

## CONTENT REQUIREMENTS: ENVIRONMENTAL IMPACT REPORT

Appendix 3 of Regulation 982 of the 2014 EIA Regulations contains the required contents of an Environmental Impact Assessment Report. The checklist below serves as a summary of how these requirements were incorporated into this Impact Assessment Report.

Requirement	Details
(1) An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include -	
(a) details of - The EAP who prepared the report; and The expertise of the EAP, including, a curriculum vitae.	The details of the EAP are included at the beginning of this report (overleaf from the cover page). The EAP's declaration and CV is also included in Annexure G3.
(b) the location of the activity, including – The 21 digit Surveyor General code of each cadastral land parcel; Where available, the physical address and farm name; Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	The proposed activity (preferred alternative) is to be situated South of Kathu on portion 2 of the farm 460 Legoko. 21 digit Surveyor General code: C0410000000004600002 Farm name and number: Portion 2 of the Farm 460 Legoko.
(c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Detailed layout plans are attached in Appendix D
(d) a description of the scope of the proposed activity, including - All listed and specified activities triggered and being applied for; and A description of the associated structures and infrastructure related to the development.	Sections 2.1.3 and 3 of the Environmental Impact Assessment report.
(e) A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy content.	Section 2 of the Environmental Impact Assessment report.
(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.	Section 4 of the Environmental Impact Assessment report.
(g) A motivation for the preferred development footprint within the approved site.	Section 3.4 of the Environmental Impact Assessment report.
(h) A full description of the process followed to reach the proposed	Section 3.2 of the Environmental Impact Assessment report.



Requirement	Details
<p>development footprint within the approved site, including -  Details of the development footprint alternatives considered;  Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;  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;  The environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;  The impacts and risks identified, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts -  (aa) can be reversed;  (bb) may cause irreplaceable loss of resources; and  (cc) can be avoided, managed or mitigated.  The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;  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;  The possible mitigation measures that could be applied and level of residual risk;  If no alternative development locations for the activity were investigated, the motivation for not considering such: and  A concluding statement indicating the preferred alternative development location within the approved site.</p>	<p>Section 3.4 of the Environmental Impact Assessment report.  Section 9 of the Environmental Impact Assessment report.  Section 9 of the Environmental Impact Assessment report and Appendix F  Appendix F of the Environmental Impact Assessment report.  Section 8 of the Environmental Impact Assessment report.  Please refer to the plan of study for Environmental Impact Report that formed part of the Final Scoping Report. The methodology for the specialist impact assessments are included in their respective studies.  Section 7.1 of the Environmental Impact Assessment report.  Section 12 of the Environmental Impact Assessment report.  Alternatives were investigated.. Please refer to Sections 4,5 and 4.4 of the Environmental Impact Assessment report.</p>
<p>(i) A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including -  A description of all environmental issues and risks that were identified during the environmental impact assessment process; and  An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.</p>	<p>Please refer to the Plan of Study For Environmental Impact Assessment that Formed part of the Final Scoping Report. Also refer to Section 8 of the Environmental Impact Assessment report.</p>
<p>(j) An assessment of each identified potentially significant impact and risk, including -  Cumulative impacts;  The nature, significance and consequences of the impact and risk;  The extent and duration of the impact and risk;  The probability of the impact and risk occurring;  The degree to which the impact and risk can be reversed;  The degree to which the impact and risk may cause irreplaceable loss of resources; and  The degree to which the impact and risk can be mitigated.</p>	<p>Section 6.3 – 6.10 of the Environmental Impact Assessment report.</p>
<p>(k) Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report.</p>	<p>Not Applicable.</p>
<p>(l) An environmental impact statement which contains –  A summary of the key findings of the environmental impact assessment;  A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and  A summary of the positive and negative impacts and risks of the</p>	<p>Section 6.12 of the Environmental Impact Assessment report.</p>

Requirement	Details
proposed activity and identified alternatives.	
(m) Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation.	Appendix H and section 7 of the Environmental Impact Assessment report.
(n) The final proposed alternatives which respond to the impact management measures, avoidance and mitigation measures identified through the assessment.	The currently proposed alternatives are provided throughout this report. Should the outcome of the Impact assessment phase require and deviations to these preferred alternatives, the Final Environmental Impact Report submitted for decision making will reflect these.
(o) Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	Section 7 of the Environmental Impact Assessment report.
(p) A description of assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed.	Section 1.3 of the Environmental Impact Assessment report.
(q) A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	Section 1.4 and section 10 of the Environmental Impact Assessment report.
(r) Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised.	The project in this regard does include operational aspects.
(s) An undertaking under oath or affirmation by the EAP in relation to: The correctness of the information provided in the reports; The inclusion of comments and inputs from stakeholders and I&APs; The inclusion of inputs and recommendations from the specialist reports where relevant; and Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	Annexure G3.
(t) Where applicable, details of any financial provisions for the rehabilitation, closure and ongoing post decommissioning management of negative environmental impacts;	Not applicable.
(u) An indication of any deviation from the approved scoping report, including the plan of study, including – Any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and A motivation for the deviation.	No deviation from the plan of study for EIA has occurred
(v) Any specific information that may be required by the competent authority.	Refer to table below.
(w) Any other matters required in terms of section 24(4)(a) and (b) of the Act.	None.

## DEA ACCEPTANCE OF FINAL SCOPING REPORT

The DEA accepted the final scoping report on 19 October 2018. The conditions of this acceptance as well as the responses thereto are included in the table below.

Comment	Response
The EIAr must provide an assessment of the impacts and mitigation measures for each of the activities as a result of the development.	Such an assessment along with the mitigation measures is provided in section .7
Please ensure that the EIAr and EMPr comply with appendix 3 and Appendix 4 of the 2014 regulations. You are also required to address all issues raised by organs of state and I&AP's prior to submission of the EIAr to the Department.	A checklist detailing compliance with appendix 3 is included above, while a checklist detailing compliance with Appendix 4 is included on the front page of the EMPr. Details on how the EAP has responded to all issues raised by

Comment	Response
	I&AP's is included in the comments and responses report attached in appendix F
The listed activities represented in the EIAR and the application form must be the same and correct.	It is confirmed that the activities represented and assessed in the EIAR are the same as those in the application form acknowledged by the the department.
The study falls within the ambit of the Square Kilometre Array – South Africa. The impacts associated with radio frequency interference on the SKA must form part of the Environmental Impact Assessment. The applicant must liaise with SKA-SA for advise on the terms of reference for the EMI and RFI studies and these studies must be completed and included in the Draft EIAR with comments being obtained on these studies from the SKA-SA.	SKA SA provided a comment on the impact of facilities on portion 2 of the farm 460 Legoko. In this comment, the SKA concluded that the closest SKA station is 110 Km away and thus the construction of a PV facility on this portion poses a low risk to the SKA. SKA-sa furthermore confirmed that no mitigation studies would be required at this stage.
Please ensure that all mitigation measures and recommendations in the specialist studies are addressed and included in the final EIAR and Environmental Management Programme (EMPr).	All mitigation measures and recommendations including those from the specialists are included in section 7 of the report.
Due to the number of similar applications in the area, all the specialist assessments must include a cumulative impact assessment.	The potential cumulative impacts are summarised in section 6.11 of this report as well as the following sections of the respective specialist reports: <ul style="list-style-type: none"> <li>- Ecology: Section 6.3</li> <li>- Avifaunal: Section 6.4</li> <li>- Visual: Section 6.8</li> <li>- Freshwater: Section 6.9</li> <li>- Social: Section 6.10</li> <li>- Agriculture: Section 6.5</li> </ul>
The EIR must provide the technical details for the proposed facility in a table format as well as their description and/or dimensions. A sample for the minimum information required is listed under point 2 of the EIA information required for solar energy facilities.	The technical details template in the format prescribed is included in the table above.
The EIAR must provide the four corner points of the proposed substation.	The corner points of the substation are included in the technical details table at the front of this report.
The EIAR must contain the following: <ul style="list-style-type: none"> <li>- Clear indication of the envisioned area for the proposed solar energy facility; i.e. placing and numbering of photovoltaic panels and associated infrastructure mapped at an appropriate scale.</li> <li>- Cleat description of all associated infrastructure.</li> </ul>	Please refer to appendix D for a copy of the detailed site layout plan showing all components associated with the proposed PV facility. Detailed descriptions of all associated infrastructure are included in the Technical layout report in appendix E10 as well as in section 3.1 of this EIAR.
Information on services required on site, e.g. sewerage, refuse removal, water and electricity.	These services will be supplied by the Gamagara Municipality. Proof of availability of these services from the municipality is included in appendix G6.
The EIAR must provide a detailed description of the need and desirability, not only providing motivation for clean energy in south africa. The need and desirability must also indicate if the proposed development is needed in the region and if the current proposed location is desirable for the proposed activity compared to other sites.	The general need and desirability of renewable energy on a national level is discussed in section 1.2, while the project specific need and desirability is discussed in section 4.
A copy of the site layout map and alternatives. All available biodiversity information must be used in the finalisation of the layout map.	The detailed site layout plan for the preferred alternative is attached in appendix D. Plans and descriptions of all alternative layouts are included in Appendix B.
An environmental sensitivity map indicating environmental sensitive features and its buffer zones identified during the EIA process.	All environmentally sensitive features and their buffer areas are depicted on the detailed site layout plans attached in appendix D.
A map combining the final layout map superimposed (overlain) on the environmental sensitivity map.	Layout overlain onto the sensitivity map is depicted on the detailed site layout plans attached in appendix D.
A shapefile of the preferred development layout/footprint must be submitted to this department.	A shapefile of the preferred development footprint is included in the CD attached to this report.
Contains requirements for information required to be contained in the Environmental Management Programme.	A checklist demonstrating compliance with these requirements are included in the EMPr attached in appendix H.


# ORDER OF REPORT

Report Summary

## **Scoping Report – Main Report**

Appendix A	:	Location, Topographical Plans
Appendix B	:	Biodiversity Overlays
Appendix C	:	Site Photographs
Appendix D	:	Detailed Site Layout Plans and Layout Development Report (AEP, 2018)
Appendix E	:	Supplementary Reports (Specialist Reports and Technical Reports)
Annexure E1	:	Ecological Impact Assessment (Todd, 2018)
Annexure E2	:	Avifaunal Impact Assessment (Todd, 2018)
Annexure E3	:	Agricultural Impact Assessment (Lubbe, 2018)
Annexure E4	:	Archaeology Impact Assessment (Nilssen, 2018)
Annexure E5	:	Palaeontology Desktop Assessment (Almond, 2018)
Annexure E6	:	Integrated Heritage Impact Assessment(De Kock, 2018)
Annexure E7	:	Visual Impact Assessment (Stead, 2018)
Appendix E8	:	Freshwater Ecology Scoping Study (Colloty, 2018)
Appendix E9	:	Socio Economic Impact Assessment (Savannah, 2018)
Annexure E10	:	Technical Design Report (AEP)
Annexure E11	:	Water Consumption Study (AEP, 2018)
Annexure E12	:	Site Selection Matrix (AEP, 2018)
Appendix F	:	Public Participation Process
Annexure F1	:	I&AP Register
Annexure F2	:	Comments and Response Report
Annexure F3	:	Adverts & Site Notices.
Annexure F4	:	Pre Application Scoping Report Notifications
Annexure F5	:	Pre Application Report Comments and Responses
Annexure F6	:	Draft Scoping Report Notifications
Annexure F7	:	Scoping Report Comments and Responses

Annexure F8	:	Notification of availability of Draft EIAr
Appendix G	:	Other Information
Annexure G1	:	Correspondence with Authorities
Annexure G2	:	Landowner Consent
Annexure G3	:	EAP Declaration & CV
Annexure G4	:	Specialist Declarations
Annexure G5	:	Title Deed / Windeed Report
Annexure G6	:	Proof of Availability of Services



# TABLE OF CONTENTS

## REPORT SUMMARY

<b>1. PROJECT OVERVIEW</b> .....	<b>I</b>
1.1 RECOMMENDATION OF THIS EIA .....	I
<b>2. NEED AND DESIRABILITY</b> .....	<b>I</b>
<b>3. ENVIRONMENTAL LEGISLATIVE REQUIREMENTS</b> .....	<b>II</b>
<b>4. DEVELOPMENT PROPOSAL &amp; ALTERNATIVES</b> .....	<b>III</b>
<b>5. PROFESSIONAL INPUT</b> .....	<b>III</b>
<b>6. PLANNING CONTEXT</b> .....	<b>III</b>
<b>7. ASSESSMENT OF IMPACTS</b> .....	<b>IV</b>
7.1 ECOLOGICAL IMPACTS ASSESSED.....	IV
7.2 FRESHWATER IMPACTS ASSESSED .....	V
7.3 HERITAGE IMPACTS ASSESSED .....	V
7.4 ARCHAEOLOGICAL IMPACTS ASSESSED.....	V
7.5 VISUAL IMPACTS ASSESSED .....	V
7.6 SOCIO-ECONOMIC IMPACTS ASSESSED.....	VI
7.7 IMPACT STATEMENT .....	VI
<b>8. CONCLUSIONS &amp; RECOMMENDATIONS</b> .....	<b>VII</b>
8.1 REMAINDER OF ENVIRONMENTAL PROCESS.....	VIII
<b>1. INTRODUCTION</b> .....	<b>1</b>
1.1 RECOMMENDATION OF THIS EIA.....	1
1.2 OVERVIEW OF ALTERNATIVE ENERGY IN SOUTH AFRICA AND THE NORTHERN CAPE .....	1
1.3 ASSUMPTIONS & LIMITATIONS.....	4
<b>2. LEGISLATIVE AND POLICY FRAMEWORK</b> .....	<b>4</b>
2.1 NATIONAL LEGISLATION.....	5
<b>2.1.1 The Constitution of the Republic of South Africa</b> .....	<b>5</b>
<b>2.1.2 National Environmental Management Act (NEMA)</b> .....	<b>5</b>
<b>2.1.3 National Environmental Management: Biodiversity (ACT 10 OF 2004)</b> .....	<b>7</b>
<b>2.1.4 National Forests Act (No. 84 of 1998):</b> .....	<b>9</b>
<b>2.1.5 Conservation of Agricultural Resources Act – CARA (Act 43 of 1983):</b> .....	<b>9</b>
<b>2.1.6 National Heritage Resources Act</b> .....	<b>10</b>
<b>2.1.7 National Water Act, NO 36 OF 1998</b> .....	<b>11</b>
<b>2.1.8 National Energy Act (No. 34 of 2008)</b> .....	<b>11</b>
2.2 PROVINCIAL LEGISLATION.....	12
<b>2.2.1 Northern Cape Nature Conservation Act, No. 9 of 2009:</b> .....	<b>12</b>
<b>2.2.2 Nature and Environmental Conservation Ordinance (19 of 1974)</b> .....	<b>12</b>
<b>2.2.3 Astronomy Geographic Advantage Act, 2007 (Act No 21 Of 2007)</b> .....	<b>12</b>
2.3 REGIONAL AND MUNICIPAL LEGISLATION.....	13

2.3.1	Northern Cape Provincial Spatial Development Framework (PSDF) (2012) .....	13
2.3.2	John Taolo Gaetsewe DM Final Draft Integrated Development Plan (IDP) 2018 – 2019 (2017)	13
2.3.3	John Taolo Gaetsewe DM Phase 5 Draft Spatial Development Framework (SDF) (2017)	14
2.3.4	Gamagara LM Integrated Development Plan (IDP) 2017 – 2022 (2017) .....	14
2.4	GUIDELINES, POLICIES AND AUTHORITATIVE REPORTS .....	15
2.4.1	Strategic Infrastructure Projects (SIPs).....	15
2.4.2	National Protected Area Expansion Strategy (NPAES) for S.A. 2008 (2010) .....	16
2.4.3	Critical Biodiversity Areas. ....	16
2.4.4	Environmental Impact Assessment Guideline For Renewable Energy Projects .....	17
2.4.5	Sustainability Imperative.....	18
2.4.6	White Paper on the Energy Policy of the Republic of South Africa (1998).....	19
2.4.7	White Paper on the Renewable Energy Policy of the Republic of South Africa (2003).....	20
2.4.8	Integrated Energy Plan (IEP) (2016) .....	20
2.4.9	Integrated Resource Plan for Electricity (IRP) 2010 – 2030 (2011) .....	21
2.4.10	The Convention on the Conservation of Migratory Species of Wild Animals .....	21
2.4.11	The Agreement on the Convention of African-Eurasian Migratory Water Birds.....	22
2.4.12	Guidelines to minimise the impacts on birds of Solar Facilities and Associated Infrastructure in South Africa.....	22
3.	ACTIVITY .....	22
3.1	TECHNICAL OVERVIEW .....	24
3.1.1	Solar Array.....	24
3.1.2	Mounting Structures .....	24
3.2	SITE SELECTION.....	25
3.2.1	Property selection process.....	25
3.2.2	Footprint selection process.....	28
3.3	PROJECT PROGRAMME AND TIMELINES.....	30
3.4	CONSIDERATION OF ALTERNATIVES .....	31
3.4.1	Layout Alternatives.....	31
3.4.2	Access Road and Entrance Alternatives.....	34
3.4.3	The no-go alternative.....	36
3.4.4	Conclusion.....	36
4.	NEED AND DESIRABILITY .....	36
4.1.1	Feasibility consideration .....	37
4.1.2	Solar Resource & Energy Production.....	37
4.1.3	Solar Farm & Grid Connection .....	37
4.1.4	Social impact .....	37
4.1.5	Employment & Skills Transfer .....	37

4.1.6	<b>need (time)</b> .....	38
4.1.7	<b>Desirability (place)</b> .....	39
4.2	SUMMARY OF SITE CONSTRAINTS .....	40
4.2.1	<b>Flora:</b> .....	40
4.2.2	<b>Fauna:</b> .....	40
4.2.3	<b>Agricultural Potential:</b> .....	40
4.2.4	<b>Heritage:</b> .....	40
4.2.5	<b>Visual:</b> .....	40
<b>5.</b>	<b>SITE DESCRIPTION AND ATTRIBUTES</b> .....	<b>41</b>
5.1	LOCATION & BUILT ENVIRONMENT .....	41
5.2	GEOLOGY & CLIMATE .....	41
5.3	SOILS .....	41
5.4	TOPOGRAPHY .....	41
5.5	BOTANICAL .....	41
5.5.1	<b>Broad-Scale Vegetation Patterns</b> .....	42
5.5.2	<b>Fine-Scale Vegetation Patterns</b> .....	42
5.6	FAUNA.....	46
5.6.1	<b>Mammals</b> .....	47
5.6.2	<b>Reptiles</b> .....	47
5.6.3	<b>Amphibians</b> .....	47
5.6.4	<b>Avifauna</b> .....	48
5.7	SOCIO ECONOMIC PROFILE .....	48
5.7.1	<b>Northern Cape Province</b> .....	48
5.7.2	<b>John Taolo Gaetsewe District Municipality</b> .....	50
5.7.3	<b>Gamagara LM</b> .....	51
5.7.4	<b>Project Site</b> .....	1
5.7.5	<b>Adjacent Properties</b> .....	1
5.8	ECOLOGICAL SENSITIVITY OF THE STUDY SITE .....	3
<b>6.</b>	<b>IMPACT ASSESSMENT</b> .....	<b>4</b>
6.1	ASSESSMENT METHODOLOGY.....	5
6.2	SUMMARY OF IMPACTS ASSESSED .....	7
6.2.1	<b>Ecological impacts assessed:</b> .....	7
6.2.2	<b>Freshwater impacts assessed:</b> .....	7
6.2.3	<b>Heritage Impacts Assessed</b> .....	7
6.2.4	<b>Archaeological impacts assessed</b> .....	8
6.2.5	<b>Visual impacts assessed</b> .....	8
6.2.6	<b>Socio-Economic impacts Assessed</b> .....	8
6.3	ECOLOGICAL IMPACTS.....	8



6.3.1	Identification of Impacts.....	8
6.3.2	Assessment of Impacts.....	9
6.3.3	Conclusion & Recommendations.....	13
6.4	AVIFAUNAL IMPACTS.....	13
6.4.1	Identification of Impacts.....	13
6.4.2	Assessment of Impacts.....	15
6.4.3	Conclusion & Recommendations.....	19
6.5	AGRICULTURAL IMPACTS.....	19
6.5.1	Identification of Impacts.....	20
6.5.2	Assessment of Impacts.....	20
6.6	ARCHAEOLOGICAL IMPACTS.....	26
6.6.1	Significance of impacts.....	26
6.6.2	Assessments of Impacts.....	27
6.6.3	Conclusions and Recommendations.....	29
6.7	PALAEONTOLOGY IMPACTS.....	29
6.8	VISUAL IMPACTS.....	30
6.8.1	Assessment of Impacts.....	30
6.8.2	Conclusion and recommendations.....	33
6.9	FRESHWATER RESOURCE IMPACTS.....	34
6.9.1	Assessment of Impacts.....	34
6.9.2	Conclusion and Recommendations.....	39
6.10	SOCIAL IMPACTS.....	40
6.10.1	Assessment of Impacts.....	40
6.10.2	Conclusion & Recommendations.....	53
6.11	CUMULATIVE IMPACT ASSESSMENT.....	54
6.12	IMPACT STATEMENT.....	57
7.	<b>MITIGATION MEASURES.....</b>	<b>59</b>
8.	<b>PLANNING CONTEXT.....</b>	<b>66</b>
9.	<b>PUBLIC PARTICIPATION PROCESS TO DATE.....</b>	<b>67</b>
9.1	REGISTRATION OF KEY STAKEHOLDERS.....	69
9.2	AVAILABILITY OF PRE APPLICATION SCOPING REPORT.....	70
9.3	COMMENTS AND RESPONSES ON PRE APPLICATION SCOPING REPORT.....	70
9.4	AVAILABILITY OF SCOPING REPORT.....	70
9.5	COMMENTS ON SCOPING REPORT.....	70
9.6	AVAILABILITY OF DRAFT ENVIRONMENTAL IMPACT REPORT.....	71
10.	<b>CONCLUSION &amp; RECOMMENDATIONS.....</b>	<b>71</b>
10.1	REMAINDER OF ENVIRONMENTAL PROCESS.....	72
11.	<b>ABBREVIATIONS.....</b>	<b>73</b>

## FIGURES

**Figure 1:** Global Horizontal radiation map for South Africa (Source: <http://solargis.info>, 2015) showing the approximate area proposed for Hotazel Solar ..... 3

**Figure 2:** Summary of Scoping & EIR Process in terms of the 2014 Regulations. .... 6

**Figure 3:** Broad-scale overview of the vegetation in and around the Gaetsewe site (Todd, 2018) ..... 9

**Figure 4:** Extract of the Northern Cape Critical Biodiversity Areas map for the study area, showing that there are no CBAs in close proximity to the site (Todd, 2018) ..... 17

**Figure 5:** Typical Layout of a Solar PV Energy Facility (AEP, 2018)..... 23

**Figure 6:** Showing preferred as well as proposed grid connection for the proposed Gaetsewe Solar Development..... 23

**Figure 7:** Cast Concrete Foundation (Solar Power Plant Business, 2013) ..... 24

**Figure 8:** Rammed / Driven Steel Pile (SolarPro, 2010)..... 25

**Figure 9:** Ground Screw (pv magazine, 2014) ..... 25

**Figure 10:** Wind Rose for the Kathu Area..... 27

**Figure 11:** Ecological Sensitivity of Portion 2 of the farm 460 (Todd,2015) ..... 28

**Figure 12:** Ecological Sensitivity on Portion 1 of the Farm 460 (Todd, 2015) ..... 29

**Figure 13:** Preferred and alternative footprint overlaid onto final site sensitivity plan (Todd, 2018) ..... 30

**Figure 14:** Layout Alternative 1 (Preferred) (AEP, 2018) ..... 32

**Figure 15:** Layout Alternative 2 (AEP, 2018)..... 33

**Figure 16:** Proposed Grid Connection ..... 34

**Figure 17:** Showing proposed access road alternatives..... 35

**Figure 18:** Showing existing access from the N14 which will be the preferred access to the SEF. .... 36

**Figure 19:** Broad-scale overview of the vegetation in and around the Gaetsewe Solar site (Todd, 2018) .... 42

**Figure 20:** Dense *Tarchonanthus camphoratus*-dominated veld within the preferred alternative. Diversity within these areas is low and the grass layer is also dominated by unpalatable species. .... 44

**Figure 21:** Example of an area of more open grassland within the footprint of the preferred alternative, with a small stand of *Acacia erioloba* in the background. Apart from the pictured stand, there are no other significant stands of *Acacia erioloba* within the footprint of this alternative..... 44

**Figure 22:** The pan present near the south-western boundary of Alternative 2. The pan is however outside of the proposed footprint. These pans are considered sensitive features of the landscape and should be avoided by the development..... 45

**Figure 23:** Open *Acacia erioloba* bushveld near to the north eastern boundary of Alternative 2, showing the low bush density compared with the majority of the Alternative 1 area. .... 46

**Figure 24:** *Acacia erioloba* bushveld in the south of Alternative 2, with *Acacia erioloba*, *Acacia haematoxylon* and *Tarchonanthus camphoratus* being prominent woody species present. .... 46

**Figure 25:** Map showing the District Municipalities of the Northern Cape Province (Source: [www.municipalities.co.za](http://www.municipalities.co.za), in Savannah, 2018). .... 50

**Figure 26:** Map showing the Local Municipalitiess of the John Taolo Gaetsewe District Municipality (Source: [www.municipalities.co.za](http://www.municipalities.co.za), in Savannah, 2018). .... 51

**Figure 27:** Sensitivity map for the Gaetsewe Solar project, showing the two alternatives and the grid connection (Todd, 2018)..... 4

**Figure 28:** Configuration of footprints on and adjacent to the proposed facility ..... 20

**Figure 29:** Proposed similar developments in the region The quantity of available soil for agricultural production decreases as a result of the footprints of these facilities. .... 24

**Figure 30:** Cumulative map showing the location of other solar energy facilities within 30km of the project site (Savannah, 2018)..... 55

## TABLES

<b>Table 1:</b> Impact Summary Table.....	vi
<b>Table 2:</b> NEMA 2014 (As amended in April 2017) listed activities for the Gaetsewe Solar Energy Facility.....	7
<b>Table 3:</b> Listed plant species known from the broad vicinity of the proposed Gaetsewe study area (Todd, 2018).....	12
<b>Table 4:</b> Strengths, weaknesses, opportunities and threats identified in the IDP for Gamagara Local Municipality.....	14
<b>Table 5:</b> Potential environmental impacts of solar energy projects (Adapted from DEA, 2015).....	18
<b>Table 6:</b> Component Areas and % of Total Project Area (AEP,2018).....	22
<b>Table 7:</b> Preliminary implementation schedule.....	31
<b>Table 8:</b> Climatic conditions on the Gaetsewe Solar Site.....	41
<b>Table 9:</b> Listed bird species known from the vicinity of the Gaetsewe Solar site, according to SABAP 1 and 2 (Todd, 2015).....	48
<b>Table 10:</b> Current land uses and characteristics of the adjacent farmlands.....	1
<b>Table 11:</b> Impacts on vegetation and listed or protected plant species resulting from construction of the PV Facility.....	9
<b>Table 12:</b> Impact 2. Direct Faunal Impacts due to Construction of the PV Facility.....	10
<b>Table 13:</b> Faunal Impacts during the operation of the PV facility.....	10
<b>Table 14:</b> Impacts on vegetation and listed or protected plant species resulting from power line construction activities.....	11
<b>Table 15:</b> Faunal Impacts due to power line construction activities.....	11
<b>Table 16:</b> Impact of reduced ability to meet conservation obligations & targets due to cumulative habitat loss.....	12
<b>Table 17:</b> Impact on broad-scale ecological processes due to cumulative loss and fragmentation of habitat.....	12
<b>Table 18:</b> Direct Avifaunal Impacts During Construction – habitat loss and disturbance.....	15
<b>Table 19:</b> Avifaunal Impacts due to operational activities – disturbance and collisions with PV panels.....	16
<b>Table 20:</b> Avifaunal Impacts due to decommissioning activities – disturbance and habitat loss.....	17
<b>Table 21:</b> Direct Avifaunal Impacts During Construction.....	17
<b>Table 22:</b> Operational phase power line electrocution and collision risk of large terrestrial birds and raptors.....	18
<b>Table 23:</b> Impact on avifaunal habitats, migration routes and nesting areas due to cumulative loss and fragmentation of habitat.....	18
<b>Table 24:</b> Assessment of agricultural impacts during construction.....	20
<b>Table 25:</b> Assessment of agricultural impacts during operation.....	22
<b>Table 26:</b> Assessment of operational phase impacts during decommissioning.....	23
<b>Table 27:</b> Renewable energy nodes within a 30km radius of the proposed Gaetsewe Solar.....	24
<b>Table 28:</b> Archaeological impacts during the construction of the Gaetsewe PV Facility.....	27
<b>Table 29:</b> Archaeological impacts during the operation of the Gaetsewe PV Facility.....	28
<b>Table 30:</b> Archaeological impacts during the construction of the Gaetsewe Grid connection.....	28
<b>Table 31:</b> Archaeological impacts during the operation of the Gaetsewe Grid connection.....	28
<b>Table 32:</b> Archaeological impacts during the construction of the Gaetsewe Access Road.....	28
<b>Table 33:</b> Archaeological impacts during the operation of the Gaetsewe Access Road.....	29
<b>Table 34:</b> Visual Impacts of Alternative 1 for Gaetsewe Solar.....	30
<b>Table 35:</b> Visual Impacts of Alternative 2 for Gaetsewe Solar.....	31
<b>Table 36:</b> Visual Impacts of Gaetsewe Solar Access Road.....	32
<b>Table 37:</b> Visual Impacts of Gaetsewe Solar Grid connection.....	32
<b>Table 38:</b> Impact on pans through the possible increase in surface water runoff on form and function.....	34
<b>Table 39:</b> Assessment of impact of increase in sedimentation and erosion.....	36
<b>Table 40:</b> Assessment of Impacts of physical disturbance by the supporting infrastructure (e.g. roads) on hydrological environment.....	37
<b>Table 41:</b> Assessment of Cumulative Impacts.....	38
<b>Table 42:</b> Impact assessment on direct and indirect employment opportunities.....	40
<b>Table 43:</b> Economic multiplier effects impact assessment.....	42
<b>Table 44:</b> Assessment of impacts from an influx of jobseekers and change in population in the study area.....	43
<b>Table 45:</b> Assessment of safety and security impacts.....	44
<b>Table 46:</b> Assessment of impacts on daily living and movement patterns.....	45

<b>Table 47:</b> Assessment of nuisance impacts (noise and dust).....	46
<b>Table 48:</b> Assessment of impacts on the sense of place.....	47
<b>Table 49:</b> Employment opportunities and skills development.....	48
<b>Table 50:</b> Assessment of the development of non-polluting, renewable energy infrastructure .....	49
<b>Table 51:</b> Assessment of the contribution to LED and social upliftment.....	50
<b>Table 52:</b> Assessment of the visual impact and impacts on sense of place.....	50
<b>Table 53:</b> Assessment on the loss of agricultural land and overall productivity .....	51
<b>Table 54:</b> Cumulative impacts of employment opportunities, business opportunities and skills development.....	52
<b>Table 55:</b> Cumulative impact with large-scale in-migration of people.....	52
<b>Table 56:</b> Other solar energy projects / developments approved within proximity of Gaetsewe Solar (SIA, Savannah, 2018) .....	54
<b>Table 57:</b> Impact Summary Table .....	57
<b>Table 58:</b> Specialist Impact Assessment of Listed Activities. ....	58
<b>Table 59:</b> Mitigation measures required for the construction, operation and decommissioning of the Gaetsewe Solar development. ....	59
<b>Table 60:</b> Public participation requirements in terms of S41 of R982.....	67
<b>Table 61:</b> Key Stakeholders automatically registered as part of the Environmental Process .....	69

## DRAFT EIR – EXECUTIVE SUMMARY

### 1. PROJECT OVERVIEW

Cape EAPrac has been appointed by **K2018091758 (SOUTH AFRICA) (Pty) Ltd**, hereafter referred to as the Applicant, as the independent **Environmental Assessment Practitioner (EAP)**, to facilitate the **Scoping & Environmental Impact Reporting (S&EIR)** process required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for the proposed development of the '**Gaetsewe Solar**' Energy Facility near Kathu in the Northern Cape Province of South Africa.

K2018091758 (SOUTH AFRICA) (Pty) Ltd have an option to lease a section of **Portion 2 of the Farm 460 Legoko** from the landowner, Carel Reitz family trust, for the purposes of developing the proposed solar facility. A copy of a letter from Carel Reitz family trust providing consent for the continuation of the EIA is attached in **Annexure G2**.

The Grid connection across the **Farm Sekgame 460** is considered to constitute a linear activity and as such, landowner consent is not required in terms of these regulations. This landowner has been automatically registered as an interested and affected party and will be given an opportunity to provide input into this environmental process.

The **total generation capacity** (contracted capacity) of the photovoltaic power generation facility will not exceed **75 Megawatts (MW)** for input into the national Eskom grid.

The purpose of this **Environmental Impact Report** is to describe the environment to be affected, the proposed project, consider all comments received in the two comment periods that have taken place to date, to present the site constraints identified by the various specialist during their site assessments, and provide and to assess the impacts of this development on the receiving environment. This environmental process has been subjected to the following public participation periods:

- The pre application Scoping Report was available for review and comment for a period of 30 Days extending from: **13 June 2018 – 16 July 2018**.
- The Scoping Report was available for a further 30 Day comment period extending from **27 July 2018 – 27 August 2018**.
- The Draft Environmental Impact Report was available for a 30 Day comment period extending from **04 December 2018 – 25 January 2019**

#### 1.1 RECOMMENDATION OF THIS EIA

The proposal by the developer is to develop Portion 2 of the Farm 460 Legoko as a renewal energy generation facility (PV). The project has received general support throughout the ongoing environmental application, with no major issues identified by any of the participating stakeholders.

The EIA process, through various investigations, has found that the proposal can be supported and that the potential negative impacts that may arise from this development can be effectively mitigated.

It is thus Cape EAPrac's considered opinion that the preferred alternative (Layout Alternative 1) can be considered for approval.

### 2. NEED AND DESIRABILITY

Need and desirability has been considered in detail in this environmental process. The overall need and desirability in terms developing renewable energy generation in South Africa and Globally is considered in section 1.2, while the project specific need and desirability is considered in section 4.

### 3. ENVIRONMENTAL LEGISLATIVE REQUIREMENTS

The current assessment is being undertaken in terms of the **National Environmental Management Act** (NEMA, Act 107 of 1998). This Act makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority (in this case, the national Department of Environmental Affairs, DEA) based on the findings of an Environmental Assessment.

The proposed development entails a number of listed activities, which require a **Scoping & Environmental Impact Reporting (S&EIR) process**, which must be conducted by an independent environmental assessment practitioner (EAP). Cape EAPrac has been appointed to undertake this process.

The listed activities associated with the proposed development, as stipulation under 2014 Regulations **327, 325 and 324** are as follows:

Listed activity as described in GN R.983, 984 and 985	Description of project activity that triggers listed activity
<b>Regulation 327 – Basic Assessment</b>	
<u>GN R327 Activity 11</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; or	The proposed Gaetsewe Solar will connect to the national electricity via the Sekgame Switching Station. The proposed distribution and transmission infrastructure includes the construction of an on-site substation and a 132kV overhead power line from the on-site substation to the Sekgame Switching Station
GN R327 Activity 28: Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	The area is currently utilised for limited agricultural purposes. The construction of a PV Facility is considered as commercial use.
<b>Regulation 325 – Scoping and Environmental Impact Reporting</b>	
<u>GN R325 Activity 1</u> : The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs within an urban area.	The proposed Gaetsewe Solar Energy Facility will have a maximum generation Capacity of 75 megawatts(AC) and as such exceeds the threshold defined in this activity.
<u>GN R325 Activity 15</u> : The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	The proposed Gaetsewe Solar Energy Facility will have a maximum footprint of 212ha and as such exceeds the threshold defined in this activity.
<b>Regulation 324 – Basic Assessment</b>	
NO Activities in terms of Regulation 324.	

**NOTE:** Basic Assessment as well as Scoping and Environmental Impact Reporting Activities are being triggered by the proposed development and as such, the Environmental Process will follow a Scoping and Environmental Impact Reporting process.

Before any of the above mentioned listed activities can be undertaken, authorisation must be obtained from the relevant authority, in this case the National Department of Environmental Affairs (DEA). Should the Department approve the proposed activity, the Environmental Authorisation does not exclude the need for obtaining relevant approvals from other Authorities who has a legal mandate.

## 4. DEVELOPMENT PROPOSAL & ALTERNATIVES

The proposed photovoltaic (PV) SEF will have a net generating capacity of 75 MW<sub>AC</sub> with an estimated maximum footprint of ± 212 ha. The proposed project footprint and alternatives were identified by the Project Developer following the findings of the ecological expert who was appointed to develop a vegetation and sensitivity rating for the entire property.

This sensitivity plan was then used to determine the preferred location of the proposed PV footprint.

The technology under consideration is either photovoltaic (PV) modules mounted on either of fixed or tracking structures. Other infrastructure includes inverter stations, internal electrical reticulation, internal roads, an on-site switching station / substation, a 132 kV overhead (OH) distribution line, auxiliary buildings, construction laydown areas and perimeter fencing and security infrastructure. The on-site switching station / substation will locate the main power transformer/s that will step up the generated electricity to a suitable voltage level for transmission into the national electricity grid, via the OH line. Auxiliary buildings include, *inter alia*, a control building, offices, warehouses, a canteen and visitors centre, staff lockers and ablution facilities and gate house and security offices.

## 5. PROFESSIONAL INPUT

The following professionals have provided input into this environmental process:

1. Ecology	-	Mr Simon Todd
2. Avifaunal	-	Mr Simon Todd
3. Archaeology	-	Dr Peter Nilssen
4. Palaeontology	-	Dr John Almond
5. Integrated Heritage	-	Stefan de Kock
6. Agricultural Potential	-	Mr Christo Lubbe
7. Visual	-	Stephen Stead
8. Freshwater	-	Dr Brian Colloty
9. Engineering aspects	-	Atlantic Energy Partners
10. Stormwater	-	JG Afrika
11. Traffic and Transportation	-	JG Africa
12. Water Consumption	-	Atlantic Energy Partners
13. Planning	-	Macroplan.
14. Socio Economic	-	Savanah Environmental

Note that not all of these professionals are considered specialists as contemplated in chapter 3 of Regulation 326. Studies such as Engineering, Stormwater, Traffic, Water Consumption and Planning constitute “technical” studies, rather than specialist studies and as such, the requirements in appendix 6 of R326 do not apply to all these professionals

## 6. PLANNING CONTEXT

A Planning specialist was appointed in order to consider the planning implications of the proposed facility. The results of the findings of the planning specialist will be presented in the EIR. The following key components will likely take place from a planning perspective.

- A **land use change application** for the rezoning of approximately 212ha, from **Agricultural Zone I to Special Zone**, will be lodged at the Gamagara Local Municipality, in accordance with the Northern Cape Planning and Development Act (Act 7 of 1998).
- If there are restrictive Title Deed conditions burdening the proposed development, an application for the removal thereof will be lodged at the Government of the Northern Cape Province, Department: Corporate Governance and Traditional Affairs, in accordance with the Removal of Title Deed Restriction Act (Act 84 of 1967).
- Parallel to the rezoning application, a **long term lease application will be lodged at the National Department of Agriculture**, in accordance with the Subdivision of Agricultural Land Act (Act 70 of 1970).
- Relevant planning documents, on all spheres of Government, will be evaluated before any land use change application is launched. These documents include, but are not limited to the following: **NSDP** (National Spatial Development Perspective); **PGDS NC** (Provincial Growth and Development Strategy), Northern Cape Province; **IDP** (Integrated Development Plan); **SDF** (Spatial Development Framework).

The planning specialist will furthermore likely engage with the following authorities as part of the planning process. Where relevant, these authorities will also be engaged with as part of the Environmental Process and will be given an opportunity to provide input and comment on this:

- **Gamagara Municipality** for approval in terms of the relevant Zoning Scheme;
- Northern Cape Department of Agriculture as well as the National Department of Agriculture, Forestry & Fisheries (DAFF) for approval in terms of Act 70 of 70 (SALA) and Act 43 of 83(CARA);
- **District Roads Engineer** for comment on the land use application;
- **Department of Water and Sanitation** (DWS) for comment in terms of the National Water Act and the land use application;
- **Department of Mineral Resources** for approval in terms of Section 53 of Act 28 of 2002;
- **Department of Transport & Public Works** for comment on the land use application;
- **South African Heritage Resource** (SAHRA) Agency for comment on the land use application;
- **Civil Aviation Authority** for comment on the land use application;
- **Eskom** Northern Cape for comment on the land use application; and
- **Northern Cape Nature** Conservation for comment on the land use application.

## 7. ASSESSMENT OF IMPACTS

The potential key impacts identified and assessed by the various specialists in compliance with the approved Plan of Study for EIR (more details on the significance and ratings of these impacts are provided below and in the attached specialist reports).

### 7.1 ECOLOGICAL IMPACTS ASSESSED

#### *Construction Phase*

- **Vegetation clearing** for construction could impact indigenous species as well as riparian and terrestrial plant communities. Vegetation clearing will also lead to **habitat loss** for fauna and potentially the **loss of sensitive faunal species, habitats and ecosystems within the remaining natural areas.**
- Presence and operation of construction machinery on site. This will create a physical impact as well as generate noise, pollution and other forms of disturbance at the site. **Disturbance could affect faunal species.**
- Increased human presence can lead to faunal **conflict.**

#### *Operational Phase*

- The presence of the development could **disrupt the connectivity of the landscape.**



- **Human-animal conflict** can occur as a result of resident baboon troops in the area.
- **Alien clearing** will improve the ecology and habitat of the area.

#### *Cumulative Impacts*

- **Transformation of intact habitat** could **disrupt the connectivity** of the landscape for fauna and flora and **impair their ability to respond to environmental fluctuations**.

## 7.2 FRESHWATER IMPACTS ASSESSED

#### *Construction Phase*

- Alteration of **riparian habitat**;
- Risks associated with landscape scale alterations in **surface flows**;
- Changes in flows leading to **degradation of river quality**.
- **Sedimentation** of downstream watercourses;
- Water **quality impacts** into downstream river systems;

#### *Operational Phase*

- There is the potential for some **loss of aquatic habitat**;
- change in the **runoff characteristics** from the site as a result in the increase in hardened surfaces;
- use of water for the development and the associated disposal of wastewater;
- **Impairment of the surface water quality**, namely sedimentation and other pollutants

## 7.3 HERITAGE IMPACTS ASSESSED

#### *Construction Phase*

- Impact on scenic routes during construction

#### *Operational Phase*

- Impacts on the heritage resources
- Impact on scenic routes
- Impact of new structures on cultural landscape and character

#### *Cumulative impacts*

- Change to the rural character
- Socio-economic upliftment

## 7.4 ARCHAEOLOGICAL IMPACTS ASSESSED

#### *Construction Phase*

- disturbance to surface and sub-surface sediments

#### *Operational Phase*

- no significant archaeological resources were identified during this assessment

#### *Cumulative Impacts*

- No cumulative impacts will arise

## 7.5 VISUAL IMPACTS ASSESSED

#### *Construction Phase*

- Visual scarring as a result of new development, clearing vegetation and construction works.

#### *Operational Phase*

- Change in the rural visual character of the site from a restful, partly developed, rural
- Visual impact on key visual receptors and secondary visual receptors;
- Potential visual;
- Visibility from sensitive receptors;
- Visual intrusion of lighting at night.

## 7.6 SOCIO-ECONOMIC IMPACTS ASSESSED

### Construction Phase

- Creation of business and employment opportunities
- Impacts associated with the presence of construction workers on site;
- Security and safety impacts associated with the presence of construction workers;
- Noise, dust and safety impacts associated with construction related activities and the movement of heavy vehicles.

### Operational Phase

- Creation of employment and business opportunities;
- Impact on rural sense of place and character of the area;
- Crime levels and pressure on local services.

## 7.7 IMPACT STATEMENT

None of the participating specialists identified any impacts that remain high after mitigation. Because of the risk adverse approach followed for the development of the preferred layout, all the main sensitive features, namely significant archaeological features, sensitive habitat features (most notably the pans and areas of high density of *Acacia erioloba*) were avoided. The interconnection powerline has also been aligned along existing servitudes and does not traverse any highly sensitive features.

From an ecological perspective the development footprint of the Alternative 1 Gaetsewe Solar PV facility is restricted largely to low sensitivity habitat within the site. The affected area is considered suitable for development and there are no impacts associated with the Gaetsewe Solar PV facility that cannot be mitigated to a low level. As such there are no fatal flaws or high post-mitigation impacts that should prevent the development from proceeding. Based on the layout provided for the assessment, the Gaetsewe Solar PV facility can be supported from a terrestrial ecology point of view. The Gaetsewe Solar grid connection with associated infrastructure is likely to generate low impacts on fauna and flora after mitigation. No high impacts that cannot be avoided were observed and from a flora and terrestrial fauna perspective, there are no reasons to oppose the development of the grid connections and associated infrastructure.

A map showing the proposed activity in relation to the key sensitive features is in attached in appendix D. All sensitive features along with their appropriate buffers are shown in this plan. As required by the EMPr, all areas outside of the proposed development footprint are to be demarcated as no go areas.

Please refer to the table below listing the key impacts and their significance post mitigation for the preferred alternative. This section must be read in conjunction with the suggested mitigation measures listed in section 67 of this Report.

**Table 1:** Impact Summary Table

Impact	Significance (Post Mitigation) and Status
Impacts on vegetation and listed or protected plant species resulting from construction activities of the PV Plant	Medium – Low (Negative)
Direct Faunal Impacts During Construction of the PV Plant	Low (Negative)
Soil Erosion Risk During Construction of the PV Plant	Low (Negative)
Alien Plant Invasion Risk During Operation of the PV Plant	Low (Negative)
Soil Erosion Risk During Operation of the PV Plant	Low (Negative)
Faunal impacts during operation of the PV Plant	Low (Negative)
Cumulative Impact on broad-scale ecological processes due to cumulative loss and fragmentation of habitat	Low (Negative)
Impacts on vegetation and listed or protected plant species resulting from construction activities of the Overhead powerline	Low(Negative)
Ecosystem degradation along the power line route due to erosion and alien plant invasion.	Low (Negative)
The possibility of permanent loss of high potential agricultural land and the impairment of land capability due to construction.	Low (Negative)

Impact	Significance (Post Mitigation) and Status
Veld conditions for grazing and the possible impact of vegetation removal during construction.	Medium (Negative)
The alteration of drainage patterns and its associated risk for erosion; due to the removal of vegetation during construction of the plant, the building of service and access roads if rehabilitation is not properly done in erosion-sensitive areas.	Low (Negative)
Changes in hydrological regimes	Very Low (Negative)
Impact on Avifaunal Priority Species	Medium – Low (Negative)
Impact on Avifaunal displacement	Low (Negative)
Avian Electrocutation Impact	Low (Negative)
Avian Collision Impact	Medium (Negative)
Overall Visual Impact	Low (Negative)
Impact on Archaeological Resources during construction	Low (Negative)
Impact on Archaeological resources during operation	Low (Negative)
Impact on Palaeontological Resources during construction	Low (Negative)
Impact on Palaeontological Resources during operation	Low (Negative)
Creation of employment and Business opportunities	Medium (Positive)
Impact of heavy machinery and construction activities	Low (Negative)
Loss of farmland	Low (Negative)
Loss of riparian systems	Low (Negative)
Impact on dry riverbeds and localised drainage systems	Low (Negative)
Impact on riparian systems through the possible increase in surface water runoff on riparian form and function	Low (Negative)
Increase in sedimentation and erosion within the development footprint	Low (Negative)
Creation of direct and indirect employment and skills development opportunities.	Medium (Positive)
Economic multiplier effects	Medium (Positive)
In-migration of people (non-local workforce and jobseekers).	Low (Negative)
Safety and security impacts	Low (Negative)
Impacts on daily living and movement patterns	Medium (Positive)
Nuisance impact (noise and dust)	Low (Negative)
Visual and sense of place impacts	Low (Negative)
Direct and indirect employment and skills development opportunities	Medium (Positive)
Development of non-polluting, renewable energy infrastructure	Medium (Positive)
Contribution to LED and social upliftment	High (Positive)
Visual and sense of place impacts	Low (Negative)
Impacts associated with the loss of agricultural land.	Low (Negative)

## 8. CONCLUSIONS & RECOMMENDATIONS

This environmental process is currently being undertaken to present proposals to the public and potential Interested & Affected Parties and to identify and assess environmental impacts, issues and concerns raised as a result of the proposed development alternatives.

