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FINAL SCOPING REPORT

for

AEP KATHU SOLAR PV ENERGY FACILITY

on

Remainder of the Farm 460 Legoko, Kathu, Northern Cape

In terms of the

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

Prepared for Applicant: AEP Kathu Solar (Pty) Ltd.

By: *Cape EAPrac*

Report Reference: GAM391/05

DEA Reference: 14/12/16/3/3/2/911

Case Officer: Nonhlahla Mkhwanazi

Date: 6 April 2016

APPOINTED ENVIRONMENTAL ASSESSMENT PRACTITIONER:

***Cape EAPrac* Environmental Assessment Practitioners**

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Report written & compiled by: **Dale Holder** (Ndip Nat Con), who has 12 years' experience as an environmental practitioner.

PURPOSE OF THIS REPORT:

DEA Decision Making

APPLICANT:

AEP Kathu Solar (Pty) Ltd.

CAPE EAPRAC REFERENCE NO:

GAM391/05

DEPARTMENT REFERENCE:

To be allocated

SUBMISSION DATE

06 April 2016

FINAL SCOPING REPORT

in terms of the

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

AEP Kathu Solar Energy Facility

Remainder of the farm 460 Legoko, Northern Cape

Submitted for:

Departmental Review

Report Issued by:

Cape Environmental Assessment Practitioners

Tel: 044 874 0365
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PO Box 2070
5 Progress Street
George 6530

REPORT DETAILS

Title:	**SCOPING REPORT** **For AEP Kathu Solar PV Energy Facility**
Purpose of this report:	This Final Scoping Report forms part of a series of reports and information sources that are being provided during the Environmental Impact Assessment (EIA) for the proposed AEP Kathu Solar PV Energy Facility in the Northern Cape Province. In accordance with the regulations, the objectives of a scoping process is to, through a consultative process: (a) identify the relevant policies and legislation relevant to the activity; (b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location; (c) identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process; (d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment; (e) identify the key issues to be addressed in the assessment phase; (f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and (g) identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored. The Pre Application Draft Scoping Report (pre-application) was available to all stakeholders for a 30 day review & comment period, **24 November 2015 – 15 December 2015.** After completion of this period, an application form was submitted and the Scoping Report was made available to interested and affected parties for a further period of 30 days extending **19 February 2016 – 22 March 2016**. This final scoping incorporates comments received during both comment periods referred to above.
Prepared for:	AEP Kathu Solar (Pty) Ltd
Published by:	*Cape Environmental Assessment Practitioners (Pty) Ltd. (Cape EAPrac)*
Authors:	Mr Dale Holder
Reviewed by:	Ms Melissa Mackay
Cape EAPrac Ref:	GAM391/05
DEA Case officer & Ref. No:	Ms Nonhlahla Mkhwanazi 14/12/16/3/3/2/911

Date:	06 April 2016
To be cited as:	*Cape EAPrac,* 2016. Final Scoping Report for the proposed AEP Kathu Solar PV Energy Facility. Report Reference: GAM391/05. 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	AEP Kathu Solar (Pty) Ltd is a renewable energy developer, proposing the development of the AEP Kathu Solar PV Energy Facility
Site Details		
Size of the site	Description and Size in hectares of the affected property.	Portion of the Farm 460 Legoko. Total Property Size: 1972.7532ha
Development Footprint	This includes the total footprint of PV panels, auxiliary buildings, onsite substation, inverter stations and internal roads.	Initial Study Area is 314ha. The total footprint of the AEP Solar PV Energy Facility will not exceed 225ha
Technology Details		
Capacity of the facility	Capacity of facility (in MW	Net generating capacity (AC) of 75MW, Installed capacity (DC) of +/-90MW.
Solar Technology selection	Type of technology	PV and/or concentrated PV with fixed, single or double axis tracking technology.
	Capacity and dimensions of the PV field	75 MW (AC) yield. Footprint of approximately 225ha .
	Structure height	PV Structures not more than 4m
	Surface area to be covered (including associated infrastructure such as roads)	Approximately 225 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 **NOTE: Grid Connection may be removed from this environmental process and included in a separate process.**		
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 line from the on-site facility substation to the proposed Sekgame Switching Station. Two grid connection alternatives are currently been incorporated into the Environmental Process.
	Route/s of power lines	Two alternative grid connection options are under investigation. Please refer to the layout plans attached in **Appendix D**.
	Voltage of overhead power lines	132kV.
	Height of the Power Line	<32m
	Servitude Width	Maximum of 30m – 40m.
Auxiliary Infrastructure		
Other infrastructure	Additional Infrastructure	Auxiliary buildings of approximately 2 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
	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).

CONTENTS OF A SCOPING REPORT

Section 2 in Appendix 2 of regulation 982 details the information that is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process to be undertaken through the environmental impact assessment process. The table below lists the minimal contents of a scoping report in terms of these regulations;

Requirement	**Details**
(a) details of - (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	This was compiled by Dale Holder of Cape Environmental Assessment Practitioners (Pty) Ltd (Cape EAPrac). Details of the EAP are included at the beginning of this report. A CV of the author as well as a company profile of Cape EAPrac is attached in **Appendix G4**
(b) the location of the activity, including - (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	The proposed activity is to be situated South of Kathu on Remainder of the farm 460 Legoko. (i) **21 digit Surveyor General code**: C04100000000004600000 (ii) **Farm name and number:** Remainder of the Farm 460 Legoko
(c) a plan which locates the proposed activity or	A Location plan including co-ordinates of the

Requirement	Details
activities applied for at an appropriate scale, or, if it is (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	proposed activity is attached in **Appendix A**.
(d) a description of the scope of the proposed activity, including - (i) all listed and specified activities triggered; (ii) a description of the activities to be undertaken, including associated structures and infrastructure;	The description of the proposed activity is detailed in section 3 on pg 14. Listed and specified activities triggered are detailed in section 2.2 on pg 5
(e) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	The legislative and policy context is included in section 2 on 4 page of this 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;	The need and desirability of the project is included in section 5 on page 18 of this report.
(h) a full description of the process followed to reach the proposed preferred activity, site and location within the site, including - (i) details of all the alternatives considered; (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts - (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; (vi) the methodology used in determining and	(i) The details of all alternatives considered is included in section 6 on pg 22. (ii) The details of the public participation already undertaken as well as the details of the public participation for the remainder of the environmental process is detailed in section 19 on page 58. (iii) An issues and responses report is included in appendix F2. (iv) Detailed site description and attributes is included in section 10 on page 30. (v) A description of potential impacts identified by the EAP as well as participating specialists is included in section 16 on pg 55. (vi) The methodology used for the determination and ranking of significance is included in section 21.4 on pg 65. Please also refer to the specific methodologies in the specialist reports attached in Appendix E. (vii) This scoping report identifies the potential positive and negative impacts associated with the proposed project. These are included in section 16 on pg 55. An assessment of the significance of these identified impacts will take place in the impact assessment phase of this environmental process. (viii) The potential mitigation measures are addressed in section 13, 14 & 15.

Requirement	Details
ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (viii) the possible mitigation measures that could be applied and level of residual risk; (ix) the outcome of the site selection matrix; (x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and (xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	(ix) Details regarding the criteria for the selection of the preferred site selection is included in section 4 on pg 15. (x) Alternatives, including layout alternatives (for both the facility and grid connection), technological alternatives and the no-go alternative have been considered. Details of these are included in section 6 on pg 22. (xi) The preferred alternative was determined using a risk adverse approach whereby the baseline specialist studies were used to determine the footprint of the proposed facility. Details of this process are included in section 4 on pg 15.
(i) a plan of study for undertaking the environmental impact assessment process to be undertaken, including - (i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity; (ii) a description of the aspects to be assessed as part of the environmental impact assessment process; (iii) aspects to be assessed by specialists; (iv) a description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists; (v) a description of the proposed method of assessing duration and significance; (vi) an indication of the stages at which the competent authority will be consulted; (vii) particulars of the public participation process that will be conducted during the environmental impact assessment process; and (viii) a description of the tasks that will be undertaken as part of the environmental impact assessment process; (ix) identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	The plan of study for Environmental Impact Assessment phase of the environmental process is included in section 20 & 21 on pg 63.

Requirement	Details
(j) an undertaking under oath or affirmation by the EAP in relation to - (i) the correctness of the information provided in the report; (ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and (iii) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	The signed EAP declaration is included in **Appendix G4**.
(k) an undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;	Please refer to the plan of Study for EIA included in section 20 & 21.
(l) where applicable, any specific information required by the competent authority;	A pre-application meeting was held between the EAP and the DEA, where the need for any specific information was discussed and agreed upon. Minutes of this meeting are attached in Appendix G2. All correspondence with the competent authority is also included in this report in appendix G2.
(m) any other matter required in terms of section 24(4)(a) and (b) of the Act.	Compliance with section 24(4)(a) and (b) is included in section 19 of the report.

ORDER OF REPORT

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Appendix C	:	Site Photographs
Appendix D	:	Solar Facility Layout Plans (Preferred Alternative)
Appendix E	:	Specialist Reports
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Annexure E2	:	Agricultural Potential Study (Lubbe, 2016)
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Annexure E4	:	Palaeontology Desktop Study (Almond, 2016)
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Annexure F5	:	Draft Scoping Phase Comments and Responses
Annexure F6	:	Scoping Report Notifications
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Annexure G1	:	Correspondence with Authorities
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Annexure G3	:	Landowner Consent
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Cape EAPrac has been appointed by **AEP Kathu Solar (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 '**AEP Kathu Solar PV Energy Facility'** near Kathu in the Northern Cape Province of South Africa.

AEP Kathu Solar (Pty) Ltd. Have an option to sub-lease a section of the remainder of the Farm 460 Legoko from the landowner, Dihan Eiendoms Trust, for the purposes of developing the proposed solar facility. A copy of a letter from Dihan Eiendoms Trust providing consent for the continuation of the EIA is attached in **Annexure G6**.

The total generation capacity (contracted capacity) of the solar facility will not exceed 75MW for input into the national Eskom grid. The project will feed into the National Grid via the proposed Sekgame Switching station.

The Pre Application Draft Scoping Report (pre-application) was available to all stakeholders for a 30 day review & comment period, **24 November 2015 – 15 December 2015.**

After completion of this period, an application form was submitted and this Scoping Report was made available to interested and affected parties for a further period of 30 days extending from **19 February 2016 – 22 March 2016.**

All comments received in both these comment periods mentioned above have been included in this final Scoping report that is herewith submitted to the DEA for decision making.

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 is considered in section 1, while the project specific need and desirability is considered in section 5.

3 ENVIRONMENTAL 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 **983, 984 and 985** are as follows:

Listed activity as described in GN R.983, 984 and 985	Description of project activity that triggers listed activity
Regulation 983 – Basic Assessment	
GN R983 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* *(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.*	The proposed AEP Kathu Solar PV Energy Facility will connect to the national electricity via the proposed Eskom Sekgame Switching Station. The proposed distribution and transmission infrastructure included the construction of an on-site substation and a 132kV overhead power line from the on-site substation to the proposed Eskom Sekgame Switching Station.
Regulation 984 – Scoping and Environmental Impact Reporting	
GN R984 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 AEP Kathu Solar PV Energy Facility will have a maximum generation Capacity (Contracted Capacity) of 75 megawatts and as such exceeds the threshold defined in this activity.
GN R984 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 AEP Kathu Solar PV Energy Facility will have a footprint of approximately 225ha and as such exceeds the threshold defined in this activity.
Regulation 985 – Basic Assessment	
NO Activities in terms of Regulation 985.	

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.

It must noted that these activities are all to be considered at the scoping phase, but certain of the activities listed above may no longer be relevant after the outcome of the specialist studies. In this case, these activities will be excluded from further assessment.

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_{AC} with an estimated footprint of ± 225 ha. A preliminary study area of ± 314 ha was identified by the Project Developer. Following this an ecological expert 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 concentrating photovoltaic (CPV) modules or 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) transmission 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 SPECIALIST STUDIES

The following specialists have been appointed and have provided input into this environmental process:

- Faunal	- Mr Simon Todd
- Avifaunal	- Mr Simon Todd
- Archaeology	- Dr Peter Nilssen
- Palaeontology	- Dr John Almond
- Intergrated Heritage	- Stefan de Kock
- Agricultural Potential	- Mr Christo Lubbe
- Visual	- Stephen Stead
- Technical aspects	- Atlantic Energy Partners
- Stormwater	- Aurecon Consulting Engineers
- Traffic and Transportation	- Aurecon Consulting Engineers
- Freshwater	- Dr Brian Colloty
- Geotechnical / Dolomitic investigation	- GCS

Copies of these studies are included in Appendix E of this report.

6 PLANNING CONTEXT

A Planning specialist will be 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 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 CONCLUSIONS & RECOMMENDATIONS

This scoping exercise is currently being undertaken to present concept proposals to the public and potential Interested & Affected Parties and to identify environmental issues and concerns raised as a result of the proposed development alternatives to date. 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 AEP Kathu Solar PV Energy Facility ite has been analysed from Ecological, Avifainal, Agricultural Potential, Heritage and Geotechnical, perspectives, and site constraints and potential impacts identified.

This Pre Application Draft Scoping Report (DSR) and Scoping report (SR) provided potential I&AP's with a background to the proposed project in order to solicit any comments and concerns that they may have relating to the proposed project.

The Pre Application Draft Scoping Report (DSR) was made available for stakeholder review and comment for a period of 21 - days, extending from **24 November 2015 – 15 December 2015**. All comments received have been included in this scoping report.

After completion of this period, an application form was submitted and the Scoping Report was made available to interested and affected parties for a further period of 30 days extending from **19 February 2016 – 22 March 2016.**

Comments received during both of these comment periods have been included in this Final Scoping Report that is herewith submitted to the competent authority for decision making.

FINAL SCOPING - MAIN REPORT

1 INTRODUCTION

Cape EAPrac has been appointed by **AEP Kathu Solar (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 '**AEP Kathu Solar PV Energy Facility**' near Kathu in the Northern Cape.

AEP Kathu Solar (Pty) Ltd have an option to sub-lease a section of the Remainder of the farm 460 Legoko from the landowner, **Dihan Eiendoms Trust**, for the purposes of developing the proposed solar facility. A copy of a letter from Dihan Eiendoms Trust providing consent for the continuation of the EIA is attached in **Appendix G3**.

All other land owners where the grid connection (linear activity) may take place have been notified of the availability of the Draft Scoping Report as well as the Scoping Report and have been given an opportunity to comment on these reports .

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 **Scoping Report** is to provide registered and potential I&AP's with background information of the project proposal as well as details of what specialist input will form part of the remainder of the environmental process.

The Pre Application Draft Scoping Report was available for review and comment for a period of 21 Days extending from: **24 November 2015 – 15 December 2015**.

After completion of this period, an application form was submitted and the Scoping Report is made available to interested and affected parties for a further period of 30 days extending from **19 February 2016 – 22 March 2016.**

All comments received during this period have been included in this Final Scoping Report.

NOTE: Registered I&AP's will be given a further opportunity to comment on various reports through the remainder of the environmental process, including:

- Draft Environmental Impact Report, and
- Environmental Management Plan.
- Additional Specialist studies that form part of the Environmental Impact Assessment phase of the Environmental Process.

1.1 OVERVIEW OF ALTERNATIVE ENERGY IN SOUTH AFRICA AND THE NORTHERN CAPE.

South Africa has for several years been experiencing considerable constraints in the availability and stability of electrical supply. Load shedding procedures have been applied since December 2005 due to multi-technical failures, as well as generation and transmission constraints.

Eskom generates about 95% of South Africa's electricity supply, and has undertaken to increase capacity to meet growing demands. At the moment, the country's power stations are 90% coal-fired, and two huge new facilities are being built to add to this capacity. However, Eskom's plans to

increase its national capacity by 40 000 megawatts in the period to 2025 have had to be scaled down due to the global economic recession (Northern Cape Business website).

International best-practice requires a 15% electricity reserve margin to deal with routine maintenance requirements and unexpected shutdowns in electricity supply systems. South Africa has historically enjoyed a large reserve margin (25% in 2002, 20% in 2004 and 16% in 2006), but that has declined over the recent past to 8% - 10%, as a result of robust economic growth and the associated demand for electricity. The spare power available to provide supply at any time of the day is known as the reserve capacity and the spare plant available when the highest demand of the year is recorded is known as the reserve margin (National Response to South Africa's Electricity Shortage, 2008). This has resulted in limited opportunities for maintenance and necessitated that power stations are run harder. This results in station equipment becoming highly stressed and an increase in unplanned outages and generator trips. The expected demand growth will rapidly erode this margin, as well as Eskom's ability to recover after it's already stressed systems shutdown.

This necessitates the additional generation of at least 3 000MW in the shortest possible time, to allow the reserve necessary to bring Eskom's system back into balance (*ibid*). This need can either be addressed from the *supply* or the *demand* side. Where the demand side interventions include short, medium and long term aspects of a national Power Conservation Programme to incentivise the public to use less electricity (as mentioned above), one of the supply side options (besides Eskom building new plants and returning old plants to service) is to allow **Independent Power Producers** (IPPs) to contribute electricity to the national grid (National Response Document, 2008). **AEP Kathu Solar (Pty) Ltd.** is one such body, which intends generating electricity from a renewable energy resource, namely solar.

In March 2011, the Cabinet approved South Africa's Integrated Resource Plan 2010, in terms of which energy from renewable sources will be expected to make up a substantial 42% of all new electricity generation in the country over the next 20 years. The government's New Growth Path for the economy also envisages up to 300 000 jobs being created in the "green" economy by 2020 (South Africa info website).