This will allow Interested & Affected Parties (I&APs), authorities, the project team, as well as specialists to provide input and raise issues and concerns, based on baseline / scoping studies undertaken. The Gaetsewe Solar PV Energy Facility has been analysed from Ecological, Avifaunal, Agricultural Potential, Heritage (including Archaeology and Palaeontology), Freshwater, Social and Visual perspectives, and site constraints and potential impacts identified.

Cape EAPrac is of the opinion that the information contained in this Impact Report and the documentation attached hereto is sufficient to allow the competent authority to apply their minds to the potential negative and/or positive impacts associated with the development, in respect of the activities applied for. This environmental process has not identified any fatal flaws with the proposal and as such it is our reasoned view that the project should proceed to the next phase of the environmental process. All specialists concur that the development as proposed (Layout Alternative 1) can be considered for approval and that there are no reason(s) why the development should not be implemented. All impacts range from high positive to medium

negative and all highly negative impacts have been avoided by the risk adverse approach to the development of this facility.

All stakeholders are requested to review this Environmental Impact and the associated appendices, and provide comment, or raise issues of concern, directly to *Cape EAPrac* within the specified 30-day comment period.

It is the recommendation of this office that the development proposal, Layout Alternative 1, be considered for approval by the competent Authority on condition that all other legislative approvals be obtained, and that the final EMPr be adhered to.

## **8.1 REMAINDER OF ENVIRONMENTAL PROCESS**

The following process is to be followed for the remainder of the environmental process:

- This Draft EIR is be made available for public review and comment period of 30-days;
- The Final EIR will be submitted to the DEA for consideration and decision-making;
- The DEA's decision (Environmental Authorisation) on the FEIR will be communicated with all registered I&APs.

# DRAFT ENVIRONMENTAL IMPACT REPORT - MAIN REPORT

## 1. INTRODUCTION

**Cape EAPrac** has been appointed by **K2018091758 (SOUTH AFRICA) (Pty) Ltd**, hereafter referred to as the Applicant, as the independent **Environmental Assessment Practitioner (EAP)**, to facilitate the **Scoping & Environmental Impact Reporting (S&EIR)** process required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for the proposed development of the '**Gaetsewe Solar**' Energy Facility near Kathu in the Northern Cape Province of South Africa.

K2018091758 (SOUTH AFRICA) (Pty) Ltd have an option to lease a section of **Portion 2 of the Farm 460 Legoko** from the landowner, Carel Reitz family trust, for the purposes of developing the proposed solar facility. A copy of a letter from Carel Reitz family trust providing consent for the continuation of the EIA is attached in **Annexure G2**.

The Grid connection across the **Farm Sekgame 460** is considered to constitute a linear activity and as such, landowner consent is not required in terms of these regulations. This landowner has been automatically registered as an interested and affected party and will be given an opportunity to provide input into this environmental process.

The **total generation capacity** (contracted capacity) of the photovoltaic power generation facility will not exceed **75 Megawatts (MW)** for input into the national Eskom grid.

The purpose of this **Environmental Impact Report** is to describe the environment to be affected, the proposed project, consider all comments received in the two comment periods that have taken place to date, to present the site constraints identified by the various specialist during their site assessments, and provide and to assess the impacts of this development on the receiving environment. This environmental process has been subjected to the following public participation periods:

- The pre application Scoping Report was available for review and comment for a period of 30 Days extending from: **13 June 2018 – 16 July 2018**.
- The Scoping Report was available for a further 30 Day comment period extending from **27 July 2018 – 27 August 2018**.
- The Draft Environmental Impact Report was available for a 30 Day comment period extending from 04 December 2018 – 25 January 2019.

### 1.1 RECOMMENDATION OF THIS EIA

The proposal by the developer is to develop Portion 2 of the Farm 460 Legoko as a renewal energy generation facility (PV). The project has received general support throughout the ongoing environmental application, with no major issues identified by any of the participating stakeholders.

The EIA process, through various investigations, has found that the proposal can be supported and that the potential negative impacts that may arise from this development can be effectively mitigated.

It is thus Cape EAPrac's considered opinion that the preferred alternative (Layout Alternative 1) can be considered for approval.

### 1.2 OVERVIEW OF ALTERNATIVE ENERGY IN SOUTH AFRICA AND THE NORTHERN CAPE

South Africa's generation capacity is dominated by coal-fired generation stations with a net output of 35.6 GWp, which represents over 85% of the country's total installed capacity of over 44 GW.

Globally, renewable energy has gained momentum, with a significant rise in the uptake of various renewable energy technologies such as solar photovoltaics (PV), wind energy, biogas and other biofuels, hydroelectricity, landfill gas, geothermal energy, and concentrated solar power (CSP).

Ministerial determinations by the South African government to procure renewable energy — such as the Integrated Resource Plan (IRP) for Electricity 2010-2030, which lays out the country's electricity future — have given growth in the renewable energy sector a significant boost.

South Africa's green economy, partly driven by the country's utility-scale Renewable Energy Independent Power Production Procurement Programme (REIPPPP), reflects these trends and is leading the way in some areas. According to Moody's, South Africa had the fastest growing green economy in the world in 2015. The REIPPPP, a key factor in this growth, is in its sixth year and has achieved remarkable successes. To date, the programme has:

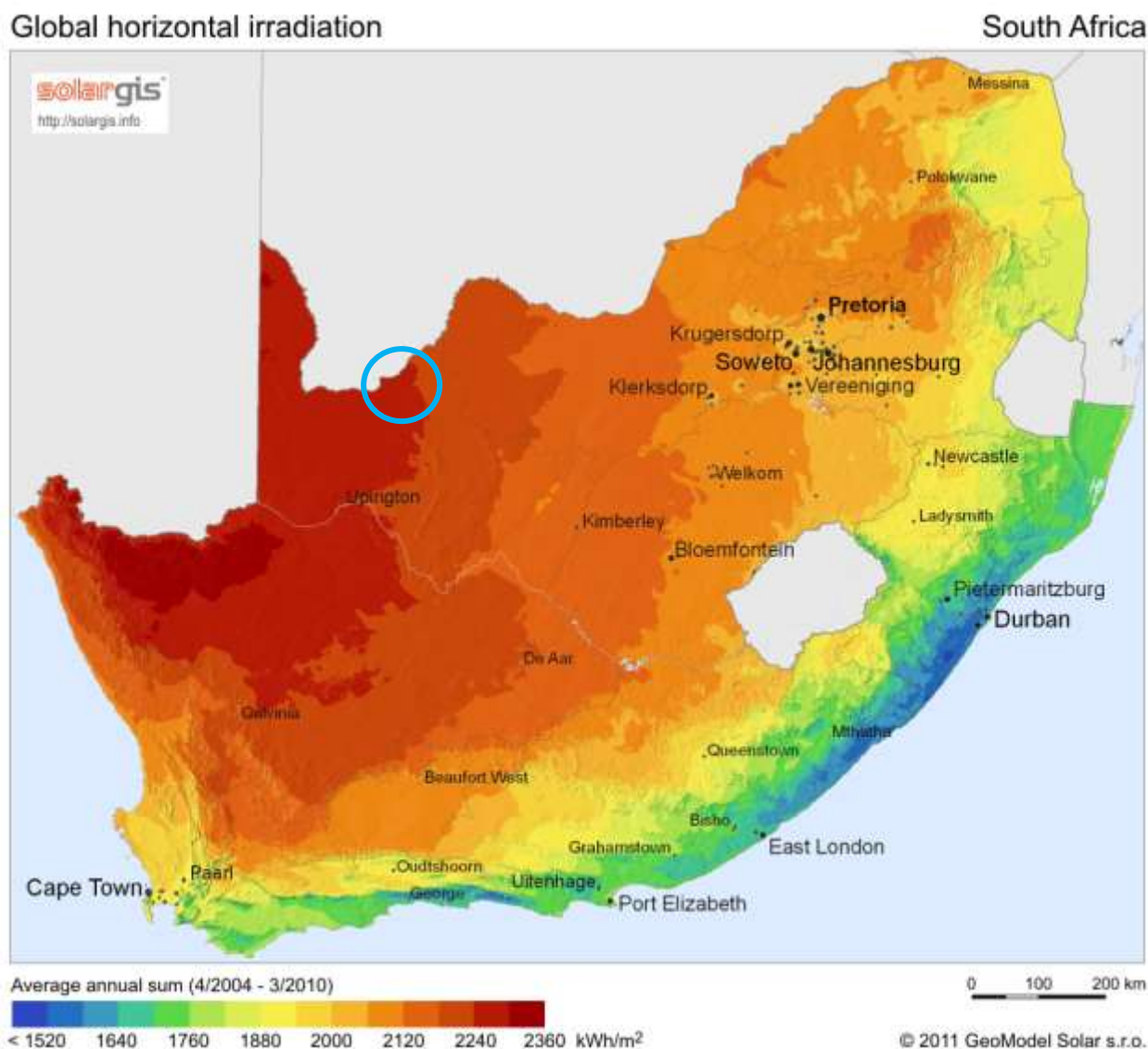
- Procured over 6 300 MWp of RE generation capacity, of which over 2 500 MWp was connected and has been feeding electricity into the national grid since June 2016.
- Selected 102 preferred bidders to develop utility-scale projects across the country – with projects in every province across South Africa.
- Received a ministerial determination to procure a further 6 300 MWp of generation capacity. This is the second time capacity to the programme has been doubled – a testimony to its success.
- Attracted over R195 billion of investment into South Africa, with over 25% from foreign investors. In doing so, the programme, through local content requirements, has successfully stimulated the development of a local renewable energy technology components manufacturing sector. Given the additional 6 300 MWp still to be procured, this sector is set to grow further.
- Achieved significant technology price reductions, with South Africa boasting some of the world's lowest clean energy costs.

Beyond these successes, the programme and, consequently, the utility-scale renewable energy industry, is well positioned to continue contributing to South Africa's national development, as enshrined in the government's Strategic Infrastructure Projects (SIP) and the National Development Plan (NDP). The programme's socio-economic development (SED) and enterprise development (ED) mechanisms give successful project developers a unique opportunity to be competitive in their bidding strategy, while contributing meaningfully to the local and national economy. Project developers have fully embraced the SED/ED component of the REIPPPP, resulting in numerous inspiring contributions to priority areas on the government's developmental agenda. Among other areas, these contributions span community development, local economic development, skills development and early childhood development.

The recent uncertainties involving the state-owned utility, Eskom, highlight the need for reforms in an evolving energy sector, where electricity generation, transmission and distribution systems require unbundling. The interest from local municipalities in procuring renewable energy generation capacity from independent power producers (IPPs) contributes further to the shift in the structure of the country's power sector.

Regionally, the Northern Cape is suggested by many to be the ideal location for various forms of alternative energy; this has resulted in a number of feasibility studies being conducted, not least of which, an investigation by the Industrial Development Corporation in 2010 into potential for photo-voltaic, thermal, solar and wind power (Northern Cape Business website, 2010).

The northern area of the Northern Cape and Namibia boasts the highest solar radiation intensity anywhere in Southern Africa. Solar energy is therefore likely to be the most viable alternative energy source for the Northern Cape, although wind-power potential is generally good along the coast (State of the Environment, S.A, 2014)



**Figure 1:** Global Horizontal radiation map for South Africa (Source: <http://solargis.info>, 2015) showing the approximate area proposed for Hotazel Solar.

The Northern Cape area is considered to have extremely favourable solar radiation levels over the majority of the year, making it ideal for the production of solar-power via photovoltaic (fixed and tracking panels) and concentrated (solar thermal) solar technology systems. Several solar irradiation maps have been produced for South Africa, all of which indicate that the Northern Cape area has **high solar irradiation**.

The Northern Cape is not too dusty, the land is flat and sparsely populated, and there are little to no geological or climate risks, meaning that the sun can be used year-round (BuaNews online, 2014). An advantage that the Northern Cape has over the Sahara Desert is the relatively wind-free environment that prevails in large portions of the province. A Clinton Climate Initiative (CCI) pre-feasibility study has found that South Africa has one of the best solar resources on the planet (Northern Cape Business website – solar power, 2015).

The introduction of private sector generation offers multiple benefits; it will contribute greatly to the diversification of both the supply and nature of energy production, assist in the introduction of new skills and in new investment into the industry, and enable the benchmarking of performance and pricing. The Department of Energy (DoE), National Treasury (NT) and the Development Bank of Southern Africa (DBSA) established the IPPPP Unit for the specific purpose of delivering on the IPP procurement objectives. The REIPPPP is a competitive bidding process used by national government to procure renewable energy generation capacity in line with the national Integrated Resource Plan (IRP) for Electricity 2010-2030.

**NOTE:** It is the intention that Gaetsewe Solar will submit a bid under this REIPPPP.

### 1.3 ASSUMPTIONS & LIMITATIONS

This section provides a brief overview of *specific assumptions and limitations* having an impact on this environmental application process:

- It is assumed that the information on which this report is based (specialist studies and project information, as well as existing information) is **correct, factual and truthful**.
- The proposed development is **in line** with the statutory planning vision for the area (namely the local Spatial Development Plan), and thus it is assumed that issues such as the cumulative impact of development in terms of character of the area and its resources, have been taken into account during the strategic planning for the area.
- It is assumed that all the relevant **mitigation measures** and agreements specified in this report will be implemented in order to ensure minimal negative impacts and maximum environmental benefits.
- It is assumed that due consideration will be given to the **discrepancies in the digital mapping** (PV panel array layouts against possible constraints), caused by differing software programs, and that it is understood that the ultimate/final positioning of solar array will only be confirmed on-site with the relevant specialist/s.
- The Department of Water Affairs **may consider the submission of a water use application** necessary for allowing the use of water from the farm boreholes and possible the crossing of the on-site drainage lines by the infrastructure associated with the solar facility. The assumption is made that on review of this Draft Scoping Report, the Department of Water Affairs will provide prompt confirmation and recommendations in this regard.
- It is assumed that Stakeholders and Interested and Affected Parties notified during the initial public participation process will submit all relevant **comments within the designated 30-days** review and comment period, so that these can included in the FSR can be timeously submitted to the delegated Authority, the Department Environmental Affairs for consideration.

The assumptions and limitations of the various specialist studies are included in their respective reports attached in **Appendix E**.

## 2. LEGISLATIVE AND POLICY FRAMEWORK

The legislation that is relevant to this study is briefly outlined below. These environmental requirements are not intended to be definitive or exhaustive, but serve to highlight key environmental legislation and responsibilities only.

Although a number of guidelines, policies and Acts apply to the proposed activity, the National Environmental Management Act (NEMA), the National Water Act (NWA), Conservation of Agricultural Resources Act (CARA) and the National Heritage Resources Act (NHRA) are key Acts regulating this application.

The current assessment is being undertaken in terms of the **National Environmental Management Act** (NEMA, Act 107 of 1998 as amended)<sup>3</sup>. This Act makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority based on the findings of an Environmental Assessment. The outcome of this S&EIR process will inform DEA's decision whether to approve or reject this application.

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<sup>3</sup> On 18 June 2010 the Minister of Water and Environmental Affairs promulgated new regulations in terms of Chapter 5 of the National Environmental Management Act (NEMA, Act 107 of 1998), viz, the Environmental Impact Assessment (EIA) Regulations 2010. These regulations came into effect on 02 August 2010 and replace the EIA regulations promulgated in 2006. In December 2014 these Regulations were replaced with the latest 2014 Regulations and in April 2017 amendments were issued.



## 2.1 NATIONAL LEGISLATION

This section deals with nationally promulgated or nationally applicable legislation associated with the proposed Gaetsewe Solar facility.

### 2.1.1 The Constitution of the Republic of South Africa

The Constitution of the Republic of South Africa (Act 108 of 1996) states that everyone has a right to a non-threatening environment and that reasonable measures are applied to protect the environment. This includes preventing pollution and promoting conservation and environmentally sustainable development, while promoting justifiable social and economic development.

The Constitution and Bill of Rights provides that:

Everyone has the right:

- to an environment that is not harmful to their health or well-being; and
- to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures:
  - prevent pollution and ecological degradation
  - promote conservation; and
  - secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development.

### 2.1.2 National Environmental Management Act (NEMA)

The National Environmental Management Act (No. 107 of 1998) (NEMA) is South Africa's key piece of environmental legislation, and sets the framework for environmental management in South Africa. It provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment. NEMA is founded on the principle that everyone has the right to an environment that is not harmful to their health or well-being as contained within the Bill of Rights. In accordance with this it states that:

- The State must respect, protect, promote and fulfil the social, economic and environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities.
- Sustainable development requires the integration of social, economic and environmental factors in the planning, implementation and evaluation of decisions to ensure that development serves present and future generations.
- Everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation, and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

In addition, the national environmental management principles contained within NEMA state that:

- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
- Development must be socially, environmentally and economically sustainable.
- The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment

The need for responsible and informed decision-making by government on the acceptability of environmental impacts is therefore enshrined within NEMA

The current assessment is being undertaken in terms of the **National Environmental Management Act** (NEMA, Act 107 of 1998)<sup>4</sup>. This Act makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority (in this case, the national Department of Environmental Affairs, DEA) based on the findings of an Environmental Assessment.

The proposed development entails a number of listed activities, which require a **Scoping & Environmental Impact Reporting (S&EIR) process**, which must be conducted by an independent environmental assessment practitioner (EAP). Cape EAPrac has been appointed to undertake this process. Figure 2 below depicts a summary of the S&EIR process.

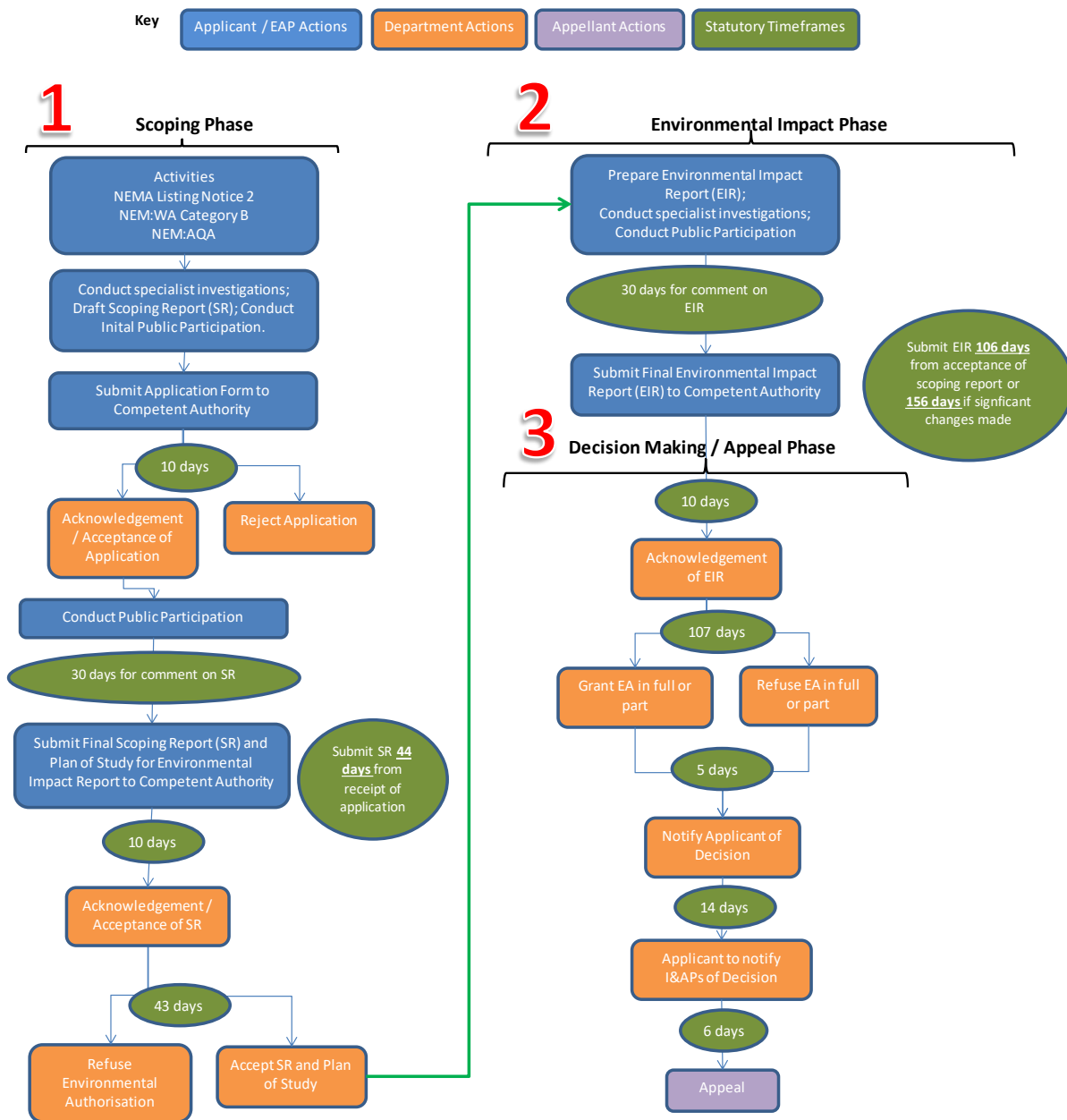


Figure 2: Summary of Scoping & EIR Process in terms of the 2014 Regulations.

<sup>4</sup> The Minister of Water and Environmental Affairs promulgated new regulations in terms of Chapter 5 of the National Environmental Management Act (NEMA, Act 107 of 1998), viz, the Environmental Impact Assessment (EIA) Regulations 2014 (as amended in April 2017). These regulations came into effect on 08 December 2014 (amended on 07 April 2017) and replace the EIA regulations promulgated in 2006 and 2010.

The listed activities associated with the proposed development, as stipulation under 2014 Regulations **327, 325 and 324** are as follows:

**Table 2:** NEMA 2014 (As amended in April 2017) listed activities for the Gaetsewe Solar Energy Facility

Listed activity as described in GN R.983, 984 and 985	Description of project activity that triggers listed activity
<b>Regulation 327 – Basic Assessment</b>	
GN R327 Activity 11: The development of facilities or infrastructure for the transmission and distribution of electricity- (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or	The proposed Gaetsewe Solar will connect to the national electricity via the Sekgame Switching Station. The proposed distribution and transmission infrastructure includes the construction of an on-site substation and a 132kV overhead power line from the on-site substation to the Sekgame Switching Station
GN R327 Activity 28: Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	The area is currently utilised for limited agricultural purposes. The construction of a PV Facility is considered as commercial use.
<b>Regulation 325 – Scoping and Environmental Impact Reporting</b>	
GN R325 Activity 1: The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs within an urban area.	The proposed Gaetsewe Solar Energy Facility will have a maximum generation Capacity of 75 megawatts(AC) and as such exceeds the threshold defined in this activity.
GN R325 Activity 15: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	The proposed Gaetsewe Solar Energy Facility will have a maximum footprint of 212ha and as such exceeds the threshold defined in this activity.
<b>Regulation 324 – Basic Assessment</b>	
NO Activities in terms of Regulation 324.	

**NOTE:** Basic Assessment as well as Scoping and Environmental Impact Reporting Activities are being triggered by the proposed development and as such, the Environmental Process will follow a Scoping and Environmental Impact Reporting process.

Before any of the above mentioned listed activities can be undertaken, authorisation must be obtained from the relevant authority, in this case the National Department of Environmental Affairs (DEA). Should the Department approve the proposed activity, the Environmental Authorisation does not exclude the need for obtaining relevant approvals from other Authorities who has a legal mandate.

### 2.1.3 National Environmental Management: Biodiversity (ACT 10 OF 2004)

The National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA) provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or

protected. The Draft National List of Threatened Ecosystems (Notice 1477 of 2009, Government Gazette No 32689, 6 November 2009) has been gazetted for public comment.

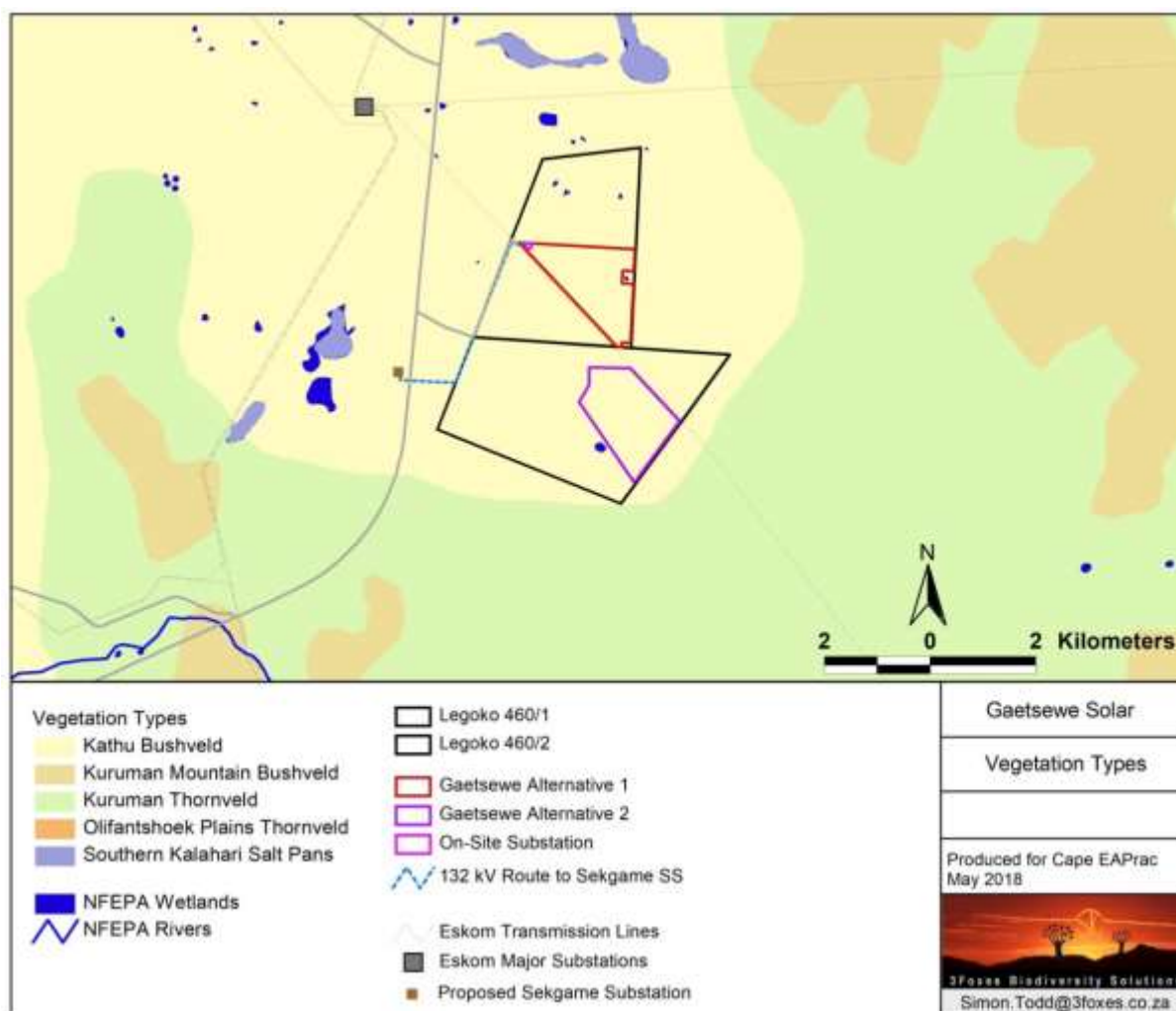
The list of threatened terrestrial ecosystems supersedes the information regarding terrestrial ecosystem status in the NSBA 2004. In terms of the EIA regulations, a basic assessment report is required for the transformation or removal of indigenous vegetation in a critically endangered or endangered ecosystem regardless of the extent of transformation that will occur. **However, all of the vegetation types on both the study sites are classified as Least Threatened.**

NEMBA also deals with endangered, threatened and otherwise controlled species. The Act provides for listing of species as threatened or protected, under one of the following categories:

- **Critically Endangered:** any indigenous species facing an extremely high risk of extinction in the wild in the immediate future.
- **Endangered:** any indigenous species facing a high risk of extinction in the wild in the near future, although it is not a critically endangered species.
- **Vulnerable:** any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future; although it is not a critically endangered species or an endangered species.
- **Protected species:** any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Certain activities, known as Restricted Activities, are regulated by a set of permit regulations published under the Act. These activities may not proceed without environmental authorization.

According to the national vegetation map (Mucina & Rutherford 2006), the site is restricted to the **Kathu Bushveld** vegetation type. This vegetation unit occupies an area of 7443 km<sup>2</sup> and extends from around Kathu and Dibeng in the south through Hotazel and to the Botswana border between Van Zylsrus and McCarthysrus. In terms of soils the vegetation type is associated with aeolian red sand and surface calcrete and deep sandy soils of the Hutton and Clovelly soil forms. The main land types are Ah and Ae with some Ag. The Kathu Bushveld vegetation type is still largely intact and less than 2% has been transformed by mining activity and it is classified as **Least Threatened**. It is, however, poorly conserved and does not currently fall within any formal conservation areas. Although no endemic species are restricted to this vegetation type a number of Kalahari endemics are known to occur in this vegetation type such as *Acacia luederitzii* var *luederitzii*, *Anthehora argentea*, *Megaloprotachne albescens*, *Panicum kalaharensense* and *Neuradopsis bechuanensis*. It is more fully described as it occurs at the site in the next section. Other vegetation types that occur in the immediate area include **Kuruman Thornveld** and **Kuruman Mountain Bushveld**, neither of which is of conservation concern.



**Figure 3:** Broad-scale overview of the vegetation in and around the Gaetsewe site (Todd, 2018)

The vegetation map is an extract of the national vegetation map as produced by Mucina & Rutherford (2006), and also includes wetlands delineated by the National Freshwater Ecosystem Priority Areas assessment (Nel et al. 2011). **There are no mapped drainage lines within the site.**

#### 2.1.4 National Forests Act (No. 84 of 1998):

The National Forests Act provides for the protection of forests as well as specific tree species, quoting directly from the Act: “no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated”.

The ecological specialist, Mr Simon Todd, Two NFA-protected tree species occur at the site, *Acacia erioloba* and *Acacia haematoxylon*. The density of both species within the preferred alternative is low and a significant impact on the local population of either species would not occur as a result of the development of this area.

Please refer to the **Ecological Impact Assessment** in **Annexure E1** for a detailed description of the protected species on the site.

#### 2.1.5 Conservation of Agricultural Resources Act – CARA (Act 43 of 1983):

CARA provides for the regulation of control over the utilisation of the natural agricultural resources in order to promote the conservation of soil, water and vegetation and provides for combating weeds and invader plant species. The Conservation of Agricultural Resources Act defines different categories of alien plants:

- Category 1 - prohibited and must be controlled;
- Category 2 – must be grown within a demarcated area under permit; and
- Category 3 - ornamental plants that may no longer be planted, but existing plants may remain provided that all reasonable steps are taken to prevent the spreading thereof, except within the flood lines of water courses and wetlands.

The abundance of alien plant species on the Gaetsewe Solar Energy Facility site is very low, which can be ascribed mainly to the aridity of the site.

The Department of Agriculture, Land Reform and Rural Development is guided by Act 43 of 1983.

In order to comply with their mandate in terms of this legislation, the developer is required to take note of the following:

Article 7.(3)b of Regulation 9238: CONSERVATION OF AGRICULTURE RESOURCES, 1983 (Act 43 of 1983)

Utilisation and protection of vleis, marshes, water sponges and water courses

- 7.(1) “no land user shall utilize the vegetation in a vlei, marsh or water sponge or within the flood area of a water course or within 10 meters horizontally outside such flood area in a manner that causes or may cause the deterioration of or damage to the natural agriculture resources.”
- (3)(b) “cultivate any land on his farm unit within the flood area of a water course or within 10 meters horizontally outside the flood area of a water course”.

As confirmed by the Freshwater Ecologist, the proposed development will not have an impact on any freshwater resources on or adjacent to the site.

### 2.1.6 National Heritage Resources Act

The protection and management of South Africa’s heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999). South African National Heritage Resources Agency (SAHRA) is the enforcing authority in the Northern Cape, and is registered as a Stakeholder for this environmental process.

In terms of Section 38 of the National Heritage Resources Act, SAHRA will comment on the detailed Heritage Impact Assessment (HIA) where certain categories of development are proposed. Section 38(8) also makes provision for the assessment of heritage impacts as part of an EIA process.

The National Heritage Resources Act requires relevant authorities to be notified regarding this proposed development, as the following activities are relevant:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- any development or other activity which will change the character of a site exceeding 5 000 m<sup>2</sup> in extent;
- the re-zoning of a site exceeding 10 000m<sup>2</sup> in extent.

Furthermore, in terms of Section 34(1), no person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the SAHRA, or the responsible resources authority.

Nor may anyone destroy, damage, alter, exhume or remove from its original position, or otherwise disturb, any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority, without a permit issued by the SAHRA, or a provincial heritage authority, in terms of Section 36 (3).

In terms of Section 35 (4), no person may destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object, without a permit issued by the SAHRA, or the responsible resources authority.

Mr Stefan de Kock, of Perception Heritage Planning, has been appointed to undertake an integrated heritage assessment for the proposed Gaetsewe Solar Energy Facility. This integrated heritage study has included an Archaeological Impact Assessment to be undertaken by Dr Peter Nilssen as well as a Paleontological Desktop Assessment undertaken by Dr John Almond.

Please refer to the Integrated Heritage Report, Archaeological Impact Assessment and Paleontological Desktop Assessment attached in Annexure E6, E4 & E5 respectively.

An application in terms of Section 38 of the NHRA has been lodged via the SAHRIS system and the case ID is 13125.

### **2.1.7 National Water Act, NO 36 OF 1998**

Section 21c & i of the National Water Act (NWA) requires the Applicant to apply for authorisation from the Department of Water and Sanitation for an activity in, or in proximity to any watercourse. Such an application would be required for any access road or PV infrastructure that crosses any watercourse.

Section 21(a) of the National Water Act is related to the abstraction of water from a water resource (including abstraction of groundwater). A Water Use Licence (WUL) would be required for such abstraction.

Water required for the construction and operation of the Gaetsewe Solar Energy Facility is to be sourced from the Gamagara Local Municipality and proof of availability thereof is included appendix G6. In Future, should the project consider abstraction from a water resource for the purposes of construction or operating of the facility, such abstraction will likely require a licence in terms of Section 21(a) of the NWA.

The ecological specialist has, as part of his baseline studies, confirmed that the project does not propose any infrastructure that encroaches onto a surface water resource. The only surface water resources identified on the property are a number of pans that may periodically contain water. These pans have however been excluded from the proposed development footprint.

The proposed development footprint is however within 500m of these pans and as such, an application for General Authorisation in terms of the National Water Act has been lodged with the Department of Water and Sanitation with Doug Jefferey Environmental Consultants. Proof of submission of this application will be included in the Final EIR.

### **2.1.8 National Energy Act (No. 34 of 2008)**

The purpose of the National Energy Act (No. 34 of 2008) is 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, while taking environmental management requirements into account. In addition, the Act also provides for energy planning, and increased generation and consumption of Renewable Energies (REs).

The objectives of the Act, are to amongst other things, to:

- Ensure uninterrupted supply of energy to the Republic.
- Promote diversity of supply of energy and its sources.
- Facilitate energy access for improvement of the quality of life of the people of the Republic.
- Contribute to the sustainable development of South Africa's economy.

The National Energy Act therefore recognises the significant role which electricity plays growing the economy while improving citizens' quality of life. The Act provides the legal framework which supports the development of renewable energy facilities for the greater environmental and social good, and provides the backdrop against which South Africa's strategic planning regarding future electricity provision and supply takes place. It also provides the legal framework which supports the development of renewable energy facilities for the greater environmental and social good.

## 2.2 PROVINCIAL LEGISLATION

This section deals with provincially promulgated or provincially applicable legislation associated with the proposed Gaetsewe Solar facility.

### 2.2.1 Northern Cape Nature Conservation Act, No. 9 of 2009:

The Northern Cape Nature Conservation Act provides inter alia for the sustainable utilisation of wild animals, aquatic biota and plants as well as permitting and trade regulations regarding wild fauna and flora within the province. In terms of this act the following section may be relevant with regards to any security fencing the solar development may require.

Manipulation of boundary fences: 19. No Person may –

(a) erect, alter, remove or partly remove or cause to be erected, altered, removed or partly removed, any fence, whether on a common boundary or on such person's own property, in such a manner that any wild animal which as a result thereof gains access or may gain access to the property or a camp on the property, cannot escape or is likely not to be able to escape therefrom.

It is recommended that the perimeter fencing around the solar development site will be constructed in a manner which allows for the passage of small and medium sized mammals: The biodiversity specialist will make recommendations with regard to the specific fencing configuration during the EIA phase of this project.

The conservation status of the plant species which have been recorded in previous studies in the area listed in the table below. Of these only *Boophone disticha* and *Acacia erioloba* can be confirmed present at the site. *Asparagus stipulaceus* does not occur in the area and is on the list as a result of the outdated taxonomy of historical species lists for the area, as this species is restricted to the coast and does not occur inland.

**Table 3:** Listed plant species known from the broad vicinity of the proposed Gaetsewe study area (Todd, 2018)

Family	Species	Status
AMARYLLIDACEAE	<i>Boophone disticha</i>	<sup>5</sup> Declining
FABACEAE	<i>Acacia erioloba</i>	Declining
ASPARAGACEAE	<i>Asparagus stipulaceus</i>	NT
ASTERACEAE	<i>Gnaphalium declinatum</i>	NT
MESEMBRYANTHEMACEAE	<i>Antimima lawsonii</i>	Rare

The Ecologist also confirmed that there are occasional Wild Olive trees (*Olea europaea subsp. Cuspidate*) present at the site, which are provincially protected, but these occur at a low density and few individuals would be impacted under either alternative.

Please also refer to the **Ecological Impact Assessment** attached in **Annexure E1** for further information on protected species present on site.

### 2.2.2 Nature and Environmental Conservation Ordinance (19 of 1974)

This legislation was developed to protect both animal and plant species within the various provinces of the country which warrant protection. These may be species which are under threat or which are already considered to be endangered. The provincial environmental authorities are responsible for implementing the provisions of this legislation, which includes the issuing of permits etc. In the Northern Cape, the Department of Environment and Nature Conservation fulfils this mandate as per the Northern Cape Nature Conservation Act as described above.

### 2.2.3 Astronomy Geographic Advantage Act, 2007 (Act No 21 Of 2007)

<sup>5</sup> According to Todd, 2018 – *Boophone disticha* is no longer listed as declining.



The purpose of the Act is to preserve the geographic advantage areas that attract investment in astronomy. The entire Northern Cape Province, excluding the Tsantsabane Municipality, has been declared an astronomy advantage area. The Northern Cape optical and radio telescope sites were declared core astronomy advantage areas. The Act allowed for the declaration of the Southern Africa Large Telescope (SALT), Meerkat and Square Kilometre Array (SKA) as astronomy and related scientific endeavours that has to be protected.

The Nearest SKA station has been identified as **REM-Opt-14**, which is approximately 110km from the site.

**The South African SKA Project Office** have been registered as a key stakeholder on this environmental process and will be requested to provide comment and input in terms of the Astronomy Geographic Advantage Act and potential impact to SKA. SKA to date have not provided specific comment on this facility, but have provided comment on another facility on the same property, where it was confirmed that the Risk to SKA is low and that NO mitigation measures are required.

## **2.3 REGIONAL AND MUNICIPAL LEGISLATION**

This section deals with regionally and municipally promulgated or regionally or municipally applicable legislation associated with the proposed Gaetsewe Solar facility<sup>6</sup>.

### **2.3.1 Northern Cape Provincial Spatial Development Framework (PSDF) (2012)**

The Northern Cape Provincial Spatial Development Framework (PSDF) (2012) states that the overarching goal for the province is to enable sustainability through sustainable development. The province considers social and economic development as imperative in order to address the most significant challenge facing the Northern Cape, which is poverty.

The PSDF considers the release of greenhouse gas (GHG) emissions created by human activity as the key cause of global warming, which in turn could result in major negative effects and disasters in the short- and medium-term. This effect would increasingly undermine human development gains. Innovative strategies would have to be implemented to reduce the impact of global deterioration.

The PSDF identifies key sectoral strategies and plans which are considered to be the key components of the PSDF. Sectoral Strategy 19 refers to a provincial renewable energy strategy. Within the PSDF a policy has been included which states that renewable energy sources (including the utilisation of solar energy) are to comprise 25% of the Province's energy generation capacity by 2020.

The overall energy objective for the province also includes promoting the development of renewable energy supply schemes which are considered to be strategically important for increasing the diversity of domestic energy supply and avoiding energy imports, while also minimising the detrimental environmental impacts. The implementation of sustainable renewable energy is also to be promoted within the Province through appropriate financial and fiscal instruments.

Considering the need for the development of renewable energy facilities in order to achieve the objective of sustainability the development of the proposed solar energy facility within the Northern Cape and within the study area is considered to be aligned with the Northern Cape PSDF.

### **2.3.2 John Taolo Gaetsewe DM Final Draft Integrated Development Plan (IDP) 2018 – 2019 (2017)**

The vision of the John Taolo Gaetsewe DM as contained within the Final Draft IDP 2018 – 2019 (2017) is:

*“Working together for a better life for all in the district.”*

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<sup>6</sup> This section includes legislation applicable to both the District (Category C) and Local (Category B) municipalities.

The mission statement of John Taolo Gaetsewe DM reflects what the DM will do in an ongoing manner to strive towards achieving its vision. The mission of the John Taolo Gaetsewe DM is:

*“Accelerating the implementation of integrated development initiatives and providing support to local municipalities.”*

In terms of development priorities the Final Draft IDP 2018 – 2019 (2017) determined that the results of the 2016 Community Survey suggest that the number of people residing within the DM is increasing, as a direct result of mining related activities. Implications for the DM in this regard include:

- The scope and extent of the DM's Spatial Development Framework (SDF).
- Service delivery demands placed on the DM and its LMs.
- The grading of the LMs, and the resources (i.e. grants and subsidies) made available to them.

The activities of the DM need to reflect its population demographics, both in terms of service delivery, as well as in terms of employment equity. Gender, racial and disability population demographics have been identified as being of particular importance in this regard. As a result, special interest groups, such as the youth, women, and persons with disabilities require specific focus in the strategic priorities of the DM.

The implementation of Gaetsewe Solar would contribute towards addressing some of the John Taolo Gaetsewe DM's development priorities through the creation of new employment opportunities which could support a portion of the increasing population, while the increase in revenue from the project could assist in the municipality in addressing service delivery demands.

### 2.3.3 John Taolo Gaetsewe DM Phase 5 Draft Spatial Development Framework (SDF) (2017)

The main economic sectors applied within the John Taolo Gaetsewe DM include eco-tourism, agriculture, mining and community services. Even though the development of RE is not specifically mentioned as part of the framework, the development of a solar energy facility within the area will add to the current economic sectors. That specifically includes community services as the development of a solar energy facility will aid in the provision of electricity, as well as employment opportunities and skills development on a local level.

The SDF states that one of the key objectives for the DM is to attract new business. With the proposed development of a solar energy facility within the area, other developers might be encouraged to consider the area as a viable location for further development. This could attract new business to the area and promote financial and socio-economic development within the DM.

### 2.3.4 Gamagara LM Integrated Development Plan (IDP) 2017 – 2022 (2017)

The vision for the Gamagara LM as contained within the IDP 2017 – 2022 (2017) is as follows:

*“Build prosperous and sustainable communities.”*

The Mission of the Gamagara LM is as follows:

*“To provide universal, sustainable services to the community in order to attain a safe and healthy environment, as well as socio-economic development by exploiting economic benefits and strengthening stakeholder relations.”*

The following strength, weaknesses, threats and opportunities have been identified for the Gamagara LM:

**Table 4:** Strengths, weaknesses, opportunities and threats identified in the IDP for Gamagara Local Municipality.

Strengths:	Weaknesses:
<ul style="list-style-type: none"> <li>• High potential for economic growth:</li> <li>• The LM is at the centre of all economic activities around the mining industry in the region. The industrial area growth and development is phenomenal as many small industries and big industry come to the area to serve the mining needs in the area.</li> <li>• Small businesses have the potential to grow and serve the improving commercial and mining</li> </ul>	<ul style="list-style-type: none"> <li>• Infrastructure:</li> <li>• Inadequate infrastructure to cater for the rapid development in the LM.</li> <li>• Ageing infrastructure.</li> <li>• Ineffective internal systems and controls:</li> <li>• Communicating available systems and controls to junior officials is lacking and leading to some of the crucial tasks not being performed accordingly e.g. delegation of power.</li> </ul>

Strengths:	Weaknesses:
<p>economic set-up. These businesses either provide mines with equipment or the sub-contract to big contractors in the mine.</p> <ul style="list-style-type: none"> <li>• High tourism potential:</li> <li>• Gamagara LM has a vast number of heritage sites that still need to be exploited. These include religious monuments and heritage sites, the oasis of the Kalahari, the caves, etc.</li> <li>• Political maturity and stability:</li> <li>• Co-operation between political parties in delivering services is a progressive one.</li> <li>• Ward Committees are functional and meeting their obligations as required.</li> <li>• There is strong political leadership and support to the municipal functioning.</li> </ul>	<ul style="list-style-type: none"> <li>• Culture of non-payment is prevalent in the LM because credit control policy is not fully implemented.</li> <li>• The LM does not have a culture of retaining skilled personnel due to inconsistent implementation of policies or lack of induction of new employees.</li> <li>• Lack of by-laws to guide and enforce compliance e.g. credit control.</li> </ul>
Opportunities:	Threats:
<ul style="list-style-type: none"> <li>• Developmental potential:</li> <li>• Integration of stakeholder contribution to the development of the LM is possible e.g. sector departments, mining industry, commercial industry, agricultural industry and tourism industry.</li> <li>• There is a potential to acquire more land for development.</li> <li>• Improve infrastructure and create jobs.</li> <li>• Internal systems could be improved:</li> <li>• Can improve on the credit control system to encourage culture of payment for services and increase municipal revenue.</li> <li>• Improve customer care and uphold to the Batho Pele Principle.</li> <li>• Enhance the LED and Tourism markets by disseminating the LED and Tourism strategy to members of the community using various methods of awareness.</li> </ul>	<ul style="list-style-type: none"> <li>• National and International economic trends may destabilise the municipality to achieve its goals.</li> <li>• Retrenchments from the mines may affect the municipal revenue.</li> <li>• Influx of job seekers in the area is causing infrastructure system failure as they overload the system.</li> </ul>

The implementation of Gaetsewe Solar would contribute somewhat towards addressing some of the weaknesses and threats identified for the Gamagara LM. Specifically with regards to contributing towards Local Economic Development (LED) market, municipal revenue, and job creation.