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 (R33-million spent) into potential for photo-voltaic, thermal, solar and wind power (Northern Cape Business website).

The 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.)

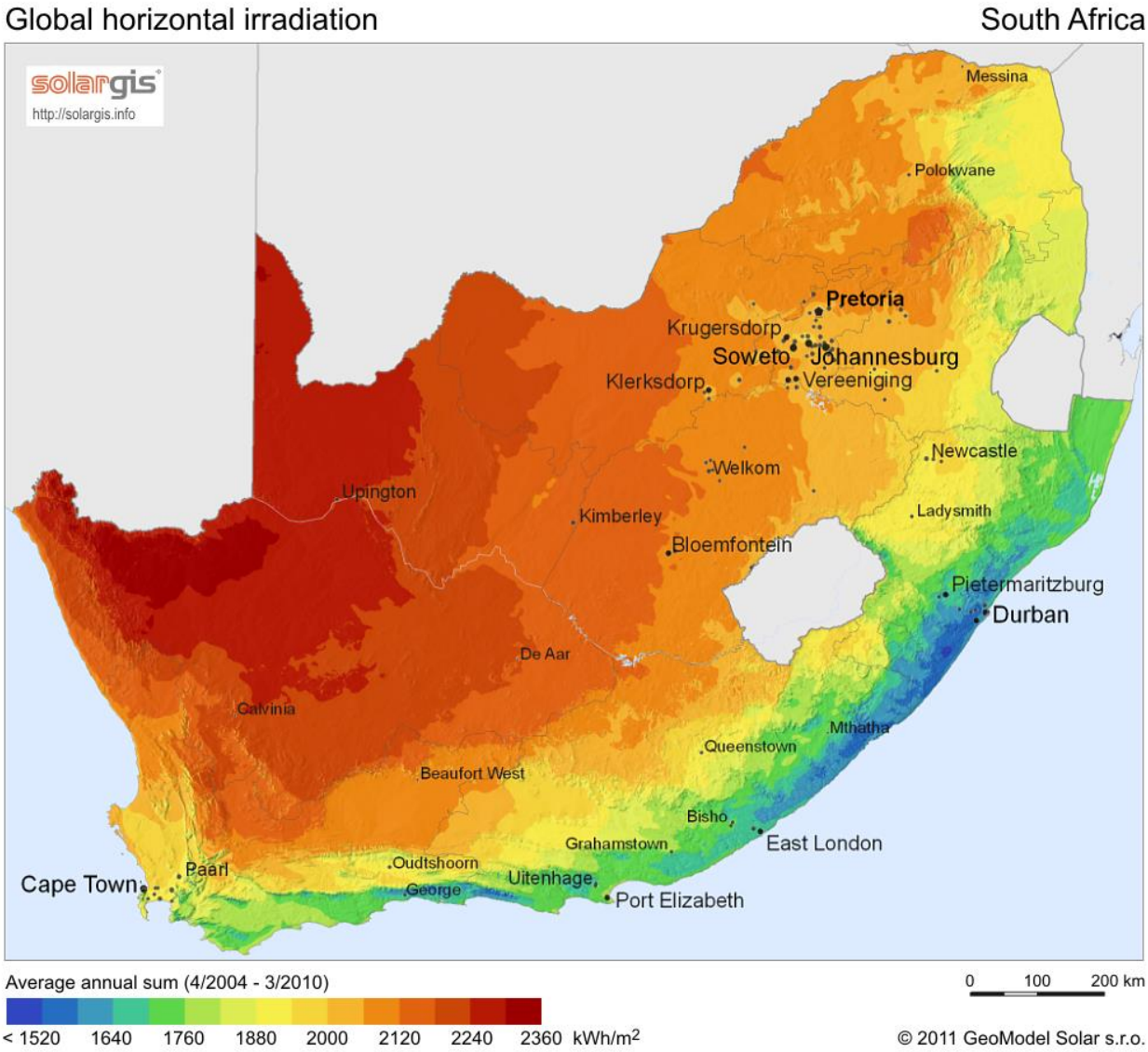


Figure 1: Global Horizontal radiation map for South Africa (Source: http://solargis.info, 2015).

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**.

A solar-investment conference was held in November 2010 at Upington and was attended by 400 delegates from all over the world. Dipuo Peters, the national Minister of Energy at that time, outlined the competitive advantages of the Northern Cape, over and above its extremely high irradiation levels, amongst others:

- relative closeness to the national power grid compared to other areas with comparable sunshine;
- water from the Orange River;
- access to two airports; and
- good major roads and a flat landscape (Northern Cape Business website – solar power).

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). 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).

AEP Kathu Solar (Pty) Ltd. is one such IPP solar project which intends to generate 75MW of electricity from solar-energy for inclusion into the National grid. The AEP Kathu Solar PV Energy Facility development site is considered ideal, primarily due to:

- The flat topography of the proposed development site and it's the availability for use for an alternative energy generation facility;
- The grid connection alternatives based in proximity to the existing Ferrum Substation & proposed new Sekgame Switching station; and
- Its location within a landscape that is already significantly transformed through mining activities.

Please **section 4** of this report for the details of the site selection matrix.

Minister Tina Joemat-Pettersson, the current Minister of Energy issued a media statement on 16 April 2015 on the Expansion and Acceleration of the Independent Power Producer Procurement Programme

In this statement, she stated that resolving the energy challenge remains a critical element of the South African Cabinet¡¦s list of nine strategic priorities to be pursued in partnership with the private sector and all stakeholders.

In this press release, the Minister confirmed that she instructed the Department and the IPP Office to accelerate and expand the Renewable Energy IPP Procurement Programme through:

- Utilising the enabling provisions in the current RFP to allocate additional MWs from Bid Window 4 procurement process.
- Issuing a Request for Further Proposals for an expedited procurement process of 1800MW from all technologies.
- Redesign the current RFP for the Fifth Bid Submission phase to be ready for release in the second quarter of 2016.

The Department of Energy (DoE) has set a number of dates for the submission of bid documents for private companies to apply for a licence to generate electricity. The bidding deadlines for the first two stages were as follow:

- 1st Bid Submission: 4 November 2011.
- 2nd Bid Submission: 5 March 2012.
- 3rd Bid submission: 19th of August 2013.
- 4th Bid submission: 18 August 2014.
- 5th Bid Submission: To be confirmed.

NOTE: It is the intention that the AEP KAthu Solar PV Energy Facility solar development will submit a bid under this Renewable Energy Independent Power Producers Procurement Programme (REIPPP)

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.

2.1 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 measure are applied to protect the environment. This includes preventing pollution and promoting conservation and environmentally sustainable development, while promoting justifiable social and economic development.

2.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA)

The current assessment is being undertaken in terms of the **National Environmental Management Act** (NEMA, Act 107 of 1998)[1] . 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.

[1] 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 2014. These regulations came into effect on 08 December 2014 and replace the EIA regulations promulgated in 2006 and 2010.

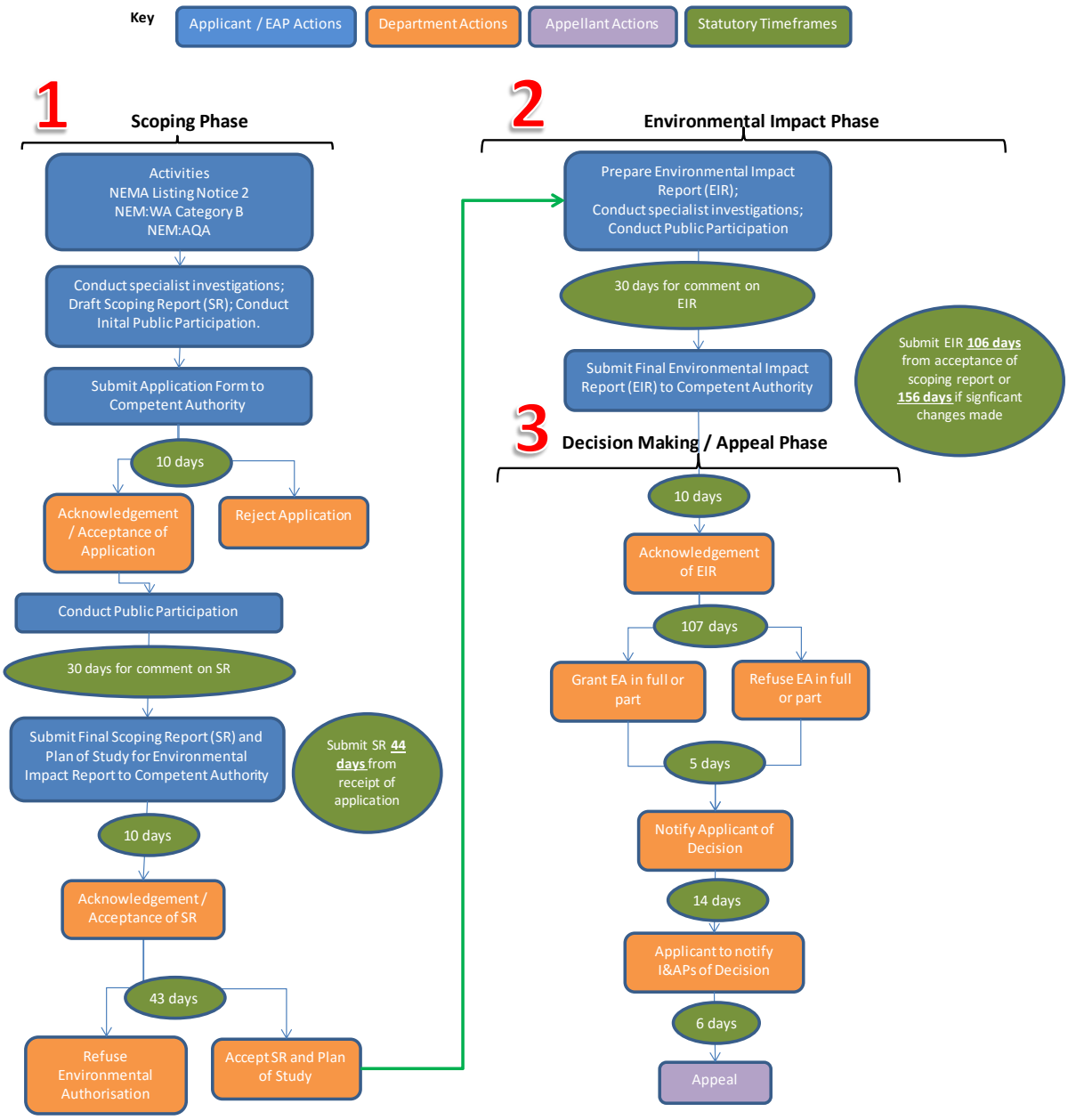


Figure 2: Summary of Scoping & EIR Process in terms of the 2014 Regulations.

The listed activities associated with the proposed development, as stipulation under 2014 Regulations **983, 984 and 985** are as follows:

Table 1: NEMA 2014 listed activities for the AEP Kathu Solar PV Energy Facility

Listed activity as described in GN R.983, 984 and 985	Description of project activity that triggers listed activity
Regulation 983 – Basic Assessment	
GN R983 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* *(ii) inside urban areas or industrial*	The proposed AEP Kathu Solar PV Energy Facility will connect to the national electricity via the proposed Eskom Sekgame Switching Station. The proposed distribution and transmission infrastructure included the construction of an on-site substation and a 132kV overhead power line from the on-site

complexes with a capacity of 275 kilovolts or more.	substation to the proposed Eskom Sekgame Switching Station.
Regulation 984 – Scoping and Environmental Impact Reporting	
GN R984 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 AEP Kathu Solar PV Energy Facility will have a maximum generation Capacity (Contracted Capacity) of 75 megawatts and as such exceeds the threshold defined in this activity.
GN R984 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 AEP Kathu Solar PV Energy Facility will have an approximate footprint of 225ha and as such exceeds the threshold defined in this activity.
Regulation 985 – Basic Assessment	
NO Activities in terms of Regulation 985.	

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.

It must noted that these activities are all to be considered at the scoping phase, but certain of the activities listed above may no longer be relevant after the outcome of the specialist studies. In this case, these activities will be excluded from further assessment.

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.

2.3 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^2 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*, *Anthephora argentea*, *Megaloprotachne albescens*, *Panicum kalaharense* 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.

2.4 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 **AEP Kathu Solar PV Energy Facility** will **not affect** on this or any other **NPAES** focus area as it is situated some distance from the Focus Area.

2.5 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, confirmed that two species protected in terms of the National Forest Act may be abundant on the site, namely *Acacia erioloba* and *Acacia haematoxylon*. The proposed development footprint has been positioned in such a way as to avoid areas where these two species occur in high densities.

An ecological specialist has been appointed to provide input into this environmental process. The results of his baseline study will be included in the Scoping Report.

2.6 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 AEP Kathu Solar PV 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 must take care 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"

2.7 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 2:Listed plant species known from the broad vicinity of the proposed AEP Kathu study area (Todd, 2015)

Family	Species	Status
AMARYLLIDACEAE	*Boophone disticha*	Declining
FABACEAE	*Acacia erioloba*	Declining
ASPARAGACEAE	*Asparagus stipulaceus*	NT
ASTERACEAE	*Gnaphalium declinatum*	NT
MESEMBRYANTHEMACEAE	*Antimima lawsonii*	Rare

An ecological specialist has been appointed to provide input into this environmental process. The results of his baseline study will be included in the Scoping Report.

2.8 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.

2.9 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 m² in extent;*
- *the re-zoning of a site exceeding 10 000m^2 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 AEP Kathu Solar PV Energy Facility. This integrated heritage study will include an Archaeological Impact Assessment to be undertaken by Dr Peter Nilssen as well as a Paleontological Desktop Assessment undertaken by Dr John Almond.

2.10 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 AEP Kathu Solar PV Energy Facility is to be sourced either sourced from Sedibeng Water or the Gamagara Local Municipality. 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 site are a number of pans that may periodically contain water. These pans have however been excluded from the proposed development.

Due to the proximity of these pans to the proposed development site and the subsequent implications in terms of the National Water Act, A freshwater specialist, Dr Brian Colloty has been appointed to provide input into this Environmental Process.

The Department of Water and Sanitation have been registered as a key stakeholder in this environmental process.

2.11 Astronomy Geographic Advantage Act, 2007 (Act No 21 Of 2007)

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 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.

2.12 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 3: 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; (This was undertaken – Please refer to ecological (fauna and flora) scoping report attached in Appendix E.)
- Plan visual impact reduction measures such as natural (vegetation and topography) and engineered (berms, fences, and shades, etc.) screens and buffers; (This was undertaken – Please refer to the baseline visual assessment attached in Appendix E.)
- Utilise existing roads and servitudes as much as possible to minimise project footprint; (Existing access and internal roads have been used to inform the development footprint and layout of this facility.)
- Site projects to avoid construction too near pristine natural areas and communities; (Areas of high and very high environmental sensitivity have been completely avoided by the proposed project footprint.)
- 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; (An avifaunal impact assessment has been commissioned and will provide additional input in this regard. The Avifaunal Impact

Assessment will form part of the Environmental Impact Reporting phase of the environmental process.)

- Fence sites as appropriate to ensure safe restricted access; (The ecological specialist has provided input into the fencing requirements of the site in light of faunal movement and corridor function.)
- Ensure dust abatement measures are in place during and post construction; (The EMPr to follow in the Draft Environmental Impact Report will make provision for dust abatement and management mechanisms during both the construction and operational phases.)
- Develop and implement a storm water management plan; (Stormwater management plan is attached in Appendix E.)
- Develop and implement waste management plan; and (A waste management plan will be included as part of the Environmental Management programme.)
- Re-vegetation with appropriate indigenous species to prevent dust and erosion, as well as establishment of alien species. (A revegetation and Habitat Restoration plan will form part of the EMPr)

The recommendations of these guidelines have been used to draft the Scoping Report and will also be considered in the compilation of the Environmental Impact Report and the Environmental Management Programme.

2.13 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.*[2]

It is believed that the proposed 75MW AEP Kathu Solar PV 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.

3 ACTIVITY

The proposed photovoltaic (PV) SEF will have a net generating capacity of 75 MW_{AC} with an estimated maximum footprint of ± 225 ha. A preliminary study area of ± 315 ha was identified by the Project Developer. Following this an ecological expert 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 ± 225 ha. The approximate area that each component of the SEF will occupy is summarised in the table below.

Table 4: Component Areas and % of Total Project Area (AEP, 2015)

SEF Component	Estimated Area	% of Total Area (± 225 ha)	% of Farm Area (1370.898 ha)
PV structures/modules	± 200 ha	86.7 %	14.2 %
Internal roads	± 18.16 ha	8 %	1.32 %
Auxiliary buildings	± 1 ha	0.4 %	0.07 %
Substation	± 0.84 ha	0.4 %	0.06 %

The technology under consideration is either concentrating photovoltaic (CPV) modules or 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) transmission 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.

[2] See definition of "sustainable development" in section 1 of NEMA.

Figure 3: Typical Layout of a Solar PV Energy Facility (AEP, 2015)

Please refer to the **Engineering Report** attached in **Annexure E6** for further information and descriptions of the proposed activity.

4 SITE SELECTION

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

4.1 PROPERTY SELECTION PROCESS

Please refer to the correspondence relating to the site (property) selection received from Atlantic Energy Partners (AEP)attached in Annexure G7 from which the following is drawn.