## 2.4 GUIDELINES, POLICIES AND AUTHORITATIVE REPORTS

This section includes relevant Guidelines, Policies and Authoritative reports applicable to the proposed Gaetsewe Solar facility.

### 2.4.1 Strategic Infrastructure Projects (SIPs)

The Presidential Infrastructure Coordinating Committee (PICC) are integrating and phasing investment plans across 18 Strategic Infrastructure Projects (SIPs) which have the following 5 core functions:

- To unlock opportunity.
- Transform the economic landscape.
- Create new jobs.
- Strengthen the delivery of basic services.
- Support the integration of African economies.

A balanced approach is being fostered through greening of the economy, boosting energy security, promoting integrated municipal infrastructure investment, facilitating integrated urban development, accelerating skills development, investing in rural development and enabling regional integration.

SIP 8 of the energy SIPs supports the development of RE projects as follow:

**SIP 8: Green energy in support of the South African economy:**

*Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010) and supports bio-fuel production facilities.*

The development of the proposed project is therefore also aligned with SIP 8 as it constitutes a green energy initiative which would contribute clean energy in accordance with the IRP 2010 – 2030.

#### **2.4.2 National Protected Area Expansion Strategy (NPAES) for S.A. 2008 (2010)**

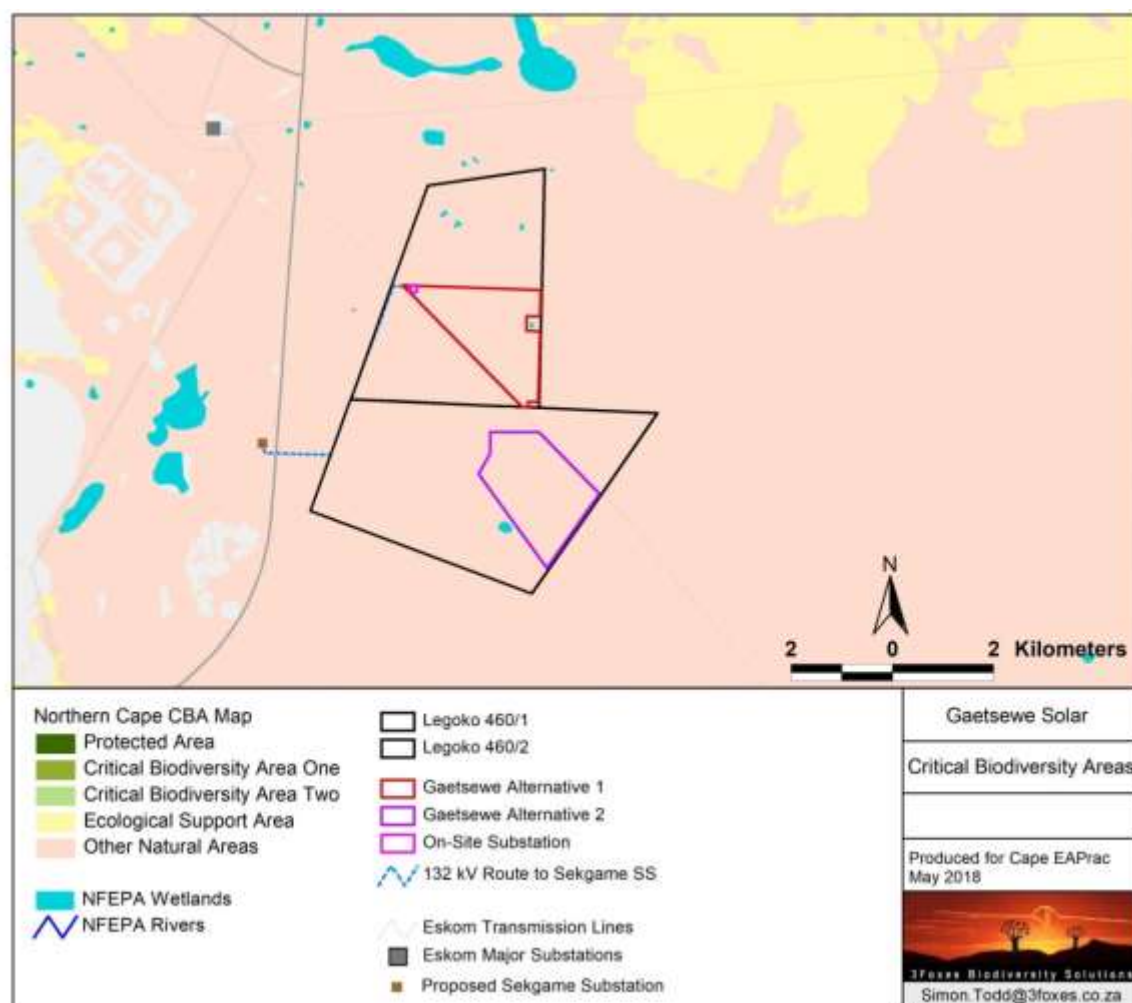
Considering that South Africa's protected area network currently falls far short of sustaining biodiversity and ecological processes, the NPEAS aims to achieve cost-effective protected area expansion for ecological sustainability and increased resilience to Climate Change. Protected areas, recognised by the National Environmental Management: Protected Areas Act (Act 57 of 2003), are considered formal protected areas in the NPAES. The NPAES sets targets for expansion of these protected areas, provides maps of the most important protected area expansion, and makes recommendations on mechanisms for protected area expansion.

The NPAES identifies 42 focus areas for land-based protected area expansion in South Africa. These are large intact and un-fragmented areas suitable for the creation or expansion of large protected areas. The closest focus areas are the **Eastern Kalahari Bushveld Focus Area** (situated 29.6kms north west and 25kms south east)

The proposed **Gaetsewe Solar Energy Facility** will **not affect** this or any other **NPAES** focus area as it is situated considerable distance from the Focus Area.

#### **2.4.3 Critical Biodiversity Areas.**

An extract of the Northern Cape Critical Biodiversity Areas map for the study area is depicted. The site lies within an area classified as "Other natural areas" and is not classified as a CBA or ESA. There are no CBAs in close proximity to the site, indicating that the development does not pose a threat to any CBAs or other areas considered to be of significance from a broad-scale conservation planning perspective.



**Figure 4:** Extract of the Northern Cape Critical Biodiversity Areas map for the study area, showing that there are no CBAs in close proximity to the site (Todd, 2018)

#### 2.4.4 Environmental Impact Assessment Guideline For Renewable Energy Projects

The Minister of Environmental Affairs published the Environmental Impact Assessment Guideline for Renewable Energy in terms of section 24J of the National Environmental Management Act, 1998 (Act No. 107 of 1998) on 16 October 2016.

In pursuit of promoting the country's Renewable Energy development imperatives, the Government has been actively encouraging the role of Independent Power Producers (IPPs) to feed into the national grid. Through its Renewable Energy IPPs Procurement Programme, the DoE has been engaging with the sector in order to strengthen the role of IPPs in renewable energy development. Launched during 2011, the IPPs Procurement Programme is designed so as to contribute towards a target of 3 725MW, and towards socio-economic and environmentally sustainable development, as well as to further stimulate the renewable industry in South Africa.

In order to facilitate the development of first phase IPPs procurement programme in South Africa, these guidelines have been written to assist project planning, financing, permitting, and implementation for both developers and regulators. The guideline is principally intended for use by the following stakeholder groups:

- Public Sector Authorities (as regulator and/or competent authority);
- Joint public sector authorities and project funders, e.g., Eskom, IDC, etc.
- Private Sector Entities (as project funder/developer/consultant);
- Other interested and affected parties (as determined by the project location and/or scope).

This guideline aims to ensure that all potential environmental issues pertaining to renewable energy projects are adequately and timeously assessed and addressed as necessary so as to ensure sustainable roll-out of these technologies by creating a better understanding of the environmental approval process for renewable energy projects.

The guidelines list the following possible environmental impacts associated with the development of solar energy facilities.

**Table 5:** Potential environmental impacts of solar energy projects (Adapted from DEA, 2015)

Impact Description	Relevant Legislation
Visual Impact	NEMA
Noise Impact (CSP)	NEMA
Land Use Transformation (fuel growth and production)	NEMA, NEMPAA, NHRA
Impacts on Cultural Heritage	NEMA, NHRA
Impacts on Biodiversity	NEMA, NEMBA, NEMPAA, NFA
Impacts on Water Resources	NEMA, NEMICMA, NWA, WSA
Hazardous Waste Generation (CSP and PV)	NEMA, NEMWA, HAS
Electromagnetic Interference	NEMA
Aircraft Interference	NEMA, MSA
Loss of Agricultural Land	SALA
Sterilisation of mineral resources	MPRDA

Assuming an IPP project triggers the need for Basic Assessment (BA) or scoping environmental Impact Assessment (S&EIA) under the EIA regulations, included in the assessment process is the preparation of an environmental management programme (EMPr). Project-specific measures designed to mitigate negative impacts and enhance positive impacts should be informed by good industry practice and are to be included in the EMP. Potential mitigation measures for solar energy projects include but are not limited to:

- Conduct pre-disturbance surveys as appropriate to assess the presence of sensitive areas, fauna, flora and sensitive habitats;
- Plan visual impact reduction measures such as natural (vegetation and topography) and engineered (berms, fences, and shades, etc.) screens and buffers;
- Utilise existing roads and servitudes as much as possible to minimise project footprint;
- Site projects to avoid construction too near pristine natural areas and communities;
- Locate developments away from important habitat for faunal species, particularly species which are threatened or have restricted ranges, and are collision-prone or vulnerable to disturbance, displacement and/or habitat loss;
- Fence sites as appropriate to ensure safe restricted access;
- Ensure dust abatement measures are in place during and post construction;
- Develop and implement a storm water management plan;
- Develop and implement waste management plan; and
- Re-vegetation with appropriate indigenous species to prevent dust and erosion, as well as establishment of alien species.

The recommendations of these guidelines have been explicitly considered in this scoping process and where necessary, additional specialist input has been obtained. Please see section 16 of this scoping report, where the nature and likely significance of these impacts have been identified.

#### 2.4.5 Sustainability Imperative

The norm implicit to our environmental law is the notion of sustainable development (“SD”). SD and sustainable use and exploitation of natural resources are at the core of the protection of the environment. SD is generally accepted to mean development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. The evolving elements of the concept of SD *inter alia* include the right to develop; the pursuit of equity in the use and allocation of natural resources (the principle of intra-generational equity) and the need to preserve natural resources for the benefit of present and future generations. Economic development, social development and the protection of the environment are considered the pillars of SD (the triple bottom line).

“Man-land relationships require a holistic perspective, an ability to appreciate the many aspects that make up the real problems. Sustainable planning has to confront the physical, social, environmental and economic challenges and conflicting aspirations of local communities. The imperative of sustainable planning translates into notions of striking a balance between the many competing interests in the ecological, economic and social fields in a planned manner. The ‘triple bottom line’ objectives of sustainable planning and development should be understood in terms of economic efficiency (employment and economic growth), social equity (human needs) and ecological integrity (ecological capital).”

As was pointed out by the Constitutional Court, SD does not require the cessation of socio-economic development but seeks to regulate the manner in which it takes place. The idea that developmental and environmental protection must be reconciled is central to the concept of SD - it implies the accommodation, reconciliation and (in some instances) integration between economic development, social development and environmental protection. It is regarded as providing a “conceptual bridge” between the right to social and economic development, and the need to protect the environment.

Our Constitutional Court has pointed out that the requirement that environmental authorities must place people and their needs at the forefront of their concern so that environmental management can serve their developmental, cultural and social interests, can be achieved if a development is sustainable. “*The very idea of sustainability implies continuity. It reflects the concern for social and developmental equity between generations, a concern that must logically be extended to equity within each generation. This concern is reflected in the principles of inter-generational and intra-generational equity which are embodied in both section 24 of the Constitution and the principles of environmental management contained in NEMA.*” [Emphasis added.]

In terms of NEMA sustainable development requires the integration of the relevant factors, the purpose of which is *to ensure that development serves present and future generations.*<sup>7</sup>

It is believed that the proposed 75MW Gaetsewe Solar Energy Facility supports the notion of sustainable development by presenting a reasonable and feasible alternative to the existing vacant land use type, which has limited agricultural potential due the lack of water and infrastructure.

Furthermore the proposed alternative energy project (reliant on a natural renewable resource – solar energy) is in line with the national and global goal of reducing reliance on fossil fuels, thereby providing long-term benefits to future generations in a sustainable manner.

#### **2.4.6 White Paper on the Energy Policy of the Republic of South Africa (1998)**

The White Paper on Energy Policy places emphasis on the expansion of energy supply options to enhance South Africa’s energy security. This can be achieved through increased use of RE and encouraging new entries into the generation market. South Africa has an attractive range of cost effective renewable resources, taking into consideration social and environmental costs. Government policy RE is thus concerned with meeting the following challenges:

- Ensuring that economically feasible technologies and applications are implemented.

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<sup>7</sup> See definition of “sustainable development” in section 1 of NEMA.

- Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options.
- Addressing constraints on the development of the renewable industry.

The policy states that the advantages of RE include, minimal environmental impacts during operation in comparison with traditional supply technologies, 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. Nonetheless, renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future. The White Paper on Energy Policy therefore supports the advancement of RE sources and ensuring energy security through the diversification of supply.

#### **2.4.7 White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)**

The White Paper on Renewable Energy Policy supplements Government's predominant policy on energy as set out in the White Paper on the Energy Policy of the Republic of South Africa (DME, 1998). The policy recognises the potential of RE, and aims to create the necessary conditions for the development and commercial implementation of RE technologies. The position of the White Paper on RE is based on the integrated resource planning criterion of:

*"Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options."*

The White Paper on RE sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing RE in South Africa. The country relies heavily on coal to meet its energy needs due to its abundant, and fairly accessible and affordable coal resources. However, massive RE resources that can be sustainable alternatives to fossil fuels, have so far remained largely untapped. The White Paper on Renewable Energy Policy fosters the uptake of RE in the economy and has a number of objectives that include: ensuring equitable resources are invested in renewable technologies, directing public resources for implementation of RE technologies, introducing suitable fiscal incentives for RE and, creating an investment climate for the development of the RE sector.

The White Paper on Renewable Energy of 2003 set a target of 10 000GWh to be generated from RE by 2013 to be produced mainly from biomass, wind, solar and small-scale hydro. The target was subsequently reviewed in 2009 during the RE summit of 2009. The objectives of the White Paper on Renewable Energy Policy are considered in six focal areas, namely, financial instruments, legal instruments, technology development, awareness raising, capacity building and education, and market based and regulatory instruments. The policy supports the investment in RE facilities as they contribute towards ensuring energy security through the diversification of energy supply, reducing GHG emissions and the promotion of RE sources.

#### **2.4.8 Integrated Energy Plan (IEP) (2016)**

The Integrated Energy Plan (IEP) (which was developed under the National Energy Act (No. 34 of 2008)), recognises that energy is essential to many human activities, and is critical to the social and economic development of a country. The purpose of the IEP is essentially to ensure the availability of energy resources, and access to energy services in an affordable and sustainable manner, while minimising associated adverse environmental impacts. Energy planning therefore needs to balance the need for continued economic growth with social needs, and the need to protect the natural environment.

The IEP is a multi-faceted, long-term energy framework which has multiple aims, some of which include:

- To guide the development of energy policies and, where relevant, set the framework for regulations in the energy sector.
- To guide the selection of appropriate technologies to meet energy demand (i.e. the types and sizes of new power plants and refineries to be built and the prices that should be charged for fuels).
- To guide investment in and the development of energy infrastructure in South Africa.



- To propose alternative energy strategies which are informed by testing the potential impacts of various factors such as proposed policies, introduction of new technologies, and effects of exogenous macro-economic factors.

A draft version of the Integrated Energy Plan (IEP) was released for comment on 25 November 2016. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development. The development of the IEP is an ongoing continuous process. It is reviewed periodically to take into account changes in the macroeconomic environment, developments in new technologies and changes in national priorities and imperatives, amongst others.

The 8 key objectives of the integrated energy planning process, are as follows:

- Objective 1: Ensure security of supply.
- Objective 2: Minimise the cost of energy.
- Objective 3: Promote the creation of jobs and localisation.
- Objective 4: Minimise negative environmental impacts from the energy sector.
- Objective 5: Promote the conservation of water.
- Objective 6: Diversify supply sources and primary sources of energy.
- Objective 7: Promote energy efficiency in the economy.
- Objective 8: Increase access to modern energy.

#### **2.4.9 Integrated Resource Plan for Electricity (IRP) 2010 – 2030 (2011)**

The Integrated Resource Plan (IRP) for Electricity 2010 – 2030 is a subset of the IEP and constitutes South Africa's National electricity plan. The primary objective of the IRP is to determine the long term electricity demand and detail how this demand should be met in terms of generating capacity, type, timing and cost. The IRP also serves as input to other planning functions, including amongst others, economic development and funding, and environmental and social policy formulation.

The current iteration of the IRP, led to the Revised Balanced Scenario (RBS) that was published in October 2010. Following a round of public participation which was conducted in November / December 2010, several changes were made to the IRP model assumptions. The document outlines the proposed generation new-build fleet for South Africa for the period 2010 to 2030. This scenario was derived based on a 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.

The Policy-Adjusted IRP reflected recent developments with respect to prices for renewables. In addition to all existing and committed power plants, the plan includes 9.6GW of nuclear, 6.25GW of coal, 17.8GW of renewables, and approximately 8.9GW of other generation sources such as hydro, and gas.

On 27 August 2018 the Draft IRP 2018 was released for comment. The Draft IRP 2018 is based on least-cost supply and demand balance and takes into account security of supply and the environment (i.e. with regards to minimising negative emissions and water usage). According to the Draft IRP 2018 key input assumptions that changed from the promulgated IRP 2010 – 2030 (2011) include, amongst others, technology costs, electricity demand projection, fuel costs and Eskom's existing fleet performance and additional commissioned capacity. For the period ending 2030, the Draft IRP 2018 proposes a number of policy adjustments to ensure a practical plan that will be flexible to accommodate new, innovative technologies that are not currently cost competitive, the minimisation of the impact of decommissioning of coal power plants, and the changing demand profile.

#### **2.4.10 The Convention on the Conservation of Migratory Species of Wild Animals**

The Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or the Bonn Convention) is an intergovernmental treaty and is the most appropriate instrument to deal with the conservation of terrestrial, aquatic and avian migratory species. The convention includes policy and guidelines with regards to the impact associated with man-made infrastructure. CMS requires that parties (South Africa is a signatory) take measures to avoid migratory species from becoming endangered (Art II, par. 1 and 2) and to make every effort to

prevent the adverse effects of activities and obstacles that seriously impede or prevent the migration of migratory species i.e. power lines (Art 111, par. 4b and 4c).

An Avifaunal Specialist has been appointed to consider the impact of the proposed Gaetsewe Solar facility as well as the powerline connecting the facility to the Sekgame Switching Station (Annexure E2). Birdlife Africa has also been given an opportunity to comment in this regard.

#### 2.4.11 The Agreement on the Convention of African-Eurasian Migratory Water Birds

The Agreement on the Conservation of African-Eurasian Migratory Water birds (AEWA) is an intergovernmental treaty dedicated to the conservation of migratory waterbirds and their habitat across Africa, Europe, the Middle East Central Asia, Greenland and the Canadian Archipelago. The AEWA covers 255 species of birds ecologically dependent on wetlands for at least part of their annual cycle and is a legally binding agreement by all contracting parties (South Africa included) to guarantee the conservation of migratory waterbirds within their national boundaries through species and habitat protection and the management of human activities. As mentioned above An Avifaunal Specialist has been appointed to consider the impact of the proposed Gaetsewe Solar facility as well as the powerline connecting the facility to the Sekgame Switching Station (Annexure E2). Birdlife Africa has also been given an opportunity to comment in this regard.

#### 2.4.12 Guidelines to minimise the impacts on birds of Solar Facilities and Associated Infrastructure in South Africa

The “Guidelines to minimise the impact on birds of Solar Facilities and Associated Infrastructure in South Africa” (Smit, 2012) is perhaps the most important (although not legally binding) document from an avifaunal impact perspective currently applicable to solar development in South Africa. The guidelines are published by BirdLife South Africa (BLSA) and detail the recommended procedure for conducting an avifaunal specialist study as well as list all of the potential impacts of interactions between birds and solar facilities and associated infrastructure. We are aware of changes to the BirdLife South Africa best-practise guidelines recently published at the Birds and Renewable Energy Forum in Johannesburg (2015) and although the revised requirements are still a work in progress and have not yet been ratified, they will inform this assessment where applicable. Please refer to Annexure E2 for a copy of the Avifaunal assessment undertaken for this project.

### 3. ACTIVITY

K2018091758 (SOUTH AFRICA) (Pty) Ltd is proposing the establishment of a commercial solar photovoltaic energy facility (SEF) on the farm known as Legoko Farm No 460 portion 2, situated in the District of Kuruman Rd, Northern Cape Province, within the jurisdiction area of the Gamagara Local Municipality.

The proposed photovoltaic (PV) SEF will have a net generating capacity of 75 MW<sub>AC</sub> with an estimated maximum footprint of ± 212 ha.

The approximate area that each component of the SEF will occupy is summarised in the table below.

**Table 6:** Component Areas and % of Total Project Area (AEP,2018).

SEF Component	Estimated Area	% of Total Area (± 212 ha)	% of Farm Area (856.5320 ha)
<b>PV structures/modules</b>	± 200 ha	90.9 %	23.3 %
<b>Internal roads</b>	± 6 ha	2.83%	0.70 %
<b>Auxiliary buildings</b>	± 1 ha	0.47 %	0.12 %
<b>Substation</b>	± 1 ha	0.47 %	0.12 %

The technology under consideration is photovoltaic (PV) modules mounted on either of fixed or tracking structures. Other infrastructure includes inverter stations, internal electrical reticulation, internal roads, an on-site switching station / substation, a 132 kV overhead (OH) distribution line, auxiliary buildings, construction laydown areas and perimeter fencing and security infrastructure. The on-site switching station / substation will locate the main power transformer/s that will step up the generated electricity to a suitable voltage level for transmission into the national

electricity grid, via the OH line. Auxiliary buildings include, *inter alia*, a control building, offices, warehouses, a canteen and visitors centre, staff lockers and ablution facilities and gate house and security offices.

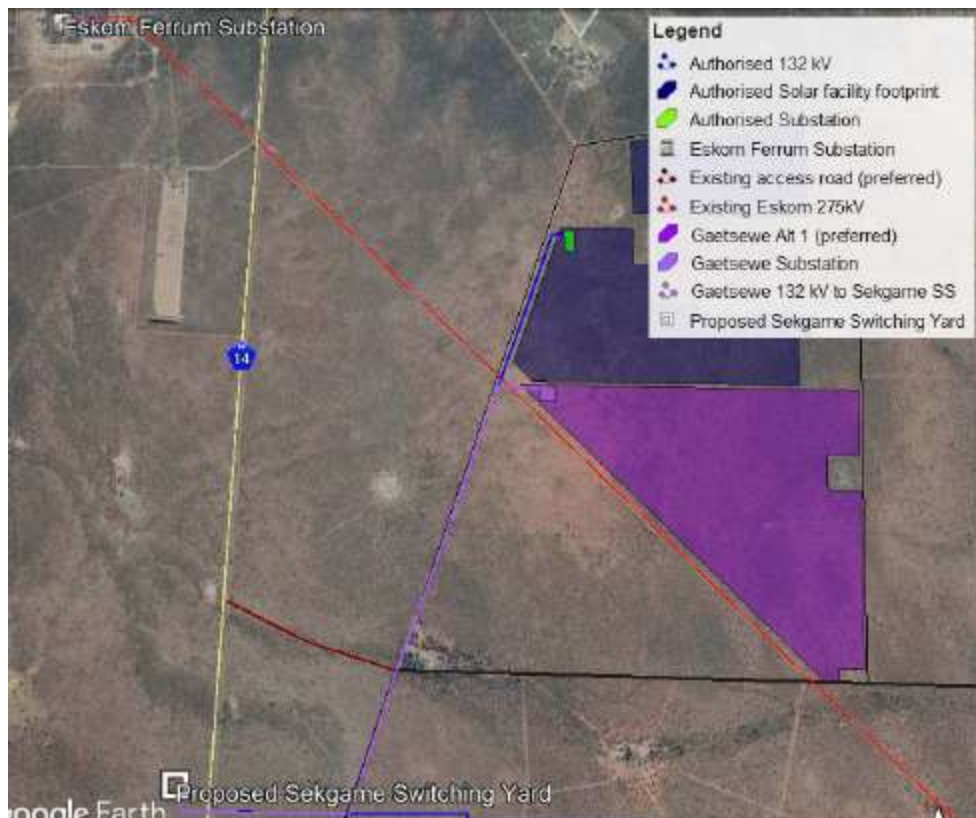
The figure below depicts a typical layout of a solar PV energy facility.



**Figure 5:** Typical Layout of a Solar PV Energy Facility (AEP, 2018)

It is customary to develop the final / detailed construction layout of the SEF only once an Independent Power Producer (IPP) is awarded a successful bid under the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), after which major contracts are negotiated and final equipment suppliers identified. For the purpose of the Draft Scoping Report (DSR), two alternative layouts and the no go alternative are assessed in accordance with the requirements prescribed in NEMA.

The preferred layout alternative has taken into account the site constraints identified by the specialist ecologist.



**Figure 6:** Showing preferred as well as proposed grid connection for the proposed Gaetsewe Solar Development

Please refer to the **layout plans** and **layout development report** in **Appendix D** for further information and descriptions of the proposed activity.

## 3.1 TECHNICAL OVERVIEW

The following section presents an overview of the main components of the solar energy facility layout as described in the Technical Design compiled by AEP. Please refer to the engineering report attached in Annexure E8 for further information regarding the Technical components of the proposed facility.

### 3.1.1 Solar Array

Solar PV modules are connected in series to form a string. A number of strings are then wired in parallel to form an array of modules. PV modules are mounted on structures that are either fixed, north-facing at a defined angle, or mounted to a single or double axis tracker to optimise electricity yield.

The solar arrays for the Gaetsewe Solar Facility will be placed in such a way that they do not interfere with sensitive features defined by the participating specialists.

### 3.1.2 Mounting Structures

Various options exist for mounting structure foundations, which include cast / pre-cast concrete, driven / rammed piles, or ground / earth screws mounting systems.



**Figure 7:** Cast Concrete Foundation (Solar Power Plant Business, 2013)

The impact on agricultural resources and production of these options are considered to be the same, however concrete is least preferred due the effort required at a decommissioning phase in order to remove the concrete from the soil, and therefore its impact on the environment. The Gaetsewe Solar Facility will therefore aim to make the most use of either driven / rammed piles, or ground / earth screws mounting systems, and only in certain instances resort to concrete foundations should geotechnical studies necessitate this.



**Figure 8:** Rammed / Driven Steel Pile (SolarPro, 2010)



**Figure 9:** Ground Screw (pv magazine, 2014)

## **3.2 SITE SELECTION**

The site selection process followed a two stage approach. Firstly to select the property for the proposed development (Portion 2 of the farm Legoko 460) and secondly to select the footprint of the proposed development within the farm portion.

### **3.2.1 Property selection process**

Please refer to the correspondence relating to the site (property) selection received from Atlantic Energy Partners (AEP) attached in Annexure E10 from which the following was highlighted as the key criteria for selection of the target properties:

#### **3.2.1.1 Proximity to towns with a need for socio-economic upliftment**

The Site is situated in close proximity to the town of Kathu and relatively close proximity to the towns of Deben and Kuruman.

These towns are typically masked with high rates of unemployment, as is the case in the Northern Cape. The closest cities in the area are Kimberley and Upington, which both also experience the same level of unemployment and poverty.

Consequently, local labour would be easy to source, which fits in well with the REIPPPP economic development criteria for socio economic upliftment.

Currently, a large proportion of local labour is used in the mining and agricultural industry. A few negatives related to agricultural employment are that it is very seasonal and it is not always in close proximity to their homes, forcing workers to travel large distances on a daily basis to reach their place of employment. Over the years, employment in the mining sector has shown to be very volatile.

#### 3.2.1.2 Access to grid

Access to the Eskom grid is vital to the viability of a SEF. The Developer corresponded with Eskom network planners to understand their future demand centres as well as strategic plans to upgrade and strengthen any local networks. It is understood that Eskom is planning to develop the new Sekgame Switching Station approximately 5km south of the existing Ferru MTS, and that they intend to connect new SEF's into this Switching Station.

Notwithstanding the fact that the SEF will contribute to meeting the electrical demand on the distribution network, proximity to the Ferrum MTS means that surplus power can be evacuated into Eskom's Transmission System and conveyed at very high voltage for consumption elsewhere in the country.

#### 3.2.1.3 Critical transmission power corridors

Eskom's '2040 Transmission Network Study' has drawn on various scenarios to determine the grid's development requirements, as well as to identify critical power corridors for future strategic development, of which the Northern corridor is one of these. The national power corridors have been refined and consolidated into five transmission power corridors of 100 km in width, which are being used by the Department of Environmental Affairs (DEA) for a strategic environmental assessment (SEA) which will seek to identify environmentally acceptable routes over which long - term environmental impact assessment (EIA) approvals can be secured. The Site falls into the Northern corridor.

#### 3.2.1.4 Land availability

The majority of land surrounding the Kathu town is considered to be undevelopable, largely due to the existing town commonage, residential developments and mining land reserved for related mining activities.

Portion 2 of Legoko Farm No 460 is one of the few privately owned land parcels suitable for solar PV development.

#### 3.2.1.5 Camel Thorn concentrations

There is a high concentration of Camel Thorn trees in the Kathu region, which are protected under the National Forest Act. To this extent it was paramount to finding a site where the least number of Camel Thorns would be required to be removed.

Of all the proposed SEF developments in the Kathu region, it is believed that the Site features some of the Camel Thorn densities in immediate the area.

Sites North of Kathu have much higher Camel Thorn concentrations in comparison to this site

#### 3.2.1.6 Renewable energy hub

Gaetsewe Solar is being developed in close proximity to other SEFs. All of these SEFs are proposed to be owned and operated by the same Lead Sponsor, each under a separate Special Purpose Vehicle (SPV). Environmentally permitting, a hub development approach has many obvious construction, operational and maintenance benefits, and allows optimum use of land as opposed to sterilising/ interrupting many more land parcels in cases where an erf/ property is used for a single development only.

It is the EAPs reasoned view that the concentration of projects within a single portion of low sensitivity land reduces landscape fragmentation and overall cumulative impact.

#### 3.2.1.7 Declining farming activity in the area

For a number of reasons, agricultural land around Kathu generally has very low agricultural potential, owing particularly to the following factors:

- The depletion of underground water resources due to mining activity;
- Periodic droughts directly impact the ability to farm sustainably; and
- Stock theft is a persistent problem in the area and therefore the area sees low agricultural production as cattle and sheep farming and other forms of small livestock farming proves to be challenging.

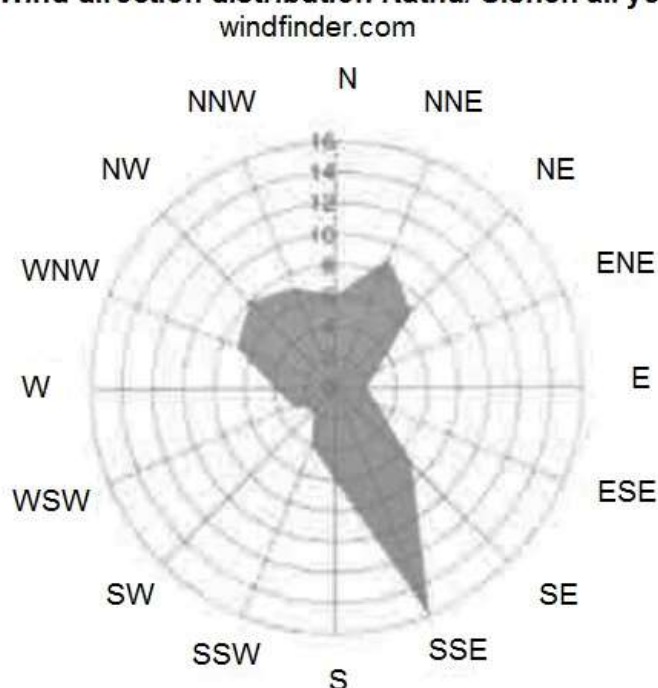
Please refer to the Agricultural Impact Assessment Scoping Report Attached in Annexure E3 for further information in this regard.

#### 3.2.1.8 Wind and dust consideration

The Kumba iron ore mine is to the north-west of the Site and venturing closer to the mining area in Kathu / Sishen would expose the SEF to increased dust levels thus reducing the efficiency of the solar PV modules and hence power generation of the SEF.

The wind direction distribution for the Kathu / Sishen region appears to be predominantly towards the north-west which it is hoped will blow most of the dust from the mine away from the Site.

#### **Wind direction distribution Kathu/ Sishen all year**



**Figure 10:** Wind Rose for the Kathu Area

#### 3.2.1.9 Proximity to access road for transportation of material and components

Large volumes of material and components would need to be transported to the project site during the construction phase of the project. The accessibility of the Site was therefore a key factor in determining the viability of Gaetsewe Solar, particularly taking transportation costs (direct & indirect) into consideration and the impact of this on project economics and therefore the ability to submit a competitive bid under the Department of Energy's ("DoE") Renewable Energy Independent Power Producer Procurement Programme ("REIPPPP").

#### 3.2.1.10 Kathu airport

The Sishen/ Kathu airport is located approximately 18km to the north-west of the Site, and therefore will not pose any threat to the aviation industry.

#### 3.2.1.11 Same landowner

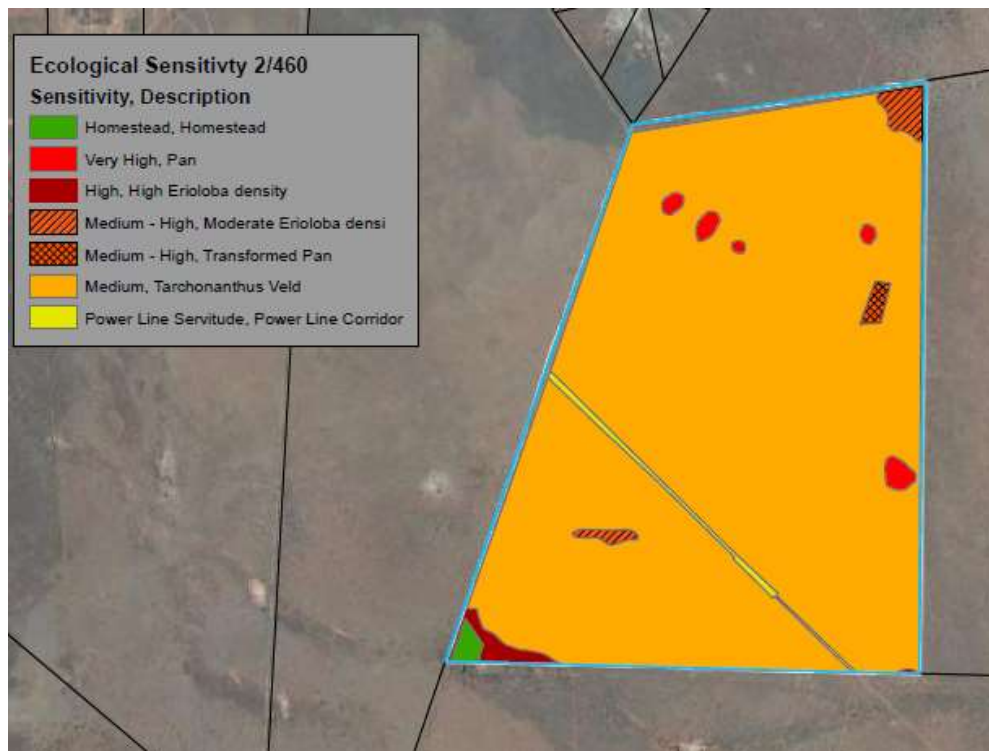
AEP has an established relationship with the landowner of Portion 2 of Legoko 460 due to other projects initiated on their land, and thus negotiating a new contract with the landowner is relatively easy

Access to the Eskom grid is vital to the viability of a SEF. The Developer corresponded with Eskom network planners to understand their future demand centres as well as strategic plans to upgrade and strengthen any local networks. It is understood that Eskom is planning to develop the new Sekgame Switching Station approximately 5km south of the existing Ferrum MTS, and that they intend to connect new SEF's into this Switching Station.

### 3.2.2 Footprint selection process

The selection of the proposed study area within Portion 2 of 460 followed a risk adverse, bottom up approach in order to ensure that the impacts of the proposed developments can be avoided as far as possible. This avoidance approach reduces the degree of mitigation required in order ensure that potential environmental impacts are within acceptable levels.

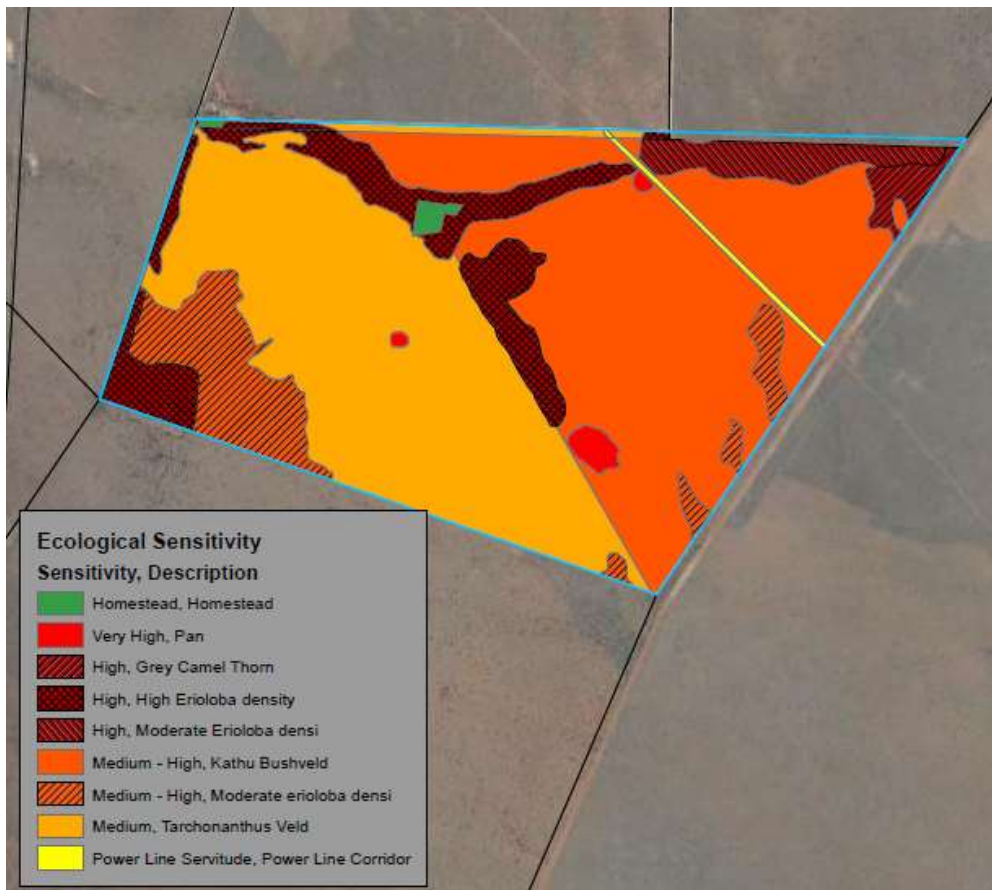
This approach was achieved by means of appointing an ecological expert, Mr Simon Todd, to develop a vegetation and sensitivity rating for the entire properties. This sensitivity plan was then used to determine the location of the proposed PV footprint. The footprint was then developed in a such a manner as to avoid all areas high and very high sensitivity and the majority of medium to high sensitivity areas. This also ensured that potential impact on all sensitive environments was minimised. The proposed footprint (study area) was created to be larger than what was needed in order to accommodate any other constraints defined by the remainder of the participating specialists. The initial footprint areas were determined based on detailed ecological assessments of the properties during 2015.



**Figure 11:** Ecological Sensitivity of Portion 2 of the farm 460 (Todd,2015)

The alternative 1(preferred) footprint is situated on portion 2.

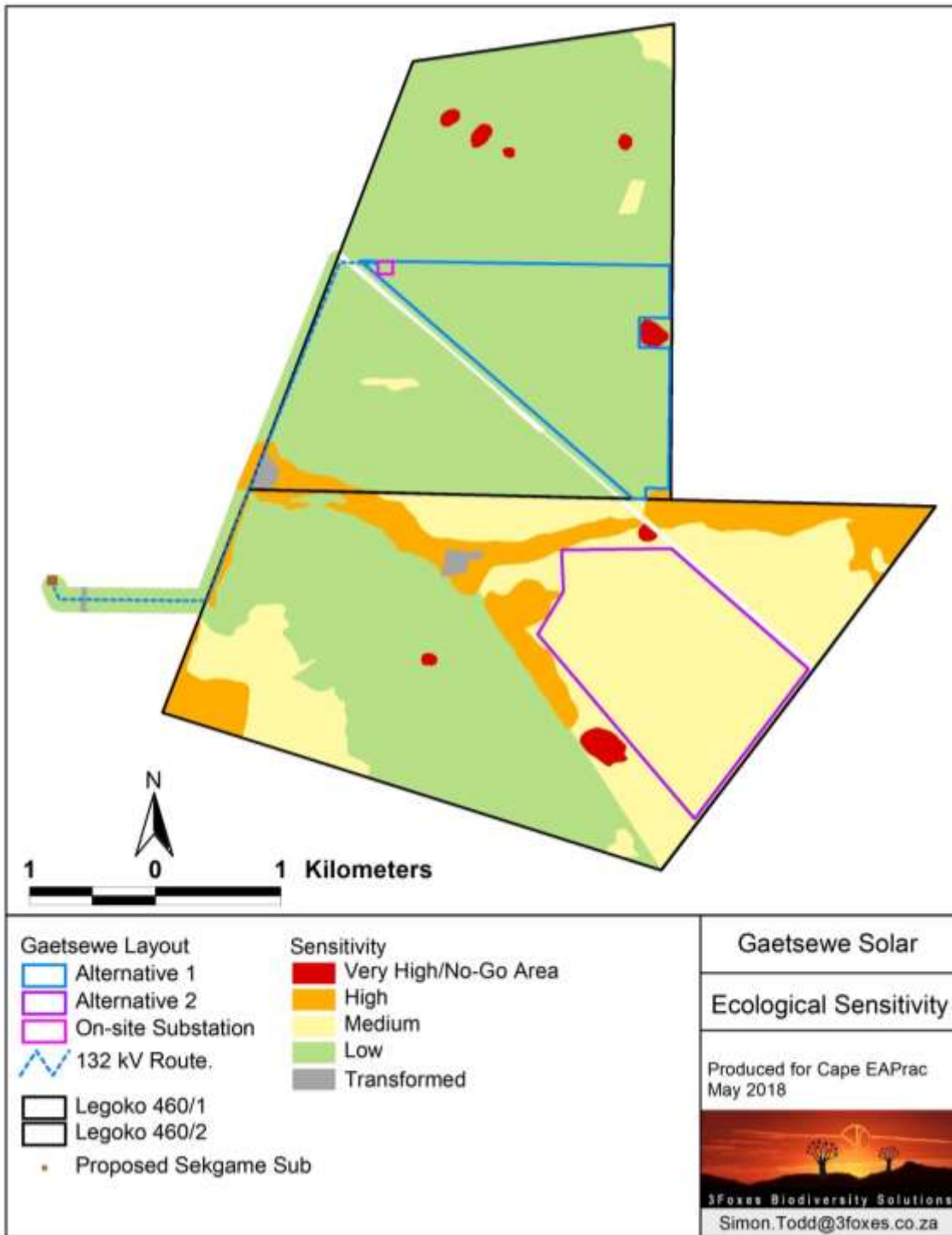




**Figure 12:** Ecological Sensitivity on Portion 1 of the Farm 460 (Todd, 2015)

The alternative 2 footprint is situated on portion 1.

The ecologist then undertook an additional site visit in another season (wet season) in order to verify the ecological components of the site and the sensitivity thereof. The tarconanthus veld on portion 2 was rated as low sensitivity, while that on portion 1 as medium sensitivity because of veld condition and densities of protected trees.. Please refer to the figure below showing the preferred as well as alternative sites overlaid onto the final site sensitivity map.



**Figure 13:** Preferred and alternative footprint overlaid onto final site sensitivity plan (Todd, 2018)

As can be seen from the figure above, the preferred footprint falls entirely within low sensitivity areas,. The alternative footprint falls entirely within medium sensitivity areas.

### 3.3 PROJECT PROGRAMME AND TIMELINES

As mentioned previously the Gaetsewe Solar Facility is intended to be lodged under the IPP procurement programme. The programme has definite and stringent timelines, which the project should meet. Note that the Department of Energy has not yet released the exact dates of the bidding schedules, so the implementation schedule below is based on the best available information we have available at this time and is subject to change.

**Table 7:** Preliminary implementation schedule.

	Description	Timeline
1	Expected IPPPP submission date (6th round)	First Quarter of 2019.
2	Preferred bidders selected	Last Quarter 2019
3	Finalisation of agreements	First Quarter 2020
4	Procurement of infrastructure	Last Quarter 2020
5	Construction	2021 - 2022
6	Commissioning	2022

The table above clearly depicts the dependence of the project on the IPP procurement programme's timelines. Any delay or acceleration within the IPP procurement programme will have a corresponding effect on the timelines of the projects timelines.

Also, as mentioned, no official public submission dates Round 6 have been communicated by the Department of Energy.

**NOTE:** Gaetsewe Solar intends submitting their bid during the 6<sup>th</sup> bidding window or thereafter if unsuccessful in immediate bidding rounds

### 3.4 CONSIDERATION OF ALTERNATIVES

The Gaetsewe Solar PV Energy Facility is to consist of solar photovoltaic (PV) technology with fixed, single or double axis tracking mounting structures, with a net generation (contracted) capacity of 75MWAC (MegaWatts - Alternating Current), as well as associated infrastructure, which will include:

- On-site switching-station / substation;
- Auxiliary buildings (gate-house and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.);
- Inverter-stations, transformers and internal electrical reticulation (underground cabling);
- Access and internal road network;
- Laydown area;
- Overhead 132kV electrical distribution line / grid connection connecting to the authorised Sekgame switching station;
- Rainwater tanks; and
- Perimeter fencing and security infrastructure.