It is AEP's understanding that the Department of Energy (DoE) will favour projects which are, inter alia, in close proximity to a demand centre, so as to reduce the losses associated with power transmission. The site identified by AEP, being the most preferable for the Legoko Solar PV Energy Facility, is the farm known as Legoko Farm No 460 portion 2, situated in the District of Kuruman Rd, Northern Cape Province, in extent 856,5320 ha (eight hundred and fifty six point five three two zero hectares); hereinafter referred to as the Site. This was based on extensive investigation of prospective sites in the Kathu area, backed by the following findings:

4.1.1 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 the Legoko SEF, 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 DoE's IPP Procurement Programme.

4.1.2 Proximity to towns with a need for socio-economic upliftment

The Site is situated in close proximity to the towns 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 IPP Procurement Programme 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 a dramatic decrease.

4.1.3 Land availability

The majority of land surrounding the Kathu town is considered to be undevelopable, largely due to the existing town commonage and mining land reserved for related mining activities. Portions 1 and 2 of Legoko Farm No 460 are a few of the available privately owned land parcels suitable for solar PV development.

4.1.4 Camel Thorn concentrations

There is a high concentration of Camel Thorn trees in the Kathu region, a tree type currently listed in South Africa as being protected in terms of 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 the lowest number of Camel Thorns (sites to the North of Kathu have high Camel Thorn concentrations in comparison to this site), and therefore the Site poses the least potential impact as a SEF.

4.1.5 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; and
- Stock theft is a persistent problem in the area and therefore the area sees low agricultural production as sheep farming and other forms of small livestock farming proves to be challenging.

4.1.6 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.

4.1.7 Wind and dust consideration

The Kumba iron ore mine is to 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 northwest which it is hoped will blow most of the dust from the mine away from the Site.

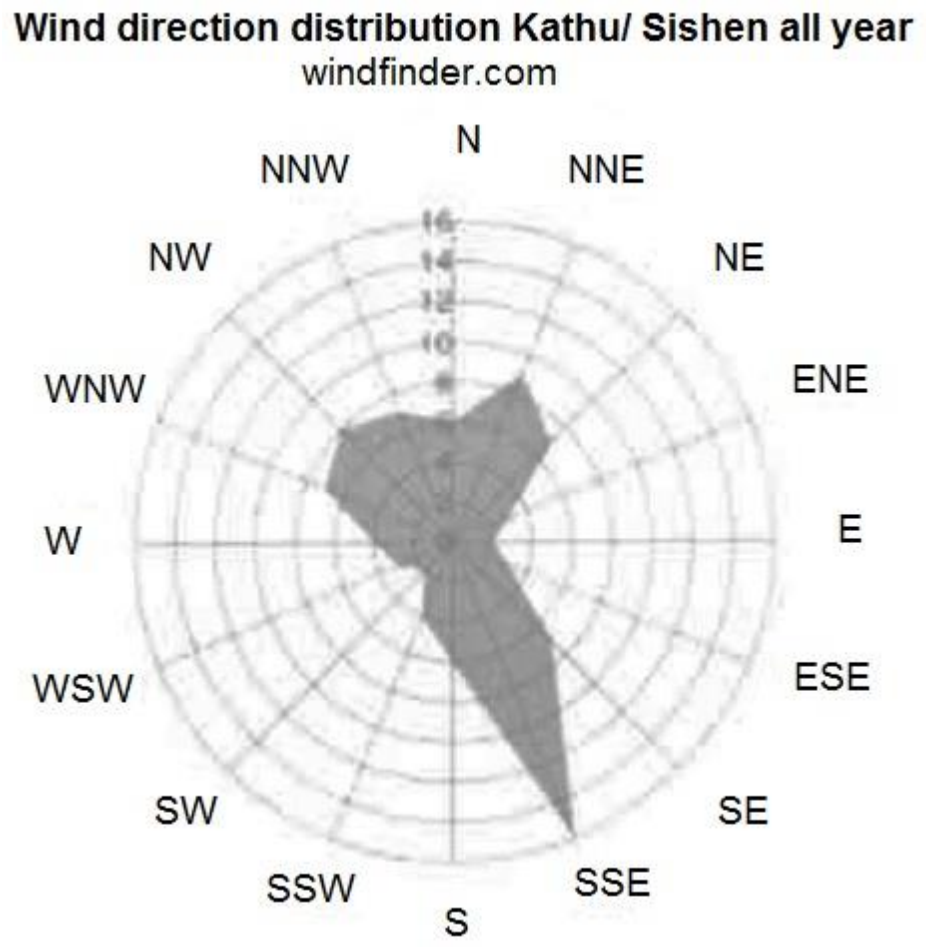


Figure 4: Wind Rose for the Kathu Area

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.

4.1.8 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.

4.2 FOOTPRINT SELECTION PROCESS

The selection of the proposed study area within Remainder of the farm 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 property. This sensitivity plan was then used to determine the location of the proposed PV footprint.

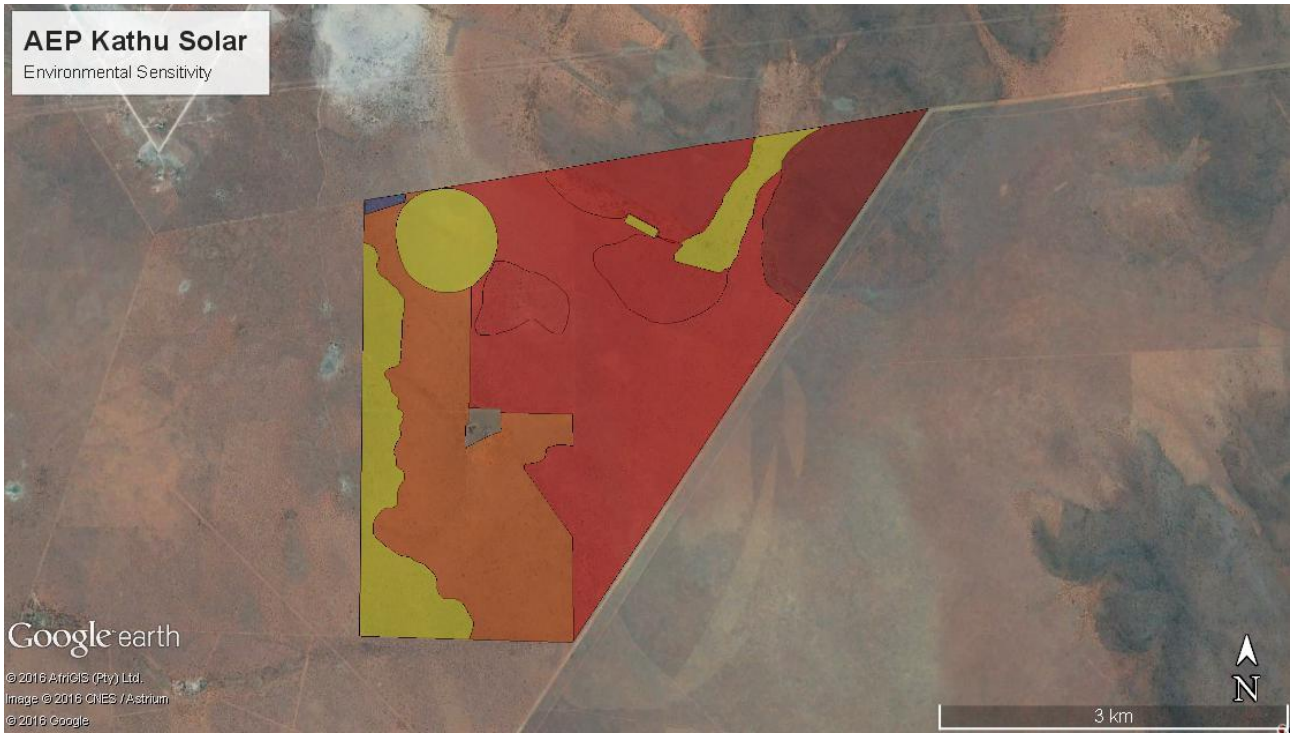


Figure 5: Environmental Sensitivity of Remainder of Farm 460 (Yellow: Medium, Orange: Medium – High, Red: High, Dark Red: Very – High).

The footprint was then developed in a such a manner as to avoid all areas with a, high and very high sensitivity. This also ensured that potential impact on the protected *Acacia erioloba* was minimised.

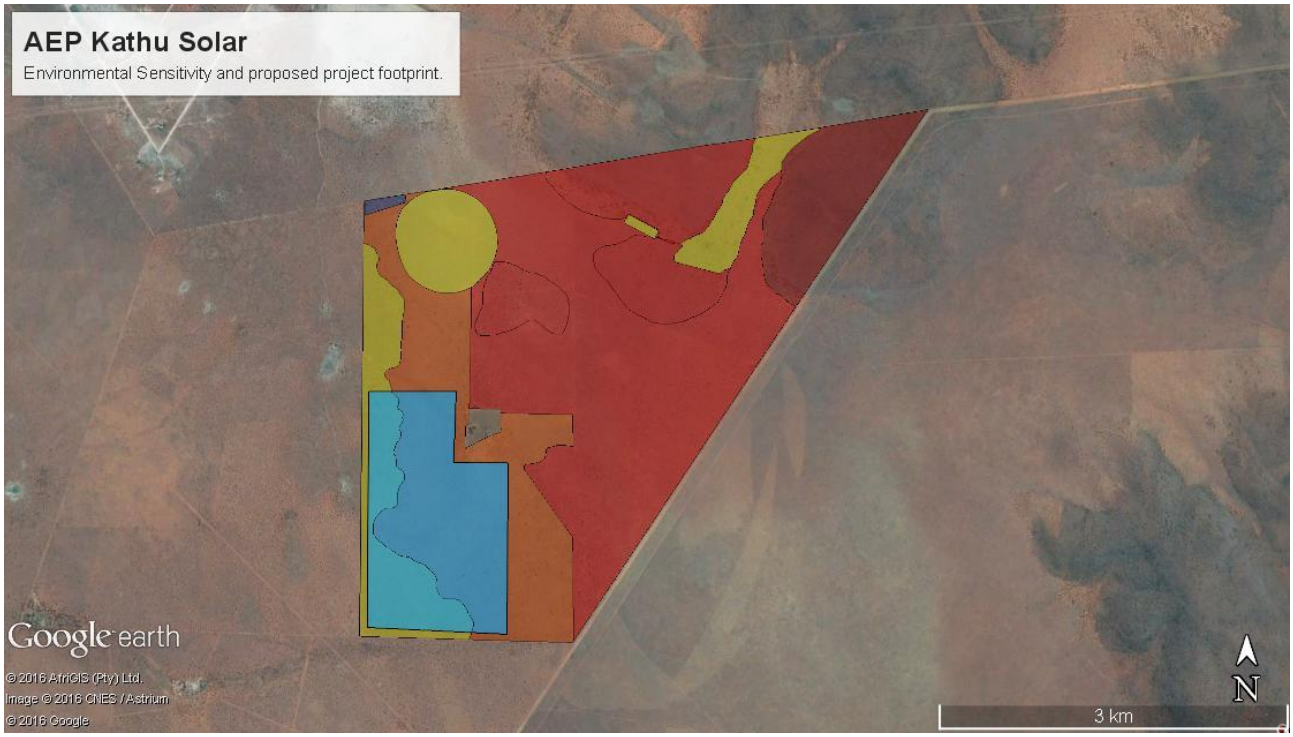


Figure 6: Proposed project footprint overlaid onto environmental sensitivity map.

5 NEED AND DESIRABILITY

In keeping with the requirements of an integrated Environmental Impact process, the DEA&DP [3]*Guidelines on Need and Desirability (2010 & 2011)* were referenced to provide the following estimation of the activity in relation to the 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.

5.1.1 Feasibility consideration

The commercial feasibility for the proposed 75MW$_{AC}$ AEP Kathu Solar PV 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.

5.1.2 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 Kathu site, the resource is sufficient to guarantee a positive return on investment.

5.1.3 Solar Farm & Grid Connection

Among the outstanding characteristics of the AEP Kathu Solar PV 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 transmission line. As the site is not used for extensive agricultural purposes, the solar facility will not interfere with the agricultural productivity of the area.

5.1.4 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

[3] The Western Cape Provincial guidelines on Need and Desirability were considered in the absence of National and Northern Cape Guidelines.

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 compliment the economic development of the region**.

5.1.5 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 AEP Kathu Solar PV 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 AEP Kathu Solar PV 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 AEP Kathu Solar PV Energy Facility reflects expenditures related to the construction and operation. These activities will increase economic activity within the region and province.

5.1.6 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 AEP Kathu Solar PV 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. AEP Kathu Solar PV 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 AEP Kathu Solar PV Energy Facility development requires the installation of a 132 kV overhead transmission 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). AEP Kathu Solar (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).

5.1.7 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, while the remaining undeveloped areas may rehabilitate to their natural state in time and remain protected as such.

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 approximately 225ha 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.

6 CONSIDERATION OF ALTERNATIVES

The proposed AEP Kathu 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 75MW$_{AC}$ (MegaWatts - Alternating Current) (and up to 86.25MW$_{DC}$ Direct Current installed/nameplate capacity), 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 electrical transmission line / grid connection (connect to the proposed Sekgame substation);
- Rainwater tanks; and
- Perimeter fencing.

A number of alternatives, including **layout** and **technological** alternatives were considered for the proposed AEP Kathu Solar PV Energy Facility. The consideration of these alternatives are detailed below.

6.1 FACILITY LAYOUT ALTERNATIVES

A number of layout alternatives have been considered for the proposed AEP Kathu Solar PV Energy Facility Development.

The AEP Kathu Solar PV Energy Facility preferred footprint has taken into account existing infrastructure in the surrounding area (sub-stations, powerlines and roads) as well as proposed infrastructure currently under investigation under other environmental processes.

6.1.1 Layout Alternative 1 – Initial Layout

During project inception an initial project footprint was considered that was directly adjacent to the main access road and bordering on the Western and Northern Boundary.

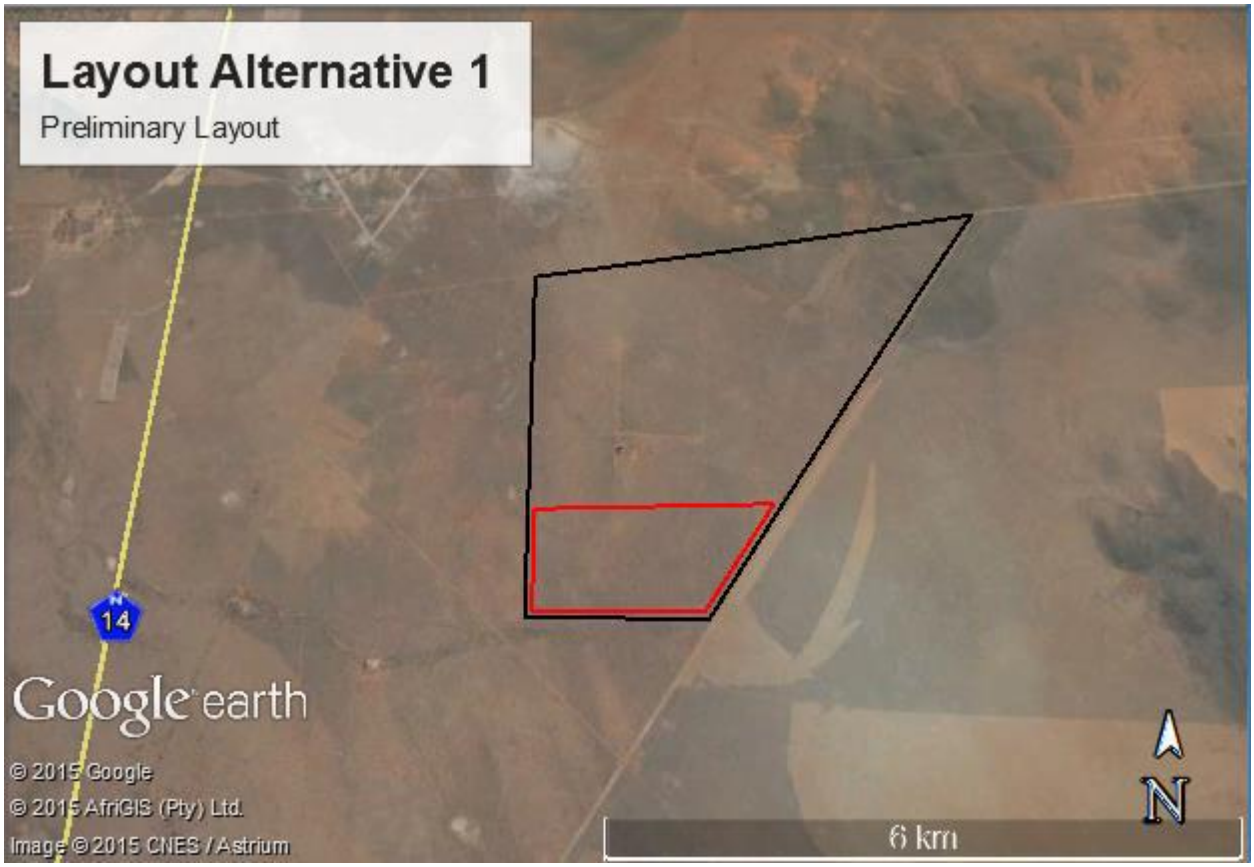


Plate 1: Layout Alternative 1 -preliminary layout**.**

After completion of the baseline ecological analysis of the property, this preliminary layout was eliminated due to the following reasons:

- Significant impact on the Highly sensitive Grey Camelthorn Veld;
- Significant impact on the Highly sensitive Acacia erioloba veld;
- Require the removal of large numbers of species protected under the National Forest Act;

Due to the unavoidable impacts as detailed above, this alternative is **eliminated** from further investigation and assessment in this environmental process.