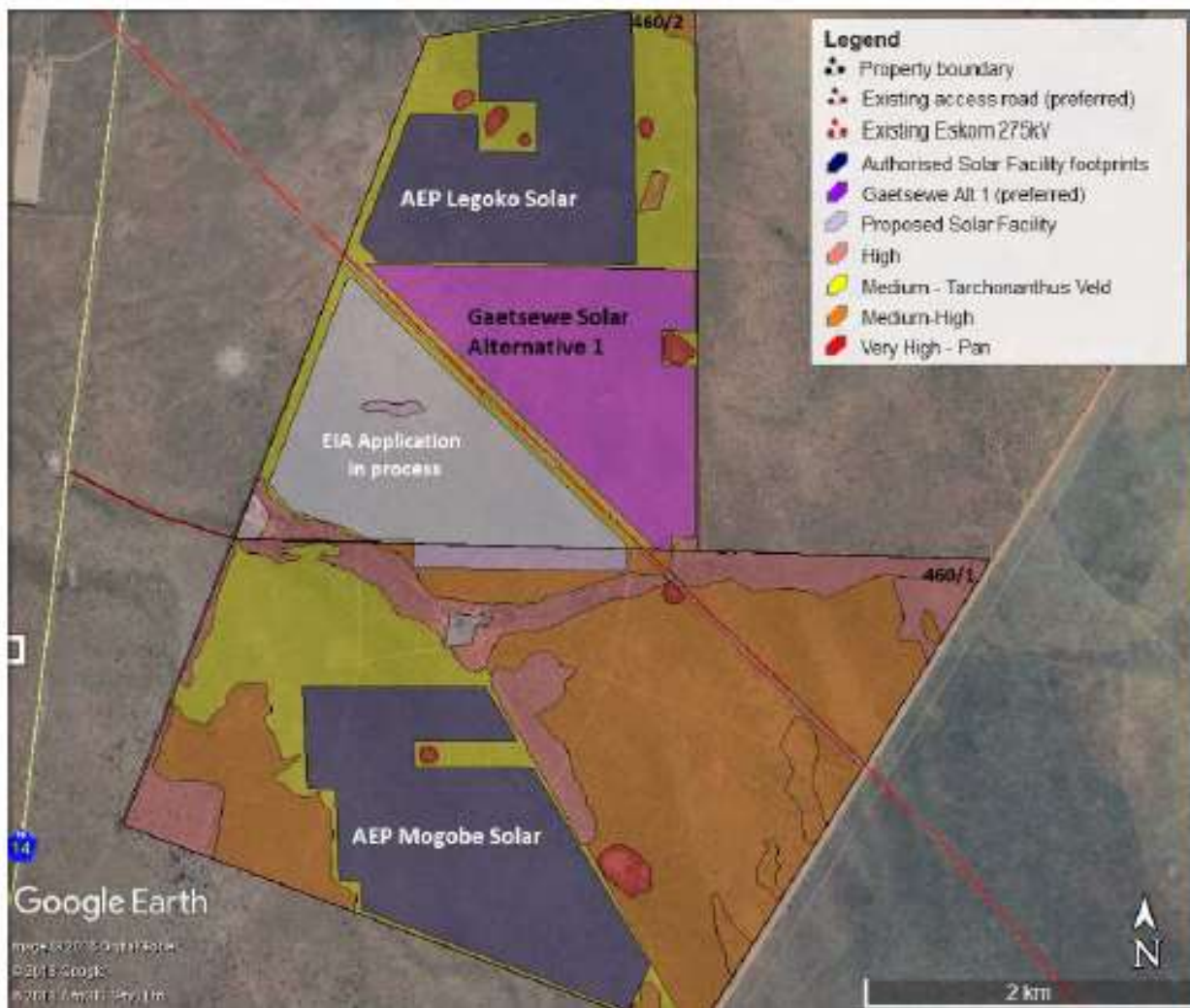
A number of alternatives, including **layout** and **technological** alternatives were considered for the proposed Gaetsewe Solar Energy Facility. The consideration of these alternatives are detailed below as summarised from the layout development report produced by AEP (Appendix D)

#### 3.4.1 Layout Alternatives

It is customary to develop the final / detailed construction layout of the SEF only once an Independent Power Producer (IPP) is awarded a successful bid under the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), after which major contracts are negotiated and final equipment suppliers identified. However, for the purpose of the Draft Scoping Report (DSR) in accordance with the minimum requirements prescribed by the Department of Environmental Affairs (DEA), two alternative layouts were identified. The following section elaborates on the layout options for the Gaetsewe Solar facility.

##### 3.4.1.1 Layout Alternative 1 (Preferred)

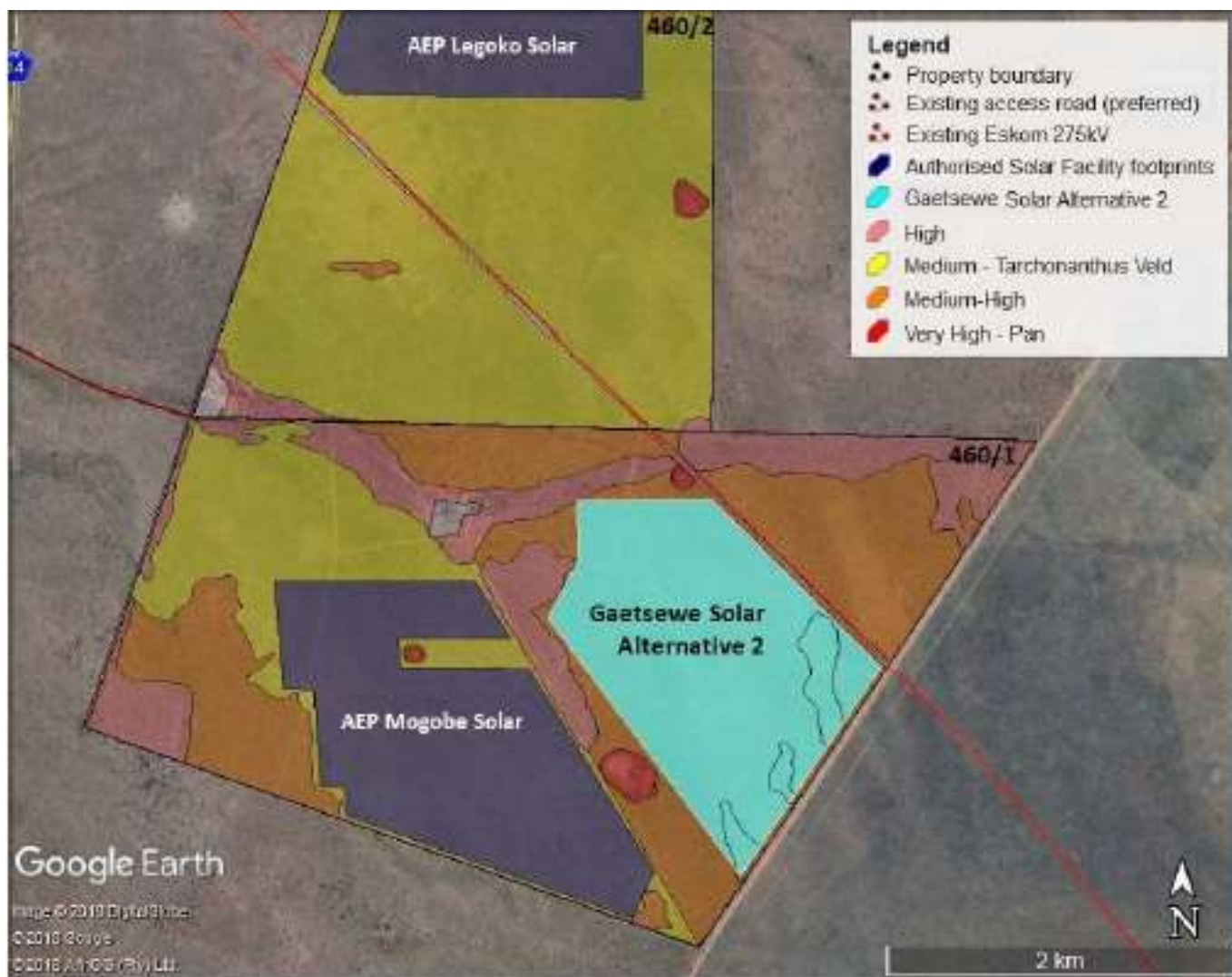
The preferred layout alternative considered during the draft scoping phase of the EIA is depicted in the Figure below. Layout Alternative 1 (Preferred) is situated on portion 2 of the farm 460.



**Figure 14:** Layout Alternative 1 (Preferred) (AEP, 2018)

3.4.1.2 Layout Alternative 2

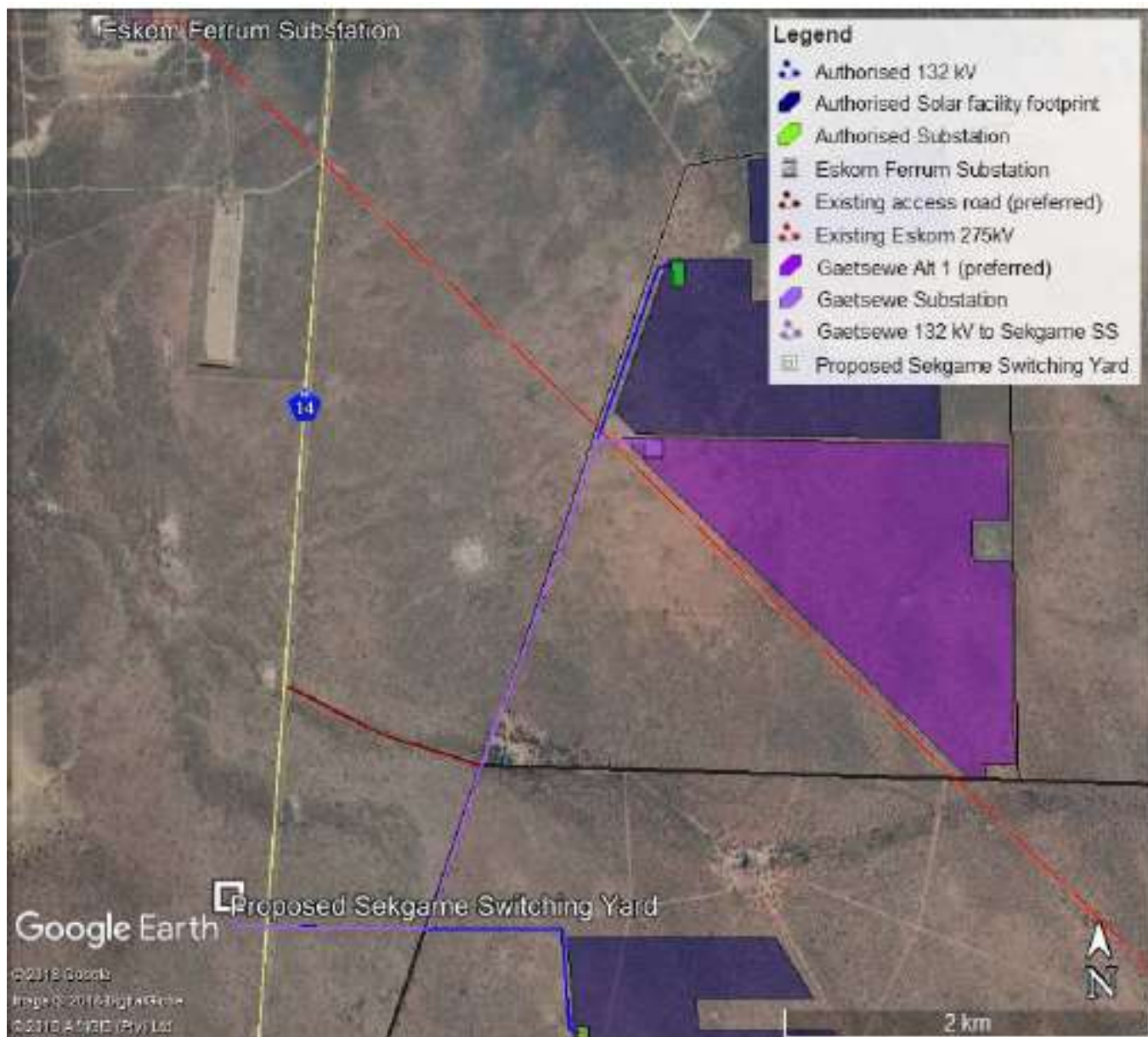
In A second layout option was identified. Layout Alternative 2 is shown in the Figure below.



**Figure 15:** Layout Alternative 2 (AEP, 2018)

3.4.1.3 Grid Connection And Cabling Alternatives

It is proposed to connect the SEF directly to the planned Sekgame Switching Station located  $\pm$  5km to the south of the existing Ferrum MTS. The SEF substation will be approximately 100m x 100m in size and feature a step-up transformer/s to transmit electricity via a 132 kV OHL directly to the Sekgame Switching Station. The OHL is envisaged to be  $\pm$  4km in length, a maximum height of 24m and occupy a servitude width of between 31m – 51m.



**Figure 16:** Proposed Grid Connection

Due to the positioning of existing and approved powerline infrastructure, alternative grid connection alignments are not under consideration in this environmental process.

**3.4.2 Access Road and Entrance Alternatives.**

Two main access roads are being considered off the N14 to the proposed Gaetsewe Solar facility, as depicted in the figure below (the orange and brown lines).



**Figure 17:** Showing proposed access road alternatives

Preferred Site Access (brown to the south): follows an existing gravel access road to the site, and then an existing internal farm access road over Portion 2 of the Farm 460 Legoko. This option is in closer proximity to the farm homestead than the alternative, however it is shorter (2.9km) than the alternative.

Alternative Site Access (orange to the north) follows an existing farm access road to Portion 2 of the Farm 460 Legoko. This option is located further from the farm homestead however it is longer (4.7km) than the preferred access route.

The access roads will be approximately 6m wide and the internal road network of the SEF will be gravelled roads, 4 – 5m in width, around the solar array periphery. Roads located in-between the solar modules will be un-surfaced tracks to be used for maintenance and cleaning of solar PV panels.

A detailed transport and traffic plan will be undertaken during the EIA phase of the project.

Precautionary measures will be taken to mitigate the risk of ground disturbances where access roads will be constructed. Special attention will be given to drainage, water flow and erosion by applying appropriate building methods.



**Figure 18:** Showing existing access from the N14 which will be the preferred access to the SEF.

### 3.4.3 The no-go alternative

The Status Quo Alternative proposes that the Gaetsewe Solar Energy Facility not go ahead and that the area in proximity to the Sekgame switching station and the Ferrum substation remain undeveloped as it is currently. The land on which the proposed project is proposed is currently vacant. It is currently used for limited cattle grazing activities, however due to a combination of poor soil quality, water scarcity and extreme climatic conditions, it has no potential for irrigated crop cultivation (This has been confirmed by the Agricultural Specialist in his report attached in Annexure E3). The area in question is also considered too small to generate noteworthy financial benefit from agricultural activities due to its low carrying capacity.

The solar-power generation potential of the Northern Cape area, particularly in proximity to the existing and proposed substations, is significant and will persist should the no-go option be taken.

The 'No-go/Status Quo' alternative will limit the potential associated with the land and the area as a whole for ensuring energy security locally, as well as the meeting of renewable energy targets on a provincial and national scale. Should the 'do-nothing' alternative be considered, the positive impacts associated with the solar facility (increased revenue for the farmer, economic investment, local employment and generation of electricity from a renewable resource) will not be realised.

The no-go alternative is thus not considered a favourable option in light of the benefits associated with the proposed solar facility, however it will be used as a baseline from which to determine the level and significance of potential impacts associated with the proposed solar development during the Impact Assessment phase of the on-going environmental process.

### 3.4.4 Conclusion

Layout Alternative 1 (Preferred) has been developed based on key criteria identified above, including inter alia, already authorised solar footprints, accessibility, assessment of alternatives, proximity to the planned Sekgame Switching Station, as well as consideration of sensitive areas to minimise ecological and other impacts.

Further assessment will be undertaken for the proposed Layout Alternative 1 and the no go alternative.

## 4. NEED AND DESIRABILITY

In keeping with the requirements of an integrated Environmental Impact process, the DEA&DP<sup>8</sup> *Guidelines on Need and Desirability (2010 & 2011)* were referenced to provide the following estimation of the activity in relation to the

<sup>8</sup> The Western Cape Provincial guidelines on Need and Desirability were considered in the absence of National and Northern Cape Guidelines.



broader societal needs. The concept of need and desirability can be explained in terms of its two components, where *need* refers to *time* and *desirability* refers to *place*. Questions pertaining to these components are answered in the Sections below.

The section above considers the overall need for alternative, so-called 'green energy' in light of the known environmental burdens associated with the impact of coal power generation through which most of our country's electricity is currently being generated. Associated aspects such as air pollution, water use and carbon tax are discussed in order to further explain the need and desirability for 'green energy' projects in general.

#### **4.1.1 Feasibility consideration**

The commercial feasibility for the proposed 75MW<sub>AC</sub> Gaetsewe Solar Energy Facility to be built on private land near Kathu, has been informed by its contextual location, and economic, social and environmental impacts and influence. The project has gathered sufficient information and conducted studies of the site and the region to make qualified and reliable assumptions on the project's various impacts.

#### **4.1.2 Solar Resource & Energy Production**

The arid climate experienced in the Northern Cape lends itself to the availability of high levels of solar energy. Considering the steady nature of the solar radiation at the Gaetsewe site, the resource is sufficient to guarantee a positive return on investment.

#### **4.1.3 Solar Farm & Grid Connection**

Among the outstanding characteristics of the Gaetsewe Solar Energy Facility site is its exceptionally flat nature, sufficient non sensitive environments and accessible location, facilitating the delivery of bulky PV Panel infrastructure, and the construction and assembly process. The proximity of the site to the N14 decreases the impact on secondary roads and natural habitat from the traffic going to and from the solar facility during construction and operations. The proximity of the New Sekgame Switching Station also allows for connection via a short distribution line. As the site is not used for intensive agricultural purposes, the solar facility will not interfere with the agricultural productivity of the area.

#### **4.1.4 Social impact**

The Northern Cape region is economically challenged due to its arid climate, challenging agricultural conditions, lack of water and limited natural resources (away from the Orange River). The Northern Cape is well-known for the large number of copper and zinc mines in the area, but since the early 1990's, many of these mines have closed down, leaving a devastating trail of unemployment behind. The local economy, mainly supported by limited agriculture, simply isn't enough to accommodate the high level of unemployment.

Private sector development is seen to offer opportunities to access Enterprise Development funds of the main mining groups. This can contribute to entrepreneurial activities linked to their supply chain (Gamagara SDF, 2010). The same applies to the investment, in terms of employment opportunities and entrepreneurial activities, associated with renewable energy projects.

Power generation is one of the rare growth opportunities for the Northern Cape due to the high solar irradiation levels and its strategic position relative to the National Transmission Network. This setup creates unprecedented growth opportunities for the area and the establishment of a **renewable energy project is considered important to diversify and complement the economic development of the region.**

#### **4.1.5 Employment & Skills Transfer**

The benefits of renewable energy facilities to local regions are not confined to the initial investment in the project. They also provide a reliable and on-going income for landowners and municipality, creating direct employment opportunities for locals, as well as flow-on employment for local businesses through provision of products and services to the project and its employees.

The Gaetsewe Solar Energy Facility will have a positive impact on local employment. During the estimated 18 month construction phase, the project will **employ approximately 40-50 people** of various qualifications. The majority will be provided by the local labour market. During operations, the solar facility is expected to have **6-10 permanent employees** ranging from security staff to administration and artisans. Due the fact that there is no skilled labour in the field of renewable energy as yet, the employment structure will consist of local and overseas capacity. To guarantee successful operations over the lifetime of the investment, the Gaetsewe Solar Energy Facility will use the skills of outside labour to **cross-train local specialists**. This cross training and skills development will take place especially in the area of technical maintenance and administration.

The economic impact of the proposed Gaetsewe Energy Facility reflects expenditures related to the construction and operation. These activities will increase economic activity within the region and province.

Note: A detailed socio-economic impact assessment will be undertaken for this project and will be presented to I&AP's in the Impact Assessment phase of the environmental process.

#### 4.1.6 Need (time)

Is the land use considered within the timeframe intended by the existing approved Spatial Development Framework (SDF)? (I.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP?

Yes, 'the employment of renewable energy technology' / development has a spatial strategic place in the Gamagara Municipality SDF while the need for a policy on the development of sustainable solar energy farms has been identified as Key Development Priority / Project.

Should the development occur here at this point in time?

Yes, the proposed Gaetsewe Solar Energy Facility is to be located outside the Kathu urban edge, would provide a welcomed diversification to the local economy and perhaps serve as a catalyst for further expansion in the stream of sustainable renewable energy development (identified as a priority development strategy IDP & SDF).

Does the community / area need the activity and the associated land use concerned?

The Gamagara Municipality identified the opportunity for a renewable energy project through their SDF and IDP processes, which include public participation. The proposed renewable energy development will allow for a diversification of employment, skills and contribute to the potential development of small business associated with its construction, operation and maintenance activities.

From the location near Kathu the proposed solar farm will contribute electricity to the constrained Northern Cape and National electrical network, contributing to a provincial and national need. Gaetsewe Solar Energy Facility has been designed to in such a way as to avoid or minimize potential negative impacts of the local environment while enhancing potential positive impacts, locally and regionally.

Are the necessary services with adequate capacity currently available?

Some existing, some new. The Gaetsewe Solar Energy Facility development requires the installation of a 132 kV overhead distribution line to connect to the proposed Sekgame Switching Station (feed into the national grid system), as well as an access road to the development site from the N14 (This will follow the existing access road). The cost of supplying the new infrastructure will be covered by the Applicant. The bird-friendly additions to the proposed new powerline will have a net benefit to the existing line, through minimizing bird collisions and electrocutions.

The water required for the construction and operation of the solar facility will be sourced from the Gamagara Municipality or Sedibeng Water and will be supplemented by stored rainwater (Proof of confirmation of availability will be included in the Environmental Impact Report).

Construction waste will be disposed of at the existing Gamagara landfill site.

Is this development provided for in the infrastructure planning of the municipality?

Yes. Attracting private investment and the employment of renewable energy development are identified as priority strategies to create sustainable urban and rural settlements.

Is this project part of a national programme to address an issue of national concern or importance?

Yes. In order to meet the increasing power demand within South Africa, Eskom has set a target of 30% of all new power generation to be derived from independent power producers (IPPs). K2018091758 (SOUTH AFRICA) (Pty) Ltd is one such IPP which intends to generate not exceeding 75MW (megawatts) of Alternating Current (AC) electricity from the proposed Solar Farm, for input into the national grid (via the proposed Sekgame Switching Station).

#### **4.1.7 Desirability (place)**

Is the development the best practicable environmental option for this land / site?

The target property is outside the Kathu Urban Edge and as such may not be considered for an alternative land use such as urban development. The property has a poor agricultural potential due to the arid climate and soil conditions. These factors have rendered the property vacant with limited land use option alternatives. Since Photovoltaic solar facilities have a limited footprint, the physical impact on receiving environment would be low.

Would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?

No. According to the Gamagara Municipality IDP, attracting Renewable Energy Investment is seen as an IDP Strategy and economic driver to alleviate unemployment and poverty and "to ensure sustainable economic and social transformation in the District". The performance of which would be reflected in the development of a Renewable Energy Strategy and Policy for the District by 2013 (IDP, 2012-2016).

Would the approval of this application compromise the integrity of the existing approved environmental management priorities for the area?

Unlikely. According to the national vegetation map (Mucina & Rutherford 2006), the solar development site lies entirely within the is classified as Least Threatened (Ecosystems that cover most of their original extent and which are mostly undamaged, healthy and functioning). Considering the extent of this relatively intact ecosystem type, and the fact that the site is not highly sensitive (there are no unique, threatened or otherwise unique habitats present which are not widely available in the wider landscape), it can withstand some loss of natural area through development.

Do location factors favour this land use at this place?

Yes. The Northern Cape region has been identified as being one of the most viable for Solar energy generation due to the following factors:

- Excellent solar radiation (compared to other regions).
- Close to existing main transport routes and access points.
- Close to connection points to the local and national electrical grid.
- Outside Critical Biodiversity areas.

The ecological sensitive areas on and surrounding the solar site have informed the optimal location and layout for the proposed solar project, with minimal impact to the receiving environment, subject to implementation of mitigation measures.

How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas?

The alternatives considered for the solar development have been iteratively designed and informed by various investigations and assessments that considered both the natural and cultural landscapes. The natural and cultural sensitive areas have been identified and where possible, avoided to prevent negative impacts on such areas.

How will the development impact on people's health and wellbeing?

The site is located outside of the Kathu urban edge and as a result is unlikely to impact negatively on the community's health and wellbeing.

Will the proposed activity or the land use associated with the activity applied for, result in unacceptable opportunity costs?

Unlikely. The next best land use alternative to the solar facility is limited agriculture (the status-quo). However, the proposed solar development site does not have any significant agricultural value and has not been utilized for any intensive agricultural purposes. The site is too small to generate noteworthy financial benefit from agricultural activities. The development of the proposed solar facility would constitute the loss of less than 212ha of the overall property. The economic benefits and opportunities that the proposed solar development holds for the landowner and the local economy of the municipal area cannot be recovered from the current or potential agricultural activities.

The opportunity costs in terms of the water-use requirements of the solar facility are within acceptable bounds if one considers the confirmed capacity from the local authority and minimal demand on the resources.

Will the proposed land use result in unacceptable cumulative impacts?

Unlikely. Due to the fact that Northern Cape has been identified as an area with high potential for renewable energy generation: solar irradiation and availability of vast tracts of land with low sensitivity, there are a number of on-going applications in the region already. The potential for further, future solar developments in the area cannot be discounted (as a large number have already been approved or are in progress). However these will have synergistic benefits for the economy and growth of the area, while the contribution to cumulative habitat loss in the area associated with this and potential future solar development would be relatively small in relation to the land resources available, with low impacts restricted to the local area.

## 4.2 SUMMARY OF SITE CONSTRAINTS

The following site-specific constraints were identified by various specialists during this scoping / baseline phase of the environmental process. As part of the risk adverse approach, it was these site constraints that were used to refine the proposed solar facility layout and to select the preferred alternative – The preferred layout has been developed taking all of these constraints into consideration.

### 4.2.1 Flora:

- **Protected** plants species and communities;
- Pans;
- **Cumulative impact** of loss of vegetation considering the other renewable energy projects on and adjacent to the site.
- Landscape connectivity

### 4.2.2 Fauna:

- Potential **collision and electrocution from power-line infrastructure** are significant causes of mortality for bustards, flamingos, eagles and vultures.

### 4.2.3 Agricultural Potential:

Cumulative impact associated with development of an entire cadastral unit.

### 4.2.4 Heritage:

No specific site constraints have been identified to date.

### 4.2.5 Visual:

Cumulative impact associated with massing of PV infrastructure

## 5. SITE DESCRIPTION AND ATTRIBUTES

The following sections provide a description of the natural environmental and built environment context of Portion 2 of the Farm 460 Legoko, with particular focus on the site location for the proposed Gaetsewe Solar.

### 5.1 LOCATION & BUILT ENVIRONMENT

The target property, Portion 2 of the Farm 460 Legoko, is located in the John Taolo Gaetsewe District (previously Kgalagadi District) of the Northern Cape Province, within the jurisdiction area of the Gamagara Local Municipality. The property is approximately **856,53 ha** in size and is located approximately 8km southeast of Kathu.

The proposed Gaetsewe Solar PV energy Facility is situated West of the N14 National Road. The study site is situated approximately 1.2km from the N14.

No buildings, ruins or any other structures were noted on or within the direct proximity of the proposed solar development site.

### 5.2 GEOLOGY & CLIMATE

The following information relating to Geology and Climate was obtained from the Agricultural Specialist. Please refer to **Annexure E3** for a full copy of his report.

The geology is that of the Transvaal sequence. Sedimentary and Volcanic rocks of this sequence include dolomite, limestone and chert.

The region is classified as a semi arid zone. The following specific parameters are applicable:

**Table 8:** Climatic conditions on the Gaetsewe Solar Site.

Annual rainfall	201-400 mm
Mean maximum temperature	31 to 33°C
Mean minimum temperature	Minus 2°C
First frost expected	11 to 20 May
Last frost expected	01 to 10 September
Hours of sunshine	>80%
Evaporation	2200 2400 mm

### 5.3 SOILS

Soils in this region usually show the following characteristics:

- Soils have minimal development, are usually shallow, on hard or weathering rock, with or without intermittent diverse soils.
- Lime is generally present in part or most of the landscape.
- Red and yellow well-drained sandy soil with high base status may occur.
- Freely drained, structure less soils may occur.
- Soils may have favourable physical properties.
- Soils may also have restricted depth, excessive drainage, high erodibility and low natural fertility.

### 5.4 TOPOGRAPHY

The area is essentially sandy Bushveld with a flat to gently undulating topography. Level plains with some relief occur.

### 5.5 BOTANICAL

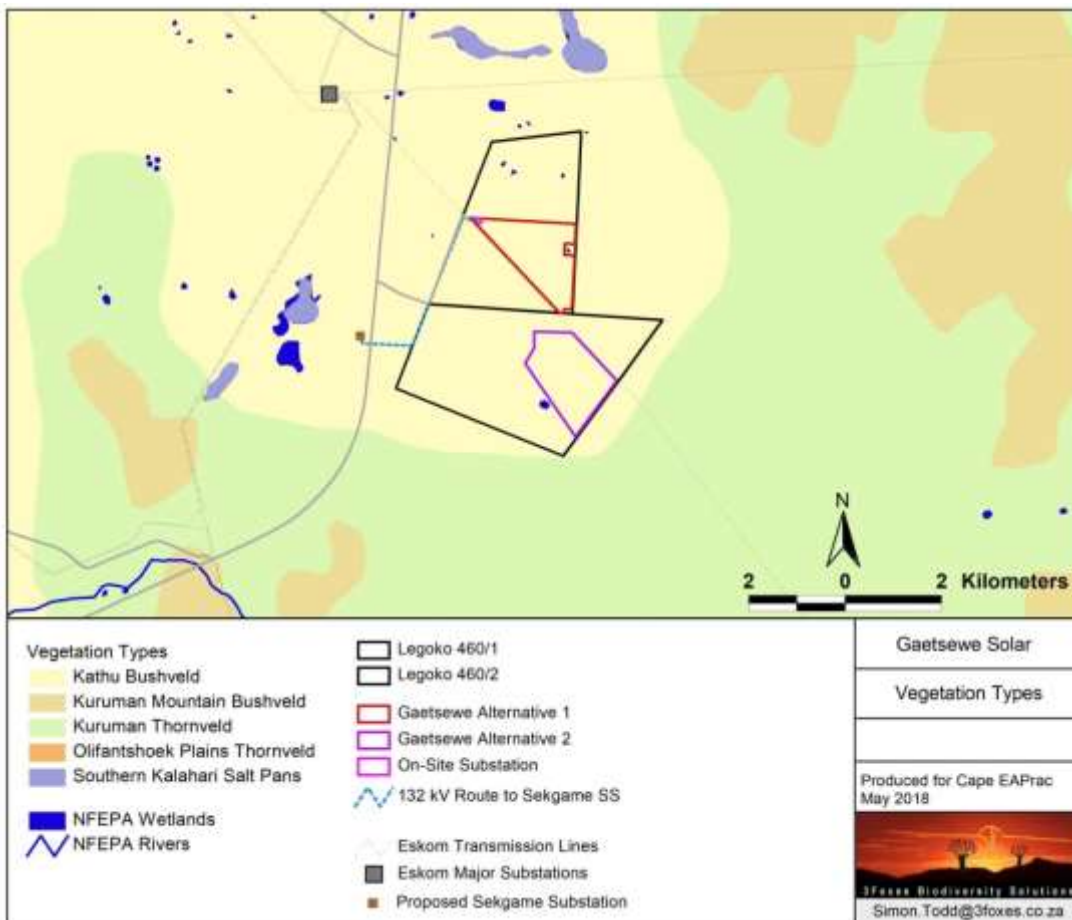
Mr Simon Todd undertook a site assessment of the entire property in order to develop a site sensitivity plan and to determine the baseline botanical composition of the site. Please refer to the Ecological Impact Assessment attached in **Annexure E1**.

### 5.5.1 Broad-Scale Vegetation Patterns

According to the national vegetation map (Mucina & Rutherford 2006), the site is restricted to the **Kathu Bushveld** vegetation type. This vegetation unit occupies an area of 7443 km<sup>2</sup> and extends from around Kathu and Dibeng in the south through Hotazel and to the Botswana border between Van Zylsrus and McCarthysrus.

In terms of soils the vegetation type is associated with aeolian red sand and surface calcrete and deep sandy soils of the Hutton and Clovelly soil forms. The main land types are Ah and Ae with some Ag. The Kathu Bushveld vegetation type is still largely intact and less than 2% has been transformed by mining activity and it is classified as **Least Threatened**. It is, however, poorly conserved and does not currently fall within any formal conservation areas.

Although no endemic species are restricted to this vegetation type a number of Kalahari endemics are known to occur in this vegetation type such as *Acacia luederitzii* var *luederitzii*, *Antheaphora argentea*, *Megaloprotachne albescens*, *Panicum kalaharensense* and *Neuradopsis bechuanensis*. Other vegetation types that occur in the immediate area include Kuruman Thornveld and Kuruman Mountain Bushveld, neither of which is of conservation concern.



**Figure 19:** Broad-scale overview of the vegetation in and around the Gaetsewe Solar site (Todd, 2018)

The vegetation map above is an extract of the national vegetation map as produced by Mucina & Rutherford (2006), and also includes wetlands delineated by the National Freshwater Ecosystem Priority Areas assessment (Nel et al. 2011). There are no mapped drainage lines within the site.

### 5.5.2 Fine-Scale Vegetation Patterns

Mr Simon Todd undertook a site assessment of the entire property in order to develop a site sensitivity plan and to determine the baseline botanical composition of the site. Please refer to the Ecological Impact Assessment attached in **Annexure E1** from which the following is drawn.

The vegetation of the preferred site is fairly homogenous and consists largely of low, fairly dense *Tachonanthus camphoratus* scrub, with occasional more open areas or small stands of *Acacia erioloba*. Differences in vegetation composition along the boundaries of Legoko 460/2 with neighbouring properties suggest that the vegetation composition of Legoko 460/2 is in a degraded state and that the high density of *Tachonanthus camphoratus* which characterises the property is the result of poor historical management.

The vegetation on Legoko 460/1 is considered to be a better, more natural condition and better corresponds with the description of Kathu Bushveld. However, large parts of Legoko 460/2 are on shallow soils overlying calcrete, which across the broader Kathu region tend to be dominated by *Tarchonanthus* or *Acacia mellifera* with few larger trees such as *Acacia erioloba* present. Nevertheless, the density and dominance of *Tachonanthus camphoratus* across much of Legoko 460/2 is most likely the result of excessive burning to improve the vegetation quality for grazing.

Within Legoko 460/2 the *Tarchonanthus*-dominated shrubland is the predominant community present across the site and no other major vegetation communities can be recognised within this property. There are however a few small pans present both on Legoko 460/2 and Legoko 460/1, which are considered sensitive features of the landscape which should be avoided as much as possible. There are no rocky outcrops within the study area, which has very little topographic diversity and is restricted to flat plains. There are no drainage lines within the site and the nearest significant drainage feature is the Gamagara River which occurs approximately 10km south west of the site. The different vegetation communities present at the site are described below.

#### 5.5.2.1 Tarchonanthus Shrubland

The majority of Legoko 460/2 consists of *Tarchonanthus camphoratus* shrubland (**Figure 20**) but with occasional more open areas (**Figure 21**). This community usually consists of a dense shrubland about 2m tall, dominated by *Tarchonanthus camphoratus* with other tall shrubs and trees present including *Zizyphus mucronata*, *Gymnosporia buxifolia*, *Acacia erioloba*, *Acacia karroo*, *Acacia mellifera* subsp. *detinens*, *Searsia ciliata*, *Ehretia rigida* subsp. *rigida*, *Diospyros lycioides* subsp. *lycioides* and *Grewia flava*. The grass layer is dominated by species such as *Aristida meridionalis*, *Aristida stipitata* subsp. *stipitata*, *Cymbopogon popischilli*, *Cynodon dactylon*, *Enneapogon cenchroides*, *Eragrostis lehmanniana*, *Eragrostis nindensis*, *Pogonarthria squarrosa*, *Schmidtia pappophoroides*, *Stipagrostis uniplumis* var. *uniplumis* and *Aristida congesta* subsp. *congesta*. Common low shrubs include *Asparagus laricinus*, *Asparagus retrofractus*, *Chrysocoma ciliata*, *Felicia muricata* subsp. *cinerascens*, *Pentzia calcarea*, *Acacia hebeclada*, *Hermannia tomentosa*, *Gnidia polycephala* and *Lantana rugosa*. Forbs were abundant at the time of the field assessment and common species present include *Dicoma schinzii*, *Geigeria ornativa*, *Elephantorrhiza elephantina*, *Indigofera daleoides* var. *daleoides* and *Gisekia pharnacioides* var. *pharnacioides*. Weedy and alien species are common in disturbed places and include *Tribulus terrestris*, *Gomphrena celosioides*, *Osteospermum muricatum*, *Verbesina encelioides*, *Heliotropium ciliatum* and *Datura stramonium*. Occasional *Prosopis* trees are also present at the site, usually around watering points.



**Figure 20:** Dense *Tarchonanthus camphoratus*-dominated veld within the preferred alternative. Diversity within these areas is low and the grass layer is also dominated by unpalatable species.



**Figure 21:** Example of an area of more open grassland within the footprint of the preferred alternative, with a small stand of *Acacia erioloba* in the background. Apart from the pictured stand, there are no other significant stands of *Acacia erioloba* within the footprint of this alternative.

#### 5.5.2.2 Pans

There are a number of small pans on the affected properties, the closest to the development footprint being along the southwestern margin of Alternative 2. This pan is similar to the other small pans that are present in the area.



The floor of the pan is dominated by species such as *Vahlia capensis*, *Osteospermum muricatum*, *Cullen tomentosum*, *Gisekia pharnacioides* var. *pharnacioides*, *Selago dinteri*, *Enneapogon desvauxii*, *Eragrostis biflora* and *Geigeria ornativa*. The margins of the pans are usually dominated by *Acacia mellifera* and *Zizyphus mucronata* with occasional *Seasia lancea* before quickly giving way to more normal *Tarchonanthus* scrub. The pans are a small feature of the landscape, but are used disproportionately by terrestrial fauna as well as birds. These areas are considered sensitive features of the landscape and should be buffered from development by at least 100m



**Figure 22:** The pan present near the south-western boundary of Alternative 2. The pan is however outside of the proposed footprint. These pans are considered sensitive features of the landscape and should be avoided by the development.

#### 5.5.2.3 *Acacia erioloba* Thornveld

Alternative 2 is located on the property Logoko 460/1 immediately south of the preferred alternative on Logoko 460/2. The habitat in this area is considered to be in a better condition than the veld on Logoko 460/2 and consists of mixed *Acacia erioloba* thornveld which broadly corresponds to the Kathu Bushveld vegetation type as described by Mucina and Rutherford (2006).

The vegetation is generally much more open than within the preferred alternative, although there are still some areas present where *Tarchonanthus camphoratus* is dominant. As a result of the lower tree cover, the grass layer on Logoko 460/1 is better developed and is a much more important component of the vegetation in terms of cover and biomass.

The woody layer within the alternative site is dominated by the trees *Acacia erioloba* and *Zizyphus mucronata*, with a variable tall shrub layer consisting of *Tarchonanthus camphoratus*, *Acacia haematoxylon*, *Gymnosporia buxifolia*, *Searsia ciliata*, *Ehretia rigida* subsp. *rigida*, *Diospyros lycioides* subsp. *lycioides* and *Grewia flava*.

The grass layer is largely composed of similar species to within the preferred alternative, but the dominance has shifted towards more palatable species. Dominant and characteristic species include *Schmidtia pappophoroides*, *Aristida meridionalis*, *Aristida stipitata* subsp. *stipitata*, *Stipagrostis uniplumis* var. *uniplumis*, *Stipagrostis obtusa*, *Cynodon dactylon*, *Enneapogon desvauxii*, *Eragrostis lehmanniana*, and *Aristida congesta* subsp. *congesta*. Due to the high grass density, forb abundance is not as high as within the preferred alternative, but the overall composition and diversity is very similar.

The general sensitivity of the alternative site is considered higher than the preferred alternative, due to the greater ecological functioning of the alternative site as well as the significantly highly abundance of protected tree species, especially *Acacia erioloba* and *Acacia haematoxylon*.



**Figure 23:** Open *Acacia erioloba* bushveld near to the north eastern boundary of Alternative 2, showing the low bush density compared with the majority of the Alternative 1 area.



**Figure 24:** *Acacia erioloba* bushveld in the south of Alternative 2, with *Acacia erioloba*, *Acacia haematoxylon* and *Tarchonanthus camphoratus* being prominent woody species present.

## 5.6 FAUNA

Mr Simon Todd undertook a site assessment of the entire property in order to develop a site sensitivity plan and to determine the baseline faunal composition of the site. Please refer to the Ecological Impact Assessment attached in **Annexure E1**.

### 5.6.1 Mammals

The mammalian community at the site is likely to be of moderate diversity; as many as 44 terrestrial mammals potentially occur in the area. The habitat diversity of the preferred site is low and the homogenous *Tarchonanthus*-scrub is not likely to have high mammal diversity.

Species captured, observed or otherwise confirmed present at the site include Aardvark, Cape Porcupine, Springhare, South African Ground Squirrel, Vervet Monkey, Small-spotted Genet, Yellow Mongoose, Slender Mongoose, Black-Backed Jackal, Steenbok, Duiker and Kudu. Small mammals trapped in the area on the current or previous site visits include Desert Pygmy Mouse *Mus indutus*, Multimammate Mouse *Mastomys coucha*, Bushveld Gerbil *Tatera leucogaster*, Hairy footed Gerbil *Gerbillurus paeba*, Pouched Mouse *Saccostomus campestris* and Grey Climbing Mouse *Dendromus melanotis*.

Five listed terrestrial mammal species potentially occur in the area; these are the Brown Hyaena *Hyaena brunnea* (Near Threatened), Black-footed Cat *Felis nigripes* (Vulnerable), Ground Pangolin *Smutsia temminckii* (Vulnerable) and South African Hedgehog *Atelerix frontalis* (Vulnerable). The Brown Hyaena is not likely to occur in the area on account of the agricultural land-use in the area which is not usually conducive to the persistence of large carnivores. The Black-footed Cat is a secretive species which would probably occur at the site given that it occurs within arid, open country. The Ground Pangolin may also occur in the area at typically low density, but usually favours more typical savannah on deep red sands and not the calcrete soils which characterise much of the site. Given the extensive national ranges of these species, the impact of the development on habitat loss for these species would be minimal and a long-term impact on these species would be unlikely.

Mammals observed at the site include from top left, Black-backed Jackal, Slender Mongoose, Bushveld Gerbil and Hairy-footed Gerbil.

### 5.6.2 Reptiles

The Gaetsewe site lies in or near the distribution range of at least 37 reptile species, of which about 30 have been observed in the area according to the ReptileMap database. This is a comparatively low total suggesting that the site has relatively low reptile species richness. Based on distribution maps and habitat requirements, the composition of the reptile fauna is likely to comprise 1 terrapin, 2 tortoises, 15 snakes, 13 lizards and skinks, and 5 geckos. No species of conservation concern are known to occur in the area. The habitat diversity within the study area is relatively low as no rocky outcrops or drainage lines are present within the study area. As a result, the number of reptile species present within the site is likely to be relatively low and only a proportion of the species known from the area are likely to be present on the site itself.

Species observed at the site or in the area in the past include Cape Cobra *Naja nivea*, Ground Agama *Agama aculeata*, Spotted Sand Lizard *Pedioplanis lineocellata*, Variable Skink *Trachylepis varia*, Bibron's Blind Snake *Afrotrophlops bibronii*, Western Rock Skink *Mabuya sulcata sulcata*, Cape Gecko *Lygodactylus capensis capensis*, Speckled Rock Skink *Trachylepis punctatissima*, Striped Skaapsteker *Psammophylax tritaeniatus* and Boomslang *Dispholidus typus typus*. Impacts on reptiles are likely to be restricted largely to habitat loss within the development footprint. This is likely to be of local significance only as there are no very rare species or specialised habitats present within the footprint areas.

### 5.6.3 Amphibians

The site lies within or near the range of 11 amphibian species, indicating that the site potentially has a moderately diverse frog community for an arid area. There is no natural permanent water or artificial earth dams within the site that would represent suitable breeding habitat for most of these species. The pans which are present at the site would occasionally contain sufficient water for breeding purposes for those species which do not require permanent water. Given the paucity of permanent water at the site, only those species which are relatively independent of water

are likely to occur in the area. Species observed in the area include Eastern Olive Toad *Amietophrynus garmani* and Bushveld Rain Frog *Breviceps adspersus*, both of which are likely to occur at the site. While Rain Frogs do not have a free-swimming phase, as the tadpoles mature in an underground nest, the Olive Toads are likely to breed in the small pans present at the site when the opportunity arises.

The only species of conservation concern which may occur at the site is the Giant Bullfrog *Pyxicephalus adspersus*. The site lies at the margin of the known distribution of this species and it has not been recorded from any of the quarter degree squares around the site, suggesting that it is unlikely to occur at the site. Impacts on amphibians are however likely to be low and restricted largely to habitat loss during construction.

#### 5.6.4 Avifauna

According to the SABAP 1 and 2 databases, 217 bird species have been recorded from the area. This total results from 135 species recorded from 39 cards from SABAP 2 and 164 species from 76 cards from SABAP 1. This suggests that the area has been reasonably well sampled and that the species list is likely to be fairly comprehensive. Eleven listed bird species are known from the area, all of which are classified as Vulnerable or Near Threatened (Table 2 below). The site does not fall within or near any of the Important Bird Areas defined by Birdlife South Africa. A number of the listed species are associated with water and are not likely to be resident at the site but may occasionally pass over the site, but are unlikely to be directly impacted by any habitat loss. Direct habitat loss is not likely to be a highly significant impact for most species and the major potential source of impact would potentially come from electrocution and collisions with the power lines. Although not all species are vulnerable to these impacts, flamingos, bustards and storks are highly vulnerable to collisions with power lines, while many of the raptors are susceptible to electrocution as well as collision. Given the relative proximity of the site to the Eskom Ferrum Substation which 8km from the site, these impacts are likely to be low especially given that the power line route is in close proximity to active mining activities.

**Table 9:** Listed bird species known from the vicinity of the Gaetsewe Solar site, according to SABAP 1 and 2 (Todd, 2015)

Family	Species Name	Common Name	Status	Frequency
Charadriidae	<i>Charadrius pallidus</i>	Chestnut-banded Plover	NT	V.Low
Ciconiidae	<i>Ciconia nigra</i>	Black Stork	NT	Medium-Low
Ciconiidae	<i>Mycteria ibis</i>	Yellow-billed Stork	NT	V.Low
Falconidae	<i>Falco biarmicus</i>	Lanner Falcon	NT	Low
Falconidae	<i>Falco naumanni</i>	Lesser Kestrel	VU	Medium
Phoenicopteridae	<i>Phoenicopterus minor</i>	Lesser Flamingo	NT	Medium-Low
Phoenicopteridae	<i>Phoenicopterus ruber</i>	Greater Flamingo	NT	High
Sagittariidae	<i>Sagittarius serpentarius</i>	Secretary Bird	NT	Low
Accipitridae	<i>Aquila rapax</i>	Tawny Eagle	VU	Low
Accipitridae	<i>Circus ranivorus</i>	African Marsh-harrier	VU	V.Low
Accipitridae	<i>Polemaetus bellicosus</i>	Martial Eagle	VU	Low

The frequency refers to the reporting rate from SABAP 1 and 2 and gives an indication of the frequency with which the species is likely to be encountered at the site, as a resident or passing over.

A Detailed Avifaunal Impact Assessment will be undertaken later on in the environmental process.

## 5.7 SOCIO ECONOMIC PROFILE

The following Socio-Economic profile was provided by the social specialist, Savannah Environmental. A full copy of this report is attached in Appendix E9

### 5.7.1 Northern Cape Province

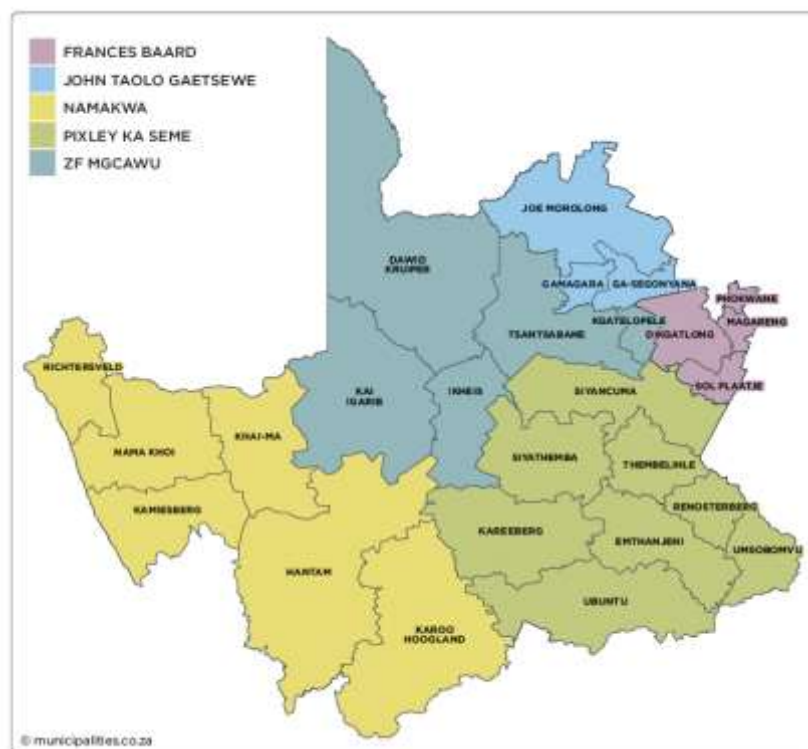
The Northern Cape Province is located in the north-western extent of South Africa, and comprises South Africa's largest Province, occupying an area approximately 372 889km<sup>2</sup> in extent, equivalent to nearly one third (30.5%) of the country's total land mass. It is also South Africa's most sparsely populated province with a population of 1 145 861, and a population density of 3.1/km<sup>2</sup>. It is bordered by the Western Cape and Eastern Cape Provinces to the south and south-east, by Free State and North West Provinces to the east, by Botswana and Namibia to the north, and by the Atlantic Ocean to the west. The Northern Cape is the only South African province which borders Namibia, and therefore plays an important role in terms of providing linkages between Namibia and the rest of South Africa. The Orange River is a significant feature, and is also the main source of water in the province. The Orange River also constitutes the international border between the Northern Cape and Namibia.

The Northern Cape offers unique tourism opportunities including wildlife conservation destinations, natural features, historic sites, festivals, cultural sites, star gazing, adventure tourism, agricultural tourism, ecotourism, game farms, and hunting areas, etc. The province is home to the Richtersveld Botanical and Landscape World Heritage Site, which comprises a United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Site under the World Heritage Convention. The Northern Cape is also home to 2 Transfrontier National Parks, namely the Kgalagadi Transfrontier Park, and the Richtersveld /Ai-Ais Transfrontier Park, as well as 5 national parks, and 6 provincial reserves.

The Northern Cape also plays a significant role in South Africa's science and technology sector, as it is home to the Square Kilometre Array (SKA), the Southern African Large Telescope (SALT), and the Karoo Array Telescope (MeerKAT).

The Northern Cape makes the smallest contribution to South Africa's economy (having contributed only 2% to South Africa's Gross Domestic Product per region (GDP-R) in 2007). The mining sector is the largest contributor to the provincial GDP, contributing 26% thereto. The Northern Cape's mining industry is of national and international importance, as it produces approximately 37% of South Africa's diamond output, 44% of its zinc, 70% of its silver, 84% of its iron-ore, 93% of its lead and 99% of its manganese.

In 2007, the agricultural sector contributed 5.8% to the Northern Cape GDP-R which was equivalent to approximately R1.3 billion. The agricultural sector also employs approximately 19.5% of the total formally employed individuals within the province (LED Strategy). The sector is experiencing significant growth in value-added activities, including game-farming, while food production and processing for the local and export market is also growing significantly (PGDS, July 2011). Approximately 96% of the land is used for stock farming, including cattle and sheep or goats, as well as game farming, while approximately 2% of the Province is used for crop farming, mainly under irrigation in the Orange River Valley and Vaalharts Irrigation Scheme (LED Strategy).

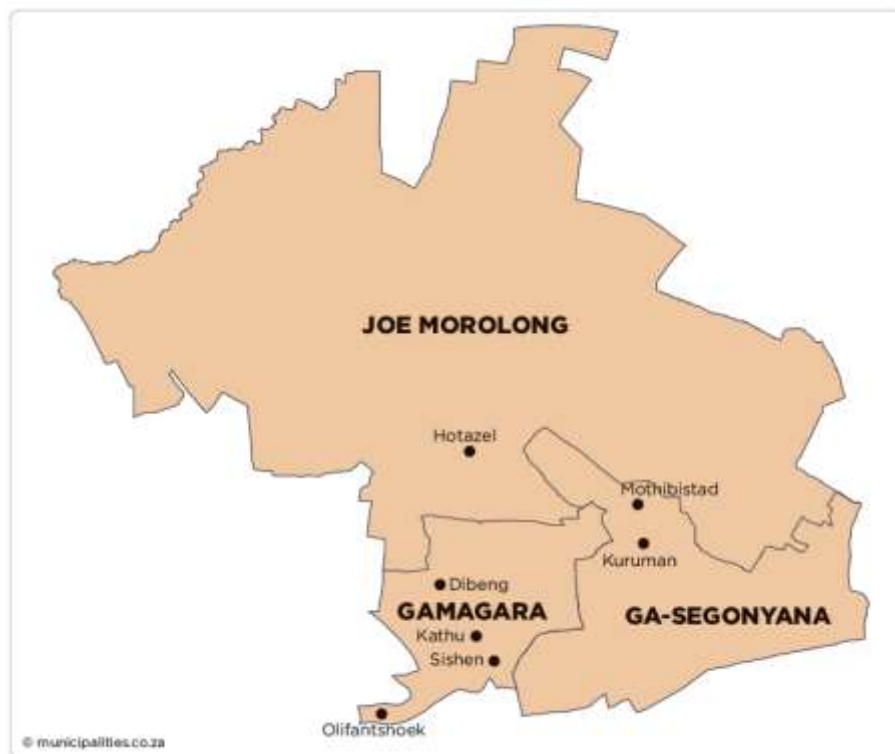


**Figure 25:** Map showing the District Municipalities of the Northern Cape Province (Source: [www.municipalities.co.za](http://www.municipalities.co.za), in Savannah, 2018).

### 5.7.2 John Taolo Gaetsewe District Municipality

The John Taolo Gaetsewe DM (previously known as the Kgalagadi DM) is situated in the north-eastern extent of Northern Cape Province. It is the second smallest DM in the province in terms of land mass (i.e. 27 283km<sup>2</sup>, equivalent to 7.32% of the total provincial land mass), and third largest in terms of population (224 799, equivalent to 19.62% of the total provincial population), with the second highest population density of 8.2/km<sup>2</sup>. The John Taolo Gaetsewe DM is bordered by ZF Mgcawu DM to the south-west, and south, Frances Baard DM to the south-east, Dr Ruth Segomotsi Mompati DM of North West Province to the east, and Botswana to the north. The DM comprises 3 LMs, namely: Gamagara, Ga-Segonyana, and Joe Morolong. In 2006 the boundaries of the John Taolo Gaetsewe DM were demarcated to include the once north-western extent of Gamagara and Olifantshoek, along with its surrounds, into the Gamagara LM.

The John Taolo Gaetsewe DM comprises 186 towns and settlements, approximately 80% of which comprise villages. Predominant towns within the DM include: Bankhara-Bodulong, Deben, Hotazel, Kathu, Kuruman, Mothibistad, Olifantshoek, Santoy, and Van Zylsrus. It is characterised by a mixture of land uses, of which agriculture and mining are dominant. The main economic sectors within the DM include agriculture, mining, and retail. The DM holds potential as a viable tourist destination and has numerous growth opportunities in the industrial sector.



**Figure 26:** Map showing the Local Municipalities of the John Taolo Gaetsewe District Municipality (Source: [www.municipalities.co.za](http://www.municipalities.co.za), in Savannah, 2018).

### 5.7.3 Gamagara LM

The Gamagara LM occupies an area approximately 2 619km<sup>2</sup> in extent, equivalent to approximately 10% of the John Taolo Gaetsewe DM land mass, and is the smallest of the 3 LMs which comprise the John Taolo Gaetsewe DM. The Gamagara LM has the smallest population (41 617), and is the second most densely populated LM of the John Taolo Gaetsewe DM with a population density of 16/km<sup>2</sup>. The Gamagara LM is situated approximately 200km north-east of Upington and 280km north-west of Kimberley in the southern to south-western extent of the John Taolo Gaetsewe DM. It is bordered by the Joe Morolong LM to the north, the Ga-Segonyana LM to the east, and the Tsantsabane LM of the ZF Mgcawu DM to the south and west.

The Gamagara LM comprises five towns, namely: Kathu, Shesheng, Dibeng, Dingleton, and Olifantshoek. Kathu is the largest town, and is also the administrative centre of the Gamagara LM. Olifantshoek is the second largest town, and is located near the Gamagara River to the north-west of Kathu. Dingleton is the smallest of the five towns, and is located in the centre of the mining activities directly south of Kathu.

The Gamagara LM has experienced considerable population growth, increasing from 23 202 people in 2001 to 41 617 people in 2011 (Census 2011). Such an increase in population can be attributed to an in-migration of people (predominantly men) in search of employment opportunities from the mining activities within the LM.

In terms of tourist attractions, the Gamagara LM is home to an endemic camel-thorn tree forest known as the Kathu Forest, which was registered as a National Heritage site in 1995. The Kathu Forest, which is situated north of the town of Kathu, has been declared a protected woodland in terms of Section 12(1) (c) of the National Forests Act (No. 84 of 1998) (NFA). The Kathu Forest is a unique woodland of exceptionally large camel-thorn trees (*Acacia erioloba*). The woodland is approximately 4 000ha in extent and comprises one of only two such woodlands in the world. In addition to the Kathu Forest other tourist attractions within the Gamagara LM include the mines (the area boasts the largest single pit, open cast iron ore mine in the world, and is the starting point of the Sishen – Saldanha railway line), and the Kathu archaeological complex comprising three heritage sites in and around the town of Kathu, which includes the Kathu town lands, Kathu pan and the Best wood pan.

#### 5.7.4 Project Site

Gaetsewe Solar is proposed on Portion 02 of the Farm Legoko No. 460 within Ward 01 of the Gamagara LM of the John Taolo Gaetsewe DM in the Northern Cape Province. The project site is located approximately 7km south-east of Kathu. The site is approximately 856ha in extent and comprises a single agricultural property. The property is currently not being utilised for livestock farming due to high crime rates and theft within the area. The landowner resides on the farm, and the main farmhouse is located in the south-western extent of the farm.

The development of AEP Legoko Solar, a 75MW commercial PV facility has been authorised in the northern extent of the property (DEA Reference No.: 14/12/16/3/3/2/819). The project site currently under investigation for the development of Gaetsewe Solar is located adjacent to, and immediately south of the AEP Legoko Solar project area.

The 75MW AEP Legoko Solar Energy Facility located on the northern portion of this farm has received environmental authorisation. The existing Ferrum-Olien 2 275kV and proposed Hotazel-Kuruman 132kV power lines traverse the property.

The N14 national road is located approximately 2km east of the project site, and traverses the area in a north to south direction, while a number of gravel roads occur within the project site. The Sishen iron ore mine is located approximately 4km east of the N14 national road, and 6km east of the eastern boundary of the project site.

#### 5.7.5 Adjacent Properties

The Majority of the surrounding area has a low number of farmsteads/buildings that are sparsely populated. The area is located within a livestock farming agricultural region, and the immediate area is presently used mainly for small livestock farming as well as proposed renewable energy facilities. The table below provides a summary of the current land uses and characteristics of the adjacent properties.

**Table 10:** Current land uses and characteristics of the adjacent farmlands

Farm Name & Portion	Location	Landowner Names	Any residents living on farm	Homesteads / Buildings on farm	Current activities taking place on the farm	Comments noted
Farm Legoko 2/460	Affected property	Carel Reitz	Landowner resides on farm.	Main farmhouse	No current activities on the property.	No issues or concerns with the proposed PV facility. In support of renewable energy development and the



Farm Name & Portion	Location	Landowner Names	Any residents living on farm	Homesteads / Buildings on farm	Current activities taking place on the farm	Comments noted
			Labourer on property during daytime. Resides in Kathu.		Environmental Authorisation (EA) has been received for the AEP Legoko Solar PV Facility on the northern section of the farm.	project.  Landowner not aware of any land claims on the property. Aware of a mining right registered on the property. Written comment has been obtained from the Department of Rural Development and Land Reform in this regard.
Farm Legoko 1/460	Adjacent to the south  Power line crosses property	Frans Briedenhann	Landowners resides on farm with his family.  2 permanent farmworkers reside on the property.	Main farmhouse  Workers accommodation  Function hall which can cater for up to 60 people.	The farm is utilised for livestock and game farming (not for commercial purposes).  EA has been received for the AEP Mogobe Solar PV Facility over the centre of the farm.	No issues or concerns with the proposed PV facility or power line.
Farm 461 (The proposed self-build 132kV power line is proposed to traverse the southern corner of this farm)	Adjacent to the west	Kumba Iron Ore	A portion of the Kathu town falls within this farm portion	N/A	Sishen iron ore mine, includes large waste rock dump landforms, large infrastructure and buildings.	No issues with the proposed development and associated infrastructure.
Farm Bestwood 1/459	Adjacent to the north	Petrus Duvenhage	Landowners reside on farm.	Main farmhouse (occupied by landowners) and few other buildings (farm workers and farm infrastructure)	Livestock farming, primarily cattle and goats farming.  Environmental authorisation has been received for a PV solar facility on the south west corner of the farm. The Bestwood Solar farm is located on the	No issues or concerns with proposed PV facility and power line. Concerns regarding safety and security. Requested that facility is fenced such as the other facilities in the area.  Landowner not aware of any land claims on the property. Not aware of any mining right registered on the property.

Farm Name & Portion	Location	Landowner Names	Any residents living on farm	Homesteads / Buildings on farm	Current activities taking place on the farm	Comments noted
					portion north of portion 1, the Remainder of the Farm Bestwood 459.	
Farm Legoko RE/460	Adjacent to the east	Dihan van Rensburg	Landowner resides on the property.  3 permanent farm workers reside on the property	Main farmhouse  Workers accommodation	Low density livestock and game farming (for local commercial use).  The authorised AEP Kathu Solar Facility is located in the south-western corner of this property, adjacent to the proposed Gaetsewe Solar site	No issues or concerns with proposed PV facility and power line. Concerns regarding safety and security. Reiterated that crime in the area should not increase as a result of the project. A concern was raised regarding the location of the access to the site and the potential to open up the area as a thoroughfare. Appropriate management of issue must be implemented.
Farm 548	To the east	Abbie Wiid (SA Army Combat Training Centre)	A small rural community resides in the centre of the farm.	N/A	Army Combat Training Centre over 158 000ha.	No issues with the proposed development and associated infrastructure.

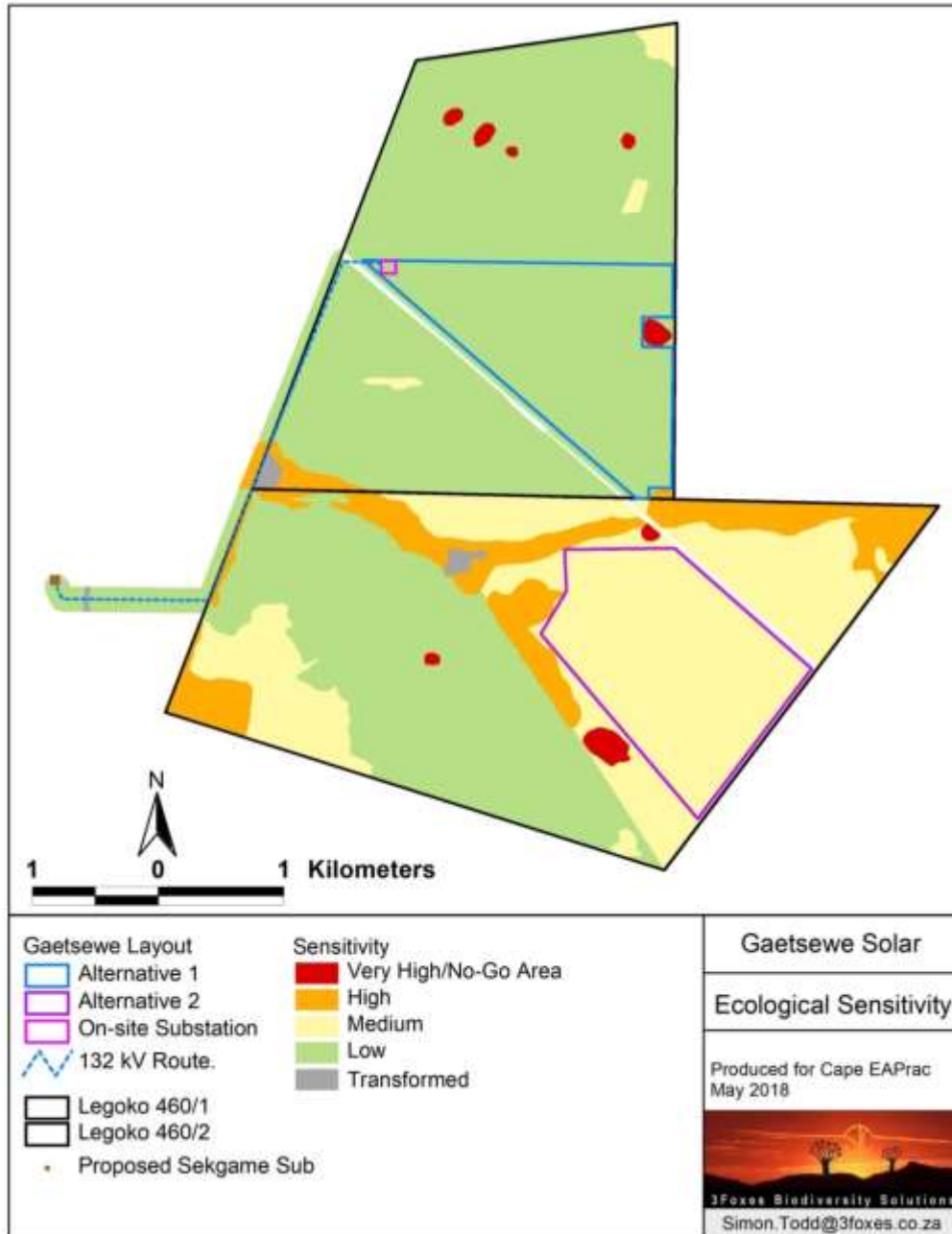
## 5.8 ECOLOGICAL SENSITIVITY OF THE STUDY SITE

Mr. Simon Todd, of Simon Todd Consulting, conducted an Ecological Sensitivity Analysis of the proposed Solar PV Energy Facility (see **Annexure E1** for full report), from which the following is drawn<sup>9</sup>

The sensitivity map for the Gaetsewe study area is illustrated in the figure below. The Alternative 1 (preferred) development area is considered to be low sensitivity *Tarchonanthus* scrub. It is likely that development of the solar energy development in this area would generate low impacts on fauna and flora. The Alternative 2 development area is considered to be Medium sensitivity and represents habitat with a much higher ecological condition than the preferred alternative and also has a much higher density of protected tree species. It is clear the preferred alternative is supported by the ecologist and the Alternative 2 development area is not considered to be a suitable area for the development of a solar energy development.

<sup>9</sup> Much of the information in this section is also included in the section on site selection, but is reiterated here for context.

With the development of the preferred alternative, the project would result in some habitat loss for fauna of minor local significance, and some loss of poor condition Kathu Bushveld vegetation with a low abundance of species of conservation concern.



**Figure 27:** Sensitivity map for the Gaetsewe Solar project, showing the two alternatives and the grid connection (Todd, 2018)

## 6. IMPACT ASSESSMENT

This section of the report was completed with input from the following specialists:

- Ecology (Todd, 2018)
- Avifauna (Todd, 2018)
- Agricultural (Lubbe, 2018)
- Archaeology (Nilssen, 2018)
- Palaeontology (Almond, 2018)

- Integrated Heritage (De Kock, 2018)
- Visual (Stead, 2018)
- Freshwater (Colloty, 2018)
- Socio Economic (Savannah, 2018)

The impacts will firstly be discussed per specialist discipline and then summarised in the impact statement in section 6.12 below.

## 6.1 ASSESSMENT METHODOLOGY

All possible impacts need to be assessed – the **direct, in-direct as well as cumulative impacts**. Impact criteria should include the following:

- **Nature of the impact:** impacts associated with the proposed Public Safety Centre development have been described in terms of whether they are negative or positive and to what extent.
- **Duration of impacts: Impact were assessed in terms of their anticipated duration:**
  - Short term (e.g. during the construction phase)
  - Medium term (e.g. during part or all of the operational phase)
  - Permanent (e.g. where the impact is for all intents and purposes irreversible)
  - Discontinuous or intermittent (e.g. where the impact may only occur during specific climatic conditions or during a particular season of the year)
- **Intensity or magnitude: The size of the impact (if positive) or its severity (if negative):**
  - Low, where the receiving environment (biophysical, social, economic, cultural etc) is negligibly affected or where the impact is so low that the remedial action is not required;
  - Medium, where the receiving environment (biophysical, social, economic, cultural etc) is altered, but not severely affected, and the impact can be remedied successfully; and
  - High, where the receiving environment (biophysical, social, economic, cultural etc) would be substantially (i.e. to a very large degree) affected. If a negative impact, could lead to irreplaceable loss of a resource and/or unacceptable consequences for human wellbeing.
- **Probability: Should describe the likelihood of the impact actually occurring indicated as:**
  - Improbable, where the possibility of the impact is very low either because of design or historic experience;
  - Probable, where there is a distinct possibility that the impact will occur;
  - Highly probable, where it is most likely that the impact will occur; or
  - Definite, where the impact will occur regardless of any prevention measures.
- **Significance: The significance of impacts can be determined through a synthesis of the assessment criteria. Significance can be described as:**
  - Low, where it would have negligible effect on the receiving environment (biophysical, social, economic, cultural etc), and on the decision;
  - Medium, where it would have a moderate effect on the receiving environment (biophysical, social, economic, cultural etc), and should influence the decision;

- High, where it would have, or there would be a high risk of, a large effect on the receiving environment (biophysical, social, economic, cultural etc). These impacts should have a major influence on the decision;
- Very high, where it would have, or there would be a high risk of, an irreversible negative impact on the receiving environment (biophysical, social, economic, cultural etc) and irreplaceable loss of natural capital/resources or a major positive effect on human well-being. Impacts of very high significance should be a central factor in decision-making.
- Provision should be made for with and without mitigation scenarios.
- **Confidence: The level of confidence in predicting the impact can be described as:**
  - Low, where there is little confidence in the prediction, due to inherent uncertainty about the likely response of the receiving ecosystem, or inadequate information;
  - Medium, where there is a moderate level of confidence in the prediction, or
  - High, where the impact can be predicted with a high level of confidence
- **Consequence: What will happen if the impact occurs**
  - Insignificant, where the potential consequence of an identified impact will not cause detrimental impact to the receiving environment;
  - Significant, where the potential consequence of an identified impact will cause detrimental impact to the receiving environment.
  - Provision must be made for with and without mitigation scenarios.

The impacts should also be assessed in terms of the following aspects:

- **Status of the impact**

The specialist should determine whether the impacts are negative, positive or neutral (“cost – benefit” analysis). The impacts are to be assessed in terms of their effect on the project and the environment. For example, an impact that is positive for the proposed development may be negative for the environment. It is important that this distinction is made in the analysis.

- **Cumulative impact**

Consideration must be given to the extent of any accumulative impact that may occur due to the proposed development. Such impacts must be evaluated with an assessment of similar developments planned and already in the environment. Such impacts will be either positive or negative, and will be graded as being of negligible, low, medium or high impact.

Care must be taken to ensure that where cumulative impacts can occur that these impacts are considered and categorised as **additive** (incremental or accumulative); **interactive**, **sequential** or **synergistic**.

Based on a synthesis of the information contained in the above-described procedure, the specialists are required to assess the potential impacts in terms of the following significance criteria:

- **No significance:** The impacts do not influence the proposed development and/or environment in any way.
- **Low significance:** The impacts will have a minor influence on the proposed development and/or environment. These impacts require some attention to modification of the project design where possible, or alternative mitigation.
- **Moderate significance:** The impacts will have a moderate influence on the proposed development and/or environment. The impact can be ameliorated by a modification in the project design or implementation of effective mitigation measures.

- **High significance:** The impacts will have a major influence on the proposed development and/or environment.

## 6.2 SUMMARY OF IMPACTS ASSESSED

The following potential key impacts have been identified and assessed by the various specialists in compliance with the approved Plan of Study for EIR (more details on the significance and ratings of these impacts are provided below and in the attached specialist reports):

### 6.2.1 Ecological impacts assessed:

#### *Construction Phase*

- **Vegetation clearing** for construction could impact indigenous species as well as riparian and terrestrial plant communities. Vegetation clearing will also lead to **habitat loss** for fauna and potentially the **loss of sensitive faunal species, habitats and ecosystems within the remaining natural areas.**
- Presence and operation of construction machinery on site. This will create a physical impact as well as generate noise, pollution and other forms of disturbance at the site. **Disturbance could affect faunal species.**
- Increased human presence can lead to faunal **conflict.**

#### *Operational Phase*

- The presence of the development could **disrupt the connectivity of the landscape.**
- **Human-animal conflict** can occur as a result of resident baboon troops in the area.
- **Alien clearing** will improve the ecology and habitat of the area.

#### *Cumulative Impacts*

- **Transformation of intact habitat** could **disrupt the connectivity** of the landscape for fauna and flora and **impair their ability to respond to environmental fluctuations.**

### 6.2.2 Freshwater impacts assessed:

#### *Construction Phase*

- Alteration of **riparian habitat**;
- Risks associated with landscape scale alterations in **surface flows**;
- Changes in flows leading to **degradation of river quality.**
- **Sedimentation** of downstream watercourses;
- Water **quality impacts** into downstream river systems;

#### *Operational Phase*

- There is the potential for some **loss of aquatic habitat.**
- change in the **runoff characteristics** from the site as a result in the increase in hardened surfaces;
- use of water for the development and the associated disposal of wastewater;
- **Impairment of the surface water quality**, namely sedimentation and other pollutants;

### 6.2.3 Heritage Impacts Assessed

#### *Construction Phase*

- Impact on scenic routes during construction

#### *Operational Phase*

- Impacts on the heritage resources
- Impact on scenic routes
- Impact of new structures on cultural landscape and character

#### *Cumulative impacts*

- Change to the rural character

- Socio-economic upliftment

#### **6.2.4 Archaeological impacts assessed**

##### *Construction Phase*

- disturbance to surface and sub-surface sediments

##### *Operational Phase*

- no significant archaeological resources were identified during this assessment

##### *Cumulative Impacts*

- No cumulative impacts will arise

#### **6.2.5 Visual impacts assessed**

##### *Construction Phase*

- Visual scarring as a result of new development, clearing vegetation and construction works.

##### *Operational Phase*

- Change in the rural visual character of the site from a restful, partly developed, rural
- Visual impact on key visual receptors and secondary visual receptors;
- Potential visual;
- Visibility from sensitive receptors;
- Visual intrusion of lighting at night.

#### **6.2.6 Socio-Economic impacts Assessed**

##### *Construction Phase*

- Creation of business and employment opportunities
- Impacts associated with the presence of construction workers on site;
- Security and safety impacts associated with the presence of construction workers;
- Noise, dust and safety impacts associated with construction related activities and the movement of heavy vehicles.

##### *Operational Phase*

- Creation of employment and business opportunities;
- Impact on rural sense of place and character of the area;
- Crime levels and pressure on local services.

### **6.3 ECOLOGICAL IMPACTS**

In this section, the impacts and associated risk factors that may be generated by the development are identified and assessed. In order to ensure that the impacts identified are broadly applicable and inclusive, all the likely or potential impacts that may be associated with the development are listed.

#### **6.3.1 Identification of Impacts**

Potential ecological impacts resulting from the development of the Gaetsewe Solar energy facility would stem from a variety of different activities and risk factors associated with the preconstruction, construction and operational phases of the project including the following:

##### **6.3.1.1 Impacts on vegetation and protected plant species**

Several protected species occur at the site which may be impacted by the development, most notably *Acacia erioloba* and *A.haematoxylon*. Vegetation clearing during construction will lead to the loss of currently intact habitat within the development footprint and is an inevitable consequence of the development. As this impact is certain to occur, it will be assessed for the construction phase as this is when the impact will occur, although the consequences will persist for a long time after construction.

##### **6.3.1.2 Direct faunal impacts**

Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some impact on fauna is highly likely to occur during construction as well as operation and this impact will therefore be assessed for the construction phase and operational phase.

#### 6.3.1.3 Reduced ability to meet conservation obligations & targets

The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the country's ability to meet its conservation targets. Although the receiving vegetation type in the study area is classified as Least Threatened and is still more than 98% intact, it is a relatively restricted vegetation type for an arid area and is therefore vulnerable to cumulative impact. This impact is therefore assessed in light of the current development as well as any other developments in the surrounding area which would also contribute to cumulative impacts.

#### 6.3.1.4 Impact on broad-scale ecological processes

Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. Due to the presence of a number of other renewable energy and mining developments in the area, habitat transformation is a potential cumulative impact of the development that is assessed.

### 6.3.2 Assessment of Impacts

The various identified impacts are assessed below for the different phases of the development, first for the PV facility and then for the grid connection. This assessment is based on the preferred and alternative layouts.

#### 6.3.2.1 Planning & Construction Phase – PV Facility

**Table 11:** Impacts on vegetation and listed or protected plant species resulting from construction of the PV Facility.

Nature of impact	Impacts on vegetation and listed or protected plant species resulting from construction activities							
Alternative	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance and Status		Confidence level
						Without Mitigation	With Mitigation	
Alternative 1	Local	Long-Term	Medium	Definite	Low	Medium Negative	Low Negative	High
Alternative 2	Local	Long-Term	High	Definite	Low	High Negative	Medium Negative	High
Mitigation/Management Actions								
<ul style="list-style-type: none"> <li>• Preconstruction walk-through of the facility in order to locate species of conservation concern that can be translocated (such as aloes) as well as comply with the Northern Cape Nature Conservation Act and DENC/DAFF permit conditions.</li> <li>• Vegetation clearing to commence only after walk through has been conducted and necessary permits obtained.</li> <li>• Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.</li> <li>• Environmental Control Officer (ECO) to provide supervision and oversight of vegetation clearing activities within sensitive areas such as near the pans.</li> </ul>								



- Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared.
- All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the construction area.
- Temporary lay-down areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use.

**Table 12:** Impact 2. Direct Faunal Impacts due to Construction of the PV Facility

Nature of impact	Direct Faunal Impacts During Construction							
Alternative	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance and Status		Confidence level
						Without Mitigation	With Mitigation	
Alternative 1	Local	Short-Term	Medium	High	High	Medium	Medium-Low Negative	High
Alternative 2	Local	Short-Term	Medium	High	High	Medium Negative	Medium-Low Negative	High
<b>Mitigation/Management Actions</b>								
<ul style="list-style-type: none"> <li>• All personnel should undergo environmental induction with regards to fauna and, in particular, awareness about not harming or collecting species such as snakes, tortoises and owls, which are often persecuted out of superstition.</li> <li>• Any fauna threatened by the construction activities should be removed to safety by the ECO or appropriately qualified environmental officer.</li> <li>• All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.</li> <li>• All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.</li> <li>• If trenches need to be dug for water pipelines or electrical cabling, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are standing open should have places where there are soil ramps allowing fauna to escape the trench.</li> </ul>								

### 6.3.2.2 Operational Phase Impacts – PV Facility

**Table 13:** Faunal Impacts during the operation of the PV facility.

Nature of Impact	Faunal Impacts due to operational activities							
Alternative	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance and Status		Confidence level
						Without Mitigation	With Mitigation	
Alternative 1	Local	Long-term	Medium-Low	Moderate	High	Medium-Low Negative	Low-Negative	High
Alternative 2	Local	Long-term	Medium-Low	Moderate	High	Medium-Low Negative	Low-Negative	High
<b>Mitigation/Management Actions</b>								
<ul style="list-style-type: none"> <li>• Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location.</li> <li>• If the site must be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs), which do not attract insects.</li> <li>• All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.</li> <li>• All vehicles accessing the site should adhere to a low speed limit (30km/h max) to avoid collisions with susceptible</li> </ul>								

- species such as snakes and tortoises.
- If the facility is to be fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences because they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the electrified strands should be placed on the inside of the fence and not the outside as is the case on the majority of already constructed PV plants.

6.3.2.3 Planning & Construction Phase Impacts – Grid connection

**Table 14:** Impacts on vegetation and listed or protected plant species resulting from power line construction activities

Impact Nature	Impacts on vegetation and listed or protected plant species resulting from power line construction activities							
Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance and Status		Confidence level
						Without Mitigation	With Mitigation	
Alternative 1	Local	Long-Term	Moderate	High	Low	Medium-Low Negative	Low Negative	High
Alternative 2	Local	Long-Term	Moderate	High	Low	Medium-Low Negative	Low Negative	High
<b>Mitigation/Management Actions</b>								
<ul style="list-style-type: none"> <li>Preconstruction walk-through of the power line route in order to locate species of conservation concern that can be translocated as well as comply with the Northern Cape Nature Conservation Act and DENC/DAFF permit conditions.</li> <li>Construction and vegetation clearing to commence only after walk through has been conducted and necessary permits obtained.</li> <li>No large woody species should be unnecessarily cleared from the power line servitude. It may be necessary to remove some individuals from the directly beneath the power line due to safety and operational concerns, however, within the servitude the presence of large woody species does not increase the fire risk and there are no valid reasons to remove such trees. If these are too tall and cause safety problems, they can be cut to a lower height rather than removed and as growth rate in arid areas is slow. It would take many years before such trees would need to be trimmed again. Such trees can be trimmed to 1m height if necessary although this would almost certainly result in the mortality of large <i>Acacia erioloba</i> individuals. DAFF has a guideline available for tree clearing and trimming within power line servitudes which should serve as a guide.</li> <li>Preconstruction environmental induction for all construction staff to ensure that basic environmental principles are adhered to. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.</li> <li>Vegetation clearing along the power line corridor should only be conducted where necessary and should not be cleared using herbicides or with a bulldozer. Vegetation can be cleared manually with bush cutters to 0.5m height where necessary.</li> <li>Temporary lay-down areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity.</li> </ul>								

**Table 15:** Faunal Impacts due to power line construction activities.

Impact Nature	Direct Faunal Impacts During Construction							
Alternative	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance and Status		Confidence level
						Without Mitigation	With Mitigation	
Alternative 1	Local	Short-Term	Medium-Low	High	High	Medium-Low Negative	Low Negative	High
<b>Mitigation/Management Actions</b>								

- All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.
- Any fauna threatened by the construction activities should be removed to safety by the ECO or appropriately qualified environmental officer.
- All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- If holes or trenches need to be dug, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Holes should only be dug when they are required and should be used and filled shortly thereafter.

#### 6.3.2.4 Cumulative Impacts

The following are the cumulative impacts that are assessed as being a likely consequence of the development of the Gaetsewe Solar PV facility. These are assessed in context of the extent of the current site, other developments in the area as well as general habitat loss and transformation resulting from mining and other activities in the area.

**Table 16:** Impact of reduced ability to meet conservation obligations & targets due to cumulative habitat loss

Nature of impact	Reduced ability to meet conservation obligations & targets due to cumulative habitat loss							
Alternative	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance and Status		Confidence level
						Without Mitigation	With Mitigation	
Alternative 1	Regional	Long-Term	Low	Low	Moderate	Low Negative	Low Negative	Moderate-High
Alternative 2	Regional	Long-Term	Medium-Low	Moderate	Moderate	Medium Low Negative	Medium Low Negative	Moderate-High
Mitigation/Management Actions								
<ul style="list-style-type: none"> <li>• The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.</li> <li>• An open space management plan should be developed for the site, which should include management of biodiversity within the fenced area, as well as that in the adjacent rangeland.</li> </ul>								

**Table 17:** Impact on broad-scale ecological processes due to cumulative loss and fragmentation of habitat.

Nature of Impact	Impact on broad-scale ecological processes due to cumulative loss and fragmentation of habitat							
Alternative	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance and Status		Confidence level
						Without Mitigation	With Mitigation	
Alternative 1	Regional	Long-Term	Medium	Moderate	Low	Medium-Low Negative	Low Negative	Moderate-High

Alternative 2	Regional	Long-Term	Medium	Moderate	Low	Medium-Low Negative	Medium Low Negative	Moderate-High
<b>Mitigation/Management Actions</b>								
<ul style="list-style-type: none"> <li>Minimise the development footprint as far as possible. A cover of indigenous grasses should be encouraged and maintained within the facility. This prevents the invasion of weeds and is the easiest to manage in the long-term. Furthermore, the grasses can be maintained low through livestock (sheep) grazing which is being successfully used at existing PV facilities.</li> <li>The facility should be fenced off in a manner which allows small fauna to pass through the facility. In practical terms this means that the facility should be fenced-off to include only the developed areas and should include as little undeveloped ground or natural veld as possible. In addition, there should not be electrified ground-strands present within 30cm of the ground and the electrified strands should be located on the inside of the fence and not the outside. Furthermore, the fence should be a single layer fence and not a double fence with a large gap between. Images of suitable fencing types from existing PV facilities are available on request.</li> </ul>								

### 6.3.3 Conclusion & Recommendations

The vegetation of the preferred Alternative 1 consists largely of degraded *Tachonanthus camphoratus* scrub, with few species or features of concern present across most of the site. Impacts on fauna and flora associated with the development of this alternative are likely to be low and no high post-mitigation impacts are likely. The Alternative 2 option occurs within good condition rangeland with a high abundance of *Acacia erioloba* and *Acacia haematoxylon*. This is the less-preferred alternative from an ecological perspective and would generate significantly higher impacts on fauna, flora and ecological processes than the preferred alternative.

Impacts associated with the development of the site would be largely restricted to the construction phase when vegetation clearing and construction activities would take place. This would result in some habitat loss and disturbance for resident fauna, with consequences restricted to the local area only. The small pan along the eastern margin of the PV area has been excluded from the footprint, but it is further recommended that the pan is not 'boxed in' and that the development area is shaped more gradually away from this feature to better maintain connectivity of the pan with the surrounding landscape. The abundance of habitats and plant species of conservation concern in the development footprint is relatively low and there would be no impacts on fauna and flora which would be of wider significance. The grid connection for the development is relatively short and while it would likely require the clearing of some *Acacia erioloba* trees, the overall footprint and impact of the grid connection would be low and would generate low impacts on fauna and flora.

Cumulative impacts in the area are a concern due firstly to the mining activity that characterises the area and secondly due to the proliferation of solar energy development in the Kathu area. In terms of habitat loss, the affected Kathu Bushveld vegetation type is still over 90% intact and while this is not a very extensive vegetation type, the loss of 212ha of degraded habitat is not considered highly significant, especially given the spatial context of the site. In terms of potential losses to landscape connectivity, the location and ecological context of the site indicates that it does not lie within an area that is considered a likely faunal movement corridor or along an important ecological gradient. As such, the overall cumulative impact of the development is considered likely to be low.

## 6.4 AVIFAUNAL IMPACTS

### 6.4.1 Identification of Impacts

In this section, the potential impacts and associated risk factors that may be generated by the development are identified. In order to ensure that the impacts identified are broadly applicable and inclusive, all the likely or potential impacts that may be associated with the development are listed.

The relevance and applicability of each potential impact to the current situation are then examined in more detail in the next section.

According to a position statement by Birdlife South Africa, the main concerns with PV facilities are the following:

- Displacement or the exclusion of nationally and/or globally threatened, rare, endemic, or range-restricted bird species from important habitats.
- Loss of habitat and disturbance of resident bird species caused by construction, operation and maintenance activities.
- Collision with the solar panels, which may be mistaken for water bodies.
- Collision and electrocution caused when perching on or flying into associated power line infrastructure.
- Habitat destruction and disturbance/exclusion of avifauna through construction (short-term) and maintenance (long-term) of new power line infrastructure.
- Habitat destruction and disturbance of birds caused by the construction and maintenance of new roads and other infrastructure.

The proposed Gaetsewe Solar development will cover an area of up to approximately 212ha, located primarily within the *Tarchonanthus* shrubland habitat on the Legoko Farm No 460/2. This habitat is somewhat degraded due to historical management practices, with few features of concern present across most of the site. Of 16 red-listed species that are known to occur in the areas, only one was seen during the site visit, while only six near-endemic species and two biome-restricted species occur. While the development may have an insignificant impact on these species, it will nevertheless impact on common local bird assemblages primarily through direct habitat loss and displacement. Species are expected to be impacted to varying degrees based on their life-history strategies, abundance and general susceptibility to the threats posed by PV facilities. While habitat loss can be quantified by extent of the development footprint, there are other impacts such as direct mortalities caused by collisions with solar panels, which are still poorly understood.

Data on estimates of birds killed at solar facilities as a direct result of collisions with associated infrastructure are limited, especially in South Africa. A recent study at a large solar facility in the Northern Cape (Visser, 2016) provides the first estimates of the potential impact on birds within the region, with direct mortalities amounting to 4.5 birds/MW/year. This short term study also concluded, however, that there was no significant association with collision-related mortality at that study site, and that further studies were required. Most injuries that were recorded were related to species such as francolin colliding with the underside of PV panels, and korhaans becoming entrapped along the perimeter fencing, between the mesh and electrical strands (Visser, 2016). A PV solar facility in the United States is reported to result in the deaths of 0.5 birds/MW/year as a direct result of the collisions with infrastructure (Walston *et al.*, 2016).

Potential avifaunal impacts resulting from the development of the Gaetsewe Solar energy facility would stem from a variety of different activities and risk factors associated with the preconstruction, construction and operational phases of the project including the following:

#### 6.4.1.1 Habitat loss and disturbance of small passerines

For the smaller passerine species the most important impacts will involve displacement from the area encompassed by the development footprint as a result of habitat destruction. The loss of habitat will be permanent while disturbance may be continuous during the operational phase of the solar facility. Other impacts such as disturbances caused by reflective panels and grid connecting power lines are

not likely to have any appreciable impact on these small species. The impacts in general can be expected to be minimal as these smaller species are far less susceptible to the associated impacts than larger species.

#### 6.4.1.2 Habitat loss, disturbance and collision risk of medium terrestrial birds and raptors

Small to medium sized non-passerines that may be impacted to some extent due to habitat loss and displacement include resident raptors such as Gabar Goshawk *Micronisus gabar*, Pale Chanting Goshawk *Melierax canorus*, Greater Kestrel *Falco rupicoloides*, and the ground-dwelling Namaqua Sandgrouse *Pterocles namaqua* and Burchell's Sandgrouse *Pterocles burchelli*, Orange River Francolin *Scleroptila gutturalis*, and Red-crested Korhaan *Lophotis ruficrista*. These species may also be susceptible to collisions with associated infrastructure such as the PV panels and power lines, but this is not expected to have a major impact on most of these species. Orange River Francolin and Red-crested Korhaan may, however, be at more risk based on the recent research (Visser, 2016).

#### 6.4.1.3 Habitat loss, disturbance and collision risk of large terrestrial birds and raptors

The group of primary concern is the medium to large non-passerines, which include the large terrestrial birds and diurnal raptors. Many of these are also red-listed, such as Tawny Eagle, Martial eagle, Verreaux's Eagle, Secretarybird, and Kori Bustard. Besides the loss of habitat that these species will experience, disturbances during construction and maintenance of the facility is also expected to have a negative impact. In addition, most of these species are also highly susceptible to collisions with power lines owing to reduced ability to see the power lines and reduced manoeuvrability in flight to avoid collisions (Martin & Shaw, 2010; Jenkins *et al.*, 2010). All large terrestrial birds, including the red-listed species, are killed in substantial numbers by existing and newly erected power lines in the country (Jenkins *et al.*, 2010; Jenkin *et al.*, 2011; Shaw, 2013). An additional threat faced by the large raptors is electrocution when perched or attempting to perch on power line structures (Lehman *et al.*, 2007).

### 6.4.2 Assessment of Impacts

The following is an assessment of the Gaetsewe SEF, for the planning, construction and operational phase of the development.

#### 6.4.2.1 Planning & Construction Phase – PV Facility

**Table 18:** Direct Avifaunal Impacts During Construction – habitat loss and disturbance

Nature of impact	Direct Avifaunal Impacts During Construction – habitat loss and disturbance							
Alternative	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance and Status		Confidence level
						Without Mitigation	With Mitigation	
Alternative 1	Local	Short-Term	Medium	High	High	Medium Negative	Low Negative	High
Alternative 2	Local	Short-Term	Medium	High	High	Medium Negative	Medium Negative	High
<b>Mitigation/Management Actions</b>								
<ul style="list-style-type: none"> <li>Avoid the high sensitivity portions of the site as indicated in the sensitivity map, such as the pans, dense <i>Acacia erioloba</i> woodland and any raptor nests that may be discovered prior to or during construction. The destruction of habitat during construction should also be strictly contained within the development footprint.</li> <li>The use of lay-down areas within the footprint of the development should be used where feasible, to avoid habitat loss and disturbance to adjoining areas.</li> <li>All building waste produced during the construction phase should be removed from the development site and be disposed of at a designated waste management facility. Similarly, all liquid wastes should be contained in appropriately sealed vessels/ponds within the footprint of the development, and be disposed of at a designated</li> </ul>								

- waste management facility after use. Any liquid and chemical spills should be dealt with accordingly to avoid contamination of the environment.
- Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to, and awareness about not harming or hunting ground-dwelling species (e.g. bustards, korhaans, thick-knees and coursers), and owls, which are often persecuted out of superstition.
  - This induction should also include awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.
  - All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as nocturnal and crepuscular species (e.g. nightjars, thick-knees and owls) which sometimes forage or rest along roads.
  - Sensitive microhabitats should be avoided, such as nesting sites during the breeding season of large terrestrial birds (generally summer; Hockey *et al.*, 2005).
  - Any avifauna threatened by the construction activities should be removed to safety by the ECO or appropriately qualified environmental officer.
  - If holes or trenches need to be dug, these should not be left open for extended periods of time as ground-dwelling avifauna or their flightless young may fall in and become trapped in them. Holes should only be dug when they are required and should be used and filled shortly thereafter.
  - No construction activity should occur near to active raptor nests should these be discovered prior to or during the construction phase. If there are active nests near construction areas, these should be reported to ECO and should be monitored until the birds have finished nesting and the fledglings left the nest.