6.1.2 Layout alternative 2 - Preferred Site

In order to avoid highly sensitive areas identified by the ecological specialist, a proposed site layout has been selected that excludes all areas of high and very high ecological sensitivity.

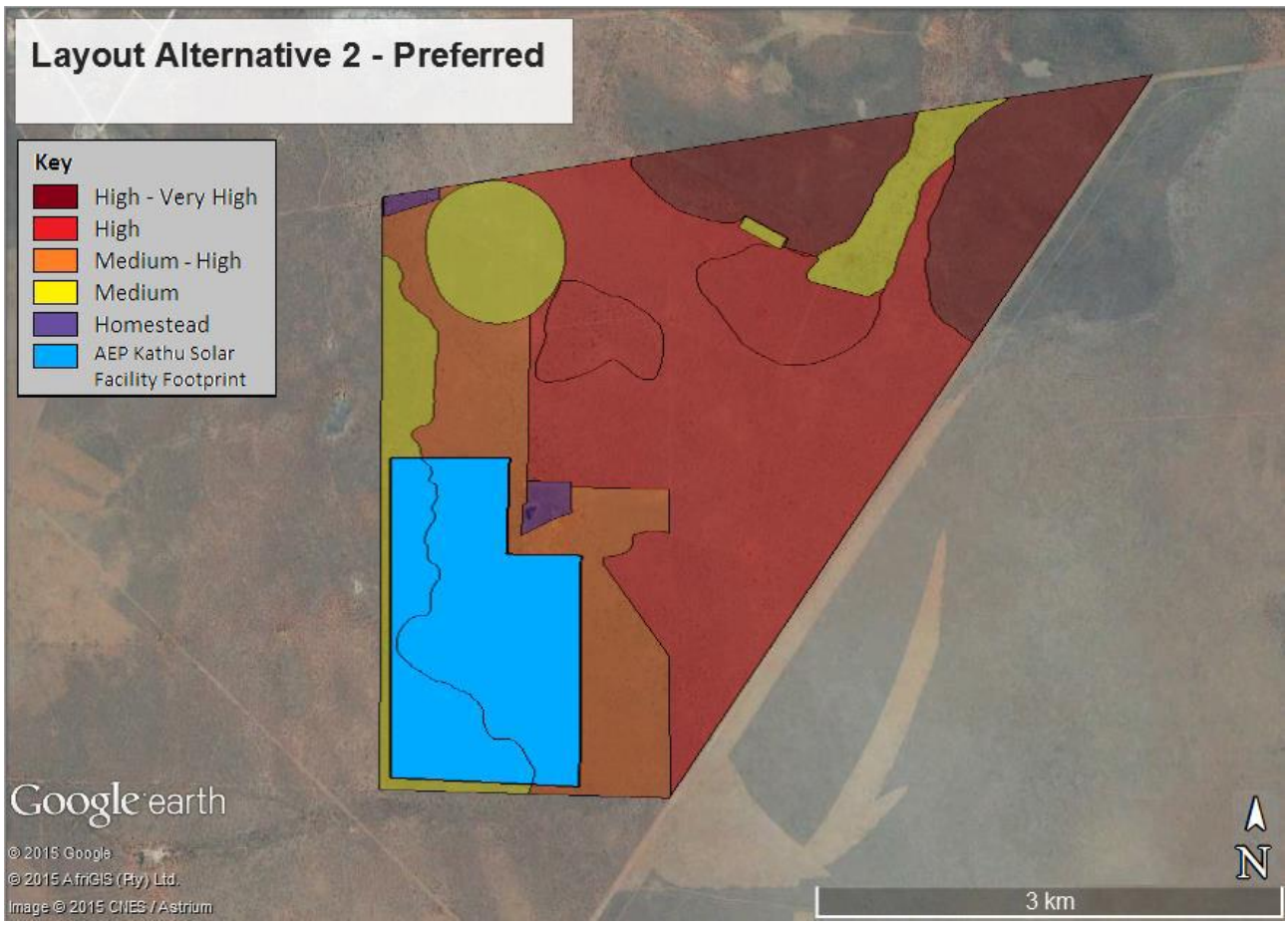


Figure 7: Layout Alternative 2 (Preferred site)

Should the results of the scoping process identify further constraints on this site, a third mitigated layout may be developed.

6.2 ACCESS ROAD AND ENTRANCE ALTERNATIVES.

Two main access roads are being considered off the N14 to the proposed AEP Kathu Solar PV Energy Facility, as depicted in Figure 9 below. The black lines in Figure 9 depict cadastral boundaries.

- **Site access 1** (Preferred) is shown by the green route. The light green is an existing gravel access road, while the darker green section would need to be constructed. The access road falls on Portion 1 of the Farm 460 Legoko so a servitude would need to be secured with the farmowner, however this is the preferred access road option because it is located further away from the farm homestead in the north western corner of Portion 0 of the Farm Legoko 460.
- **Site access 2** (Alternative) is shown by the orange route and follows an existing road from the intersection of the R380 and the N14. The road is a communal access road up to the point where Bestwood 459/1 and Legoko 460/2 meet, then the road goes along the boundary on Bestwood 459/1. A servitude would need to be secured with this farm owner. This option however is in closer proximity to the farm homestead.

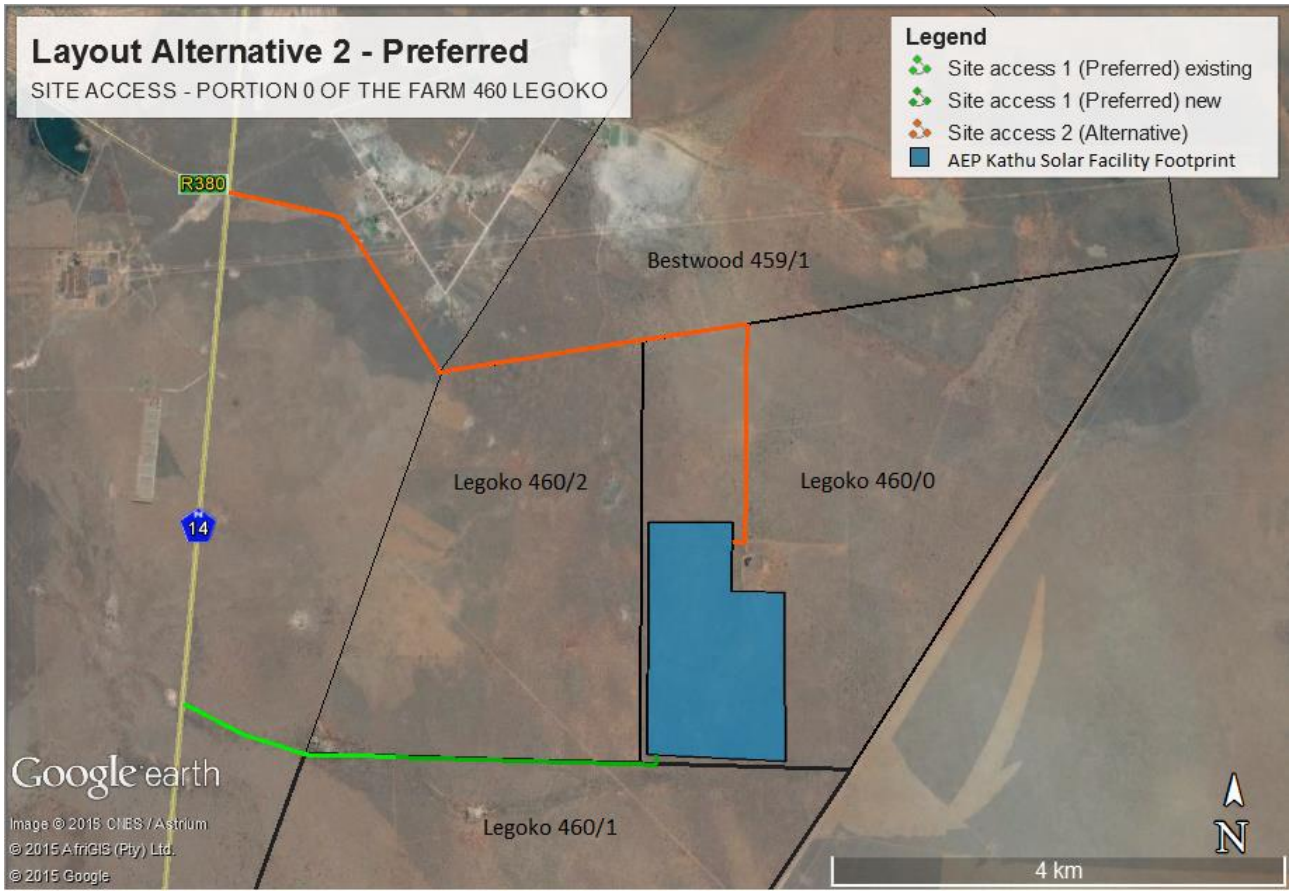


Figure 8: Site Access to Remainder of the Farm 460 Legoko (AEP, 2015)

Both the abovementioned access road options are considered to be viable from environmental and technical viewpoints, however the preferred site access (brown) will impact the usability of the grazing camp since it will divide the camp whereas the alternative runs along a camp fence and may be better for dust control. These alternatives will be investigated in further detail during the EIA phase of the project.

The required access roads would be gravel and approximately 5m in width.

Please refer to the **Engineering Layout Report** in **Annexure E6** for further information on the proposed access roads.

6.3 GRID CONNECTION ALTERNATIVES

It is proposed to connect the SEF directly to the planned Sekgame Switching Station (SS) located ± 5km to the south of the existing Ferrum MTS. The SEF substation will be approximately 120m x 70m in size and feature a step-up transformer/s to transmit electricity via a 132 kV OH line directly to the Sekgame SS. The OH power line is envisaged to be ± 5 - 6km in length, a maximum height of 32m and occupy a servitude width of between 31m – 40m.

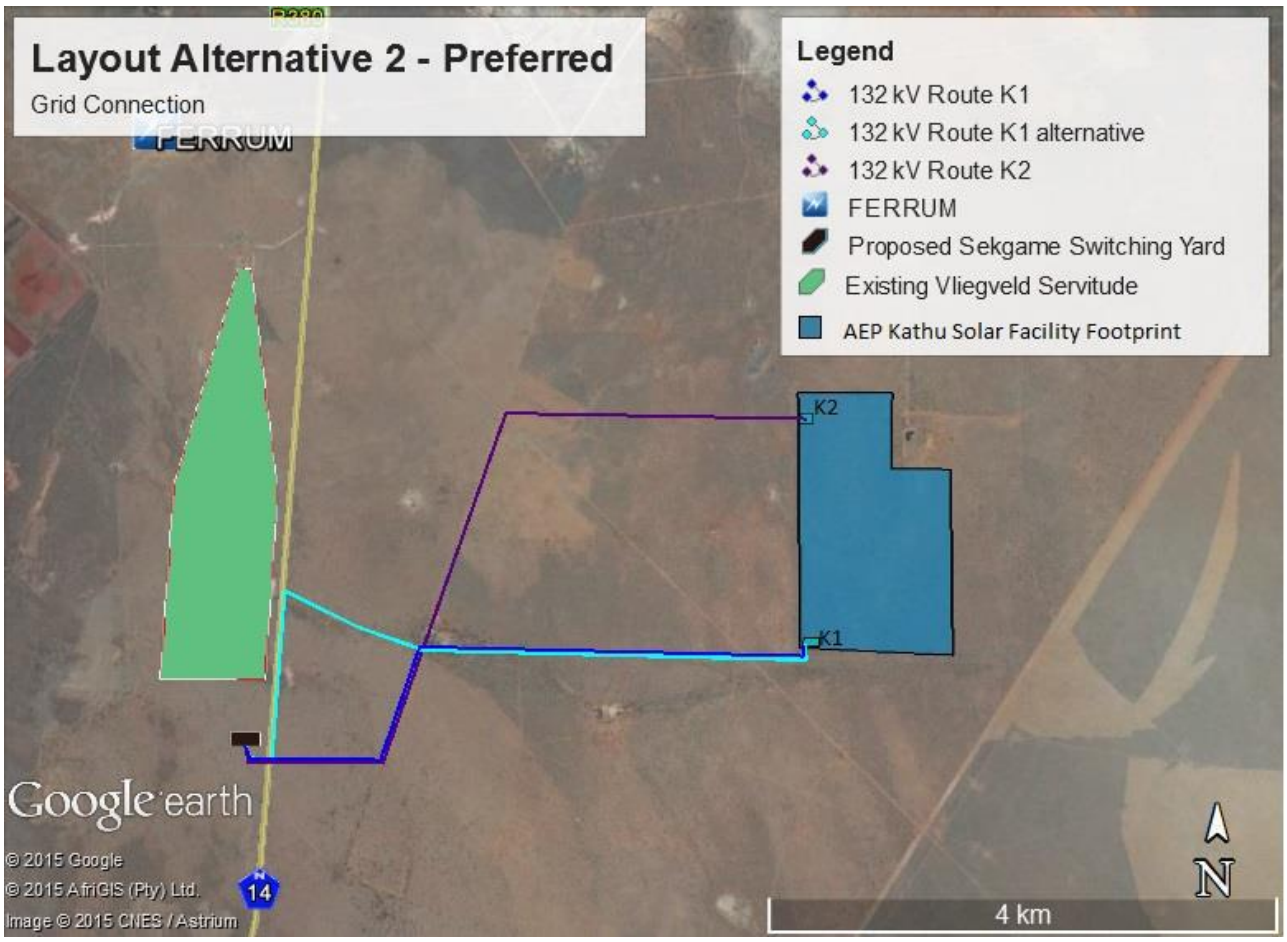


Figure 9: Grid Connection alternatives for the proposed AEP Kathu Solar PV Energy Facility (AEP,2015)

A 75 MW_{AC} installation will require specific electrical components to meet the national grid code requirements in order to generate and supply electricity into the national grid.

The conversion from DC (modules) to AC is achieved by means of inverter stations. A single inverter station is connected to a number of solar arrays, are will be placed along the internal service roads for ease of access. A number of inverter stations will be installed for the SEF (up to maximum of ± 60), each of which is connected to the on-site / facility substation.

Final placement of the inverter stations and on-site / facility substation will need to take ground conditions into consideration. Interconnecting electrical cabling will be trenched where practical, and follow internal access roads to the greatest extent. Sensitive areas will consequently be avoided as far as possible, or alternatively, cables will be fastened above-ground to the mounting structures so as to avoid excessive excavation works and clearing of vegetation.

6.4 THE NO-GO ALTERNATIVE

The Status Quo Alternative proposes that the AEP Kathu Solar PV 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 E2). 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.

7 TECHNICAL OVERVIEW

The following section presents an overview of the main components of the solar energy facility layout as described in the Engineering report compiled by AEP. Please refer to the engineering report attached in Annexure E6 for further information regarding the Technical componants of the proposed facility.

7.1 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 AEP Kathu Solar PV Energy Facility will be placed in such a way that they do not interfere with sensitive features defined by the participating specialists.

7.2 MOUNTING STRUCTURES

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

Plate 2: 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 AEP Kathu Solar PV Energy 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.

Plate 3: Rammed / Driven Steel Pile (SolarPro, 2010)

Plate 4: Ground Screw (pv magazine, 2014)

8 ECONOMIC CONTEXT

8.1 PROJECT COST OVERVIEW

Renewable energy projects, such as the proposed solar facility, require significant capital investment. Funds of equity and debt investors either from foreign or domestic sources are obtained. The cost requirements and potential revenue are discussed in this section, sketching a business case for the development of renewable energy projects within South Africa (specifically solar farms in the Northern Cape).

The project costs consist of two parts, capital cost and running cost. The capital cost pertains to all costs incurred for the establishment of a producing facility. The running cost relates to those costs incurred to ensure that the facility operates as it should throughout its expected lifetime.

Solar PV installations can operate for many years with relatively little maintenance or intervention. Therefore after the initial capital outlay required for building the solar power plant, further financial investment is limited. Operating costs are also limited compared to other power generation technologies.

8.1.1 Project specific costs

The AEP Kathu Solar PV Facility detailed costing has not been completed on the date of submitting this scoping report. The project is, however, based on the industry standard cost with capital expenditure that can amount to more or less R20-25M per megawatt installed capacity. The running cost of a solar PV facility is minimal related to the initial capital cost, contributing to the most significant cost of constructing and running a solar PV facility.

8.1.2 Revenue streams

The payback of the facility results mainly from electricity sales, intended under the current governmental programme, known as the “Renewable Energy Independent Power Producer Procurement Programme” (REIPPPP).

The IPP procurement programme portrays fixed ceiling prices for bidders to tender against in a competitive environment. The establishment of these ceiling prices is based on industry standard return on investments.

As part of the IPP procurement programme preferred bidders will enter into a power purchase agreement between the IPP generator and the Single Buyers Office/Department of Energy. National treasury provides surety, while NERSA regulates the IPP licences.

The bidding and tender procedure of the IPP procurement programme requires an approved EIA Environmental Authorisation/Record of Decision as a gate keeping criteria, where no project would be considered without the EIA Environmental Authorisation being given.

9 PROJECT PROGRAMME AND TIMELINES

As mentioned previously the AEP Kathu Solar PV 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 for the 5th and 6th bidding submissions.