6.4.2.2 Operational Phase Impacts – PV Facility

**Table 19:** Avifaunal Impacts due to operational activities – disturbance and collisions with PV panels

Nature of Impact		Avifaunal Impacts due to operational activities – disturbance and collisions with PV panels						
Alternative	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance and Status		Confidence level
						Without Mitigation	With Mitigation	
Alternative 1	Local	Long-term	Medium-Low	Moderate	High	Medium-Low Negative	Low-Negative	High
Alternative 2	Local	Long-term	Medium-Low	Moderate	High	Medium Negative	Low-Negative	High
<b>Mitigation/Management Actions</b>								
<ul style="list-style-type: none"> <li>• If the site must be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs), which do not attract insects. The use of lighting at night should be kept to a minimum, so as not to unnecessarily attract invertebrates to the solar facility and possibly their avian predators, and to minimise disturbance to birds flying over the facility at night.</li> <li>• All incidents of collision with panels should be recorded as meticulously as possible, including data related to the species involved, the exact location of collisions within the facility, and suspected cause of death. Post-construction monitoring with the aid of video surveillance should be considered, as this will contribute towards understanding bird interactions with solar panels.</li> <li>• If birds are nesting on the infrastructure of the facility and cannot be tolerated due to operational risks of fire, electrical shorts, soiling of panels or other concerns, birds should be prevented from accessing nesting sites by using mesh or other manner of excluding them. Birds should not be shot, poisoned or harmed as this is not an effective control method and has negative ecological consequences. Birds that already have eggs or nestlings should be allowed to fledge their young before nests are removed. If there are any persistent problems with avifauna, then an avifaunal specialist should be consulted for advice on further mitigation.</li> <li>• All food waste and litter at the site should be placed in bins with lids and removed from the site on a regular basis.</li> <li>• All vehicles accessing the site should adhere to a low speed limit (30km/h max) to avoid collisions with susceptible species such as nocturnal and crepuscular species (e.g. nightjars, thick-knees and owls) which sometimes forage or rest on roads at night.</li> </ul>								

6.4.2.3 Decommissioning Phase Impacts – PV Facility

**Table 20:** Avifaunal Impacts due to decommissioning activities – disturbance and habitat loss

Nature of Impact	Avifaunal Impacts due to decommissioning activities – disturbance and habitat loss							
Alternative	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance and Status		Confidence level
						Without Mitigation	With Mitigation	
Alternative 1	Local	Short-term	Medium-Low	Moderate	High	Medium-Low Negative	Low-Negative	High
Alternative 2	Local	Short-term	Medium-Low	Moderate	High	Medium-Low Negative	Low-Negative	High
<b>Mitigation/Management Actions</b>								
<ul style="list-style-type: none"> <li>All above-ground infrastructure should be removed from the site. Below-ground infrastructure such as cabling can be left in place if it does not pose a risk, as removal of such cables may generate additional disturbance and impact, however, this should be in accordance with the facilities' decommissioning and recycling plan, and as per the agreements with the land owners concerned.</li> <li>All vehicles accessing the site should adhere to a low speed limit (30km/h max) to avoid collisions with susceptible species such nocturnal and crepuscular species (e.g. nightjars, thick-knees and owls) which sometimes forage or rest on roads at night.</li> <li>Rehabilitation and revegetation of the site in accordance with a site-specific revegetation and rehabilitation plan, with follow-up monitoring to ensure compliance and adequate achievement of revegetation targets.</li> </ul>								

#### 6.4.2.4 Planning & Construction Phase – Grid Connection

**Table 21:** Direct Avifaunal Impacts During Construction

Impact Nature	Direct Avifaunal Impacts During Construction							
Alternative	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance and Status		Confidence level
						Without Mitigation	With Mitigation	
Alternative 1	Local	Short-Term	Medium-Low	High	High	Medium-Low Negative	Low Negative	High
<b>Mitigation/Management Actions</b>								
<ul style="list-style-type: none"> <li>All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting or hunting ground-dwelling species (e.g. bustards, korhaans, thick-knees and coursers), and owls, which are often persecuted out of superstition.</li> <li>Any avifauna threatened by the construction activities should be removed to safety by the ECO or appropriately qualified environmental officer.</li> <li>All vehicles (construction or other) accessing the site should adhere to a low speed limit (30km/h max) to avoid collisions with susceptible species such as nocturnal and crepuscular species (e.g. nightjars, thick-knees and owls) which sometimes forage or rest on roads, especially at night.</li> <li>If holes or trenches need to be dug, these should not be left open for extended periods of time as ground-dwelling avifauna or their flightless young may fall in and become trapped in them. Holes should only be dug when they are required and should be used and filled shortly thereafter.</li> <li>The design and layout of any proposed power lines must be endorsed by members of the Eskom-EWT Strategic Partnership, taking into account the mitigation guidelines recommended by Birdlife South Africa (Smit, 2012; Jenkins <i>et al.</i>, 2017).</li> <li>The route that the power line will follow should be the shortest distance possible across an area where collisions are expected to be minimal, or follow existing power lines, and be marked with bird diverters to make the lines as visible as possible to collision-susceptible species. Recommended bird diverters such as brightly coloured 'aviation' balls, thickened wire spirals, or flapping devices that increase the visibility of the lines should be fitted where considered necessary.</li> <li>Regular monitoring of power lines should be undertaken to detect bird carcasses, to enable the identification of any</li> </ul>								



- areas of high impact to be marked with bird diverters.
- Only power lines structures that are considered safe for birds should be erected to avoid the electrocutions of birds (particularly large raptors) perching or attempting to perch. Where necessary, deterrent devices such as bird guards should be mounted on relevant parts of the pylons to further reduce the possibility of electrocutions.

#### 6.4.2.5 Operational Phase – Grid Connection

**Table 22:** Operational phase power line electrocution and collision risk of large terrestrial birds and raptors

Operational phase power line electrocution and collision risk of large terrestrial birds and raptors								
Impact Nature								
Alternative	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance and Status		Confidence level
						Without Mitigation	With Mitigation	
Alternative 1	Local	Long-Term	Medium-Low	High	High	Medium-Low Negative	Low Negative	High
<b>Mitigation/Management Actions</b>								
<ul style="list-style-type: none"> <li>• Regular monitoring of the power line should be undertaken to detect bird carcasses, to enable the identification of any areas of high impact where additional mitigation such as fitting bird diverters may be required. This should occur at least monthly for the first year after construction.</li> <li>• Any raptors or other birds nesting on the power line structures should not be disturbed while the birds are breeding. If species such as sociable weavers are present, which are making the line unsafe, then these nests should be regularly removed before breeding can commence. Measures should also be put in place to prevent birds persistently nesting in problem areas by using artificial nesting platforms and perches positioned away from live components.</li> </ul>								

#### 6.4.2.6 Cumulative Impacts

The following are the cumulative impacts that are assessed as being a likely consequence of the development of the Gaetsewe Solar PV Facility. These are assessed in context of the extent of the current site, other developments in the area as well as general habitat loss and transformation resulting from mining and other activities in the area.

**Table 23:** Impact on avifaunal habitats, migration routes and nesting areas due to cumulative loss and fragmentation of habitat

Broad-scale avifaunal impacts due to cumulative loss and fragmentation of habitat								
Nature of Impact								
Alternative	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance and Status		Confidence level
						Without Mitigation	With Mitigation	
Alternative 1	Regional	Long-Term	Medium	Moderate	Low	Medium-Low Negative	Low Negative	Moderate-High
Alternative 2	Regional	Long-Term	Medium	Moderate	Low	Medium-Low Negative	Medium Low Negative	Moderate-High
<b>Mitigation/Management Actions</b>								
<ul style="list-style-type: none"> <li>• Minimise the development footprint as far as possible.</li> <li>• The facility should be fenced off in a manner which allows small fauna to pass through the facility, but that does not result in ground-dwelling avifauna (e.g. bustards, korhaan, francolin, thick-knees) being trapped and electrocuted along the boundary fences (Visser, 2016). In practical terms this means that the facility should be fenced-off to include only the developed areas and should include as little undeveloped ground or natural veld as possible. In</li> </ul>								

addition, there should not be electrified ground-strands present within 30cm of the ground and the electrified strands should be located on the inside of the fence and not the outside. Furthermore, the fence should be a single layer fence and not a double fence with a large gap between. Images of suitable fencing types from existing PV facilities are available on request.

### 6.4.3 Conclusion & Recommendations

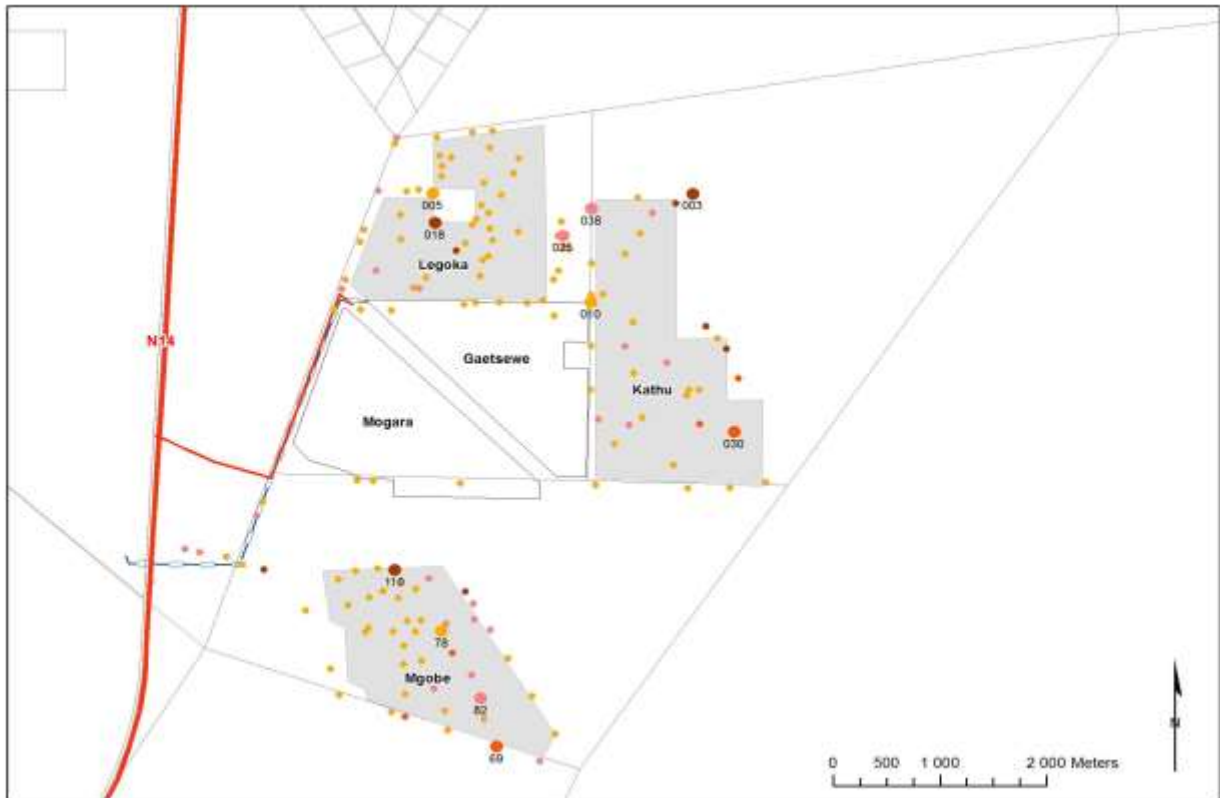
The study area lies within the Kalahari bioregion and supports the typical avifaunal assemblage expected for the area. Although 11 threatened and five Near-Threatened species are known to occur within the area, most of these are not common in the area and probably occur in low numbers. Further, the vegetation of the preferred Alternative 1 consists of homogenous and degraded *Tachonanthus camphoratus* scrub. Impacts on avifauna with the development on this site are likely to be low and no high post-mitigation impacts are likely. The Alternative 2 option occurs within better condition rangeland with greater structural diversity and associated higher avifaunal species richness and abundance. This is the less preferred alternative from an avifaunal perspective and would likely generate significantly higher impacts on the avifauna than the preferred alternative.

The expected impacts of the proposed solar development area will include the following, 1) habitat loss and fragmentation associated with the *Tarchonanthus* scrub habitat, 2) disturbance and displacement caused during the construction and maintenance phases, and 3) direct mortality of avifauna colliding with solar panels and associated power line structures, as well as electrocutions with power line infrastructure, and 4) a cumulative habitat loss at a broader scale from renewable energy developments in the wider area. Habitat loss and disturbance during the construction phase of the development will impact mostly small passerine species and medium-sized non-passerines, with consequences restricted to the local area only. Impacts related to collisions with PV panels and associated infrastructure (such as fencing) will impact mostly medium-sized non-passerines (e.g. korhaans, francolin and sandgrouse). Red-listed species will be impacted by the loss of foraging habitat and disturbances, and potentially by collisions and electrocutions with power line infrastructure. However, given the extensive national ranges of these species, the impact of the development on habitat loss for these species would be minimal and a long-term impact unlikely.

Several mitigation measures can be implemented during the construction and maintenance phase of the proposed development to reduce the impacts on the avifauna. During the construction phase, mitigation measures may assist in reducing displacement and disturbance by restricting habitat loss and disturbance strictly to within the footprint of the development. Impacts associated with the power line, such as collisions and electrocutions, should be mitigated where necessary through regular monitoring to determine high risk areas where bird diversions (e.g. bird flappers) should be located along the power line route. Identified sensitive habitats, such as the pans and dense *Acacia erioloba* woodland, should be excluded from the development footprint.

## 6.5 AGRICULTURAL IMPACTS.

The proposed development will have a footprint of 212 ha in addition to the 230 ha permitted for construction of the Legoko PV Solar Energy Facility on the 856.53 ha farm. The configuration of footprints with other PV facilities this and adjacent portion is shown in the figure below.



**Figure 28:** Configuration of footprints on and adjacent to the proposed facility

**6.5.1 Identification of Impacts**

The following potential impacts have been identified by the agricultural specialist:

- Loss of agricultural land;
- Loss of income to the owner;
- The loss to the farming community;
- Loss to non-farming community;
- Impairment of land capability due to construction;
- Accumulation of spoil material; and
- Altering of drainage patterns with construction of roads support buildings and PV panels

**6.5.2 Assessment of Impacts**

6.5.2.1 Planning and construction phase impacts

**Table 24:** Assessment of agricultural impacts during construction.

Nature of Impact		
Soil pollution with contaminants during the construction phase may take place, including spillages of hydrocarbon (fuel oil) and cement. This is possible during the construction of all facets of the facility: laydown area, concrete foundations of the auxiliary buildings, inverter stations subterranean cabling, main access and internal service roads.		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Medium Term (2)	Very short (1)
Magnitude	Low (4)	Minor(2)
Probability	Probable (3)	Probable(3)
Significance	Low(21)	Low (12)
Status (Positive or negative)	Negative	Negative
Reversibility	Partly reversible	Fully reversible

Irreplaceable loss of Resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes
<p>Refuelling normally takes place in the laydown area. Proactive measures must be taken which include constructing a designated area where refuelling can take place. This area must have an impervious floor with low wall that will keep the spillage inside. This area should be cleaned with absorbent material on a regular basis. The use of cut-off drains must be incorporated to divert upslope clean storm water around the site into a natural drainage system. On the down slope, polluted water must be collected via a cut-off drain into a leachate collection and recovery system. When spillage accidentally takes place, it should be removed and replaced with unpolluted soil. The clean soil can be sourced from excavations nearby. The polluted soil must be piled at a temporary storage facility with a firm waterproof base and is protected from inflow of storm water. It must have an effective drainage system to a waterproof spillage collection area. Contaminated soil must be disposed of at a hazardous waste storage facility.</p>		
Cumulative impacts:		
No, site-bound		
Residual Risks		
Yes, it is impossible to clear the affected area completely.		

<b>Nature of Impact</b>		
<p>The establishment of the PV Solar facility will be done at the expense of agricultural land. Area to be lost for agricultural development would be 212 ha in size. This includes the area under PV panels, internal service roads and temporary laydown area.</p>		
	Without mitigation	With mitigation
Extent	Local – Regional (3)	Local (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	Medium (39)	Low (20)
Status (Positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of Resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation:		
<p>The general objective is to position the PV facilities on the lowest potential soil and not in places that may have impact on agricultural activities, drainage lines and places with a sensitive nature. Existing road alignments are followed and roads upgraded for use during the lifespan of facility. With the appropriate planning, the same lifestyle can be achieved during the lease period of the facility from the land so occupied by the facility.</p>		
Cumulative impacts:		
Impact is low due to agricultural potential of the locally. With additional facilities, the impact will become more significant if not mitigated.		
Residual Risks:		
None, after decommissioning this impact will be reversed when rehabilitation has been completed.		

<b>Nature of Impact</b>		
<p>The construction of a PV Solar facility will cause impairment of the land capability with the potential risk of erosion and generation of spoil material on unwanted areas.</p>		
	Without mitigation	With mitigation
Extent	Local (2)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Low (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium(30)	Low (24)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation:		
Brush cut only to clear Camphor bush leaving topsoil un-disturbed. Use mechanised machinery when installing posts to		

eliminate need for foundations. Construct on alternate strips to combat possible erosion.
Cumulative impacts:
No cumulative impacts are expected to occur, as all impacts will be site bounded.
Residual Risks:
No. Affected areas will be rehabilitated, as the impact will only be applicable during the construction phase.

Nature of Impact		
The establishment of the PV Solar facility may alter drainage patterns with construction and cause erosion		
	Without mitigation	With mitigation
Extent	Local (2)	Local (1)
Duration	Long term (2)	Long term (2)
Magnitude	Low (2)	Low (2)
Probability	Probable (2)	Probable (2)
Significance	Low(12)	Low (10)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation:		
Establish structures on the contour. Use grass strips to regulate flow speed		
Cumulative impacts:		
No, all impacts will be site bounded.		
Residual Risks:		
No. Affected areas will be rehabilitated when operation has ceased.		

6.5.2.2 Operational phase impacts

**Table 25:** Assessment of agricultural impacts during operation

Nature of Impact		
Soil pollution with contaminants during the operational phase may take place, including spillages of hydrocarbon (fuel oil) and cement. This is possible during the maintenance of the facility:		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Long Term (4)	Long Term (4)
Magnitude	Low (2)	Minor(2)
Probability	Probable (2)	Probable(2)
Significance	Low(14)	Low (14)
Status (Positive or negative)	Negative	Negative
Reversibility	Partly reversible	Fully reversible
Irreplaceable loss of Resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation		
Refuelling normally takes place in the workshop of the control building. A designated area for refuelling must be constructed with an impervious floor and low wall that will keep the spillage inside. Any spillage must be cleaned with absorbent material as soon as possible and disposed into clearly marked containers. Where spillage takes place, contaminated soil must be excavated and replaced with unpolluted soil. The contaminated soil should be collected by a licenced landfill contractor.		
Cumulative impacts:		
No, site-bound.		
Residual Risks		

Yes, It is impossible to clear the affected area completely.

Nature of Impact		
The establishment of the PV Solar facility will be done at the expense of agricultural land. Area to be lost for agricultural development would be 212 ha in size. This includes the area under PV panels, internal service roads and temporary laydown area.		
	Without mitigation	With mitigation
Extent	Local – Regional (3)	Local (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	improbable (2)
Significance	Medium (39)	Low (20)
Status (Positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of Resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation:		
The general objective is to position the PV facilities on the lowest potential soil and not in places that may have impact on agricultural activities, drainage lines and places with a sensitive nature. Existing road alignments are followed and roads upgraded for use during the lifespan of facility. With the appropriate planning, the same live style can be achieved during the lease period of the facility from the land so occupied by the facility.		
Cumulative impacts:		
Impact is low due to agricultural potential of the locally. With additional, the impact will become more of significance if not mitigated.		
Residual Risks:		
None, after decommissioning this impact will be reversed when rehabilitation has been completed.		

### 6.5.2.3 Decommissioning Phase Impacts

**Table 26:** Assessment of operational phase impacts during decommissioning

Nature of Impact		
Soil pollution with contaminants during the decommissioning phase may take place, including spillages of hydrocarbon (fuel oil) and cement. This is possible during the decommissioning of all facets of the facility: laydown area, demolished concrete foundations of the auxiliary buildings, inverter stations subterranean cabling, main access and internal service roads.		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Medium Term (2)	Very short (1)
Magnitude	Low (4)	Minor(2)
Probability	Probable (3)	Probable(3)
Significance	Low(21)	Low (12)
Status (Positive or negative)	Negative	Negative
Reversibility	Partly reversible	Fully reversible
Irreplaceable loss of Resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation:		
Refuelling normally takes place in the workshop of the control building. A designated area for refuelling must be constructed with an impervious floor and low wall that will keep the spillage inside. Any spillage must be cleaned with absorbent material as soon as possible and disposed into clearly marked containers. Where spillage takes place, contaminated soil must be excavated and replaced with unpolluted soil. The contaminated soil should be collected by a licenced landfill contractor.		
Cumulative impacts		
No, site-bound.		
Residual Risks		
Yes, It is impossible to clear the affected area completely.		

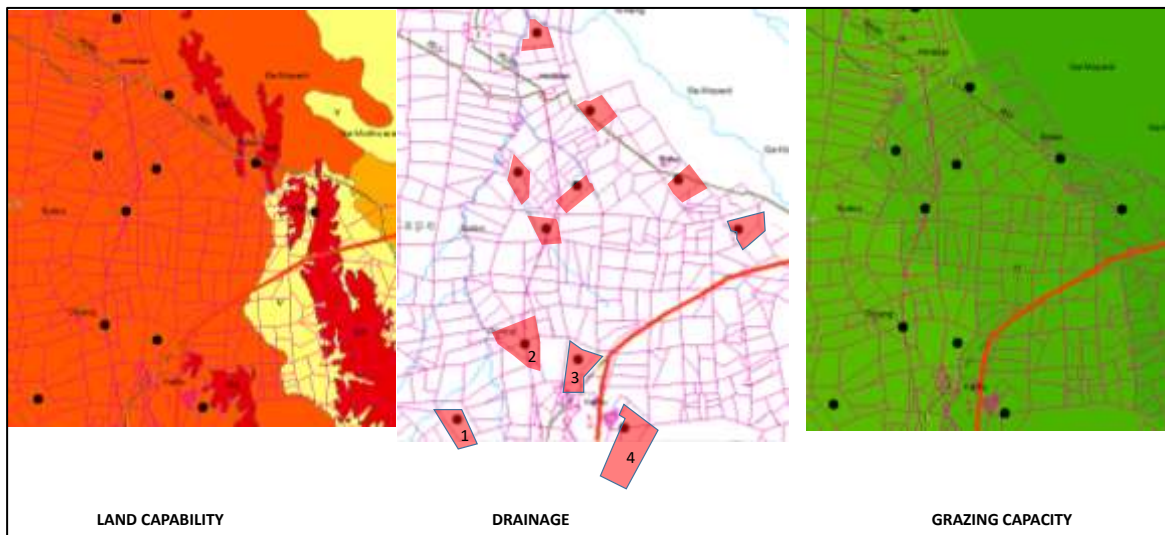
6.5.2.4 Cumulative Impacts

To assess the cumulative impacts, an overview map showing the land capability, drainage and grazing capacity is used to identify possible impacts that may accumulate as similar developments are developed in a 30 km radius from this facility.

There are four PV power facility nodes within in a 30km radius, including Gaetsewe Solar as detailed in the table and figures below.

**Table 27:** Renewable energy nodes within a 30km radius of the proposed Gaetsewe Solar.

Reference	Name	Status
1	No Name	Authorisation lapsed 2012
2	Sishen Solar	Approved 2011
	San Solar	Approved 2016
	Boitshoko	Approved 2016
3	Kalahari	Approved 2015
4	Mogobe	Approved 2016
	Legoko	Approved 2016
	Kathu	Approved 2017
	Bestwood	Approved 2011
	Gaetsewe	Application in process (this application)
	Mogara	Application in process



**Figure 29:** Proposed similar developments in the region The quantity of available soil for agricultural production decreases as a result of the footprints of these facilities.

Nature of Impact		
Cumulative Impacts on loss of agricultural land as a result of result of Renewable energy developments in the area.		
	Overall impact of proposed project considered in isolation	Cumulative impact of the projects in the area
Extent	Local – Regional (1)	Regional(2)
Duration	Long Term (4)	Long Term (4)
Magnitude	Low(4)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Medium (36)
Status (Positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of Resources?	No	No
Can impacts be mitigated?	Yes	Yes

<b>Mitigation:</b>
Ensure that most infrastructure features are erected on transformed or non-arable land. Implement stormwater management as an integral part of planning and as a guideline for the positioning of structures. Use existing roads and conservation structures to the maximum in the planning and operation phases. Rehabilitate disturbed areas as soon as possible after construction.

<b>Nature of Impact</b>		
Clearing of vegetation increases flow speed and a lower infiltration tempo increases silt transport.		
	Overall impact of proposed project considered in isolation	Cumulative impact of the projects in the area
Extent	Local (1)	Regional(2)
Duration	Long Term (4)	Long Term (4)
Magnitude	low (4)	Low (4)
Probability	Improbable (2)	Probable (3)
Significance	Low (18)	Medium (30)
Status (Positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of Resources?	No	No
Can impacts be mitigated?	Yes	Yes
<b>Mitigation:</b>		
Erosion and sediment control with proper water run-off control planning.		

<b>Nature of Impact</b>		
Chemicals, hazardous substances and waste used or generated during the lifespan of the facility accumulates and soil may become contaminated		
	Overall impact of proposed project considered in isolation	Cumulative impact of the projects in the area
Extent	Local (1)	Regional(2)
Duration	Long Term (4)	Long Term (4)
Magnitude	low (4)	Low (4)
Probability	Improbable (2)	Probable (3)
Significance	Low (18)	Medium (30)
Status (Positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of Resources?	No	No
Can impacts be mitigated?	Yes	Yes
<b>Mitigation:</b>		
Appropriate handling and storage of chemicals and hazardous substances and waste should be done.		

#### 6.5.2.5 Conclusion & Recommendations

High potential soils are not expected in the region of this proposed facility, because of the low annual rainfall, high evaporation rate and extreme temperatures. Soils formed under these conditions have little movement of soluble nutrients and insoluble clay particles in the soil profile, restricting the adsorption of nutrients that would be available to plants. The soil is thus low in nutrient availability and has a low response to fertilizer input. Calcium layer limits water movement, root development and poses a mechanical restriction for cultivation.

The soils observed on this site concur to the above and is of low potential because of:

- Low annual rainfall, high evaporation and extreme temperatures restrict dry land cultivation;
- The very shallow soil depth with its limited water holding capacity restricts root development;
- The very fine sand grade of top soil influences the stability and increases the erosion potential;



- The hard setting layer hampers mechanical cultivation.

Where more than one facility is established on a single piece of land, they share connections lines to the national grid, instead of having several connection lines constructed. The same applies to access and internal roads. Thus, less additional farms are cut into pieces for solar energy provision.

From an environmental and land use perspective, no fatal flaws are associated with the project, if the mitigation measures recommended are applied. From an agricultural perspective, the photovoltaic (PV) solar energy facility will have a low impact on its environment and could therefore be authorised.

## **6.6 ARCHAEOLOGICAL IMPACTS.**

The purpose of an AIA is to conduct a survey of the affected areas in order to identify, record and rate the significance of archaeological resources, to assess the impact of the proposed area and linear developments on such resources and to recommend mitigation and management measures where necessary.

To this end, the archaeologist undertook a comprehensive foot survey focused on the entire extents of Portions 1 and 2 of Farm 460 Legoko. The potential for different landforms, sediments or landscape features to contain archaeological traces was assessed according to type, such as rocky surfaces, sandy surfaces, cultivated areas, previously developed or disturbed areas, rock shelters, and so on. Overall, the significance of archaeological occurrences or sites was assessed against results of previous archaeological studies in the region as well as their content and context. Attributes that were considered in determining significance include artefact and/or ecofact types, rarity of finds, exceptional items, organic preservation, aesthetic appeal, potential for future research, density of finds and the context in which archaeological traces occur.

Once archaeological traces were identified, recorded and assessed in terms of their significance, the aim of the AIA is to assess the potential negative impacts of development on such resources and to make recommendations in mitigation.

The archaeological record on both Portions of Farm 460 Legoko is the same. While several archaeological occurrences were identified and recorded, these are few and far between and occur as isolated stone artefacts or very low density stone artefact scatters. The vast bulk of the finds are of Later Stone Age origin with only a few specimens being of potential Middle Stone Age origin or adiagnostic with respect to their relative age. The most common formal tools are a variety of scrapers and second most common are notched pieces and adzes. Banded ironstone is the most common raw material and few pieces were made in chalcedony or chert. The absence of Early Stone Age material was surprising given their abundance in the immediate surroundings of Kathu. No other tangible heritage resources were identified and built structures on the property are all modern and of no heritage value.

One of the very low density scatters occurs on the edge of a shallow pan or depression is similar to those described by Beaumont and Morris. This suggests that early hunters may have waited for game at these naturally occurring water sources. The stone artefact scatter is considered to be too ephemeral to warrant sampling or collection. No other cultural or faunal remains are associated with the stone artefacts.

### **6.6.1 Significance of impacts**

Stone Age materials identified in the study area occur as isolated finds or in very low density stone artefact scatters, and are not associated with any organic or other cultural remains. As a result, these heritage resources are considered to be of low archaeological significance and are designated a field rating of Generally Protected C. Because they were adequately documented during this study, it is suggested that no further investigation or recording is needed before development commences. It is also recommended that, due to their low significance, a permit for their disturbance or destruction is not required from the heritage authorities.

Because no significant archaeological resources were identified during the survey, the proposed development layouts and linear developments do not need to be altered. It is suggested that the documentation of the archaeological record in the affected areas made during the current study is sufficient and that no further investigation is needed. It is further noted that there are no fatal flaws or constraints from an archaeological perspective, and that there are no objections to the proposed linear and area developments associated with the Gaetsewe Solar facility. On archaeological grounds, there is no preference for either of the proposed development alternatives, although the applicant's preferred alternative (Alternative 1) is in an ecologically less sensitive area when compared with Alternative 2.

## 7. Sources of Risk, Impact Identification and Assessment

Because archaeological resources are non-renewable and each archaeological occurrence is unique, it is important that areas affected by development are assessed for the presence and sensitivity of such resources prior to development. The Gaetsewe Solar facility and associated power line and access road will involve area and linear developments respectively and these could have a permanent negative impact on archaeological resources. This study has shown that archaeological resources do occur in the affected environment, but that they are of low significance. The purpose of this AIA is to assess the sensitivity of archaeological resources in the affected areas, to determine the potential impacts on such resources, and to avoid and/or minimise such impacts on sensitive resources through management and/or mitigation measures.

Direct negative impacts on archaeological resources will occur during the construction and installation phase of the proposed development. Indirect and cumulative impacts will occur during the operational phase of the development. It is noted that, as part of the cumulative impacts on the archaeological record, Eskom is proposing to construct and upgrade their existing 66kV network to a 132kV network between Hotazel, Kuruman and Kathu (see Figure 8). It appears that a portion of this upgrade will affect the area studied during this archaeological investigation. It is concluded, however, that the cumulative impact of the proposed Eskom upgrade will be negligible in the current study area.

While artefacts of mainly Later Stone Age origin were identified in the study areas, no significant archaeological sites were recorded and based on the surface finds, it is highly improbable that significant archaeological sites are currently buried beneath surface sediments.

The below criteria for assessment are drawn from the EIA Regulations that were published in April 1998 by the South African Department of Environmental Affairs and Tourism. The format of impact tables presented below was provided by Cape EAPrac.

As outlined in section 5.1 and 5.2 above, the proposed development will involve construction and installation activities that will have a permanent negative impact on archaeological resources identified in this study. However, the archaeological resources are considered to be of low significance and their destruction will not have a negative impact on the heritage value of the area.

### 6.6.2 Assessments of Impacts

#### 6.6.2.1 Construction phase impacts – PV Facility

**Table 28:** Archaeological impacts during the construction of the Gaetsewe PV Facility.

Alternative	Nature of impact	Extent of impact	Duration of impact	Intensity	Probability of occurrence	Status of the impact	Cumulative impact	Degree of confidence	Level of significance	Significance after mitigation
Gaetsewe Alt 1 & 2	Construction & Installation	Local	Long term to permanent	High	Definite	Negative for archaeological resources; positive for	Low	High	Low	Low

NO-GO	Farming activities	Local	Long term to perman	Low	Low to medium	Neutral	Low	Medium	Low	Low
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6.6.2.2 Operational phase impacts – Facility

**Table 29:** Archaeological impacts during the operation of the Gaetsewe PV Facility.

Alternative	Nature of impact	Extent of impact	Duration of impact	Intensity	Probability of occurrence	Status of the impact	Accumulative impact	Degree of confidence	Level of significance	Significance after mitigation
Gaetsewe Alt 1 & 2	Operational	Local	Long term to perman	Low	Low	Neutral	Low	High	Low	Low
NO-GO	Farming activities	Local	Long term to perman	Low	Low to medium	Neutral	Low	Medium	Low	Low

6.6.2.3 Construction phase impacts – Grid Connection

**Table 30:** Archaeological impacts during the construction of the Gaetsewe Grid connection

Alternative	Nature of impact	Extent of impact	Duration of impact	Intensity	Probability of occurrence	Status of the impact	Accumulative impact	Degree of confidence	Level of significance	Significance after mitigation
Power line	Construction & Installatio	Local	Long term to perman	Low	Low to medium	Negligibly negativ	Low	High	Low	Low
NO-GO	Farming activities	Local	Long term to perman	Low	Low to medium	Neutral	Low	Medium	Low	Low

6.6.2.4 Operational phase impacts – Grid connection

**Table 31:** Archaeological impacts during the operation of the Gaetsewe Grid connection

Alternative	Nature of impact	Extent of impact	Duration of impact	Intensity	Probability of occurrence	Status of the impact	Accumulative impact	Degree of confidence	Level of significance	Significance after mitigation
Power line	Operational	Local	Long term to perman	Low	Low	Neutral	Low	High	Low	Low
NO-GO	Farming activities	Local	Long term to perman	Low	Low to medium	Neutral	Low	Medium	Low	Low

6.6.2.5 Construction phase impacts – Access Road

**Table 32:** Archaeological impacts during the construction of the Gaetsewe Access Road.

Alternative	Nature of impact	Extent of impact	Duration of impact	Intensity	Probability of occurrence	Status of the impact	Accumulative impact	Degree of confidence	Level of significance	Significance after mitigation
Access road	Construction	Local	Long term to perman	Low	Low to medium	Negligibly negativ	Low	High	Low	Low
NO-GO	Farming activities	Local	Long term to perman	Low	Low to medium	Neutral	Low	Medium	Low	Low

6.6.2.6 Operational Phase impacts – Access Road

**Table 33:** Archaeological impacts during the operation of the Gaetsewe Access Road

Alternative	Nature of impact	Extent of impact	Duration of impact	Intensity	Probability of occurrence	Status of the impact	Accumulative impact	Degree of confidence	Level of significance	Significance after mitigation
Access road	Operational	Local	Long term to permanent	Low	Low	Neutral	Low	High	Low	Low
NO-GO	Farming activities	Local	Long term to permanent	Low	Low to medium	Neutral	Low	Medium	Low	Low

### 6.6.3 Conclusions and Recommendations

From an archaeological perspective there are no fatal flaws, and therefore, no objections to the authorisation of the proposed development of either of the alternative layouts for the Gaetsewe Solar facility, associated grid connection route and access road.

### 6.7 PALAEOLOGY IMPACTS

Dr John Almond from Natura viva undertook a desktop palaeontological assessment of the proposed Gaetsewe Solar PV Energy facility from which the following is summarised. A copy of this assessment is included in **Annexure E4**.

According to geological maps, satellite images and recent palaeontological assessments in the Kathu area the flat-lying Gaetsewe Solar PV Solar Energy Facility study area is underlain by a considerable thickness of Plio-Pleistocene to Recent sediments of the Kalahari Group. The underlying Precambrian bedrocks – viz. dolomites, cherts and possible iron formations of the Transvaal Supergroup – are too deeply buried to be directly affected by the proposed development. The Kalahari Group succession near Kathu mainly comprises well-developed calcretes or surface limestones (Mokolane Formation) that may total 30 m or more in thickness in the region, together with a thin (probably < 1 m) surface veneer of aeolian sands (Gordonia Formation), alluvial deposits and sparse near-surface gravels. In general the Kalahari Group calcretes and sands are of low palaeontological sensitivity, mainly featuring widely-occurring plant and animal trace fossils (e.g. invertebrate burrows, plant root casts). Recent palaeontological field assessments in the Sishen – Hotazel region by the author have not recorded significant fossil material within these near-surface Kalahari sediments. A very important fossil assemblage of Pleistocene to Holocene mammal remains - predominantly teeth with scarce bone material associated with Earlier, Middle and Later Stone Age artefacts, well-preserved peats and pollens - is recorded from unconsolidated doline (solution hollow) sediments at the well-known Kathu Pan site, located some 5.5 km northwest of Kathu. There are at present no obvious indications of comparable fossiliferous, tool-bearing solution hollow infills exposed at present within the study area although such sediments might conceivably be present but hidden beneath cover sands.

The overall impact significance of the proposed solar energy development, including the 132 kV grid connection to Sekgame Switching Station, access roads and on-site substation, is rated as LOW as far as palaeontological heritage is concerned; there is therefore no preference for either solar facility site option on palaeontological grounds. Likewise, cumulative impacts are likely to be of LOW significance, given the scarcity of important fossils (especially vertebrate remains) within the sedimentary rock units concerned as well as the huge outcrop area of the Kalahari Group as a whole. The degree of confidence for this assessment is rated as medium because of the uncertainty surrounding the presence or absence of potentially fossiliferous buried doline infill deposits within the study area.

Due to the inferred low impact significance of the proposed Gaetsewe Solar PV Energy Facility development as far as fossil heritage resources are concerned, no further specialist palaeontological studies or monitoring are recommended at this stage. The following mitigation measures to safeguard

fossils exposed on site as chance finds during the construction phase are recommended (Please also see the tabulated Chance Fossil Finds Procedure appended to this report):

If the mitigation measures outlined above are adhered to, the residual impact significance of any construction phase impacts on local palaeontological resources is considered to be low. The mitigation measures proposed here should be incorporated into the Environmental Management Programme (EMP) for the Gaetsewe Solar PV Solar Energy Facility project. The palaeontologist concerned with mitigation work will need a valid collection permit from SAHRA. All work would have to conform to international best practice for palaeontological fieldwork and the study (e.g. data recording fossil collection and curation, final report) should adhere to the minimum standards for Phase 2 palaeontological studies published by SAHRA (2013).

## 6.8 VISUAL IMPACTS

The following visual impacts could take place during the lifetime of the **proposed PV** project:

- Loss of site landscape character due to the removal of vegetation and the construction of the PV structures and associated infrastructure during construction.
- Wind-blown dust due to the removal of large areas of vegetation during construction.
- Possible soil erosion from temporary roads crossing drainage lines during constructions.
- Windblown litter from the laydown and construction sites during construction.
- Massing effect in the landscape from a large-scale modification during operation.
- On-going soil erosion during operation.
- On-going windblown dust during operation.
- Movement of vehicles and associated dust during decommissioning.
- Wind-blown dust from the disturbance of cover vegetation / gravel during decommissioning.
- A long term change in landuse setting a precedent for other similar types of solar energy projects.

The following visual impacts could take place during the lifetime of the proposed **transmission line**:

- Possible soil erosion from temporary roads crossing drainage lines during construction.
- Windblown litter from the lay-down and construction sites during construction
- On-going soil erosion during operation
- On-going windblown dust during operation
- Sunlight glint off cables and structures during operation
- Movement of vehicles and associated dust during decommissioning
- Windblown dust from the disturbance of cover vegetation/gravel during decommissioning.
- Massing effects from numerous power lines converging on the substations.
- Cluttering effects from ad-hoc routings that are not aligned with existing Eskom power line corridors.

### 6.8.1 Assessment of Impacts

#### 6.8.1.1 Visual Impacts of Gaetsewe solar Alternative 1 (Preferred)

**Table 34:** Visual Impacts of Alternative 1 for Gaetsewe Solar

Impact Activity	Phase	Mitigation	Nature	Extent	Duration	Severity	Probability	Significance without	Significance with
Gaetsewe Alternative 1	Construction	W/Out	negative	Local	Short	Med	P	Med	
		With	negative	Local	Short	Low	P		Low
	Operation	W/Out	negative	Local	Long	Med	P	Med	

(Preferred )	Closure	With	negative	Local	Long	Low	P		Low
		W/Out	negative	Local	Short	Med	P	Med	
	Cumulative	With	negative	Local	Short	Low	P		Low
		W/Out	negative	Local	Long	Med	P	Med	
		With	negative	Local	Long	Med	P		Med

The Visual Impact Significance of the Gaetsewe Solar Preferred Alternative 1 is rated **medium** without mitigation for all phases. The relative remoteness of the location, the low receptor sensitivity and the low scenic quality of the landscape (which is currently mine and agriculture landscape related), will reduce the intensity of the landscape change. Mitigation is recommended which would result in **low** visual impact significance for all phases. These mitigation measures would include management of lights at night and continued management of wind blown dust.

The Cumulative visual risk to scenic resources was rated **medium negative** with little opportunity for mitigation due to the close proximity of the proposed site to the authorised Legoko, and the proposed Mogara, solar facilities. The combined views of the three solar facilities once constructed are likely to create a strong, local visual massing effect within the agriculturally zoned area. However, site visual resources are low, and with the proposed Gaetsewe site located on low lying ground, the zone of visual influence will be contained. Retaining the bushveld vegetation around the proposed PV areas will retain the surrounding agricultural sense of place, and further localise the combined zone of visual influence. With successful rehabilitation of the area back to an agricultural land use on closure, the cumulative visual risk could be reduced to **negligible in the long term**.

#### 6.8.1.2 Visual Impacts of Gaetsewe solar Alternative 2

**Table 35:** Visual Impacts of Alternative 2 for Gaetsewe Solar

Impact Activity	Phase	Mitigation	Nature	Extent	Duration	Severity	Probability	Significance without	Significance with
Gaetsewe Alternative 2	Construction.	W/Out	negative	Local	Short	Med	P	Med	
		With	negative	Local	Short	Low	P		Low
	Operation	W/Out	negative	Local	Long	Med	P	Med	
		With	negative	Local	Long	Low	P		Low
	Closure	W/Out	negative	Local	Short	Med	P	Med	
		With	negative	Local	Short	Low	P		Low
	Cumulative	W/Out	negative	Local	Long	Med	P	Low	
		With	negative	Local	Long	Med	P		Low

As with the Gaetsewe Preferred Alternative 1, the Visual Impact Significance of the Gaetsewe Alternative 2 is rated **medium** without mitigation for all phases. This is also due to the relative remoteness of the location, the low receptor sensitivity and the low scenic quality of the landscape (which is currently mine and agriculture related). Mitigation is recommended which would result in **low** visual impact significance for all phases. Refer to the Preferred Alternative 1 assessment for mitigation detail)

The cumulative visual risk to scenic resources was rated **low negative** with little opportunity for mitigation due to the more remote location of the proposed site. Although located to the north of the

Mogobe Solar site (authorised but not constructed), the gap between the two sites is sufficient to reduce the combined visual massing effects if the bushveld vegetation is retained. The surrounding visual resources are medium to low with limited value for landuse based eco-tourism due to the close proximity of the Sishen Mine. With the proposed alternative site also located on low-lying ground, the zone of visual influence is locally contained. With successful rehabilitation of the area back to agricultural land use on closure, the cumulative visual risk could be reduced to **negligible in the long term**.

#### 6.8.1.3 Visual Impacts of Gaetsewe solar – Access Road

Due to the close alignment of the proposed roads to existing farm roads, the road access impact rating for both road options are rated the same.

**Table 36:** Visual Impacts of Gaetsewe Solar Access Road

Impact Activity	Phase	Mitigation	Nature	Extent	Duration	Severity	Probability	Significance without	Significance with
Road access (both options)	Construction	W/Out	negative	Site	Short	Medium - Low	P	Medium - Low	
		With	negative	Site	Short	Low	P		Low
	Operation	W/Out	negative	Site	Long	Medium - Low	P	Medium - Low	
		With	negative	Site	Long	Very Low	P		Very low
	Closure	W/Out	negative	Site	Short	Medium - Low	P	Medium - Low	
		With	negative	Site	Short	Low	P		Very low
	Cumulative	W/Out	negative	Site	Long	Medium	I	Medium	
		With	positive	Site	Short	Very Low	P		Low

The Visual Impact Significance without mitigation of the road access routes was rated **medium to low** for all phases. This is because the proposed roads mainly follow existing farm road alignment. Additional factors include the remoteness of the locality in relation to the relatively small visual footprint of the source impact. With mitigation and effective dust management, the Visual Impact Significance was also rated **very low** for construction and closure phases, and **very low** for operation, should effective rehabilitation be implemented.

Without mitigation, Cumulative Visual Significance for road access was rated **medium**. This is due to the potential of the improved road attracting further development in area. As the road would be a cul-de-sac and on private property, further development is unlikely. With continuation of the existing farming activities taking place on the remainder of the farm, the cumulative effects can be reduced to **low**.

#### 6.8.1.4 Visual Impacts of Gaetsewe solar – Grid connection

**Table 37:** Visual Impacts of Gaetsewe Solar Grid connection.

Impact Activity	Phase	Mitigation	Nature	Extent	Duration	Severity	Probability	Significance without	Significance with
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Selfbuild Grid and Substation	Construction	W/Out	negative	Local	Short	Low	P	Low	
		With	negative	Local	Short	Low	P		Very Low
	Operation	W/Out	negative	Local	Long	Low	P	Low	
		With	negative	Local	Long	Low	P		Very Low
	Closure	W/Out	negative	Local	Short	Low	P	Low	
		With	negative	Local	Short	Very Low	P		Very Low
	Cumulative	W/Out	negative	Reg.	Long	High	P	Medium	
		With	negative	Local	Short	Low	P		Low

Without mitigation, construction and closure phase impacts were rated **low** as the proposed power line mainly follows existing distribution power line / telecommunication lines as well as existing farm access routes. The ZVI for the monopoles is also expected to not exceed two kilometres due to the higher visual absorption capacity created by the existing Eskom power line infrastructure, as well as the surrounding medium sized bushveld trees. The crossing of both power line options is perpendicular to the N14 and in close proximity to the proposed Eskom Sekgame Substation. The proposed on-site substation is located in a remote location, outside of receptor views. Mitigation would essentially be related to soil erosion management that would be limited due to the routing mainly following existing farm roads. With erosion control the visual significance can be reduced to **very low**.

### 6.8.2 Conclusion and recommendations.

The visibility of the proposed PV and power lines project is rated **Local**. Visibility of the proposed 4m high PV structures would effectively dissipate outside of the 2km high exposure zone. Topographic screening to the north and east, and from Sishen dumps to the west, localise the viewshed. Exposure is rated **Medium to Low** with the main receptors, the N14 National Highway, located approximately 1.7km to the west of the proposed PV site. The exposure of the proposed power line is rated **High** due to the crossing over the N14 National Road. Receptor sensitivity to landscape change for all the proposed development areas was rated **Low** due to the mining landscape context where landscape based tourism is limited.

Scenic quality for all proposed development areas was rated **Low**, due to the strong negative influence of the Sishen Mine as well as the two Eskom transmission line corridors located north of the proposed site. No significant scenic resources were identified within the area. As such, the Class I and Class II Visual Objectives that require landscape preservation were not assigned. Due to the zoning of the property as Agriculture, a Class III Visual Objective was assigned to the proposed development site to protect the surround agricultural sense of place.

The cumulative visual assessment found that two authorised PV projects are located within the immediate vicinity, with another proposed adjacent to the proposed Gaetsewe PV site. Legoko Solar is located directly north of the proposed PV development site, with Mogobe Solar located approximately 1km to the south of the site. Although authorised, both of the facilities are yet to be constructed and as such the existing bushveld rural agricultural scenery dominates the local landscape context. Another PV solar facility, Mogara Solar, is also proposed adjacent the proposed site along the southwest border. Although the Mogara and Getsewe EIA status is yet to be defined, the combined footprint of these proposed PV projects, in conjunction with the authorised Legoko Solar facility, will create a large combined visual footprint. The combined views of the three solar facilities once constructed are likely to create a strong, but localised, visual massing effect within the agriculturally zoned area. Retaining the bushveld vegetation around the proposed PV areas, will retain their agricultural landuse, will further localise the combined zone of visual influence. Due to the close proximity to the Sishen Mine, the visual resources of the area are not utilised for landscape-based tourism. As such, the cumulative visual impact is rated Low Risk.



As visual resources are **low**, receptor sensitivity to landscape change is **low**, and the zone of visual influence can be **locally contained**, it is recommended that the proposed Gaetsewe PV project be authorised as visual resources will not be significantly impacted. With the contained zone of visual influence of the site, the consolidation of the three PV projects into the triangular portion of property would be visually preferred to fragmentation of larger portions of land to the south. As such, the Gaetsewe Preferred Alternative 1 would be marginally preferred over the southern alternative layout

**6.9 FRESHWATER RESOURCE IMPACTS**

During the freshwater impact assessment study, a number of potential key issues / impacts were identified. The loss of wetlands (pans) was not assessed as the proposed sites (preferred and alternative) have no direct impact on these systems or their catchments. Also, no structures would be placed within the 20m buffer proposed for the pans – As recommended by the ecology specialist, a 100m buffer around the pan has been excluded from the PV layout.

**6.9.1 Assessment of Impacts**

The proposed project could affect adjacent freshwater systems through changes in the hydrological environment by the introduction of hard surfaces. Therefore, the following impacts were assessed by the specialist.

6.9.1.1 Impact 1: Impact on pans through the possible increase in surface water runoff on form and function

The physical removal or the clearing of natural vegetation could alter the hydrological nature of the area, by increasing the surface run-off velocities, while reducing the potential for any run-off to infiltrate the soils. This impact would however be localised (panel arrays), as a large portion of the remaining farm and the catchment would remain intact.

Cumulative impacts:

The increase in surface run-off velocities and the reduction in the potential for groundwater infiltration is likely to occur, however considering that the site is not near any drainage channels and the annual rainfall is low, this impact is not anticipated. It is however assumed, together with the low mean annual run-off that with suitable stormwater management the impacts could however be mitigated, coupled to the fact that a low percentage of projects actually move into the construction phase.

Residual impacts:

Diversion of run-off away from downstream systems is unlikely to occur as the annual rainfall figures are low and no natural drainage features or water courses are located within the study area.

Impact Significance:

Slight Negative

**Table 38:** Impact on pans through the possible increase in surface water runoff on form and function

Extent (A1)		
A measure of the importance of the condition, which is assessed against the spatial boundaries or human interests it will affect.		
National / International interests	4	1
Regional / National interests	3	
Areas immediately outside the local condition	2	
Important only to the local condition	1	
No importance	0	
Magnitude of change / effect (A2)		

Magnitude is defined as a measure of the scale of benefit/dis-benefit of an impact or a condition.		
Major positive benefit	3	-1
Significant improvement in status quo	2	
Improvement in status quo	1	
No change / Status quo	0	
Negative change to status quo	-1	
Significant negative dis-benefit or change	-2	
Major dis-benefit or change	-3	
Group A Score:		-1
Group B (Situation criteria)		
Duration / Permanence (B1)		
This defines whether a condition is temporary or permanent, and should be seen only as a measure of the temporal status of the condition.(e.g.: an embankment is a permanent condition even if it may one day be breached or abandoned; whilst a coffer dam is a temporary condition, as it will be removed).		
No change / Not Applicable	1	3
Temporary	2	
Permanent	3	
Reversibility (B2)		
This defines whether the condition can be changed and is a measure of the control over the effect of the condition. It should not be confused or equated with permanence. (e.g.: an accidental toxic spillage into a river is a temporary condition (B1) but its effect (death of fish) is irreversible (B2); a town's sewage treatment works is a permanent condition (B1), the effect of its effluent can be changed (reversible condition) (B2))		
No change / Not Applicable	1	2
Reversible	2	
Irrversible	3	
Cumulative (B3)		
This is a measure of whether the effect will have a single direct impact or whether there will be a cumulative effect over time, or a synergistic effect with other conditions. The cumulative criterion is a means of judging the sustainability of a condition, and is not to be confused with a permanent /irreversible situation.		
No change / Not Applicable	1	2
Non-cumulative / single	2	
Cumulative / synergistic	3	
Group B Score:		7
Final Assessment score		-7

#### 6.9.1.2 Impact 2: Increase in sedimentation and erosion

Increase in sedimentation and erosion within the development footprint

##### Cumulative impacts:

Additional downstream erosion and sedimentation of systems lower in the catchment although unlikely due to lack of any water courses.

##### Residual impacts:

Additional downstream erosion and sedimentation of systems lower in the catchment although unlikely due to lack of any water courses.

### Impact Significance

Slight Negative

**Table 39:** Assessment of impact of increase in sedimentation and erosion.

Extent (A1)		
A measure of the importance of the condition, which is assessed against the spatial boundaries or human interests it will affect.		
National / International interests	4	1
Regional / National interests	3	
Areas immediately outside the local condition	2	
Important only to the local condition	1	
No importance	0	
Magnitude of change / effect (A2)		
Magnitude is defined as a measure of the scale of benefit/dis-benefit of an impact or a condition.		
Major positive benefit	3	-1
Significant improvement in status quo	2	
Improvement in status quo	1	
No change / Status quo	0	
Negative change to status quo	-1	
Significant negative dis-benefit or change	-2	
Major dis-benefit or change	-3	
Group A Score:		-1
Group B (Situation criteria)		
Duration / Permanence (B1)		
This defines whether a condition is temporary or permanent, and should be seen only as a measure of the temporal status of the condition.(e.g.: an embankment is a permanent condition even if it may one day be breached or abandoned; whilst a coffer dam is a temporary condition, as it will be removed).		
No change / Not Applicable	1	3
Temporary	2	
Permanent	3	
Reversibility (B2)		
This defines whether the condition can be changed and is a measure of the control over the effect of the condition. It should not be confused or equated with permanence. (e.g.: an accidental toxic spillage into a river is a temporary condition (B1) but its effect (death of fish) is irreversible (B2); a town's sewage treatment works is a permanent condition (B1), the effect of its effluent can be changed (reversible condition) (B2))		
No change / Not Applicable	1	2
Reversible	2	
Irreversible	3	
Cumulative (B3)		

This is a measure of whether the effect will have a single direct impact or whether there will be a cumulative effect over time, or a synergistic effect with other conditions. The cumulative criterion is a means of judging the sustainability of a condition, and is not to be confused with a permanent /irreversible situation.		
No change / Not Applicable	1	2
Non-cumulative / single	2	
Cumulative / synergistic	3	
Group B Score:		7
Final Assessment score		-7

#### 6.9.1.3 Impact 3: Physical disturbance by the supporting infrastructure (e.g. roads) on hydrological environment

Physical disturbance by the supporting infrastructure (roads & transmission lines) on the aquatic environment although none occur or could be avoided / spanned

##### Cumulative impacts:

Additional downstream erosion and sedimentation of systems lower in the catchment although unlikely due to lack of any water courses.

##### Residual impacts:

Additional downstream erosion and sedimentation of systems lower in the catchment although unlikely due to lack of any water courses.

##### Impact Significance

Slight Negative

**Table 40:** Assessment of Impacts of physical disturbance by the supporting infrastructure (e.g. roads) on hydrological environment

<b>Extent (A1)</b>		
A measure of the importance of the condition, which is assessed against the spatial boundaries or human interests it will affect.		
National / International interests	4	1
Regional / National interests	3	
Areas immediately outside the local condition	2	
Important only to the local condition	1	
No importance	0	
<b>Magnitude of change / effect (A2)</b>		
Magnitude is defined as a measure of the scale of benefit/dis-benefit of an impact or a condition.		
Major positive benefit	3	-1
Significant improvement in status quo	2	
Improvement in status quo	1	
No change / Status quo	0	
Negative change to status quo	-1	
Significant negative dis-benefit or change	-2	
Major dis-benefit or change	-3	
Group A Score:		-1

Group B (Situation criteria)		
Duration / Permanence (B1)		
This defines whether a condition is temporary or permanent, and should be seen only as a measure of the temporal status of the condition. (e.g.: an embankment is a permanent condition even if it may one day be breached or abandoned; whilst a coffer dam is a temporary condition, as it will be removed).		
No change / Not Applicable	1	3
Temporary	2	
Permanent	3	
Reversibility (B2)		
This defines whether the condition can be changed and is a measure of the control over the effect of the condition. It should not be confused or equated with permanence. (e.g.: an accidental toxic spillage into a river is a temporary condition (B1) but its effect (death of fish) is irreversible (B2); a town's sewage treatment works is a permanent condition (B1), the effect of its effluent can be changed (reversible condition) (B2))		
No change / Not Applicable	1	2
Reversible	2	
Irreversible	3	
Cumulative (B3)		
This is a measure of whether the effect will have a single direct impact or whether there will be a cumulative effect over time, or a synergistic effect with other conditions. The cumulative criterion is a means of judging the sustainability of a condition, and is not to be confused with a permanent /irreversible situation.		
No change / Not Applicable	1	2
Non-cumulative / single	2	
Cumulative / synergistic	3	
Group B Score:		7
Final Assessment score		-7

#### 6.9.1.4 Cumulative Impacts

In the assessment of this project, the surrounding projects within a 35km radius of the site were assessed. From an aquatic environment standpoint, these projects don't share any of the same direct subquaternary catchment and thus the other projects are too far removed.

Presently, no significant cumulative impacts with regard to the Preferred Alternative were identified as these are also located outside of the delineated aquatic systems and their buffers for the proposed site.

#### Impact Significance

Slight to None

**Table 41:** Assessment of Cumulative Impacts

Extent (A1)		
A measure of the importance of the condition, which is assessed against the spatial boundaries or human interests it will affect.		
National / International interests	4	1
Regional / National interests	3	
Areas immediately outside the local condition	2	

Important only to the local condition	1	
No importance	0	
<b>Magnitude of change / effect (A2)</b>		
Magnitude is defined as a measure of the scale of benefit/dis-benefit of an impact or a condition.		
Major positive benefit	3	-1
Significant improvement in status quo	2	
Improvement in status quo	1	
No change / Status quo	0	
Negative change to status quo	-1	
Significant negative dis-benefit or change	-2	
Major dis-benefit or change	-3	
Group A Score:		-1
<b>Group B (Situation criteria)</b>		
<b>Duration / Permanence (B1)</b>		
This defines whether a condition is temporary or permanent, and should be seen only as a measure of the temporal status of the condition.(e.g.: an embankment is a permanent condition even if it may one day be breached or abandoned; whilst a coffer dam is a temporary condition, as it will be removed).		
No change / Not Applicable	1	3
Temporary	2	
Permanent	3	
<b>Reversibility (B2)</b>		
This defines whether the condition can be changed and is a measure of the control over the effect of the condition. It should not be confused or equated with permanence. (e.g.: an accidental toxic spillage into a river is a temporary condition (B1) but its effect (death of fish) is irreversible (B2); a town's sewage treatment works is a permanent condition (B1), the effect of its effluent can be changed (reversible condition) (B2))		
No change / Not Applicable	1	2
Reversible	2	
Irreversible	3	
<b>Cumulative (B3)</b>		
This is a measure of whether the effect will have a single direct impact or whether there will be a cumulative effect over time, or a synergistic effect with other conditions. The cumulative criterion is a means of judging the sustainability of a condition, and is not to be confused with a permanent /irreversible situation.		
No change / Not Applicable	1	2
Non-cumulative / single	2	
Cumulative / synergistic	3	
Group B Score:		7
<b>Final Assessment score</b>		<b>-7</b>

### 6.9.2 Conclusion and Recommendations

With suitable mitigation and avoidance of the pans and buffer area, the development should have no direct impact on the overall status of the aquatic systems and within the study area.

No protected or species of special concern (aquatic flora) were observed within the aquatic areas during the site visit thus the development poses no risk to any such species. Therefore, based on the site visits the significance of the impacts on the aquatic environment within the study area would be **SLIGHT**.

When considering any other potential projects within the adjacent / nearby farms the potential for changes to the surrounding aquatic habitat would not be significant especially during the operational phases (hard surfaces and stormwater management). It is however assumed that any such changes would be detrimental to the various projects owners, i.e. erode areas around mirrors. This coupled with the low mean annual run-off and with suitable stormwater management, the impacts could however be mitigated. The likelihood of any cumulative impacts listed in this report is especially low when considering that only a low percentage of projects will actually move into the construction phase.

A WULA in terms of Section 21 c and i of the National Water Act will be required for development within 500m of a wetland boundary. Doug Jeffrey Environmental Consultants have compiled and submitted a WULA for these activities in the regulated Zone.

## **6.10 SOCIAL IMPACTS**

During the scoping phase, a number of social impacts were identified by the social specialist, Savannah Environmental. The assessment of these impacts is included in the section below.

### **6.10.1 Assessment of Impacts**

#### **6.10.1.1 Planning and Construction Phase Impacts**

The following impacts associated with the construction and planning phases of the development were identified and assessed by the specialist.

##### **IMPACT 1: Direct and indirect employment opportunities and skills development**

It is anticipated that at its peak the construction of the proposed project will result in the creation of approximately 300 to 400 employment opportunities. Of those employment opportunities likely to be generated, approximately 60% (i.e. 180 to 240) will accrue to low skilled workers, 25% (i.e. 75 to 100) to semi-skilled workers, and 15% (i.e. 45 to 60) to skilled workers. Employment opportunities generated as a result of the project will be temporary in nature, and will last for the duration of the construction period (i.e. approximately 12 to 18 months), while the skills developed through experience in the construction of the project will be retained by the community members involved. The project proponent anticipates that the majority of the general labour force will as far as possible be sourced from the local labour pool. Where relevant skills are unavailable from the local labour pool, these would need to be sought elsewhere. Solar PV projects make use of large numbers of unskilled and semi-skilled labour so there will be good opportunity to use local labour. The injection of income into the area in the form of wages will represent an opportunity for the local economy and businesses in the area.

In addition to direct employment opportunities associated with the construction of the project, a number of indirect employment opportunities will also be created. Indirect employment opportunities will predominantly be created in the service industry, through the opportunity for the provision of secondary services to the construction team. Services may include for example accommodation, catering, and laundry services. Indirect employment opportunities created as a result of the construction of the project would also be temporary in nature and would last for the duration of the construction period (i.e. approximately 12 to 18 months). While difficult to quantify, indirect employment opportunities are significant in that they provide greater opportunity for women to be included and benefitted, albeit indirectly. Other indirect employment opportunities that will be created during construction relate to increased demand for transportation, equipment rental, sanitation and waste removal etc. which may benefit local service providers.

The creation of employment opportunities is considered to be of moderate magnitude given the levels of unemployment within the area, the low average income, and the fact that the majority of employment within the surrounding area is of a seasonal nature as it is associated with the agricultural sector.

**Table 42:** Impact assessment on direct and indirect employment opportunities

Nature:		
The creation of direct and indirect employment opportunities during the construction phase of the project.		
	Without enhancement	With enhancement
Extent	Local-Regional (3)	Local-Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Minor (2)	Moderate (6)
Probability	Highly probable(4)	Definite (5)
Significance	Low (28)	Medium (55)
Status (positive or negative)	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	
Enhancement:		
<ul style="list-style-type: none"> <li>• A local employment policy should be adopted to maximise opportunities made available to the local labour force.</li> <li>• Labour should be sourced from the local labour pool, and only if the necessary skills are unavailable should labour be sourced from (in order of preference) the greater Gamagara LM, John Taolo Gaetsewe DM, Northern Cape Province, South Africa, or elsewhere.</li> <li>• Where feasible, training and skills development programmes should be initiated prior to the commencement of the construction phase.</li> <li>• As with the labour force, suppliers should also as far as possible be sourced locally.</li> <li>• As far as possible local contractors that are compliant with Broad-Based Black Economic Empowerment (B-BBEE) criteria should be used.</li> <li>• The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.</li> </ul>		
Cumulative impacts:		
<ul style="list-style-type: none"> <li>• Opportunity to decrease the local unemployment levels and increase the levels of income and spending power within the region.</li> <li>• Opportunity to upgrade and improve skills levels in the area.</li> <li>• Opportunity for local entrepreneurs to develop their businesses (which could result in the creation of additional employment opportunities, levels of income and spending power through sustainable growth).</li> </ul>		
Residual impacts:		
<ul style="list-style-type: none"> <li>• Improved pool of skills and experience in the local area.</li> <li>• Economic growth for small-scale entrepreneurs.</li> <li>• Temporary employment during the construction phase will result in job losses and struggles for construction workers to find new employment opportunities.</li> </ul>		

### IMPACT 2: Economic multiplier effects

There are likely to be opportunities for local businesses and service providers to provide services and materials for the construction phase of the proposed project. The economic multiplier effects from the use of local goods and services will include, but is not limited to, the provision of construction materials and equipment, and workforce essentials such as catering services, trade clothing, safety equipment, ablution, accommodation, transportation and other goods. In addition, off-site accommodation may be required in nearby towns such as Kathu for contract workers and certain employees. The increase in demand for goods and services may stimulate local business and local economic development (however locally sourced materials and services may be limited due to availability). There is likely to be a direct increase in industry and indirect increase in secondary businesses.

In terms of business opportunities for local companies, expenditure during the construction phase will create business opportunities for the regional and local economy. The increase in demand for new materials and services in the nearby area may stimulate local business and local economic development. There is likely to be a direct increase in industry and indirect increase in secondary businesses. The project proponent should source services needed from the local area as much as possible. These necessities should be sourced from nearby towns and local service providers.



Potential opportunities for local economies, a decrease in current level of unemployment, and an increase in incomes will in turn stimulate further expenditure and sales within the local economies.

The injection of income into the area in the form of wages will represent an opportunity for the local economy and businesses in the area. Through the stimulation of employment and income, new demand may be created within local and regional economies. With increased income comes additional income for expenditure on goods and services supplied. Indirect impacts would occur as a result of the new economic development, and would include new jobs at businesses that may support the construction workforce or provide project materials, and associated income. The intention should therefore be to maximise local labour employment opportunities, which is likely to have a positive impact on local communities and downstream benefits with regards to household income, education and other social aspects. Such benefits may however be limited given the short construction period (i.e. approximately 12 to 18 months).

**Table 43:** Economic multiplier effects impact assessment

<b>Nature:</b>		
<b>Significance of the impact from the economic multiplier effects from the use of local goods and services.</b>		
	Without enhancement	With enhancement
<b>Extent</b>	Local-Regional (3)	Local-Regional (3)
<b>Duration</b>	Short term (2)	Short term (2)
<b>Magnitude</b>	Low (4)	Moderate (6)
<b>Probability</b>	Highly probable (4)	Definite (5)
<b>Significance</b>	Medium (36)	Medium (55)
<b>Status (positive or negative)</b>	Positive	Positive
<b>Reversibility</b>	N/A	N/A
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impacts be mitigated?</b>	Yes	
<b>Enhancement:</b>		
<ul style="list-style-type: none"> <li>It is recommended that a local procurement policy is adopted to maximise the benefit to the local economy.</li> <li>A database of local companies, specifically Historically Disadvantaged Individuals (HDIs) which qualify as potential service providers (e.g. construction companies, security companies, catering companies, waste collection companies, transportation companies etc.) should be created and companies listed thereon should be invited to bid for project-related work where applicable.</li> <li>Local procurement is encouraged along with engagement with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods and products from local suppliers where feasible.</li> </ul>		
<b>Cumulative impacts:</b>		
Opportunity for local capital expenditure, potential for the local service sector.		
<b>Residual impacts:</b>		
Improved local service sector, growth in local business.		

### IMPACT 3: Influx of jobseekers and change in population

Construction projects have the potential to attract jobseekers which may move into an area in search of employment opportunities. An influx of people looking for employment or other economic opportunities could result in increased pressure being placed on economic and social infrastructure, and a change in the local population. Population change refers to the size, structure, density as well as demographic profile of the local community.

An influx of jobseekers into an area, could lead to a temporary increase in the level of crime, cause social disruption and put pressure on basic services. This includes municipal services such as sanitation, electricity, water, waste management, health facilities, transportation and the availability of

housing. It could also potentially create conflict between locals and outsiders due to potential differences in racial, cultural and ethnic composition. A further negative impact that could result due to an influx of jobseekers into an area is an increase in unemployment levels due to an oversupply of available workforce, particularly with respect to semi and unskilled workers.

Given the relatively small labour force required for the project (i.e. approximately 300 to 400 opportunities at the peak of construction comprising 180 to 240 opportunities for low skilled workers, 75 to 100 opportunities for semi-skilled workers, and 45 to 60 opportunities for skilled workers), the short duration of the construction period (i.e. approximately 12 to 18 months), and the close proximity of the site to the town of Kathu (from which the majority of labour is likely to be sourced), the construction of the project is not anticipated to result in changes to the population within the site or its surrounds. In addition, due to the fact that no man camps will be established on site, the potential for an influx of people into the area or change in population demographics is anticipated to be minimal. The labour force is therefore also not anticipated to place significant pressure on local resources and social networks, or existing services and infrastructure, as they would already be accessing services at their places of residence.

**Table 44:** Assessment of impacts from an influx of jobseekers and change in population in the study area

Nature:		
In-migration of labourers in search of employment opportunities, and a resultant change in population, and increase in pressure on local resources and social networks, or existing services and infrastructure.		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Improbable (2)	Improbable (2)
Significance	Low (18)	Low (14)
Status (positive or negative)	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> <li>• Develop and implement a local procurement policy which prioritises “locals first” to prevent the movement of people into the area in search of work.</li> <li>• Engage with local community representatives prior to construction to facilitate the adoption of the locals first procurement policy.</li> <li>• Provide transportation for workers (from Kathu and surrounds) to ensure workers can easily access their place of employment and do not need to move closer to the project site.</li> <li>• Working hours should be kept between daylight hours during the construction phase, and / or as any deviation that is approved by the relevant authorities.</li> <li>• Compile and implement a grievance mechanism.</li> <li>• Appoint a Community Liaison Officer (CLO) to assist with the procurement of local labour.</li> <li>• Prevent the recruitment of workers at the project site.</li> <li>• Implement a method of communication whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.</li> <li>• Establish clear rules and regulations for access to the proposed site.</li> <li>• Appoint a security company and implement appropriate security procedures to ensure that workers do not remain onsite after working hours.</li> <li>• Inform local community organisations and policing forums of construction times and the duration of the construction phase.</li> <li>• Establish procedures for the control and removal of loiterers from the construction site.</li> </ul>		
Cumulative impacts		
Additional pressure on natural resources, services, infrastructure and social dynamics in the area due to an increase in people and change in population. Possible increase in criminal activities and economic losses in area for property owners.		

**Residual impacts:**

Possibility of outside workers remaining in the area after construction is completed and subsequent pressures on local infrastructure, resources and services.

**IMPACT 4: Safety and security impacts**

The commencement of construction activities can be associated with an increase in crime within an area. The perceived loss of security during the construction phase of a project due to an influx of workers and / or outsiders to the area (as in-migration of newcomers, construction workers or jobseekers are usually associated with an increase in crime), may have indirect effects such as increased safety and security concerns for neighbouring properties, damage to property, increased risk of veld fire, stock theft, poaching, crime and so forth. All landowners have raised concerns regarding security in the area and have reiterated that crime in the area should not increase as a result of the project. A concern was raised regarding the location of the access to the site and the potential to open up the area as a thoroughfare.

Given the fact that a man camp will not be established onsite, and the labour force will therefore not permanently reside within the area, or have any reason to be onsite after hours, it is anticipated that the probability and significance of such safety and security impacts occurring will be reduced.

The project proponent should strive to develop and maintain good relationships and ongoing and open communication with neighbouring landowners. Suitable grievance control mechanisms must be developed and implemented, and the local community informed of the grievance mechanism to be followed. In addition, a security company must be appointed and appropriate security measures implemented prior to the commencement of construction activities onsite

**Table 45: Assessment of safety and security impacts**

Nature:		
Temporary increase in safety and security concerns associated with the influx of people during the construction phase.		
	Without mitigation	With mitigation
Extent	Local (2)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	High (8)	Moderate (6)
Probability	Probable (3)	Improbable (2)
Significance	Medium (36)	Low (20)
Status (positive or negative)	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> <li>Working hours should be kept within daylight hours during the construction phase, and / or as any deviation that is approved by the relevant authorities.</li> <li>Provide transportation for workers to prevent loitering within or near the project site outside of working hours.</li> <li>The perimeter of the construction site should be appropriately secured to prevent any unauthorised access to the site. The fencing of the site should be maintained throughout the construction period.</li> <li>The appointed EPC Contractor must appoint a security company to ensure appropriate security procedures and measures are implemented.</li> <li>Access in and out of the construction site should be strictly controlled by a security company appointed to the project.</li> <li>A CLO should be appointed as a grievance mechanism. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.</li> <li>The EPC Contractor should implement a stakeholder management plan to address neighbouring farmer concerns regarding safety and security.</li> <li>The project proposed must prepare and implement a FMP; this must be done in conjunction with surrounding landowners.</li> <li>The EPC Contractor must prepare a Method Statement which deals with fire prevention and management.</li> </ul>		
Cumulative impacts:		

<ul style="list-style-type: none"> <li>• Possible increase in crime levels (with influx of people) with subsequent possible economic losses.</li> <li>• Increased risk of veld fires if vegetation clearing is not appropriately implemented, monitored and maintained.</li> </ul>
Residual impacts:
None anticipated.

#### IMPACT 5: Impacts on daily living and movement patterns

Project components and equipment will be transported to site using road transport. The N14 national road provides the primary access to the area, while the project site itself is accessed through the use of existing unsurfaced farm roads, which can be accessed from the N14 national road. The N14 connects the town of Kathu in the north, to the towns of Upington in the west, and Postmasburg in the south (via the R325). Traffic utilising the road is mainly mining related, but could also include tourist traffic. Local farmers and residents utilise gravel access roads to access their farms.

Increased traffic due to construction vehicles could cause disruptions to road users, the local community and increase safety hazards, especially on the main road that will be utilised - the N14. The use of local roads and transport systems may cause road deterioration and congestion. An increase of traffic from the rise in construction vehicles is a safety concern for other road users and local communities in the area. Impacts will be magnified since farm roads are not designed to carry heavy traffic and are prone to erosion. Noise, vibrations, dust and visual pollution from heavy vehicle traffic during the construction phase could also negatively impact local residents and road users.

The upgrading of access roads may damage the fences along the access road. Infrastructure such as roads and fencing should be maintained in the present condition and repaired immediately, if damaged as a result of construction activities. The contractor should be responsible for managing this impact on private property.

There are a few and sparsely populated homesteads or residents living in the nearby area, which will be impacted by the project. In terms of national roads involved, the expectation is that the proponent should consult with the relevant roads agency to ensure that they do not contribute to the deterioration of roads without taking some responsibility for repairing the impact that their construction vehicles may have on the road during construction phase.

The key sensitive social receptors are as follows:

- Farm Legoko 2/460: The landowner resides on the farm. No grazing activities take place on this farm.
- Farm Legoko 1/460: The adjacent landowner and a few farm workers reside on the farm. The farm is utilised for livestock and game farming activities.
- Farm Legoko RE/460: The adjacent landowner and a few farm workers reside on the farm. The farm is utilised for livestock and game farming activities.
- Farm Bestwood 1/459: Landowners reside on farm. The farm is utilised for livestock and game farming activities.

**Table 46:** Assessment of impacts on daily living and movement patterns.

Nature:		
Temporary increase in traffic disruptions and movement patterns during the construction phase.		
	Without mitigation	With mitigation
Extent	Local-Regional (3)	Local-Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	High (8)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	Medium (39)	Medium (33)
Status (positive or negative)	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	
Mitigation:		

<ul style="list-style-type: none"> <li>• All vehicles must be road worthy and drivers must be qualified, obey traffic rules, follow speed limits and be made aware of the potential road safety issues.</li> <li>• Heavy vehicles should be inspected regularly to ensure their road worthiness.</li> <li>• Provision of adequate and strategically placed traffic warning signs and control measures along the R505 and gravel farm access roads to warn road users of the construction activities taking place for the duration of the construction phase. Warning signs must be visible at all times, and especially at night.</li> <li>• Implement penalties for reckless driving as a way to enforce compliance to traffic rules.</li> <li>• Avoid heavy vehicle activity during “peak” hours (when children are taken to school, or people are driving to work).</li> <li>• The developer and EPC Contractor must ensure that all fencing along access roads is maintained in the present condition or repaired if disturbed due to construction activities.</li> <li>• The developer and EPC Contractor must ensure that the roads utilised for construction activities are either maintained in the present condition or upgraded if disturbed due to construction activities.</li> <li>• The EPC Contractor must ensure that damage / wear and tear caused by construction related traffic to the access roads is repaired before the completion of the construction phase.</li> <li>• A method of communication must be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.</li> </ul>
<b>Cumulative impacts:</b>
Possible increased traffic and traffic disruptions impacting local communities.
<b>Residual impacts:</b>
None anticipated.

#### IMPACT 6: Nuisance impacts (noise & dust)

Impacts associated with construction related activities include noise, dust, and possible disruption to adjacent properties. Site clearing activities increase the risk of dust and noise being generated, which can in turn negatively impact on adjacent properties. The movement of heavy construction vehicles and construction activities and equipment also have the potential to create noise at the project site, as well as along the N14, and other local access roads. The primary sources of noise during construction would be from construction equipment, vehicle / truck traffic, and ground vibration. Noise levels can be audible over a large distance however are generally short in duration. Dust would be generated from construction activities as well as trucks / vehicles driving on gravel access roads. This impact will negatively impact sensitive receptors, and could also potentially negatively impact surrounding land users. The impact of noise and dust on surrounding land users and local farmsteads can be reduced through the application of appropriate mitigation measures.

**Table 47:** Assessment of nuisance impacts (noise and dust)

<b>Nature:</b>		
Nuisance impacts in terms of temporary increase in noise and dust, and wear and tear on access roads to the site.		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	High (8)	Moderate (6)
Probability	Highly probable (4)	Probable (3)
Significance	Medium (44)	Low (27)
Status (positive or negative)	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>• The movement of heavy vehicles associated with the construction phase should be timed to avoid weekends, public holidays and holiday periods where feasible.</li> <li>• 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.</li> <li>• Ensure all vehicles are road worthy, drivers are qualified and are made aware of the potential noise and dust issues.</li> <li>• A CLO should be appointed. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.</li> </ul>		

<b>Cumulative impacts:</b>
<ul style="list-style-type: none"> <li>• If damage to roads is not repaired then this will affect other road users and result in higher maintenance costs for vehicles of road users.</li> <li>• Other construction activities in the area will heighten the nuisance impacts, such as noise, dust and wear and tear on roads.</li> </ul>
<b>Residual impacts:</b>
Only damage to roads that is not fixed could affect road users.

**IMPACT 7: Visual and sense of place impacts**

Intrusion impacts such as aesthetic pollution (i.e. building materials, construction vehicles, etc.), noise and light pollution, and impacts on the rural nature of the site will impact the “sense of place” for the local community. Construction related activities have the potential to negatively impact a local area’s “sense of place”. The alteration of the sense of place in view of the local residents and road users will start during the construction phase and remain for the project’s operational lifetime.

Given the nature of the surrounding area within which the project is proposed, the number of PV projects already authorised in the area, and the limited visual impact the project is anticipated to have (i.e. most significantly within 2km of the site) it can be anticipated that the visual and sense of place impacts associated with the construction of the facility will be of low significance.

**Table 48:** Assessment of impacts on the sense of place

<b>Nature:</b>		
Intrusion impacts from construction activities will have an impact on the area’s “sense of place”.		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Low (4)	Low (4)
Probability	Highly probable (4)	Probable (3)
Significance	Low (28)	Low (21)
Status (positive or negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>• Implement mitigation measures identified in the Visual Impact Assessment (VIA) prepared for the project.</li> <li>• Limit noise generating activities to normal daylight working hours and avoid weekends and public holidays.</li> <li>• The movement of heavy vehicles associated with the construction phase should be timed to avoid weekends, public holidays and holiday periods where feasible.</li> <li>• 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.</li> <li>• All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.</li> <li>• Communication, complaints and grievance channels must be implemented and contact details of the CLO must be provided to the local community in the study area.</li> </ul>		
<b>Cumulative impacts:</b>		
Other construction activities in the area will heighten the intrusion impacts, such as noise, dust and aesthetic pollution and further negatively impact the area’s ‘sense of place’.		
<b>Residual impacts:</b>		
None anticipated.		

**6.10.1.2 Operation Phase Impacts**

The following impacts associated with the construction and planning phases of the development were identified and assessed by the specialist.

Gaetsewe Solar is anticipated to operate for a minimum of 20 years. The facility will operate continuously, 7 days a week, during daylight hours. While the solar facility will be largely self-

sufficient, monitoring and periodic maintenance activities will be required. Key elements of the O&M plan include monitoring and reporting the performance of the solar facility, conducting preventative and corrective maintenance, receiving visitors, and maintaining security.

The potential positive and negative social impacts which could arise as a result of the operation of the proposed project include the following:

#### IMPACT 1: Direct and indirect employment opportunities and skills development

It is anticipated that the operation of the project is likely to create a maximum of approximately 60 employment opportunities, comprising approximately 42 low-skilled, approximately 15 semi-skilled, and approximately 3 skilled opportunities. Employment opportunities include safety and security staff, operation and monitoring, and maintenance crew. Maintenance activities will be carried out throughout the lifespan of the project, and will include washing of solar panels, vegetation control, and general maintenance around the solar energy facility. The employment opportunities generated as a result of the project will be long term and will last for the duration of operation (i.e. approximately 20 years). None of the employment opportunities will be permanently stationed onsite. In addition to the direct employment opportunities it is anticipated that additional indirect employment opportunities will be generated during the operation of the project.

**Table 49:** Employment opportunities and skills development

<b>Nature:</b>		
The creation of employment opportunities and skills development opportunities during the operation phase for the country and local economy.		
	Without mitigation	With mitigation
Extent	Local-Regional (3)	Local-Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Highly probable(4)	Definite (5)
Significance	Medium (44)	Medium (55)
Status (positive or negative)	Positive	Positive
Reversibility	N/A	
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>It is recommended that local employment policy is adopted to maximise the opportunities made available to the local community.</li> <li>The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.</li> <li>Vocational training programs should be established to promote the development of skills.</li> </ul>		
<b>Cumulative impacts:</b>		
Opportunity to reduce unemployment rates.		
<b>Residual impacts:</b>		
Improved pool of skills and experience in the local area.		

#### IMPACT 2: Development of non-polluting, renewable energy infrastructure

South Africa currently relies predominantly on coal-generated electricity to meet its energy needs. As a result, the country's carbon emissions are considerably higher than those of most developed countries partly because of the energy-intensive sectors which rely heavily on low quality coal, which is the main contributor to GHG emissions. The use of solar technology for power generation is considered a non-consumptive use of a natural resource which produces zero GHG emissions during its operation. The generation of RE utilising solar power will contribute positively to South Africa's

electricity market. Given South Africa's reliance on Eskom as a power utility, the benefits associated with a REIPPP Programme are regarded as an important contribution, and the advancement of RE has been identified as a priority for South Africa.

Increasing the contribution of the RE sector to the local economy would contribute to the diversification of the local economy and provide greater economic stability. The growth in the RE sector as a whole could introduce new skills and development into the area. This is especially true with regards to solar power specifically considering the number of other solar power projects proposed within the broader area.

The development of RE projects have the potential to contribute to the stability of the economy, and could contribute to the local economy through employment generation (direct, indirect, and local service providers) and revenue generation for the LM. While the overall contribution of the project to South Africa's total energy requirements is small, the facility will also contribute towards offsetting the total carbon emissions associated with energy generation in South Africa. It should however be noted that such a benefit is associated with all RE projects and not only solar power projects in particular.

**Table 50:** Assessment of the development of non-polluting, renewable energy infrastructure

Nature:		
Development of non-polluting, renewable energy infrastructure.		
	Without mitigation	With mitigation
Extent	Local-Regional-National (4)	Local-Regional-National (4)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Definite (5)	Definite (5)
Significance	Medium (50)	Medium (50)
Status (positive or negative)	Positive	Positive
Reversibility	Yes	
Irreplaceable loss of resources?	Yes (impact of climate change)	
Can impacts be mitigated?	No	
Mitigation:		
None identified.		
Cumulative impacts		
Reduce carbon emissions through the use of renewable energy and contribute to reducing global warming.		
Residual impacts		
Reduce carbon emissions through the use of renewable energy and contribute to reducing global warming.		

### IMPACT 3: Contribution to Local Economic Development (LED) and social upliftment

Projects which form part of the DoE's REIPPP Programme are required, as part of their bidding requirements, to contribute towards LED and social upliftment initiatives within the area in which they are proposed. In addition, they are required to spend a percentage of their revenue on socio-economic and enterprise development, as well as allocate ownership shares to local communities that benefit previously disadvantaged communities around the project. A portion of the dividends generated by each development also need to be invested into LED projects and programmes. The proposed development therefore has the potential to contribute positively towards socio-economic development and improvements within the local area.

Socio-economic spin-offs from the proposed development could therefore contribute towards better infrastructure provision, and the investment in education and skills development. An in-depth Community Needs Assessment (CNA) is required to ensure that the beneficiary community's needs are understood and sufficiently addressed by the proposed development programmes in order to



contribute meaningfully towards local economic growth and development. It should be noted however that such a benefit would be associated with all RE projects and not just solar power projects in particular.

**Table 51:** Assessment of the contribution to LED and social upliftment

Nature:		
Contribution to LED and social upliftment during the operation of the project.		
	Without mitigation	With mitigation
Extent	Local-Regional-National (4)	Local-Regional-National (4)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	High (8)
Probability	Highly probable (4)	Highly probable (4)
Significance	Medium (56)	High (64)
Status (positive or negative)	Positive	Positive
Reversibility	N/A	
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> <li>• A CNA must be conducted to ensure that the LED and social upliftment programmes proposed by the project are meaningful.</li> <li>• Ongoing communication and reporting is required to ensure that maximum benefit is obtained from the programmes identified, and to prevent the possibility for such programmes to be misused.</li> <li>• The programmes should be reviewed on an ongoing basis to ensure that they are best suited to the needs of the community at the time (bearing in mind that these are likely to change over time).</li> </ul>		
Cumulative impacts:		
Significant LED and social upliftment of the local communities as a result of other IPP projects within the area.		
Residual impacts:		
Social upliftment of the local communities through the development and operation of the project.		

#### IMPACT 4: Visual and sense of place impacts

An area's sense of place is created through the interaction of various characteristics of the environment, including atmosphere, visual resources, aesthetics, climate, lifestyle, culture, and heritage. An area's sense of place is however subjective and largely dependent on the demographics of the population residing within the area and their perceptions regarding trade-offs. For example, while some individuals may prefer not to see any form of infrastructure development, others may have an interest in large-scale infrastructure, or engineering projects, and the operation of such facilities, and consider the impact to be less significant. Such a scenario may especially be true given that the project comprises a RE project, and could therefore be seen as benefitting the local environment, when compared to non-renewable energy generation projects.

An impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light. The social impacts associated with the impact on sense of place relate to the change in the landscape character and visual impact of Gaetsewe Solar. The area surrounding the project site is characterised by existing mining activities and electricity infrastructure (including substations, power lines and authorised solar facilities). Considering this, it can be anticipated that the visual and sense of place impacts associated with the operation of the facility will be of low significance.

**Table 52:** Assessment of the visual impact and impacts on sense of place

Nature:
Visual impacts and sense of place impacts associated with the operation phase of Gaetsewe Solar.

	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Minor (2)
Probability	Highly Probable (4)	Probable (3)
Significance	Medium (36)	Low (21)
Status (positive or negative)	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	
<b>Mitigation:</b>		
Implement mitigation measures identified in the VIA report prepared for the project.		
<b>Cumulative impacts:</b>		
Potential impact on the current sense of place in the area due to other solar power developments within the area.		
<b>Residual impacts:</b>		
The visual impact of Gaetsewe Solar will remain if the facility is not decommissioned and dismantled after the end of its operational life.		

#### IMPACT 5: Impacts associated with the loss of agricultural land

The development of the proposed project on an agricultural property would result in the area of land required to support the development footprint being removed from potential agricultural production. This could have negative implications in terms of food production and security, and could also threaten jobs of workers employed in the agricultural activities. This is not seen as an issue on this property however as it is currently not utilised for any agricultural activities.

**Table 53:** Assessment on the loss of agricultural land and overall productivity

<b>Nature:</b>		
Loss of agricultural land and overall productivity as a result of the operation of the proposed project on an agricultural property.		
	Without mitigation	With mitigation
Extent	Site (1)	Site (1)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Not probable (2)	Improbable (1)
Significance	Low (22)	Low (9)
Status (positive or negative)	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	
<b>Mitigation:</b>		
The following mitigation measures were provided in the Soil, Land Use and Land Capability Assessment Report: <ul style="list-style-type: none"> <li>• Keep the project footprint as small as possible.</li> <li>• Avoid areas with wetland land capability.</li> </ul>		
<b>Cumulative impacts:</b>		
Loss of agricultural land as a result of the number of solar energy facilities proposed within the area. Decrease in overall productivity as a result of the loss of grazing land.		
<b>Residual impacts:</b>		
Economically unviable portions of agricultural land which may reduce overall productivity.		

### 6.10.1.3 Cumulative Impacts

#### IMPACT 1: Cumulative impact from employment, skills and business opportunities

Gaetsewe Solar and the establishment of other solar power projects within the area has the potential to result in significant positive cumulative impacts, specifically with regards to the creation of a number of socio-economic opportunities for the region, which in turn, can result in positive social benefits. The positive cumulative impacts include creation of employment, skills development and training opportunities, and downstream business opportunities. The cumulative benefits to the local, regional, and national economy through employment and procurement of services are more considerable than that of Gaetsewe Solar alone.

**Table 54:** Cumulative impacts of employment opportunities, business opportunities and skills development

Nature:		
An increase in employment opportunities, skills development and business opportunities with the establishment of more than one solar power facility.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Local-Regional (3)	Local-Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Moderate (6)
Probability	Highly probable(4)	Highly Probable (4)
Significance	Medium (44)	Medium (52)
Status (positive or negative)	Positive	Positive
Reversibility	N/A	
Irreplaceable loss of resources?	N/A	
Can impacts be mitigated?	Yes	
Confidence in findings	High	
Enhancement:		
The establishment of a number of solar power projects under the REIPPP Programme in the area has the potential to have a positive cumulative impact on the area in the form of employment opportunities, skills development and business opportunities. The positive benefits will be enhanced if local employment policies are adopted and local services providers are utilised by the developers to maximise the project opportunities available to the local community.		
Residual impacts:		
<ul style="list-style-type: none"> <li>• Improved pool of skills and experience in the local area.</li> <li>• Economic growth for small-scale entrepreneurs.</li> </ul>		

#### IMPACT 2: Cumulative impact with large scale in-migration of people

While the development of a single solar power project may not result in a major influx of people into an area, the development of several projects may have a cumulative impact on the in-migration and movement of people. In addition, the fact that the project is proposed within an area characterised by good levels of solar irradiation suitable for the development of commercial solar energy facilities implies that the surrounding area is likely to be subject to considerable future applications for PV energy facilities. Levels of unemployment, and the low level of earning potential may attract individuals to the area in search of better employment opportunities and higher standards of living.

It is very difficult to control an influx of people into an area, especially in a country where unemployment rates are high. It is therefore important that the project proponent implement and maintain strict adherence with a local employment policy in order to reduce the potential of such an impact occurring.

**Table 55:** Cumulative impact with large-scale in-migration of people

Nature		
Negative impacts and change to the local economy with an in-migration of labourers, businesses and jobseekers to the area.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Local (1)	Local-Regional (3)
Duration	Short-term (2)	Long term (4)
Magnitude	Low (4)	Moderate (6)
Probability	Very Improbable (1)	Probable (3)
Significance	Low (7)	Medium (39)
Status (positive or negative)	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	
Confidence in findings	High	
Enhancement		
<ul style="list-style-type: none"> <li>• Develop a recruitment policy / process (to be implemented by contractors), which will source labour locally.</li> <li>• Work together with government agencies to ensure service provision is in line with the development needs of the local area.</li> <li>• Form joint ventures with community organisations, through Trusts, which can provide local communities with benefits, such as employment opportunities and services.</li> </ul>		
Residual impacts		
Possibility of outside workers remaining in the area after construction is completed and subsequent pressures on local infrastructure, services and poverty problems.		

#### 6.10.1.4 Decommissioning Phase Impacts

Typically, major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income and will be similar to the impacts during the construction phase. This has implications for the households who are directly affected, the communities within which they live, and the relevant local authorities. However, in the case of Gaetsewe Solar it is anticipated that the proposed facility will be refurbished and upgraded to prolong its life. No decommissioning of the facility is proposed.

### 6.10.2 Conclusion & Recommendations

There are some vulnerable communities within the project area that may be affected by the development of Gaetsewe Solar and its associated infrastructure. Traditionally, the construction phase of a PV solar development is associated with the majority of social impacts. Many of the social impacts are unavoidable and will take place to some extent, but can be managed through the careful planning and implementation of appropriate mitigation measures. A number of potential positive and negative social impacts have been identified for the project, however an assessment of the potential social impacts indicated that there are no perceived negative impacts that are sufficiently significant to allow them to be classified as “fatal flaws”.

Based on the social impact assessment, the following general conclusions and findings can be made:

- The potential negative social impacts associated with the construction phase are typical of construction related projects and not just focussed on the construction of solar PV projects (these relate to an influx of non-local workforce and jobseekers, intrusion and disturbance impacts (i.e. noise and dust, wear and tear on roads) and safety and security risks), and could be reduced with the implementation of the mitigation measures proposed. The significance of such impacts on the local communities can therefore be mitigated.

- The development will introduce employment opportunities during the construction phase (temporary employment) and a limited number of permanent employment opportunities during operation phase.
- The proposed project could assist the local economy in creating entrepreneurial growth and opportunities, especially if local business is involved in the provision of general material, goods and services during the construction and operational phases. This positive impact is likely to be compounded by the cumulative impact associated with the development of several other solar facilities within the surrounding area, and as a result of the project's location within an area which is characterised by high levels of solar irradiation and which is therefore well suited to the development of commercial solar energy facilities.
- The proposed development also represents an investment in infrastructure for the generation of non-polluting RE, and represents a positive social benefit for society as a whole.
- When considering Gaetsewe Solar, it is also important to consider the cumulative social impacts that may arise with other proposed solar PV projects in the area.
- It should be noted that the perceived benefits associated with the project, which include RE generation and local economic and social development, outweigh the perceived impacts associated with the project.

The proposed project and associated infrastructure is unlikely to result in permanent damaging social impacts. From a social perspective it is concluded that the project could be developed subject to the implementation of recommended mitigation measures and management actions identified for the project.

## 6.11 CUMULATIVE IMPACT ASSESSMENT

This section is summarised from the cumulative impact assessments that took place by each of the participating specialists. For further details in this regard, the reader is referred to the Specialist assessments contained in appendix E.