Table 5: Preliminary implementation schedule**.**

	Description	**Timeline**
1	Expected IPPPP submission date (5th round)	Second Quarter of 2016.
2	Preferred bidders selected	Last Quarter 2016
3	Finalisation of agreements	First Quarter 2017
4	Procurement of infrastructure	Last Quarter 2017
5	Construction	2017 - 2018
6	Commissioning	2018

The table above clearly depicts the dependence of the project on the IPP procurement programme's timelines. Any delay 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 for Round 5 and Round 6 have been communicated by the Department of Energy.

NOTE: The AEP Kathu Solar PV Energy Facility intends submitting their bid during the 5th or 6th bidding window or thereafter if unsuccessful in immediate bidding rounds.

10 SITE DESCRIPTION AND ATTRIBUTES

The following sections provide a description of the natural environmental and built environment context of Remainder of the Farm 460 Legoko, with particular focus on the site location for the proposed AEP Kathu Solar PV Energy Facility.

10.1 LOCATION & BUILT ENVIRONMENT

The target property, Remainder 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 **1972.7532ha** in size and is located approximately 9km southeast of Kathu.

The proposed AEP Kathu Solar PV energy Facility is situated West of the N14 National Road. The study site is situated approximately 1.5km from the N14.

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

Additional information on regarding the built environment will be included in the Heritage impact assessment that will be included in the Draft EIR.

10.2 GEOLOGY & CLIMATE

The following information relating to Geology and Climate was obtained from the Agricultural Specialist.

10.2.1 Geology

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

10.2.2 Climate

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

Table 6: Climatic conditions on the Remainder of the Farm 460 Legoko.

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

10.2.3 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.

10.3 TOPOGRAPHY

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

10.4 Botanical Composition Of The Site

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.

10.4.1 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^2 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*, *Anthephora argentea*, *Megaloprotachne albescens*, *Panicum kalaharense* 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.

10.4.2 Fine-Scale Vegetation Patterns

Fine scale vegetation patterns on the site will be determined by the ecological specialist as part of baseline study. This will be reported on in the scoping report to follow later on in the environmental process.

10.5 Faunal Component Of The Site

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.

10.5.1 Mammals

The mammalian community at the site is likely to be of moderate diversity, as many as 44 terrestrial mammals and 9 bat species potentially occur in the area. The habitat diversity of the site is however relatively low and consists of bushveld of varying degrees of density, with some relatively open areas of grassland on sandy soils giving way to dense *Tarchnanthus camphoratus* veld or areas of high *Acacia erioloba* or *Acacia haematoxylon* density on deeper sands. Species observed at or in the immediate vicinity of 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, Springbok, Gemsbok and Kudu. Small mammals trapped in the area include Desert Pygmy Mouse *Mus indutus*, Multimammate Mouse *Mastomys coucha*, Bushveld Gerbil *Tatera leucogaster*, 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), Honey Badger *Mellivora capensis* (IUCN LC and SARDB Endangered), Black-footed Cat *Felis nigripes* (Vulnerable), Ground Pangolin *Smutsia temminckii* (Vulnerable) and South African Hedgehog *Atelerix frontalis*. There are also four Near Threatened bat species present in the area. 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. Similarly there is a high probability that the Honey Badger occurs at the site, while the Ground Pangolin may also occur in the area at typically low density. 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.

10.5.2 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. There are however some pans present at the site which 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*.

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.

10.5.3 Reptiles

The Kathu site lies in or near the distribution range of at least 37 reptile species (Appendix 3). 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.

Species observed in the area in the past include Cape Cobra *Naja nivea*, Ground Agama *Agama aculeata*, Spotted Sand Lizard *Pedioplanis lineoocellata*, Variable Skink *Trachylepis varia*, Bibron's Blind Snake *Afrotyphlops 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*. The only species of potential conservation concern which may occur at the site is the Namaqua Plated Lizard *Gerrhosaurus typicus* which was classified as Near Threatened (IUCN 2009), but has since been downgraded to Least Concern by SARCA (Bates *et al*.). 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.

10.5.4 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 7: Listed bird species known from the vicinity of the Kathu site, according to SABAP 1 and 2 (Todd, 2015)

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

11 PLANNING CONTEXT

A Planning specialist will be 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 225ha, 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.

12 AGRICULTURAL POTENTIAL OF THE STUDY SITE

Mr Christo Lubbe undertook an agricultural potential study of the Proposed AEP Kathu Solar project site. A copy of this report is attached in Appendix E2 and the summary of his findings are reflected below.

More than 88% of the soil has an effective depth of less than 30 cm and is dominated by carbonate outcrops. Cultivation is prevented by the lack of soil.

12.1 SOIL CHARACTERISTICS

- Texture of the top and subsoil : sandy
- Sand grade : very fine
- Colour : red
- Water holding capacity: <20mm/m
- Carbon content: low
- Consistency : Loose to very loose

12.2 CLIMATE OF THE AREA

- Semi-arid
- Annual rain 201 to 400mm
- Evaporation 2200 to 2400mm

The climate and soil property combination makes the site largely unsuitable for cultivation. The area is utilised as grazing,

12.3 POSSIBLE IMPACTS

The following possible impacts will received further attention during the impact assessment.

- Loss of agricultural land due to direct occupation by solar panels and other infrastructure.
- Alteration of drainage lines due to the construction of foundations and roads.
- Placement of spoil material generated from construction related excavations.
- Access roads dividing grazing camps in unusable sizes
- Cumulative impacts

12.4 CONCLUSION AND RECOMMENDATION

The climate and soil property combination makes the site largely unsuitable for cultivation. The area is used for grazing.

Impacts are at this stage regarded as low, but assessment will provide conclusions.

13 ECOLOGICAL SENSITIVITY OF THE STUDY SITE

Mr. Simon Todd, of Simon Todd Consulting, conducted an Ecological Sensitivity Analysis of the proposed AEP Solar PV Energy Facility as depicted below.

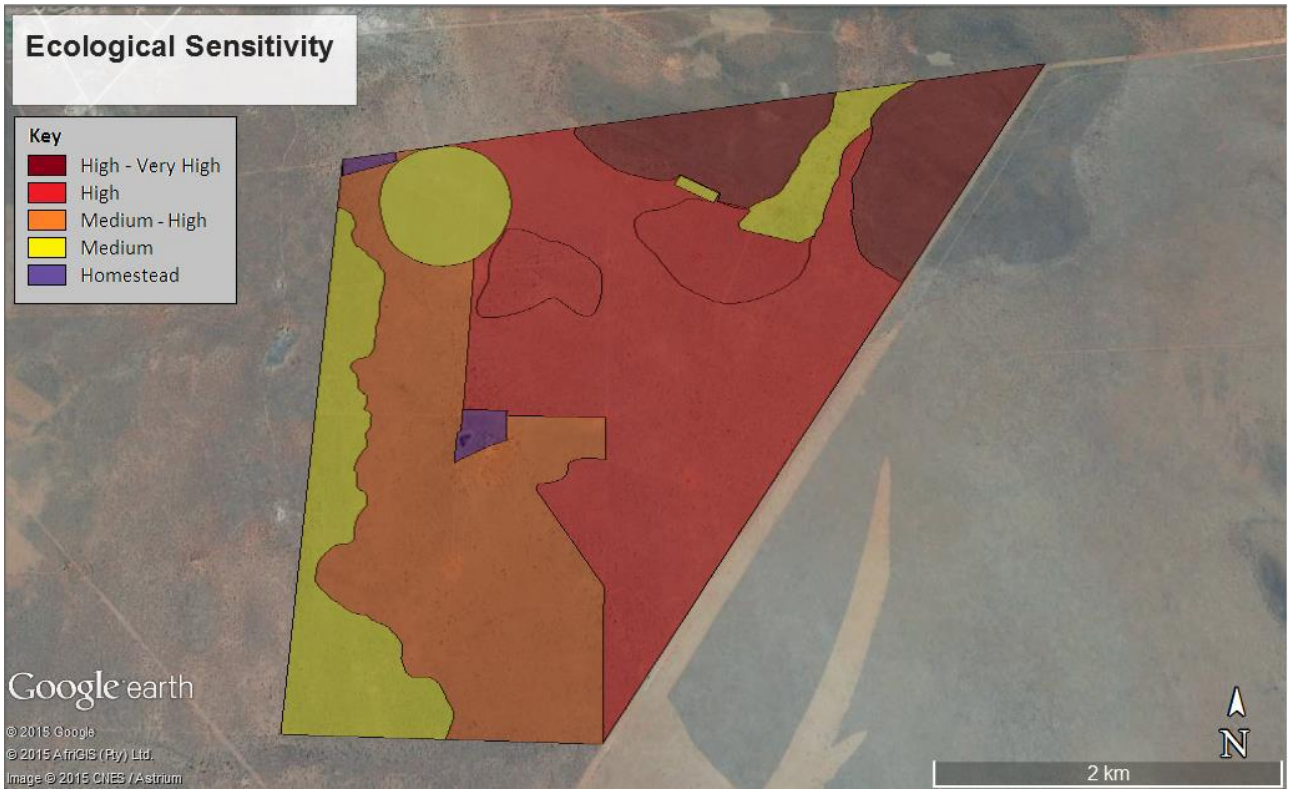


Figure 10: Site sensitivity analysis (Todd, 2015)

14 FRESHWATER ECOLOGICAL CONSIDERATIONS

Dr Brian Colloty has been appointed to undertake a freshwater ecology impact assessment of the proposed development. A copy of Dr Colloty's report is attached in Appendix E12 and summarised below.

14.1 APPROACH / METHODS

The study areas contain is known as an arid rainfall area consisting of dry river beds with little or no flows and clusters of endorheic pans. Thus the following approach was followed for the aquatic assessment:

- A desktop assessment of the study area covering the development footprint in relation to available information related to wetland / riverine ecosystems functioning, river classification, flow regime, water quality, physical, biota, and riparian habitat within the region.
- Mapping to demarcate local drainage and catchments within a 500m radius of the study area (Portion 0 of the Farm Legoko No. 460) (geo-referenced GIS shape files of the aquatic areas) to demonstrate the connectivity between the site and the surrounding region, i.e. the zone of influence. Maps depicting demarcated waterbodies have been delineated at a scale of 1:10 000 after a ground-truthing the study area.

- The determination of the ecological state of any aquatic systems, estimating their biodiversity, conservation and ecosystem function importance with regard ecosystem services at two sites based on their proximity to PV infrastructure or road crossings. Note that this determination does not include avifaunal, herpetological or invertebrate studies; however, possible habitat for species of special concern has been identified.
- Recommendations made for buffer zones and No-go areas around delineated wetland areas based on the relevant legislation, e.g. Conservation Plan guidelines or best practice.
- Impact assessment, based on the standard assessment methodology.
- Recommendations for mitigation of identified impacts, including engineering services that could negatively affect demarcated aquatic areas.
- Recommendations for Environmental Management / Monitoring Plans.

14.2 THE REGIONAL STUDY AREA

The study area is located within the D41J Subquaternary Catchment of the Ga-Mogara River a tributary of the Kuruman River, located within the Molopo River Catchment. The study area however showed no evidence of any water courses or drainage lines that occurred within the site. However, the National Wetland Inventory (ver 4) (SANBI) does indicate several endorheic pans within the study area and close to the preferred alternative site.

The landscape is characterised by large plains covered by bushveld. The surrounding land use and consequent state of the surrounding vegetation is largely determined by the agricultural practices within the study area, which is dominated by cattle production.

The pans are typical of this flat landscape where runoff accumulates in these depressions. The depressions have formed through the dissolution of the underlying limestone creating these endorheic systems (i.e. inflow but no visible surface outflow) and are thus karst (lime) related systems (Plate 2). This was confirmed by the soil specialist that indicated that large areas within the study area were covered by hard pan carbonates.

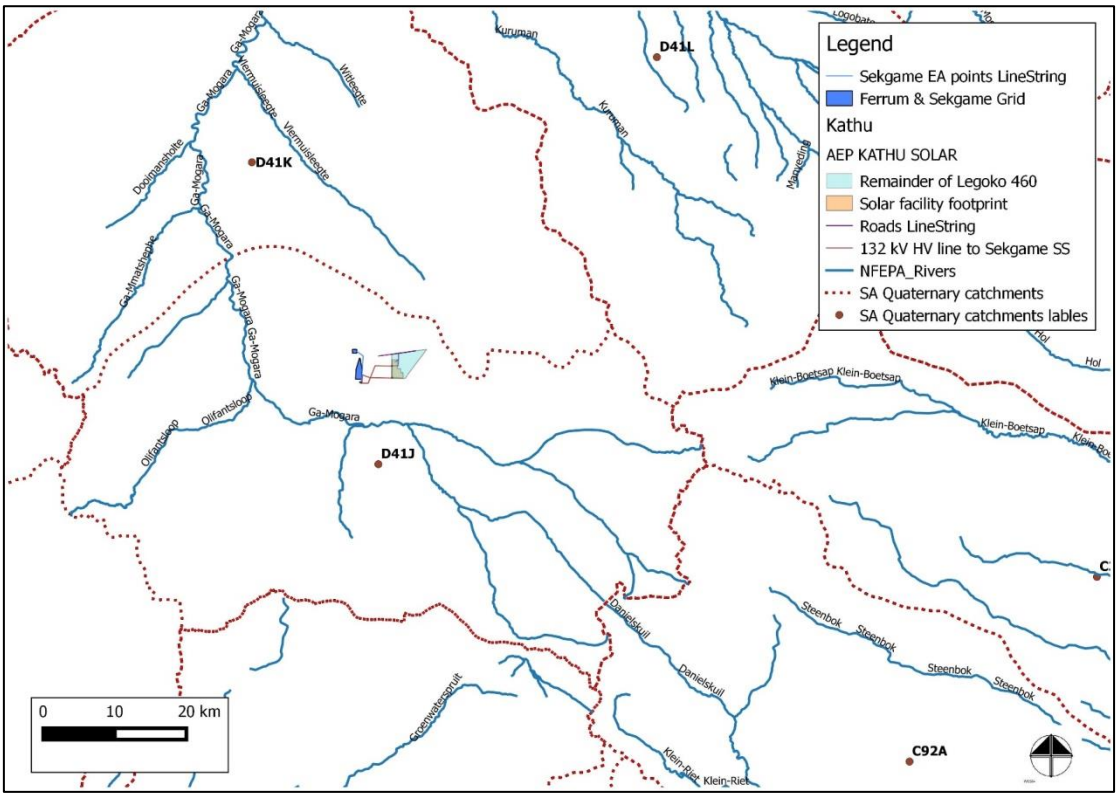


Figure 11: The study area in relation with the Quaternary Catchments and the main stem rivers (Source: DWS & NFEPA)

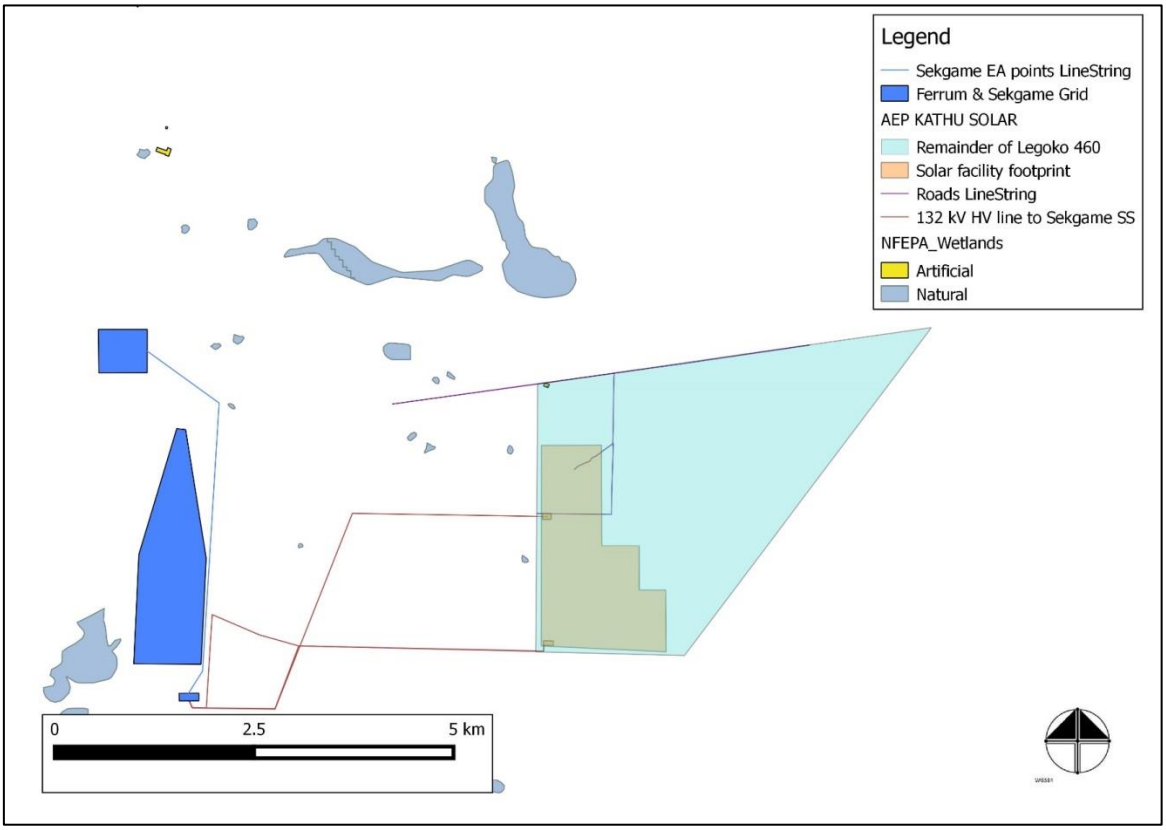


Figure 12: The study area and project components in relation to wetlands and water courses described in National Spatial Databases (SANBI)