Where appropriate, certain specialists (particularly agriculture) did include a cumulative assessment of a much wider area than the accepted 30km radius

No potentially fatal flaws have been identified associated with cumulative impacts. The potentially most significant cumulative impact is deemed to be the failure to meet conservation targets as a result of all the developments combined. The ecology specialist rated this impact as a low negative (with local significance only). Kindly also refer to the specialist reports attached in Appendix E for the detailed cumulative impact assessments.

The 2014 EIA Regulations (GNR 326) define a cumulative impact as follows:

*“Cumulative impact in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.”*

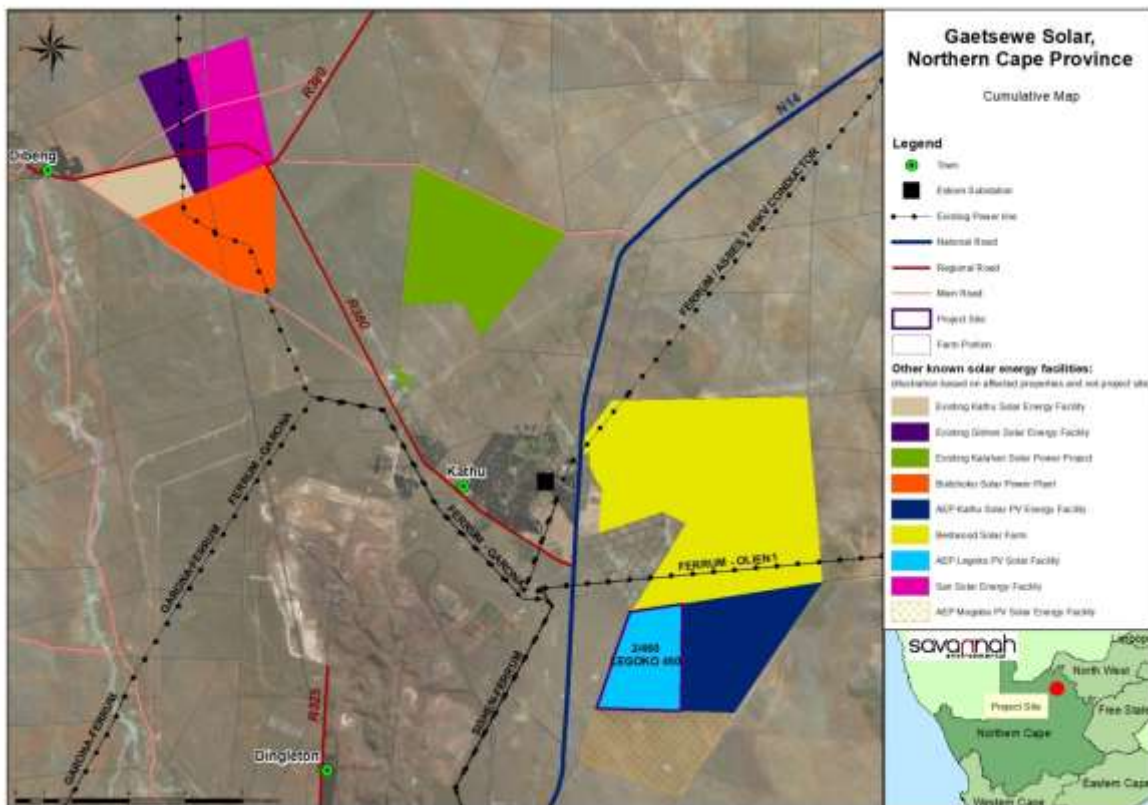
There are a number of other renewable energy facilities in the vicinity of the proposed Gaetsewe solar as detailed in the table below.

**Table 56:** Other solar energy projects / developments approved within proximity of Gaetsewe Solar (SIA, Savannah, 2018)

Project Name	Location	Approximate distance from the PV Facility development site	Project Status
Solar farm for Bestwood, Kgalagadi District Municipality, Northern Cape	Remaining extent of Farm Bestwood 459-RD	7km to the north	Received Environmental Authorisation (EA)
PV Solar facility on Farm	Portion 1 Farm Bestwood	Adjacent farm to the north	Received EA

Project Name	Location	Approximate distance from the PV Facility development site	Project Status
Bestwood 1/459	459		
AEP Kathu Solar facility	RE of Farm Legoko 460	Adjacent farm to the east	Received EA
AEP Mogobe Solar PV Energy Facility	Portion 1 of Farm Legoko 460	Adjacent farm to the south	Received EA
AEP Legoko Solar Facility	Portion 2 of the Farm 460 Legoko	Same farm; to the north	Received EA
100MW Kalahari Solar Power Project (CSP)	Portion 0 of farm Kathu 466	17.5km to the north west	Preferred Bidder (PB) Round 3.5: construction commenced in May 2016
75MW San Solar Energy Facility and Associated Infrastructure	Remaining extent of Farm Wincanton 472	26km to the north west	Received EA
75MW Sishen Solar Farm	Portion 6 of Wincanton 472	26.5km to north west	Preferred Bidder (PB) Round 2: in operation
75MW Kathu Solar Energy Facility	Portion 4 of the Farm Wincanton 472	26.5km to north west	Preferred Bidder (PB) Round 1: in operation
115 MW Boitshoko Solar Power Plant	Remaining Extent of Portion 1 of The Farm Lime Bank no. 471	18.5km to the north-west	Received EA

In addition to those listed above, an additional facility is proposed on the same site, known as Mogara Solar, a 75MW PV solar energy facility and associated infrastructure, proposed for development on Portion 1 and Portion 02 of the Farm Legoko No. 460, located adjacent to and immediately north of this project.



**Figure 30:** Cumulative map showing the location of other solar energy facilities within 30km of the project site (Savannah, 2018)

Potential cumulative impacts identified for the project include various negative impacts such as loss of habitat, visual massing, loss of agricultural land an influx jobseekers and change in the area's sense of place, but also include positive cumulative impacts on the economy, business development, and employment.

From an ecological perspective, Cumulative impacts associated with the development are a concern. However, the loss of the habitat within the preferred alternative is not considered highly significant, given the degraded nature of the site and the location and ecological context of the site. As a result, the overall cumulative impact of the development is considered likely to be low.

There are several existing PV projects in the Kathu area including the already built Kalahari Solar, Kathu Solar and Sishen Solar Farms. These cover an area of 950ha and are considered to form part of the existing baseline for the area and represent existing impacts to the area. The 950ha footprint of these is however small in comparison with the iron and manganese mines in the area, which with an existing footprint of at least 12 000ha are currently the major driver of habitat loss and transformation in the area. There are several authorised PV developments in close vicinity to the Gaetsewe site, including the Legoko Solar PV facility on the same property as the current development, the Kathu Solar PV facility immediately east of the site and the Mogobe Solar PV facility on the same property as the alternative site for the current development. These would result in approximately 700ha of habitat loss should they all go ahead. The density and extent of development in the area raises potential concern around cumulative impact in the area. However, the overall development pressure in the wider area is still low and the proximity of the current development and those on the adjacent properties to Kathu and active mining activity means that the site is not likely to be of high significance for landscape connectivity. In addition, the proximity of several other PV developments in the immediate area is seen as a positive aspect of the development as a relatively confined node of development in a relatively low sensitivity area is seen as preferable to scattered developments across a wider area which is likely to include less favourable habitats for development. The overall extent of cumulative impact due to all the solar energy development in the area is seen to be relatively low and currently stands at less than 0.2% of the extent of Kathu Bushveld. The additional unbuilt projects from the area would contribute even less than this and the potential contribution of the Gaetsewe Solar PV development at 212ha would represent about 0.03% of the extent of Kathu Bushveld and as such considered to have local significance only. In addition, it is important to note the degraded nature of the site and the comparatively low value of this area compared to better condition vegetation elsewhere in the area. The same rationale applies to the cumulative impacts on avifauna and provided that areas such as the Alternative 2 site are not subjected to future developments, the proposed development is expected to have a minimal cumulative impact on the local avifauna.

From an aquatic perspective, when considering any other potential projects within the adjacent / nearby farms the potential for changes to the surrounding aquatic habitat would not be significant especially during the operational phases (hard surfaces and stormwater management). It is however assumed that any such changes would be detrimental to the various projects owners, i.e. erode areas around panels. This coupled with the low mean annual run-off and with suitable stormwater management, the impacts could however be mitigated. The likelihood of any cumulative impacts listed in this report is especially low when considering that only a low percentage of projects will actually move into the construction phase.

From a social perspective the project is deemed to have a Medium positive cumulative impact from employment, skills and business opportunities and skills development and a Low negative cumulative impact from large-scale in-migration of people

From a visual perspective, the Cumulative visual risk to scenic resources was rated medium negative with little opportunity for mitigation due to the close proximity of the proposed site to the authorised Legoko, and the proposed Mogara, solar facilities. The combined views of the three solar facilities once constructed are likely to create a strong, local visual massing effect within the agriculturally zoned area. However, site visual resources are low, and with the proposed Gaetsewe site located on

low lying ground, the zone of visual influence will be contained. Retaining the bushveld vegetation around the proposed PV areas will retain the surrounding agricultural sense of place, and further localise the combined zone of visual influence. With successful rehabilitation of the area back to an agricultural land use on closure, the cumulative visual risk could be reduced to negligible in the long term.

## 6.12 IMPACT STATEMENT

None of the participating specialists identified any impacts that remain high after mitigation. Because of the risk adverse approach followed for the development of the preferred layout, all the main sensitive features, namely significant archaeological features, sensitive habitat features (most notably the pans and areas of high density of *Acacia erioloba*) were avoided. The interconnection powerline has also been aligned along existing servitudes and does not traverse any highly sensitive features.

From an ecological perspective the development footprint of the Alternative 1 Gaetsewe Solar PV facility is restricted largely to low sensitivity habitat within the site. The affected area is considered suitable for development and there are no impacts associated with the Gaetsewe Solar PV facility that cannot be mitigated to a low level. As such there are no fatal flaws or high post-mitigation impacts that should prevent the development from proceeding. Based on the layout provided for the assessment, the Gaetsewe Solar PV facility can be supported from a terrestrial ecology point of view. The Gaetsewe Solar grid connection with associated infrastructure is likely to generate low impacts on fauna and flora after mitigation. No high impacts that cannot be avoided were observed and from a flora and terrestrial fauna perspective, there are no reasons to oppose the development of the grid connections and associated infrastructure.

A map showing the proposed activity in relation to the key sensitive features is in attached in appendix D. All sensitive features along with their appropriate buffers are shown in this plan. As required by the EMPr, all areas outside of the proposed development footprint are to be demarcated as no go areas.

Please refer to the table below listing the key impacts and their significance post mitigation for the preferred alternative. This section must be read in conjunction with the suggested mitigation measures listed in section 7 of this Report.

**Table 57:** Impact Summary Table

Impact	Significance (Post Mitigation) and Status
Impacts on vegetation and listed or protected plant species resulting from construction activities of the PV Plant	Medium – Low (Negative)
Direct Faunal Impacts During Construction of the PV Plant	Low (Negative)
Soil Erosion Risk During Construction of the PV Plant	Low (Negative)
Alien Plant Invasion Risk During Operation of the PV Plant	Low (Negative)
Soil Erosion Risk During Operation of the PV Plant	Low (Negative)
Faunal impacts during operation of the PV Plant	Low (Negative)
Cumulative Impact on broad-scale ecological processes due to cumulative loss and fragmentation of habitat	Low (Negative)
Impacts on vegetation and listed or protected plant species resulting from construction activities of the Overhead powerline	Low(Negative)
Ecosystem degradation along the power line route due to erosion and alien plant invasion.	Low (Negative)
The possibility of permanent loss of high potential agricultural land and the impairment of land capability due to construction.	Low (Negative)
Veld conditions for grazing and the possible impact of vegetation removal during construction.	Medium (Negative)



Impact	Significance (Post Mitigation) and Status
The alteration of drainage patterns and its associated risk for erosion; due to the removal of vegetation during construction of the plant, the building of service and access roads if rehabilitation is not properly done in erosion-sensitive areas.	Low (Negative)
Changes in hydrological regimes	Very Low (Negative)
Impact on Avifaunal Priority Species	Medium – Low (Negative)
Impact on Avifaunal displacement	Low (Negative)
Avian Electrocutation Impact	Low (Negative)
Avian Collision Impact	Medium (Negative)
Overall Visual Impact	Low (Negative)
Impact on Archaeological Resources during construction	Low (Negative)
Impact on Archaeological resources during operation	Low (Negative)
Impact on Palaeontological Resources during construction	Low (Negative)
Impact on Palaeontological Resources during operation	Low (Negative)
Creation of employment and Business opportunities	Medium (Positive)
Impact of heavy machinery and construction activities	Low (Negative)
Loss of farmland	Low (Negative)
Loss of riparian systems	Low (Negative)
Impact on dry riverbeds and localised drainage systems	Low (Negative)
Impact on riparian systems through the possible increase in surface water runoff on riparian form and function	Low (Negative)
Increase in sedimentation and erosion within the development footprint	Low (Negative)
Creation of direct and indirect employment and skills development opportunities.	Medium (Positive)
Economic multiplier effects	Medium (Positive)
In-migration of people (non-local workforce and jobseekers).	Low (Negative)
Safety and security impacts	Low (Negative)
Impacts on daily living and movement patterns	Medium (Positive)
Nuisance impact (noise and dust)	Low (Negative)
Visual and sense of place impacts	Low (Negative)
Direct and indirect employment and skills development opportunities	Medium (Positive)
Development of non-polluting, renewable energy infrastructure	Medium (Positive)
Contribution to LED and social upliftment	High (Positive)
Visual and sense of place impacts	Low (Negative)
Impacts associated with the loss of agricultural land.	Low (Negative)

The table below shows the listed activities applied for with a reference of where the impacts associated with the specific activity are assessed by specialists.

**Table 58:** Specialist Impact Assessment of Listed Activities.

Listed activity as described in GN R.983, 984 and 985	Reference to Impact Assessment
<b>Regulation 983 – Basic Assessment</b>	
<b>GN R983 Activity 11:</b> <i>The development of facilities or infrastructure for the transmission and distribution of electricity-</i> (i) <i>outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or</i> (ii) <i>inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.</i>	Annexures E1, E2, E3, E4, E5, E7, E8, E12, E13 & E14.
<b>GN R983 Activity 12:</b> The development of- (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	Annexures E1, E8, E11 & E13
<b>GN R983 Activity 19:</b> <i>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic</i> (i) <i>a watercourse;</i>	Annexures E1, E8, E11 & E13
<b>Regulation 984 – Scoping and Environmental Impact Reporting</b>	
<b>GN R984 Activity 1:</b> The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs within an urban area.	Annexures E1, E2, E3, E4, E5, E7, E8, E10, E12, E13 & E14.
<b>GN R984 Activity 15:</b> The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	Annexures E1, E2, E3, E4, E5, E7, E8, E10, E12, E13 & E14.

## 7. MITIGATION MEASURES

Please refer to the table below, which summarises the mitigation measures recommended by both the Specialists and Cape EAPrac. This table summarises the mitigations, and details whether they should be included as conditions of approval, or whether they have been included as actions in the EMPr.

**Table 59:** Mitigation measures required for the construction, operation and decommissioning of the Gaetsewe Solar development.

Mitigation	Condition of Approval	Included in EMPr
<b>Ecology</b>		
Undertake preconstruction walk-through of the facility in order to locate species of conservation concern that can be translocated (such as aloes) as well as comply with the Northern Cape Nature Conservation Act and DENC/DAFF permit conditions.	X	

Mitigation	Condition of Approval	Included in EMPr
Vegetation clearing to commence only after walk through has been conducted and necessary permits obtained.	X	
Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.		X
Environmental Control Officer (ECO) to provide supervision and oversight of vegetation clearing activities within sensitive areas such as near the pans.	X	
Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared.		X
All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the construction area.		X
All personnel should undergo environmental induction with regards to fauna and, in particular, awareness about not harming or collecting species such as snakes, tortoises and owls, which are often persecuted out of superstition.		X
Any fauna threatened by the construction activities should be removed to safety by the ECO or appropriately qualified environmental officer.		X
All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.		X
All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.		X
If trenches need to be dug for water pipelines or electrical cabling, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are standing open should have places where there are soil ramps allowing fauna to escape the trench.		X
Temporary lay-down areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use.	X	
All personnel should undergo environmental induction with regards to fauna and, in particular, awareness about not harming or collecting species such as snakes, tortoises and owls, which are often persecuted out of superstition.		X
Any fauna threatened by the construction activities should be removed to safety by the ECO or appropriately qualified environmental officer.		X
The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas		X
An open space management plan should be developed for the site, which should include management of biodiversity within the fenced area, as well as that in the adjacent rangeland.		X
<b>AVIFAUNAL</b>		
Avoid the high sensitivity portions of the site as indicated in the sensitivity map, such as the pans, dense <i>Acacia erioloba</i> woodland and any raptor nests that may be discovered prior to or during construction. The destruction of habitat during construction should also be strictly contained within the development footprint.		X
The use of lay-down areas within the footprint of the development should be used where feasible, to avoid habitat loss and disturbance to adjoining areas.		X
All building waste produced during the construction phase should be removed from the development site and be disposed of at a designated waste management facility. Similarly, all liquid wastes should be contained in appropriately sealed vessels/ponds within the footprint of the development, and be disposed of at a designated waste management facility after use. Any liquid and chemical spills should be dealt with accordingly to avoid contamination of the environment.		X
Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to, and awareness about not harming or hunting ground-dwelling species (e.g. bustards, korhaans, thick-knees and coursers), and owls, which are often persecuted out of superstition.		X

Mitigation	Condition of Approval	Included in EMPr
This induction should also include awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.		X
All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such nocturnal and crepuscular species (e.g. nightjars, thick-knees and owls) which sometimes forage or rest along roads.		X
Sensitive microhabitats should be avoided, such as nesting sites during the breeding season of large terrestrial birds (generally summer; Hockey et al., 2005).		X
Any avifauna threatened by the construction activities should be removed to safety by the ECO or appropriately qualified environmental officer		X
If holes or trenches need to be dug, these should not be left open for extended periods of time as ground-dwelling avifauna or their flightless young may fall in and become trapped in them. Holes should only be dug when they are required and should be used and filled shortly thereafter.		X
No construction activity should occur near to active raptor nests should these be discovered prior to or during the construction phase. If there are active nests near construction areas, these should be reported to ECO and should be monitored until the birds have finished nesting and the fledglings left the nest.		X
If the site must be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs), which do not attract insects. The use of lighting at night should be kept to a minimum, so as not to unnecessarily attract invertebrates to the solar facility and possibly their avian predators, and to minimise disturbance to birds flying over the facility at night.		X
All incidents of collision with panels should be recorded as meticulously as possible, including data related to the species involved, the exact location of collisions within the facility, and suspected cause of death. Post-construction monitoring with the aid of video surveillance should be considered, as this will contribute towards understanding bird interactions with solar panels.		X
If birds are nesting on the infrastructure of the facility and cannot be tolerated due to operational risks of fire, electrical shorts, soiling of panels or other concerns, birds should be prevented from accessing nesting sites by using mesh or other manner of excluding them. Birds should not be shot, poisoned or harmed as this is not an effective control method and has negative ecological consequences. Birds that already have eggs or nestlings should be allowed to fledge their young before nests are removed. If there are any persistent problems with avifauna, then an avifaunal specialist should be consulted for advice on further mitigation.		X
All food waste and litter at the site should be placed in bins with lids and removed from the site on a regular basis.		X
During decommissioning, all above-ground infrastructure should be removed from the site. Below-ground infrastructure such as cabling can be left in place if it does not pose a risk, as removal of such cables may generate additional disturbance and impact, however, this should be in accordance with the facilities' decommissioning and recycling plan, and as per the agreements with the land owners concerned.		X
During decommissioning, rehabilitation and revegetation of the site in accordance with a site-specific revegetation and rehabilitation plan, with follow-up monitoring to ensure compliance and adequate achievement of revegetation targets.		X
The design and layout of any proposed power lines must be endorsed by members of the Eskom-EWT Strategic Partnership, taking into account the mitigation guidelines recommended by Birdlife South Africa (Smit, 2012; Jenkins et al., 2017).	X	
The route that the power line will follow should be the shortest distance possible across an area where collisions are expected to be minimal, or follow existing power lines, and be marked with bird diverters to make the lines as visible as possible to collision-susceptible species. Recommended bird diverters such as brightly coloured 'aviation' balls, thickened wire spirals, or flapping devices that increase the visibility of the lines should be fitted were considered necessary.		X
Regular monitoring of power lines should be undertaken to detect bird carcasses, to enable the identification of any areas of high impact to be marked with bird diverters.		X

Mitigation	Condition of Approval	Included in EMPr
Only power lines structures that are considered safe for birds should be erected to avoid the electrocutions of birds (particularly large raptors) perching or attempting to perch. Where necessary, deterrent devices such as bird guards should be mounted on relevant parts of the pylons to further reduce the possibility of electrocutions.	X	
Regular monitoring of the power line should be undertaken to detect bird carcasses, to enable the identification of any areas of high impact where additional mitigation such as fitting bird diverters may be required. This should occur at least monthly for the first year after construction	X	
Any raptors or other birds nesting on the power line structures should not be disturbed while the birds are breeding. If species such as sociable weavers are present, which are making the line unsafe, then these nests should be regularly removed before breeding can commence. Measures should also be put in place to prevent birds persistently nesting in problem areas by using artificial nesting platforms and perches positioned away from live components.		X
The facility should be fenced off in a manner which allows small fauna to pass through the facility, but that does not result in ground-dwelling avifauna (e.g. bustards, korhaan, francolin, thick-knees) being trapped and electrocuted along the boundary fences (Visser, 2016). In practical terms this means that the facility should be fenced-off to include only the developed areas and should include as little undeveloped ground or natural veld as possible. In addition, there should not be electrified ground-strands present within 30cm of the ground and the electrified strands should be located on the inside of the fence and not the outside. Furthermore, the fence should be a single layer fence and not a double fence with a large gap between. Images of suitable fencing types from existing PV facilities are available on request.		X
<b>AGRICULTURE</b>		
The EPC contractor must investigate the use of livestock grazing via an electrified camp system to reduce biomass under the panels.		
The EPC contractor to investigate the establishment of high density feeding outside of the PV footprint.		X
Refuelling normally takes place in the laydown area. Proactive measures must be taken which include constructing a designated area where refuelling can take place. This area must have an impervious floor with low wall that will keep the spillage inside. This area should be cleaned with absorbent material on a regular basis. The use of cut-off drains must be incorporated to divert upslope clean storm water around the site into a natural drainage system. On the down slope, polluted water must be collected via a cut-off drain into a leachate collection and recovery system. When spillage accidentally takes place, it should be removed and replaced with unpolluted soil. The clean soil can be sourced from excavations nearby. The polluted soil must be piled at a temporary storage facility with a firm waterproof base and is protected from inflow of storm water. It must have an effective drainage system to a waterproof spillage collection area. Contaminated soil must be disposed of at a hazardous waste storage facility.		X
Brush cut only to clear Camphor bush leaving topsoil un-disturbed. Use mechanised machinery when installing posts to eliminate need for foundations. Construct on alternate strips to combat possible erosion.		
Refuelling normally takes place in the workshop of the control building. A designated area for refuelling must be constructed with an impervious floor and low wall that will keep the spillage inside. Any spillage must be cleaned with absorbent material as soon as possible and disposed into clearly marked containers. Where spillage takes place, contaminated soil must be excavated and replaced with unpolluted soil. The contaminated soil should be collected by a licenced landfill contractor.		
The general objective is to position the PV facilities on the lowest potential soil and not in places that may have impact on agricultural activities, drainage lines and places with a sensitive nature. Existing road alignments are followed and roads upgraded for use during the live span of facility. With the appropriate planning, the same live style can be achieved during the lease period of the facility from the land so occupied by the facility.		X

Mitigation	Condition of Approval	Included in EMPr
<b>ARCHAEOLOGY</b>		
Archaeological resources identified during this study do not require further recording/studies, and because they are considered to be of low heritage value and have been adequately recorded through this assessment, it is suggested that they can be disturbed or damaged without a permit from SAHRA.		X
In the event that excavations and earthmoving activities expose significant archaeological or heritage resources, such activities must stop and SAHRA must be notified immediately.	X	
If exposed during development, archaeological resources must be dealt with in accordance with the National Heritage Resources Act (No. 25 of 1999) and at the expense of the developer.	X	
In the event of exposing human remains during construction, the matter will fall into the domain of the South African Heritage Resources Agency and will require a professional archaeologist to undertake mitigation if needed. Such work will also be at the expense of the developer	X	
<b>PALAEONTOLOGY</b>		
The ECO and / or the Site Engineer responsible for the development must remain aware that all sedimentary deposits have the potential to contain fossils and he / she should thus monitor all substantial excavations into sedimentary bedrock for fossil remains. If any substantial fossil remains (e.g. vertebrate bones, teeth, horn cores) are found during construction SAHRA should be notified immediately (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that appropriate mitigation (i.e. recording, sampling or collection) by a palaeontological specialist can be considered and implemented, at the developer's expense	X	
A chance-find procedure should be implemented so that, in the event of fossils being uncovered, the ECO / Site Engineer will take the appropriate action, which includes: Stopping work in the immediate vicinity and fencing off the area with tape to prevent further access; Reporting the discovery to the provincial heritage agency and/or SAHRA; Appointing a palaeontological specialist to inspect, record and (if warranted) sample or collect the fossil remains; Implementing any further mitigation measures proposed by the palaeontologist; and - Allowing work to resume only once clearance is given in writing by the relevant authorities.		X
<b>VISUAL</b>		
<b>During Construction – PV Facility</b>		
Bushveld trees surrounding the proposed PV sites should be retained for visual screening.	X	
The laydown area should be sited away from the N14.		X
Topsoil from the footprints of the road and structures should be dealt with in accordance with EMP.		X
The buildings should be painted a grey-brown colour		X
Fencing should be simple, diamond shaped (to catch wind-blown litter) and appear transparent from a distance. The fences should be checked on a monthly basis for the collection of litter caught on the fence.		X
Signage on the N14 should be moderated.		X
Lights at night have the potential to significantly increase the visual exposure of the proposed project. It is recommended that mitigations be implemented to reduce light spillage (refer to appendix for general guidelines).		X
<b>During Operation – PV Facility</b>		
Control of lights at night to allow only local disturbance to the current dark sky night landscape (refer to appendix for general guidelines).		X
Continued erosion control and management of dust.		X
<b>During Decommissioning – PV Facility</b>		

Mitigation	Condition of Approval	Included in EMPr
All structures should be removed and where possible, recycled		X
Building structures should be broken down (including foundations)		X
The rubble should be managed according to NEMWA and deposited at a registered landfill if it cannot be recycled or reused.		X
All compacted areas should be rehabilitated according to a rehabilitation specialist		
Monitoring for soil erosion should be undertaken on a routine basis		
<b>During Construction – Access Road</b>		
The laydown area should be sited away from the N14.		X
If very dry conditions prevail and dust becomes a nuisance, dust suppression measures need to be implemented.		X
Topsoil from the footprints of the road and structures should be dealt with in accordance with the EMP.		X
Construction should preferably not take place at night-time.		X
If very dry conditions prevail and dust becomes a nuisance, dust suppression measures need to be implemented.		X
<b>During Decommissioning Access Road</b>		
If very dry conditions prevail and dust becomes a nuisance, dust suppression measures need to be implemented.		X
Unless required for on-going farm utilisation, all compacted areas should be rehabilitated according to a rehabilitation specialist recommendations		X
Monitoring for soil erosion should be undertaken on an annual basis until the impacted areas have been successfully rehabilitated.		X
<b>During Planning and Construction of the Grid connection</b>		
Integration planning with Eskom if required.		X
Strict access control to a single track along the route making use of existing farm tracks for access from the road where possible.		X
Soil erosion management to be implemented where required.		X
Strict litter control.		X
On-going erosion control monitoring by the ECO		X
<b>During Decommissioning of the Grid Connection</b>		
Removal of all structures and recycling of the structure and cables.		X
Removal of any foundations and filling of holes created and shaped to appear natural		X
Rehabilitation and restoration of the footprint and track according to a rehabilitation specialist recommendations.		X
<b>FRESHWATER</b>		
Any stormwater within the site must be handled in a suitable manner, i.e. separate clean and dirty water streams around the plant, and install stilling basins to capture large volumes of run-off, trap sediments and reduce flow velocities.		X
Any stormwater within the site must be handled in a suitable manner and install stilling basins to capture large volumes of run-off, trap sediments and reduce flow velocities (e.g. water used when washing the panels)		
The proposed layout has been developed to avoid any wetlands. Care should however be taken when any clearing is done, that this area is monitored for plant re-growth, firstly to prevent alien plant infestations and to ensure no erosion or scour takes place.		X
<b>SOCIAL</b>		
A local employment policy should be adopted to maximise opportunities made available to the local labour force.		X
Labour should be sourced from the local labour pool, and only if the necessary skills are unavailable should labour be sourced from (in order of preference) the greater Gamagara LM, John Taolo Gaetsewe DM, Northern Cape Province, South Africa, or elsewhere.		X
Where feasible, training and skills development programmes should be initiated prior to the commencement of the construction phase.		X
As far as possible local contractors that are compliant with Broad-Based Black Economic Empowerment (B-BBEE) criteria should be used.		X

Mitigation	Condition of Approval	Included in EMPr
The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.		X
A database of local companies, specifically Historically Disadvantaged Individuals (HDIs) which qualify as potential service providers (e.g. construction companies, security companies, catering companies, waste collection companies, transportation companies etc.) should be created and companies listed thereon should be invited to bid for project-related work where applicable.		X
Local procurement is encouraged along with engagement with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods and products from local suppliers where feasible.		X
Develop and implement a local procurement policy which prioritises "locals first" to prevent the movement of people into the area in search of work.		X
Engage with local community representatives prior to construction to facilitate the adoption of the locals first procurement policy.		X
Provide transportation for workers (from Kathu and surrounds) to ensure workers can easily access their place of employment and do not need to move closer to the project site.		X
Working hours should be kept between daylight hours during the construction phase, and / or as any deviation that is approved by the relevant authorities.		X
Compile and implement a grievance mechanism.		X
Appoint a Community Liaison Officer (CLO) to assist with the procurement of local labour.		X
Prevent the recruitment of workers at the project site.		X
Implement a method of communication whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.		X
Establish clear rules and regulations for access to the proposed site.		X
Appoint a security company and implement appropriate security procedures to ensure that workers do not remain onsite after working hours.		X
Inform local community organisations and policing forums of construction times and the duration of the construction phase.		X
Establish procedures for the control and removal of loiterers from the construction site.		X
Working hours should be kept within daylight hours during the construction phase, and / or as any deviation that is approved by the relevant authorities.		X
Provide transportation for workers to prevent loitering within or near the project site outside of working hours.		X
The perimeter of the construction site should be appropriately secured to prevent any unauthorised access to the site. The fencing of the site should be maintained throughout the construction period.		X
The appointed EPC Contractor must appoint a security company to ensure appropriate security procedures and measures are implemented.		X
Access in and out of the construction site should be strictly controlled by a security company appointed to the project.		X
A CLO should be appointed as a grievance mechanism. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.		X
The EPC Contractor should implement a stakeholder management plan to address neighbouring farmer concerns regarding safety and security.		X
The project proposed must prepare and implement a FMP; this must be done in conjunction with surrounding landowners.		X
Communication, complaints and grievance channels must be implemented and contact details of the CLO must be provided to the local community in the study area.		X
The EPC Contractor must prepare a Method Statement which deals with fire prevention and management.		X
The movement of heavy vehicles associated with the construction phase should be		X



Mitigation	Condition of Approval	Included in EMPr
timed to avoid weekends, public holidays and holiday periods where feasible.		
A CLO should be appointed. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.		X
It is recommended that local employment policy is adopted to maximise the opportunities made available to the local community.		X
A CNA must be conducted to ensure that the LED and social upliftment programmes proposed by the project are meaningful. Ongoing communication and reporting is required to ensure that maximum benefit is obtained from the programmes identified, and to prevent the possibility for such programmes to be misused. The programmes should be reviewed on an ongoing basis to ensure that they are best suited to the needs of the community at the time (bearing in mind that these are likely to change over time).		X
The establishment of a number of solar power projects under the REIPPP Programme in the area has the potential to have a positive cumulative impact on the area in the form of employment opportunities, skills development and business opportunities. The positive benefits will be enhanced if local employment policies are adopted and local services providers are utilised by the developers to maximise the project opportunities available to the local community.		X

## 8. PLANNING CONTEXT

A Planning specialist was appointed in order to consider the planning implications of the proposed facility. The results of the findings of the planning specialist will be presented in the EIR. The following key components will likely take place from a planning perspective.

- A **land use change application** for the rezoning of approximately 212ha, from **Agricultural Zone I to Special Zone**, will be lodged at the Gamagara Local Municipality, in accordance with the Northern Cape Planning and Development Act (Act 7 of 1998).
- If there are restrictive Title Deed conditions burdening the proposed development, an application for the removal thereof will be lodged at the Government of the Northern Cape Province, Department: Corporate Governance and Traditional Affairs, in accordance with the Removal of Title Deed Restriction Act (Act 84 of 1967).
- Parallel to the rezoning application, a **long term lease application will be lodged at the National Department of Agriculture**, in accordance with the Subdivision of Agricultural Land Act (Act 70 of 1970).
- Relevant planning documents, on all spheres of Government, will be evaluated before any land use change application is launched. These documents include, but are not limited to the following: **NSDP** (National Spatial Development Perspective); **PGDS NC** (Provincial Growth and Development Strategy), Northern Cape Province; **IDP** (Integrated Development Plan); **SDF** (Spatial Development Framework).

The planning specialist will furthermore likely engage with the following authorities as part of the planning process. Where relevant, these authorities will also be engaged with as part of the Environmental Process and will be given an opportunity to provide input and comment on this

- **Gamagara Municipality** for approval in terms of the relevant Zoning Scheme;
- Northern Cape Department of Agriculture as well as the National Department of Agriculture, Forestry & Fisheries (DAFF) for approval in terms of Act 70 of 70 (SALA) and Act 43 of 83(CARA);
- **District Roads Engineer** for comment on the land use application;

- **Department of Water and Sanitation (DWS)** for comment in terms of the National Water Act and the land use application;
- **Department of Mineral Resources** for approval in terms of Section 53 of Act 28 of 2002;
- **Department of Transport & Public Works** for comment on the land use application;
- **South African Heritage Resource (SAHRA)** Agency for comment on the land use application;
- **Civil Aviation Authority** for comment on the land use application;
- **Eskom Northern Cape** for comment on the land use application; and
- **Northern Cape Nature Conservation** for comment on the land use application.

## 9. PUBLIC PARTICIPATION PROCESS TO DATE

Section 41 in Chapter 6 of regulation 982 details the public participation process that has to take place as part of an environmental process. The table below provides a quick reference to show how this environmental process has or intends to comply with these legislated requirements relating to public participation.

**Table 60:** Public participation requirements in terms of S41 of R982

Regulated Requirement	Description
(1) If the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land. (2) Subregulation (1) does not apply in respect of- (a) linear activities;	Proof of landowner consent for the PV facility is attached in <b>Annexure G2</b> .  The proposed grid connection is deemed to constitute a linear activity and as such not required to obtain landowner consent.
The person conducting a public participation process must take into account any relevant guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of an application or proposed application which is subjected to public participation by -	
(a) fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of - (i) the site where the activity to which the application or proposed application relates is or is to be undertaken; and (ii) any alternative site;	A site notice was placed along the N14 at the access road as well as at the entrance to both properties.  Photographic evidence of these notices is attached in <b>Annexure F3</b> .
(b) giving written notice, in any of the manners provided for in section 47D of the Act, to -	
(i) the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;	The tenants at the existing dwelling on the property were personally visited by the EAP and a notification letter provided to them.
(ii) owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;	Owners of adjacent properties have been notified of this environmental process. Such owners have been requested to inform the occupiers of the land of this environmental process. Please refer to <b>Annexure F4</b> for copies of these notifications
(iii) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;	The ward councillor has been notified of this environmental process.  Please refer to <b>Annexure F4</b> for copies of these notifications
(iv) the municipality which has jurisdiction in the area;	The Gamagara municipality has been notified of this environmental process.

Regulated Requirement	Description
	Please refer to <b>Annexure F4</b> for copies of these notifications.
(v) any organ of state having jurisdiction in respect of any aspect of the activity; and	Please refer to section 19.1 below showing the list of organs of state that were notified as part of this environmental process. Please refer to <b>Annexure F4</b> for copies of these notifications.
(vi) any other party as required by the competent authority;	DEA will be given an opportunity to comment on the pre application scoping report and any other requirements highlighted by them will be complied with.
(c) placing an advertisement in - (i) one local newspaper; or (ii) any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;	An advert was placed in the Kathu Gazette. Please refer to <b>Annexure F3</b> for a copy of this advertisement. There is currently no official Gazette that has been published specifically for the purpose of providing public notice of applications
(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii);and	Adverts were not placed in provincial or national newspapers, as the potential impacts will not extend beyond the borders of the municipal area.
(e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to - (i) illiteracy; (ii) disability; or (iii) any other disadvantage.	Notifications have included provision for alternative engagement in the event of illiteracy, disability or any other disadvantage. In such instances, Cape EAPrac will engage with such individuals in such a manner as agreed on with the competent authority.
(3) A notice, notice board or advertisement referred to in subregulation (2) must - (a) give details of the application or proposed application which is subjected to public participation; and (b) state - (i) whether basic assessment or S&EIR procedures are being applied to the application; (ii) the nature and location of the activity to which the application relates; (iii) where further information on the application or proposed application can be obtained; and (iv) the manner in which and the person to whom representations in respect of the application or proposed application may be made.	Please refer to <b>Annexure F3</b> .
(4) A notice board referred to in subregulation (2) must - (a) be of a size at least 60cm by 42cm; and (b) display the required information in lettering and in a format as may be determined by the competent authority.	Please refer to <b>Annexure F3</b> .
(5) Where public participation is conducted in terms of this regulation for an application or proposed application, subregulation (2)(a), (b), (c) and (d) need not be complied with again during the additional public participation process contemplated in regulations 19(1)(b) or 23(1)(b) or the public participation process contemplated in regulation 21(2)(d), on condition that - (a) such process has been preceded by a public participation process which included compliance with	This will be complied with if final reports are produced later on in the environmental process.

Regulated Requirement	Description
subregulation (2)(a), (b), (c) and (d); and (b) written notice is given to registered interested and affected parties regarding where the - (i) revised basic assessment report or, EMPr or closure plan, as contemplated in regulation 19(1)(b); (ii) revised environmental impact report or EMPr as contemplated in regulation 23(1)(b); or (iii) environmental impact report and EMPr as contemplated in regulation 21(2)(d); may be obtained, the manner in which and the person to whom representations on these reports or plans may be made and the date on which such representations are due.	
(6) When complying with this regulation, the person conducting the public participation process must ensure that - (a) information containing all relevant facts in respect of the application or proposed application is made available to potential interested and affected parties; and (b) participation by potential or registered interested and affected parties is facilitated in such a manner that all potential or registered interested and affected parties are provided with a reasonable opportunity to comment on the application or proposed application. (7) Where an environmental authorisation is required in terms of these Regulations and an authorisation, permit or licence is required in terms of a specific environmental management Act, the public participation process contemplated in this Chapter may be combined with any public participation processes prescribed in terms of a specific environmental management Act, on condition that all relevant authorities agree to such combination of processes.	All reports that are submitted to the competent authority will be subject to a public participation process. These include: <ul style="list-style-type: none"> <li>- Pre Scoping Report</li> <li>- Scoping Report</li> <li>- Plan of Study for Environmental Impact Report</li> <li>- Environmental Impact Report</li> <li>- Environmental Management Plan</li> <li>- All specialist reports that form part of this environmental process.</li> </ul>

## 9.1 REGISTRATION OF KEY STAKEHOLDERS

A number of key stakeholders were automatically registered and were given an opportunity to comment on the Draft Scoping Report. Copies and proof of these notifications are included in **Appendix F**. A list of key stakeholders registered for this process included in the table below.

**Table 61:** Key Stakeholders automatically registered as part of the Environmental Process

Stakeholders Registered		
Neighbouring property owners	Department of Environmental Affairs and Nature Conservation	Department of Water Affairs
Gamagara Municipality: Municipal Manager	South African National Parks	Department of Science and Technology
Gamagara Municipality: Ward Councillors	South African National Roads Agency Limited	The Council for Scientific and Industrial Research
South African Heritage Resources Agency	Department of Transport and Public Works	The South African Square Kilometre Array
Northern Cape Heritage Resources Authority	Department of Health	The South African Civil Aviation Authority
Department of Agriculture, Forestry and Fisheries	Department of Minerals and Energy	Department of Science and Technology
Provincial Department of Agriculture	Eskom	Department of Communications
Gamagara Municipality Ward councillors	Department of Mineral Resources	SENTECH
Department of Environmental Affairs,	Birdlife Africa.	Endangered Wildlife Trust.

Stakeholders Registered		
Biodiversity Directorate.		

## 9.2 AVAILABILITY OF PRE APPLICATION SCOPING REPORT

Automatically registered I&AP's were notified of the availability of the Pre Application Scoping Report for review and comment. A digital copy of the report was placed on the Cape EAPrac website. In order to facilitate effective comment, all State Departments and key stakeholders have been provided with digital copies of the report on CD.

The pre application scoping report was made available for a 30 day comment period extending from **13 June 2018 – 16 July 2018**. Copies of the report were available at the following locations:

- Cape EAPrac Website: [www.cape-eaprac.co.za](http://www.cape-eaprac.co.za)
- Kathu Library at 1 Hendrik van Eck Rd, Kathu; and

In order to facilitate effective comment amongst stakeholders, all key stakeholders, State Departments and Organs of State were provided with a copy of the Scoping report on CD.

## 9.3 COMMENTS AND RESPONSES ON PRE APPLICATION SCOPING REPORT

During the comment period on the pre application Draft Scoping Report, only 3 comments were received from the following parties:

- John Geeringh (ESKOM) – Mr Geeringh confirmed that Eskom would provide the applicant with future plans for transmission and distribution around the Sekgame switching station. Once the applicant receives these, the impact of these on the proposed connection to the Sekgame switching station will be considered.
- Ephron Maradwa (Department of Environmental Affairs) – Mr Maradwa confirmed receipt of the pre application draft scoping reports, but confirmed that they would only be processed once an application is submitted.
- Ms Rene de Kock (SANRAL) – Ms de Kock reiterated the previous comments submitted for the AEP Kathu and the AEP Legoko Solar developments and confirmed that SANRAL may require an upgrade of the N14 / R380 intersection.

All comments received on this pre application scoping report were, responded to and are included in the this scoping report.

## 9.4 AVAILABILITY OF SCOPING REPORT

Registered I&AP's were given a further opportunity to review and comment on this scoping report.

The scoping report was available for a further 30 day comment period extending from 27 July 2018 – 27 August 2018. All comments received on this scoping report have been included in this Final Scoping Report which is herewith submitted to DEA for decision making.

Copies of the report were available at the following locations:

- Cape EAPrac Website: [www.cape-eaprac.co.za](http://www.cape-eaprac.co.za)
- Kathu Library at 1 Hendrik van Eck Rd, Kathu; and

In order to facilitate effective comment amongst stakeholders, all key stakeholders, State Departments and Organs of State were provided with a copy of the Scoping report on CD.

## 9.5 COMMENTS ON SCOPING REPORT.

During the per comment period on the Scoping report, only a single additional comment was received from the DEA. The response to this comment is included in the table at the front of this report (pg vi).

There were a number of comments that were received outside of the formal comment period, and these are also included in this section. Additional comments were received from:

- The Department of Mineral Resources;
- Gamagara Municipality (confirmation of availability of services)
- Department of Rural Development and Land Reform (Confirmation of no land claims)

Copies of all comments received in this regard are included in appendix F

## 9.6 AVAILABILITY OF DRAFT ENVIRONMENTAL IMPACT REPORT

Registered I&AP's are given a further opportunity to review and comment on this Draft Environmental Impact.

The draft Environmental Impact Report is available for a further 30 day comment period extending from 04 December 2018 – 25 January 2019. All comments received during this period will be included in the Final Environmental Impact Report to be submitted to DEA for decision making.

Copies of the report are available at the following locations:

- Cape EAPrac Website: [www.cape-eaprac.co.za](http://www.cape-eaprac.co.za)
- Kathu Library at 1 Hendrik van Eck Rd, Kathu; and

In order to facilitate effective comment amongst stakeholders, all key stakeholders, State Departments and Organs of State were provided with a copy of the Scoping report on CD.

## 10. CONCLUSION & RECOMMENDATIONS

This environmental process is currently being undertaken to present proposals to the public and potential Interested & Affected Parties and to identify and assess environmental impacts, issues and concerns raised as a result of the proposed development alternatives.

This will allow Interested & Affected Parties (I&APs), authorities, the project team, as well as specialists to provide input and raise issues and concerns, based on baseline / scoping studies undertaken. The Gaetsewe Solar PV Energy Facility has been analysed from Ecological, Avifaunal, Agricultural Potential, Heritage (including Archaeology and Palaeontology), Freshwater, Social and Visual perspectives, and site constraints and potential impacts identified.

*Cape EAPrac* is of the opinion that the information contained in this Impact Report and the documentation attached hereto is sufficient to allow the competent authority to apply their minds to the potential negative and/or positive impacts associated with the development, in respect of the activities applied for. This environmental process has not identified any fatal flaws with the proposal and as such it is our reasoned view that the project should proceed to the next phase of the environmental process. All specialists concur that the development as proposed (Layout Alternative 1) can be considered for approval and that there are no reason(s) why the development should not be implemented. All impacts range from high positive to medium negative and all highly negative impacts have been avoided by the risk adverse approach to the development of this facility.

All stakeholders are requested to review this Environmental Impact and the associated appendices, and provide comment, or raise issues of concern, directly to *Cape EAPrac* within the specified 30-day comment period.

It is the recommendation of this office that the development proposal, Layout Alternative 1, be considered for approval by the competent Authority on condition that all other legislative approvals be obtained, and that the final EMPr be adhered to.

## **10.1 REMAINDER OF ENVIRONMENTAL PROCESS.**

The following process is to be followed for the remainder of the environmental process:

- This Draft EIR is to be made available for public review and comment period of 30-days;
- The Final EIR will be submitted to the DEA for consideration and decision-making;
- The DEA's decision (Environmental Authorisation) on the FEIR will be communicated with all registered I&APs.

## 11. ABBREVIATIONS

AIA	Archaeological Impact Assessment
BGIS LUDS	Biodiversity Geographic Information System Land Use Decision Support
CBA	Critical Biodiversity Area
CDSM	Chief Directorate Surveys and Mapping
CEMPr	Construction Environmental Management Programme
DEA	Department of Environmental Affairs
DEA&NC	Department of Environmental Affairs and Nature Conservation
DME	Department of Minerals and Energy
EAP	Environmental Impact Practitioner
EHS	Environmental, Health & Safety
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESA	Ecological Support Area
GPS	Global Positioning System
GWh	Giga Watt hour
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
kV	Kilo Volt
LUDS	Land Use Decision Support
LUPO	Land Use Planning Ordinance
MW	Mega Watt
NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act



NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NPAES	National Protected Area Expansion Strategy
NSBA	National Spatial Biodiversity Assessment
NWA	National Water Act
PM	Post Meridiem; "Afternoon"
PSDF	Provincial Spatial Development Framework
S.A.	South Africa
SACAA / CAA	South African Civil Aviation Authority
SAHRA	South African National Heritage Resources Agency
SANBI	South Africa National Biodiversity Institute
SANS	South Africa National Standards
SDF	Spatial Development Framework
TOPS	Threatened and Protected Species

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