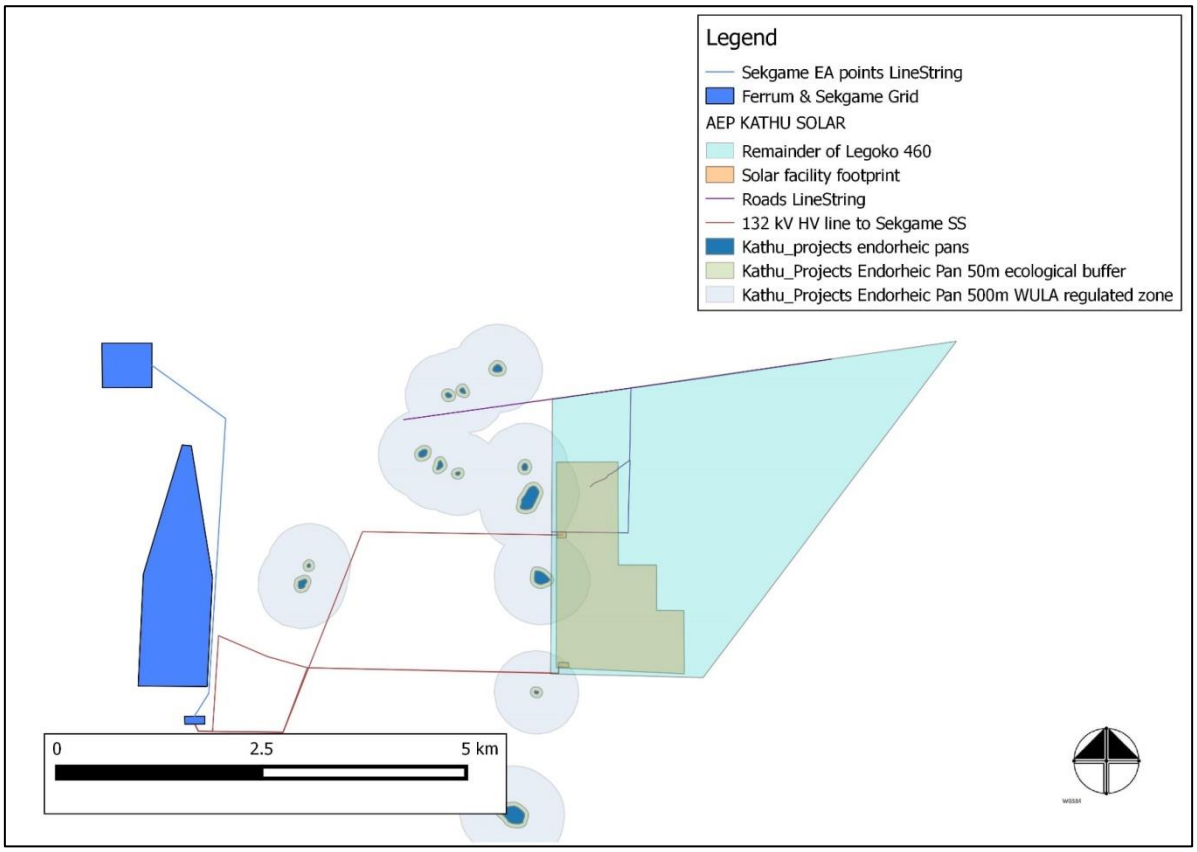


Figure 13: The observed and delineated wetlands observed within the study area

14.3 ON-SITE DATA

14.3.1 Endorheic Pans

No flow or surface water was observed during the surveys, particularly within any water courses or drainage lines. This assessment is therefore based on a broad evaluation of the natural vegetation found within the region and at the site in relation to the wetlands observed and delineated. The pans a form of wetland are ephemeral for long periods even years at a time. Surface water will thus accumulate for short periods after heavy rainfalls, and then either evaporate or percolate into the surrounding ground water systems. No instream or aquatic vegetation was observed in these systems and species were similar to those observed in the surrounding systems.

Notably none of the proposed development (PV panels, planned access roads or the transmission line alignments) falls within the proposed 50m no-go ecological buffer Although some of the infrastructure does occur within the 500m regulated zone would require a water use license.

14.4 PRESENT ECOLOGICAL STATE, ECOLOGICAL IMPORTANCE AND SENSITIVITY

In the compilation of this report, a number of sensitive areas within and adjacent to the study area were identified. From an aquatic systems point of view most of these were associated with the endorheic pans, noting that two of these have been transformed when converted into farm dams.

However, two sites representative of these systems within the study area were identified and rated to assess the Present Ecological State (PES) and Ecological Importance & Sensitivity (EIS) of the affected systems. Although the PES / EIS, was assessed using the VEGRAI 3 models, this was

only based on the riparian vegetation component as no instream biota, flows or water quality could be used in the Index for Habitat Integrity due to the extreme ephemeral natural of these systems. The description and scores for each of the sites is presented below, while the overall sensitivity of the systems based on the representative sites assessed below is shown in the figure below. The only systems that received a Low sensitivity assessment were the two pans that had been transformed:

PES Site 1– 27.744527S; 23.106589E (DD.dddd WGS84)

Figure 14: A small pan located in the northern portion of the study area. Note the hard pan carbonate (limestone) in the foreground

The Present Ecological State (PES) assessment was conducted although no instream vegetation was observed, with the pan colonised by typical grass and shrub species from the region. In the Level 3 Riparian Vegetation Response Assessment Index (VEGRAI, Kleynhans *et al*. 2007), PES scoring system (see table below), the non-marginal woody vegetation thus dominated the overall PES score (B/C = Near Natural / Moderately Modified). The score was lowered due to the presence of grazing, trampling and encroachment by the surrounding shrubs.

The Ecological Importance and Sensitivity (EIS) of this system, which is representative of all the pans found throughout the site was rated as Moderate (importance), however due to type and uniqueness within these systems the **Sensitivity would be rated as High** (= Red areas in Figure below). The likelihood and significance of this impact is assessed in detail in the impact assessment of this report. The EIS score could have been higher but due to the lack of aquatic habitat, grazing and the presence encroaching vegetation the score was reduced.

Table 8: EIS Score for AEP Kathu Solar on PES Site 1

LEVEL 3 ASSESSMENT					
METRIC GROUP	**CALCULATED RATING**	**WEIGHTED RATING**	**CONFIDENCE**	**RANK**	**% WEIGHT**
MARGINAL	100,0	66,7	3,0	2,0	2,0
NON MARGINAL	73,3	24,4	3,0	1,0	1,0
	2,0				3,0
LEVEL 3 VEGRAI (%)				76.5	

VEGRAI EC				**B/C**
AVERAGE CONFIDENCE				3,0

PES Site 2 – 27.758615S 23.108379E (DD.dddd WGS84)

Figure 15: One of the larger pans showing located in the southern portion of the study area

Present Ecological State (PES) Site 2 was situated south of PES Site 1 within a larger pan. No marginal or instream vegetation or other associated aquatic biota have been observed in this system due to its ephemeral nature. The PES score (See Level 3 VEGRAI assessment results below) was B = Near Natural, but this was due to additional impacts such as existing tracks, livestock tracks and grazing that have affected the this system.

The Ecological Importance and Sensitivity (EIS) of this system, which is representative of all the pans found throughout the site was rated as Moderate (importance), however due to type and uniqueness within these systems the **Sensitivity would be rated as High** (= Red areas in Figure below). The likelihood and significance of this impact is assessed in detail in the impact assessment of this report. The EIS score could have been higher but due to the lack of aquatic habitat, grazing and the presence encroaching vegetation the score was reduced.

Table 9: EIS Score for AEP Kathu Solar on PES Site 2

LEVEL 3 ASSESSMENT					
METRIC GROUP	**CALCULATED RATING**	**WEIGHTED RATING**	**CONFIDENCE**	**RANK**	**% WEIGHT**
MARGINAL	100,0	66,7	3.5	1,0	1,0
NON MARGINAL	60,0	20,0	3.5	2,0	2,0
	2,0				3,0
LEVEL 3 VEGRAI (%)				85.8	
VEGRAI EC				**B**	
AVERAGE CONFIDENCE				2,8	

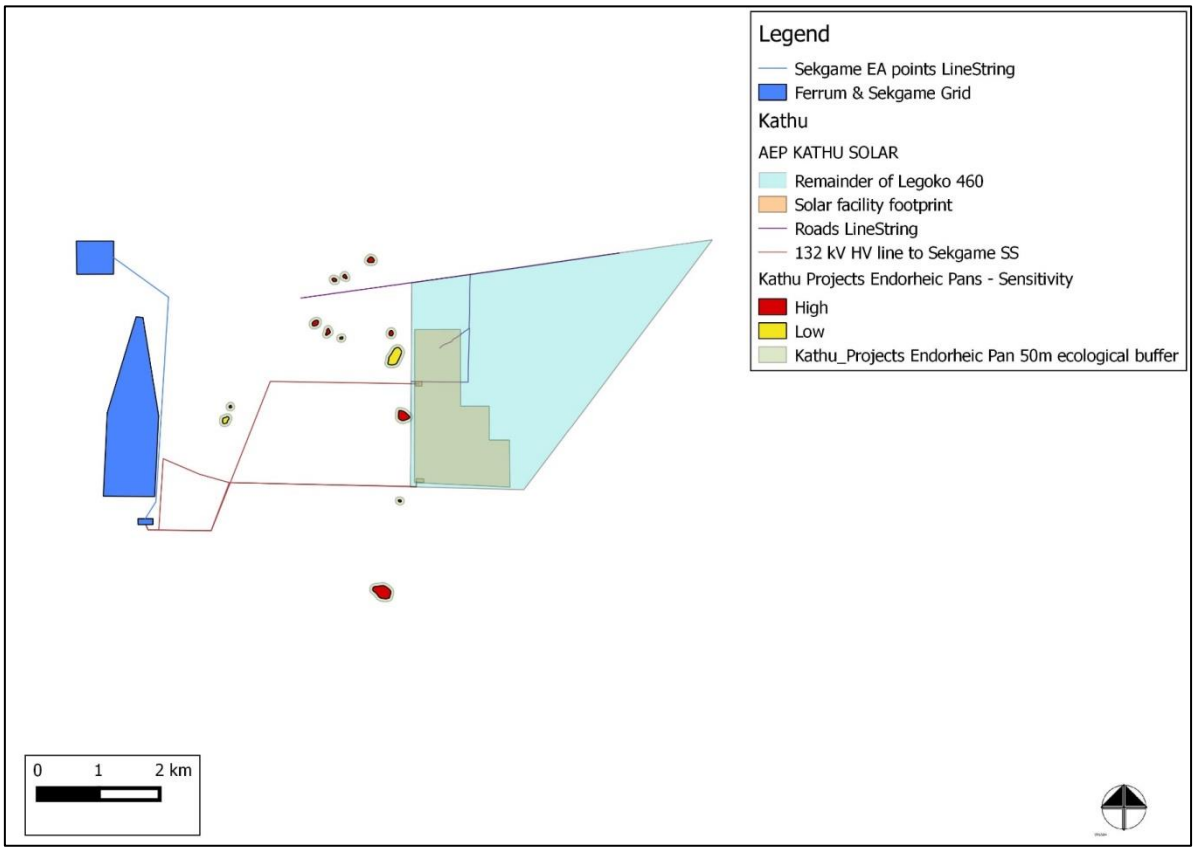


Figure 16: Overall sensitivity rating for the various aquatic systems. Note the 50m no-go buffer is also indicated.

14.5 RECCOMENDED ENVIRONMENTAL MANAGEMENT PLAN MEASURES

The following recommendations have been made by the Freshwater Specialist and will be included in the Environmental Management Plan that will form part of the Draft Environmental Impact Reports.

Table 10: Management recommendations made by the freshwater specialist.

Project component/s	Site selection with regard minimising the overall impact on the functioning of the aquatic environment
Potential impact	Loss of important habitat
Activity risk source	Placement of hard engineered surfaces (PV plants)
Mitigation: Target / Objective	Select a favourable site, having the least impact or within an area that is least sensitive, i.e. not within wetlands and their buffers.
Mitigation: Action/control	Minimise the loss of aquatic habitat – physical removal and replacement by hard surfaces by avoiding as many of the sensitive (High) pans possible as is shown in Figure 5
Responsibility	Developer
Timeframe	Planning and design phase
Performance indicator	N/A

Monitoring	N/A
Project component/s	Alteration of sandy substrata into hard surfaces impacting on the local hydrological regime
Potential impact	Poor stormwater management and the alteration hydrological regime
Activity risk source	Placement of hard engineered surfaces
Mitigation: Target / Objective	Any stormwater within the site will be handled in a suitable manner, i.e. clean and dirty water streams around the plant and install stilling basins to capture large volumes of run-off, trapping sediments and reduce flow velocities.
Mitigation: Action/control	Reduce the potential increase in surface flow velocities and the impact on aquatic systems
Responsibility	Developer / Operator
Timeframe	Planning, design and operation phase
Performance indicator	Water quality and quantity management - "Water Use Licence Conditions"
Monitoring	Surface water monitoring plan that ensures no erosion takes place
Project component/s	The use of chemicals and hazardous substances during construction and operation
Potential impact	These pollutants could be harmful to aquatic biota, particularly during low flows when dilution is reduced. Lime-containing (high pH) construction materials such as concrete, cement, grouts, etc., deserve a special mention, as they are highly toxic to fish and other aquatic biota. If dry cement powder or wet uncured concrete comes into contact with surface run-off or river water, these compounds can elevate the pH to lethal levels. Thus extreme care should be taken when these hazardous compounds are used near water. For fish, pH levels of over 10 are considered toxic.
Activity risk source	Accidental spillage of harmful materials and or hydrocarbons used during the construction process.
Mitigation: Target / Objective	Management actions that are applicable to all the construction sites include: • Strict use and management of all hazardous materials used on site. Considering the extremely low likelihood of surface flows, it is advised that construction activities are suspended unit such contaminants are removed from the site if surface flows are observed at or adjacent to the selected site area • Strict management of potential sources of pollution (hydrocarbons from vehicles and machinery, cement during construction, etc.). • Strict control over the behaviour of construction workers. • All areas adjacent to the hard-engineered erosion-control structures provided for this project, which are (accidently) disturbed during the construction activities, should to be rehabilitated using appropriate indigenous vegetation.
Mitigation:	Minimise the potential impact of pollutants entering the pans

Action/control	
Responsibility	Developer / Operator
Timeframe	Planning, design and operation phase
Performance indicator	Water quality and quantity management - "Water Use Licence Conditions"
Monitoring	Surface water monitoring plan

The recommendations made above, will be incorporated into the Environmental Management Plan that will form part of the Draft and Final Environmental Impact Reports.

14.6 CONCLUDING COMMENTS

With suitable mitigation and avoidance of the pans (incl of the 50m non go buffer), 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 **LOW**.

The Figure above indicates the various water use regulated zones within the study area as required by legislation. A WULA in terms of Section 21 c and i of the National Water Act will be required should any construction take place within any these areas i.e., any development within 500m of a wetland boundary.

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 to the fact that 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 the only a low percentage of projects will actually move into the construction phase.

15 VISUAL CONSIDERATIONS

Mr Stephen Stead of Visual Resource Management Africa has been appointed to undertake a Visual Impact Assessment of the proposed development. The Visual Scoping Statement is attached in annexure E7 and is summarised below.

15.1 PROJECT VISIBILITY

The visible extent, or viewshed, is ‘the outer boundary defining a view catchment area, usually along crests and ridgelines’ (Oberholzer, 2005). In order to define the extent of the possible influence of the proposed project, a viewshed analysis is undertaken from the proposed sites at a specified height above ground level as indicated in the below table making use of open source NASA ASTER Digital Elevation Model data (NASA, 2009). The extent of the viewshed analysis was restricted to a defined distance that represents the approximate zone of visual influence (ZVI)

of the proposed activities, which takes the scale, and size of the proposed projects into consideration in relation to the natural visual absorption capacity of the receiving environment. The maps are informative only as visibility tends to diminish exponentially with distance, which is well recognised in visual analysis literature (Hull & Bishop, 1988). The ZVI for the proposed SEF site was restricted to 12km, as the surrounding slightly elevated terrain to the west and east would contain 6m high landscape modifications within this range. The surrounding landscape visual absorption capacity is also higher due to the Sishen Mine landforms, the Eskom power lines as well as the built environment to the north of the proposed site.

Table 11: Proposed Project Heights Table

Project	Proposed Activity	Approx. Max. Height (m)	Approx. ZVI (km)
PV	PV Structures	6	12
Power line	Monopole Structures	25	6

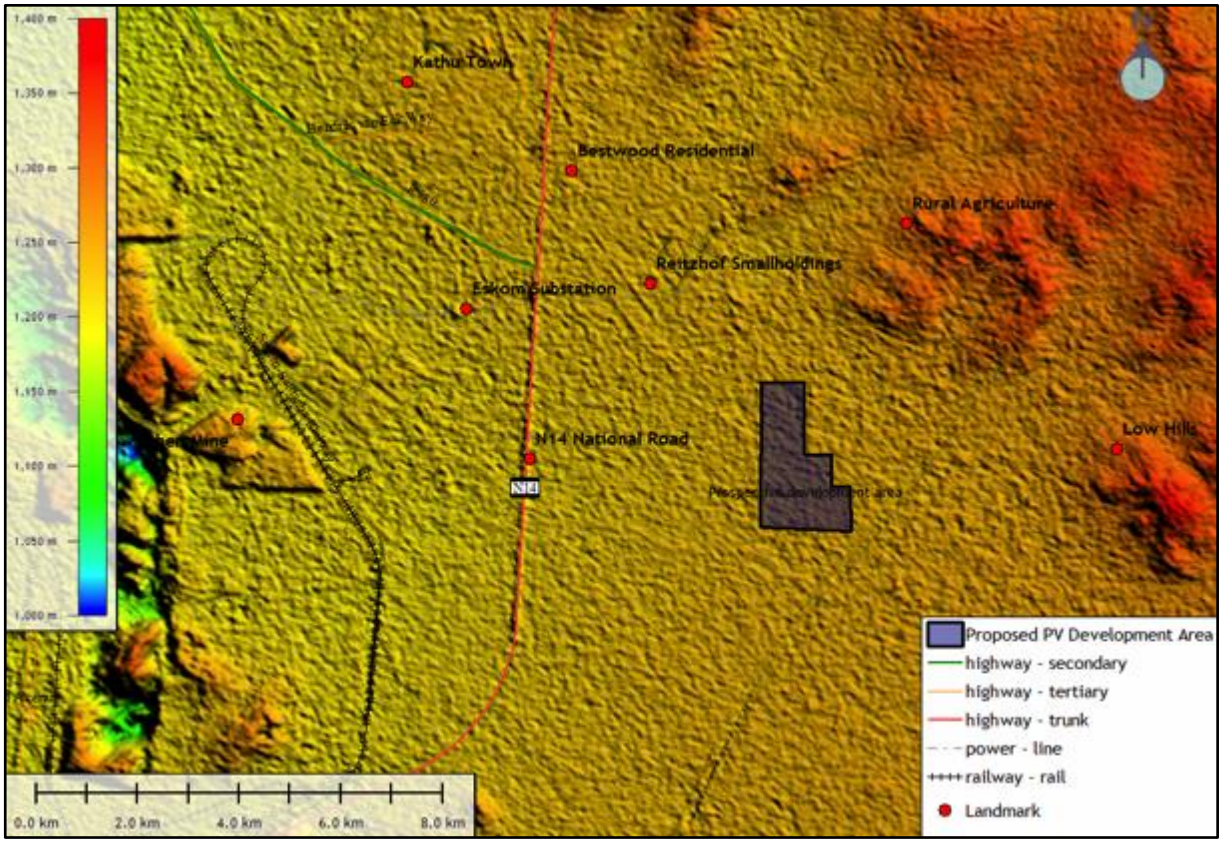


Figure 17: Regional NASA ASTER Digital Elevation Model Map depicting the regional topography in relation to key landmarks surrounding the proposed development site.

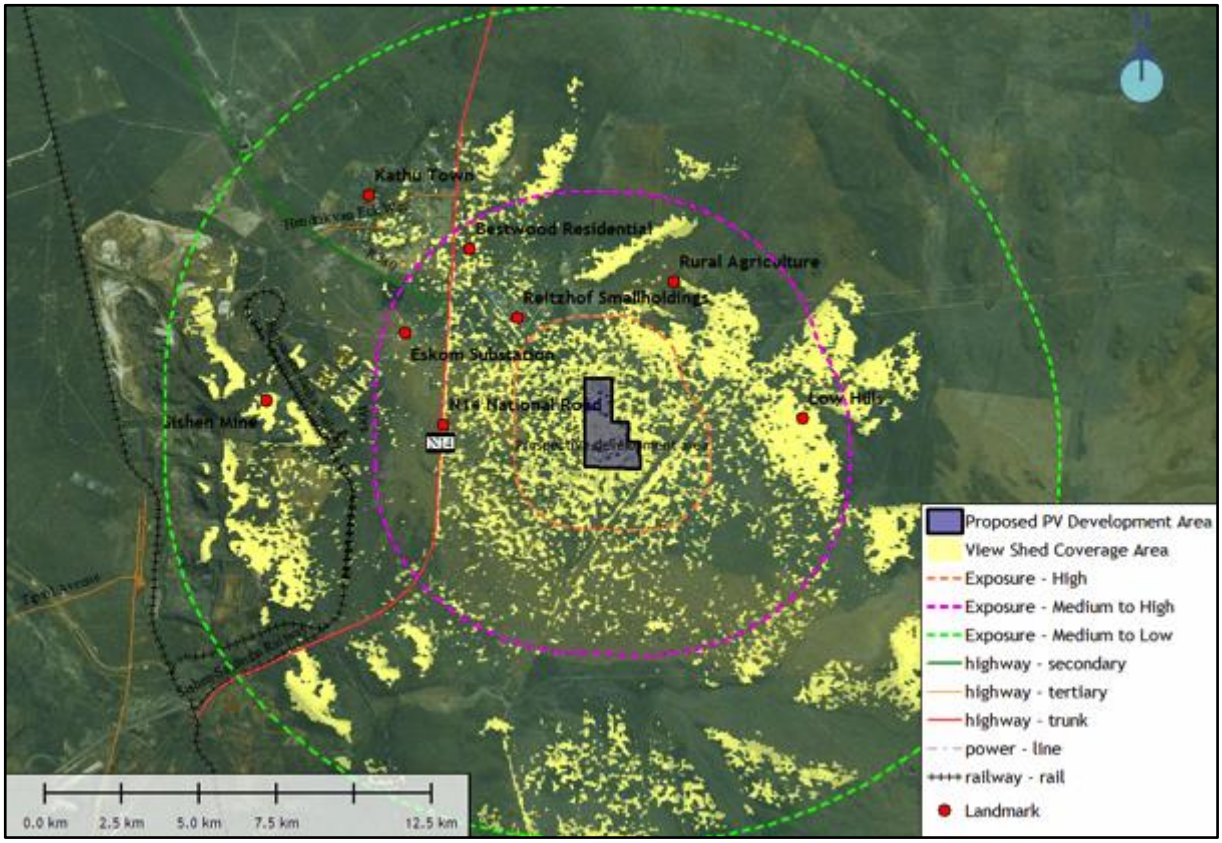


Figure 18: Viewshed from the proposed PV site generated from 6m above ground with landscape context features indicated overlaid onto OS Satellite Image Map

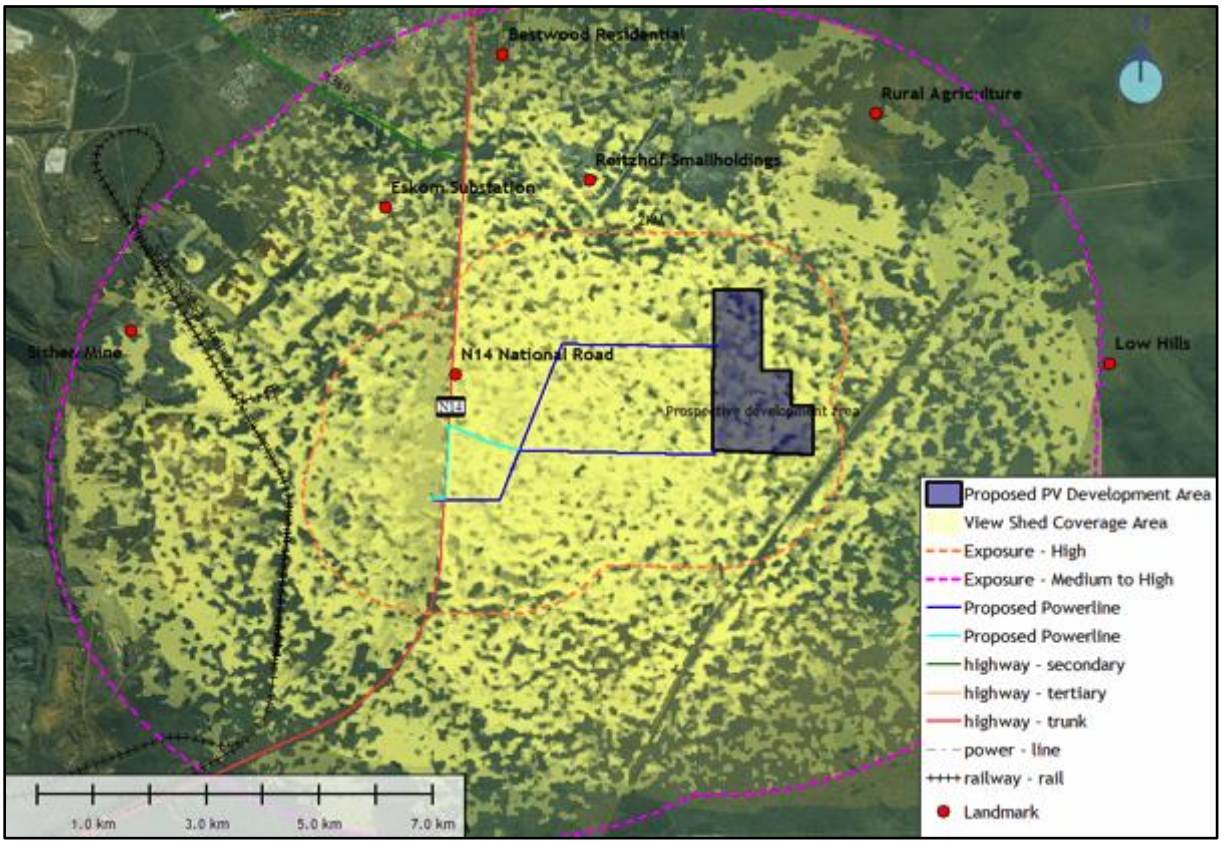


Figure 19: Viewshed from the proposed power line turning points at 25m above ground with landscape context features indicated overlaid onto OS Satellite Image Map

15.2 REGIONAL LANDSCAPE CHARACTER

Landscape character is defined by the U.K. Institute of Environmental Management and Assessment (IEMA) as the 'distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement'. It creates the specific sense of place or essential character and 'spirit of the place'. (IEMA, 2002)

The following landmarks defining the surrounding area's characteristic landscape, were identified within the proposed project viewshed, and subsequently surveyed during the site visit:

- The N14 National Road
- Sishen Mine
- Rural agricultural areas
- Reitzhof small holdings
- Bestwood residential areas
- Eskom regional substation (Ferrum MTS) and power lines

15.2.1 The N14 National Highway

Figure 20: Photograph in a southerly direction of the N14 National Road

The N14 is a national road located 1.7km to the west of the proposed project boundary. 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.

15.2.2 Sishen Mine

Figure 21: Photograph depicting the Sishen Mine waste rock dumps and factories.

Sishen mine is located approximately 3.5km to the west of the proposed project boundary. The iron ore mine is one of the largest in South Africa and includes large waste rock dump landforms, large infrastructure and buildings. A by-product of processing the iron ore is a red-oxide dust that colours the buildings as seen in the photograph above. Contrast generated by the large man-made landforms and structures is high and dominates the attention of the casual observer. Although the visual massing of the buildings and infrastructure is reduced by their red colouration against the backdrop of the similarly coloured waste dumps, the overall landscape character of the site and surrounds is influenced negatively, visually degrading the surrounding landscape context within approximately a four kilometre radius.

15.2.3 Rural agricultural areas

The proposed site, as well as the areas to the east and south of the site, are currently utilised for agriculture, the main farming activity is livestock farming with cattle. The proposed site and surroundings (excluding Reitzhof to the north) are zoned for agricultural land uses. Care should be taken to ensure that landuse changes on the site do not negatively influence the viability of the adjacent farming lands.

Figure 22: Photograph of the typical vegetation where livestock are grazed.

15.2.4 Reitzhof small holdings

Figure 23: Photograph of the entrance sign to Reitzhof Smallholdings.

Located approximately two kilometres northwest of the proposed site is the small holding area of Reitzhof. As indicated in the photograph above, the triangular area is divided up into approximately 30 medium sized stands, which are serviced by a single internal gravel road. Many of the stands have not been developed, allowing a rural agricultural sense of place. Most of the

structures on the developed plots are also of a size and scale that do not dominate the attention of the casual observer. However, some large sheds that are industrial in size and scale have been built. If this practice were to be continued, a semi-industrial sense of place would result. The surrounding bush-veld vegetation, which includes some medium sized trees, does reduce the visibility of the proposed site to receptors from the surrounding areas.

15.2.5 Bestwood residential estate

Figure 24: Photograph of the existing residential dwellings of the Bestwood estate.

Located 5.5km to the northwest of the proposed site is the new residential area of Bestwood Estate. Stands are small and most of the development appears to be single storey residential. There are some double storey units utilised for accommodation.

15.2.6 Eskom regional substation and power lines

Located approximately 4.5km to the west of the proposed site, is the Ferrum substation which is an important regional electrical supply node. Located in close proximity to the proposed site (approx. 1km to the north and adjacent the south-west corner) are two 400kv transmission lines (see the northern transmission line in Figure 14 below). Also of influence within the landscape are the Eskom routing corridors for the 66Kv to 132Kv network upgrade that Eskom is proposing. As depicted in Figure 15 below, the proposed lines are located in close proximity to the proposed site and the proposed power lines, in conjunction with the existing Eskom lines, could result in negative cumulative visual effects. To avoid this occurrence, care should be undertaken to ensure that as much as possible, that the proposed power lines are aligned with existing and proposed Eskom power line routings.

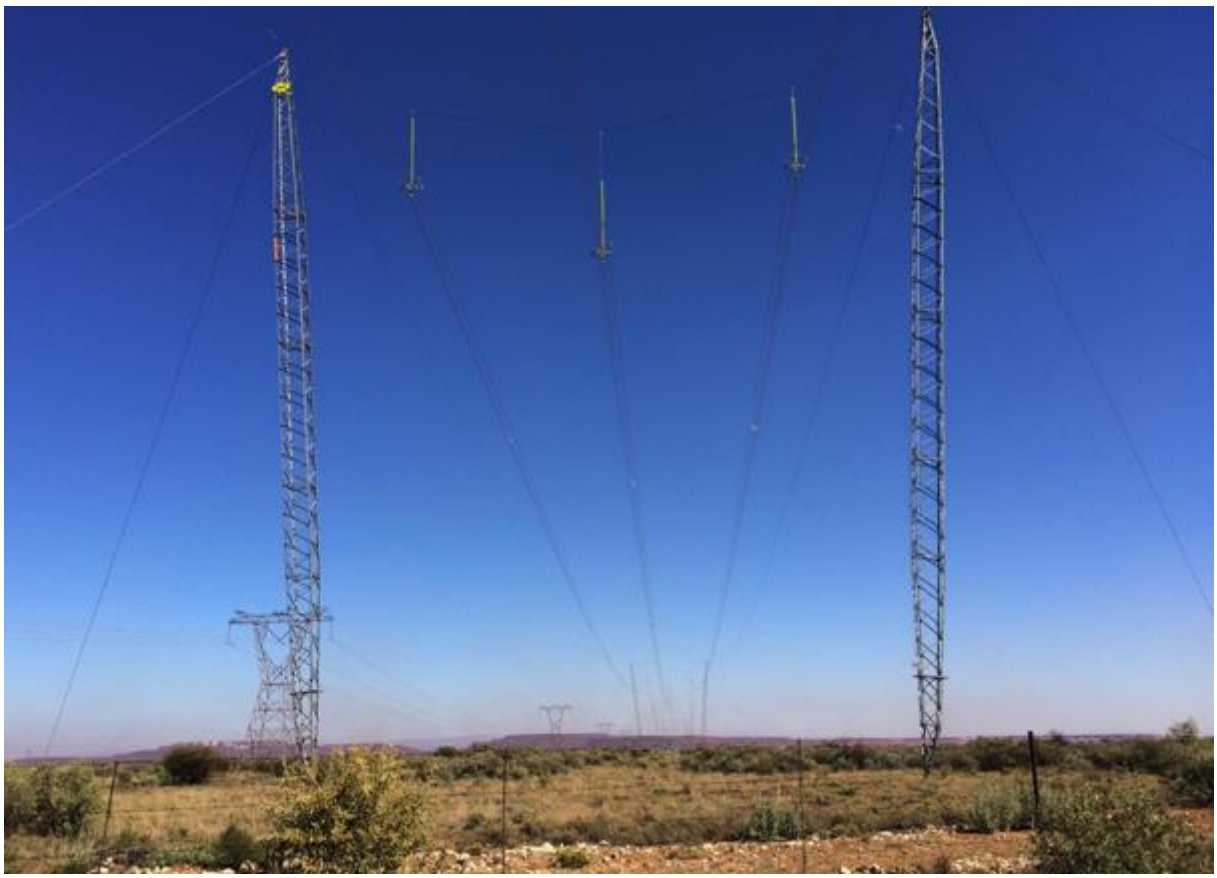


Figure 25: Photograph of the northern Eskom transmission line corridor.

Figure 26: Map of the proposed Eskom routing corridors for the 66Kv to 132Kv network upgrade in relation to the proposed PV site.

15.3 SITE LANDSCAPE CHARACTER

In terms of the VRM methodology, landscape character is derived from a combination of scenic quality, receptor sensitivity to landscape change, and distance of the proposed landscape modification from key receptor points. The scenic quality is determined making use of the VRM scenic quality questionnaire (refer to addendum). In order to better understand the visual resources of the site, regional vegetation and terrain influences are described at a broad-brush level.

15.3.1 Site Topography

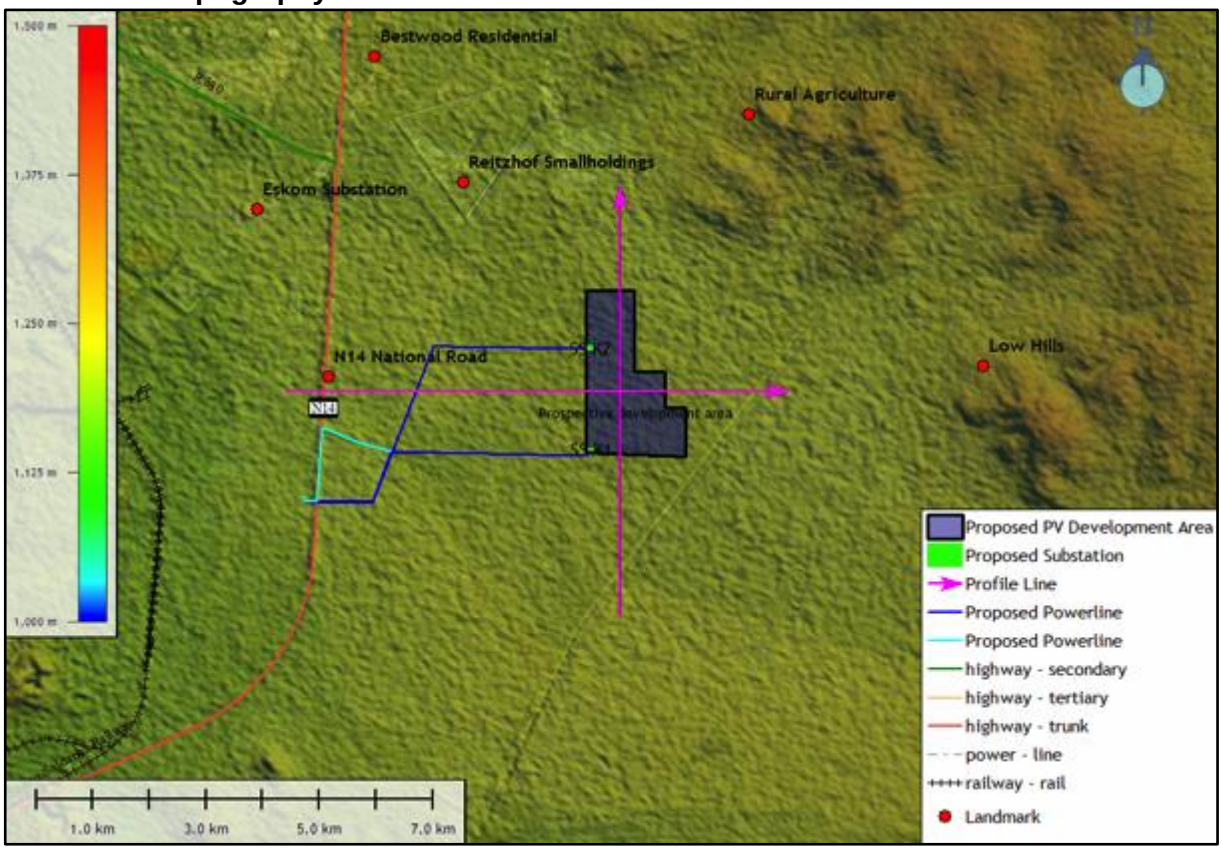
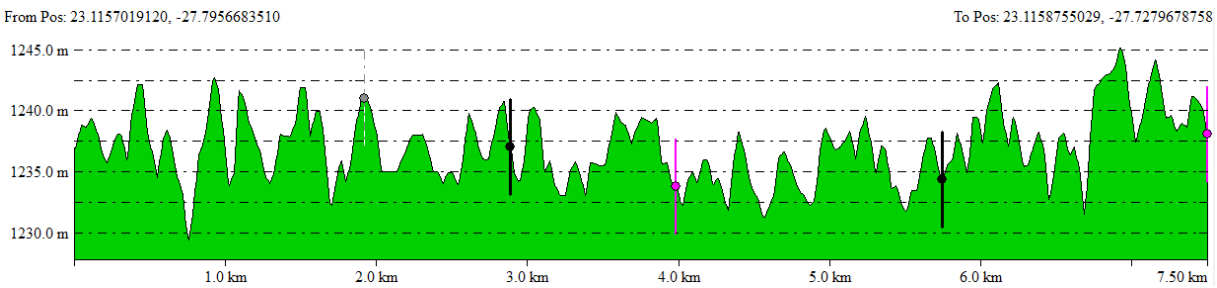
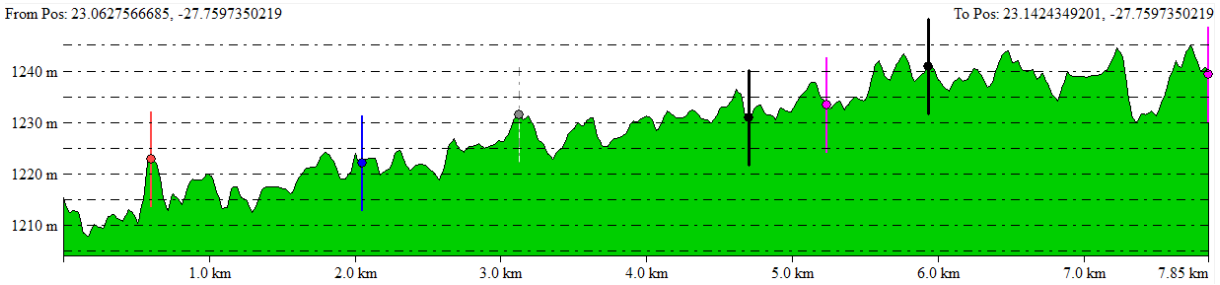


Figure 27: Profile line locality in relation to proposed development areas terrain overlay map

The below elevation profiles were generated making use of ASTER data Digital Elevation Model. As indicated in the South to North Profile, the proposed site is regionally located in a slight topographic depression, with slightly raised ground to the north. Across the profile, the terrain is essentially flat. The West to East Profile depicts a gradual rise in elevation, with the site west facing and draining to the east. High ground to the east would restrict the visual extent, with lower ground to the west opening up views of the proposed landscape modification.



South to North Profile



West to East Profile

Figure 28: Profile lines

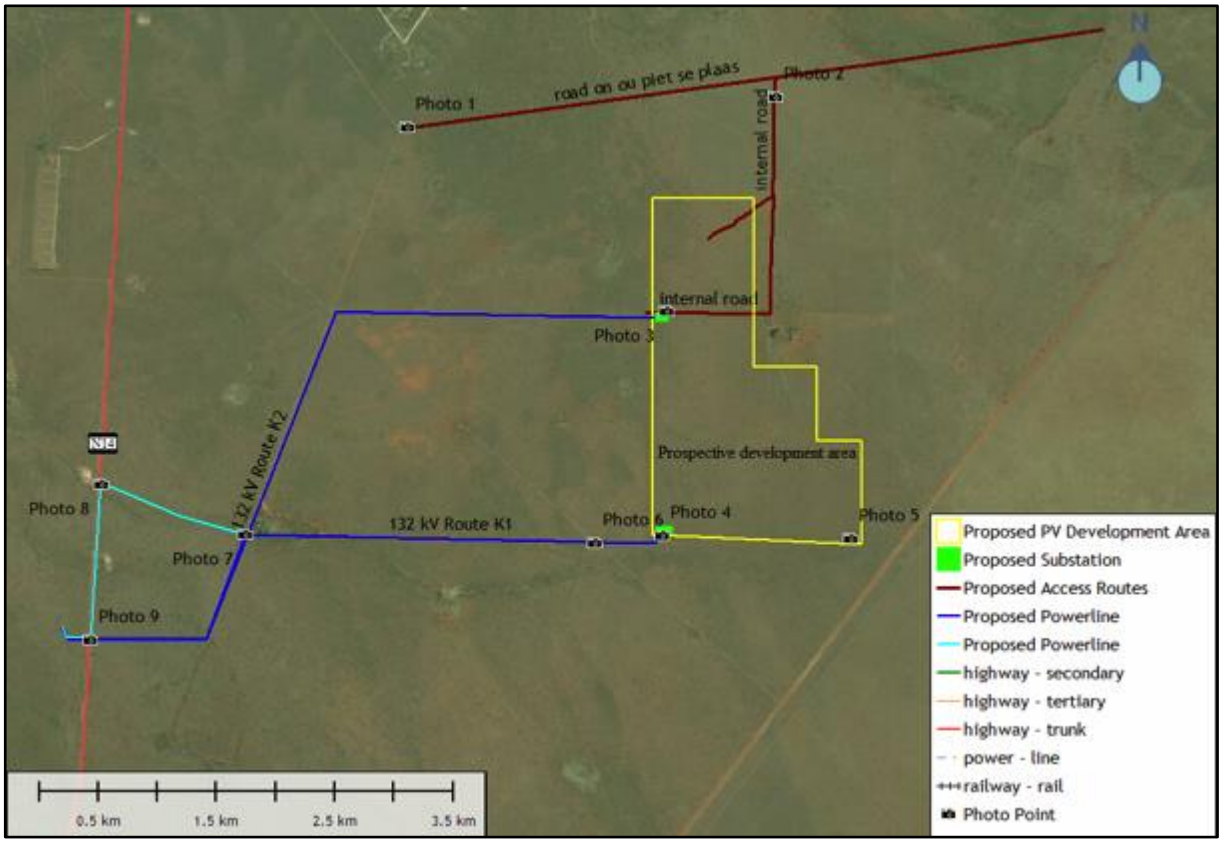


Figure 29: Site landscape character and photograph point locality overlay onto Open Source Satellite image map.

15.3.2 Site Photographs

Figure 30: View east from Photo 1 location of the existing farm road and telephone poles with the low hills in the background.

Figure 31: View south from Photo 2 location of the existing farm track and the vegetation that has been cleared as part of the centre-pivot irrigation system.

Figure 32: View north from Photo 3 of the sparse vegetation in the foreground with the Eskom power line located in the background.

Figure 33: View east from Photo 4 of the sparce vegetation and low hills in the background

Figure 34: View north from Photo 5 location of the very sparce vegetation and the low hills in the background

Figure 35: View northwest from Photo 6 location of the existing Eskom power line under which the proposed 132kV power line will be routed.

Figure 36: View north from Photo 7 location of the existing distribution line which the proposed 132kV power line will cross over.

Figure 37: View south from Photo 8 location of the N14 road and the existing telephone lines to the west of the road.

Figure 38: View west from Photo 9 location of the proposed 132kV power line crossing of the N14 with the Sishen Waste Rock Dumps located in the background.

15.3.3 Scenic Quality and Receptor Sensitivity Ratings

Table 12: Scenic Quality Rating Table

Aspect	Rating	Motivation
Landform	1	Generally flat terrain that has few or no interesting landscape features.
Vegetation	2	Some variety of vegetation, but only one or two major types.
Water	1	Not applicable
Colour	2	Subtle colour variation created by the grey-green vegetation and the orange colour of the sands.
Scarcity	2	Interesting within its setting but fairly common within the region.
Adjacent scenery	1	The dominance of the adjacent multiple power lines to the north and south, as well as the limited views of Sishen Mine to the west, reduce the scenic value of the adjacent scenery.
Cultural Modif.	2	Cultural modifications on site are limited to farm tracks, fences and some farming structures. These maintains the existing rural agricultural sense of place.
Total	1	C (Low)

(Key: A= scenic quality rating of ≥19 (High to Very High); B = rating of 12 – 18 (Medium-high to Medium-low), C= rating of ≤11 (Medium-low to Very Low))

Table 13: Receptor Sensitivity Rating Table

Aspect	Rating	Motivation
Type user	Low	Reitzhof, located to the north of the property, does include residential users, who might experience medium levels of concern for the maintenance of visual quality. This would more likely be related to perceived devaluation of property prices, as opposed to aesthetic

		values.
Amount use	Low	Current direct views of the property are limited. This is due to the surrounding vegetation, which includes some small trees, as well as a slight topographic rise between the N14 users and the site.
Public interest	Low	Given the strong mining landscape context to the west of the site and the domination of mining within the local economy, it is likely that public interest in maintaining visual quality is low.
Adjacent land users	Low	The nearest receptors are from the Reitzhof smallholdings and the N14 road users. The southern section of the Reitzhof area is strongly dominated by the Eskom power lines that cut through this area. The section of N14 from which users see the proposed site, is also strongly influenced by the views of the Sishen Mine to the west (away from the proposed site). Both factors are likely to reduce the concern for the maintenance of visual quality.
Special zoning	Medium	The property is currently zoned rural agricultural which restricts development to agricultural purposes.
Overall	Medium to Low	

15.3.4 Key Observation Points

Key Observation Points (KOPs) are defined by the Bureau of Land Management as the people (receptors) located in strategic locations surrounding the property that make consistent use of the views associated with the site where the landscape modifications are proposed. These locations are important in terms of the VRM methodology, which requires that the degree of contrast that the proposed landscape modifications will make to the existing landscape be measured from these most critical locations, or receptors, surrounding the property.

To define the KOPs, potential receptor locations are identified in the viewshed analysis, which are screened, based on the following criteria:

- Angle of observation
- Number of viewers
- Length of time the project is in view
- Relative project size
- Season of use
- Critical viewpoints, e.g. views from communities, road crossings
- Distance from property

The receptors at these points will have clear views of the proposed project which could result in a change to local visual resources. The KOP's are:

- Reitzhof small holdings (proposed PV site)
- N14 National Road (proposed power line)

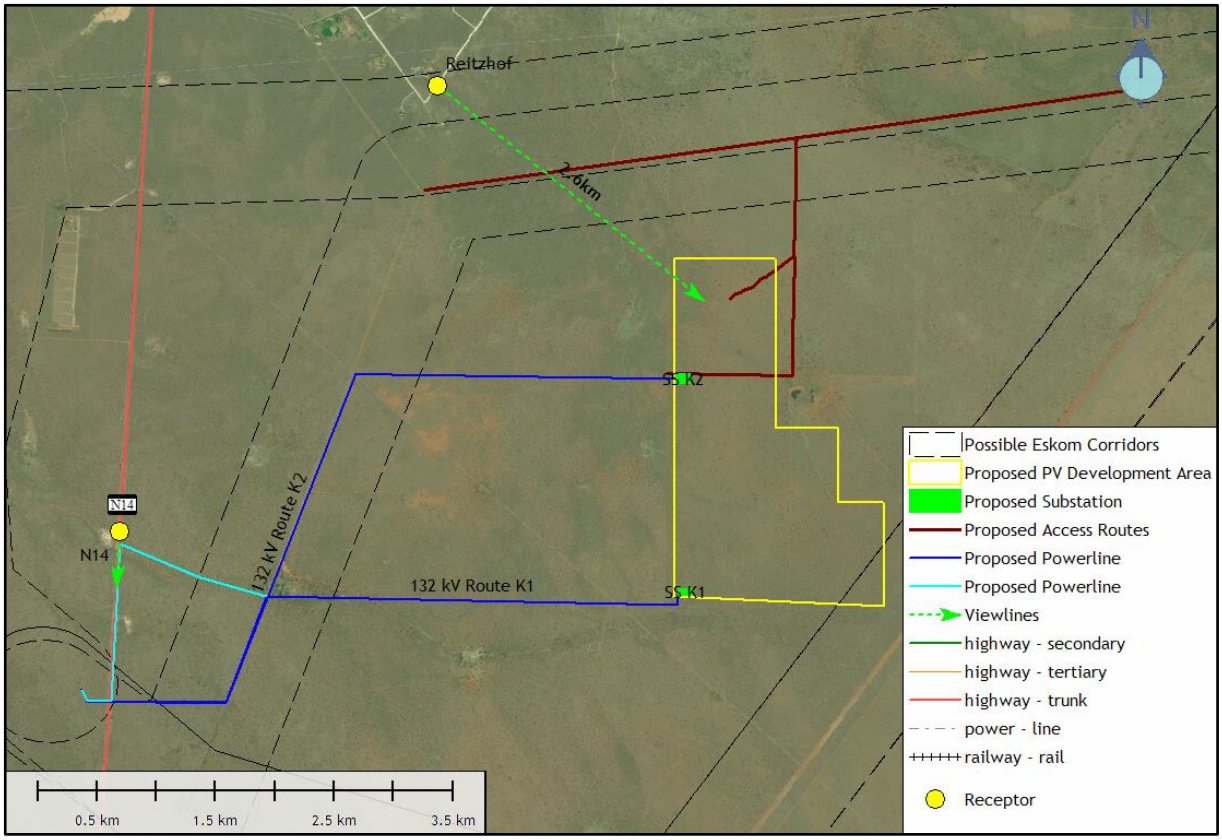


Figure 39: Map depicting the main receptor locations and distances to the proposed site.

Figure 40: Photograph depicting the view from the southern section of Reitzhof in the direction of the proposed site. Visibility of 6m high PV structures is unlikely

Figure 41: Photograph depicting the view south from the N14 road with the proposed alternative power line routed east of the road.

15.4 VRM FINDINGS

15.4.1 Visibility

The visibility of the proposed PV and power lines is rated **low.** 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.

15.4.2 Exposure

Exposure is rated **medium to high** with the main receptors, the N14 National Highway, located approximately 1.7km to the west. Two of the Reitzhof smallholdings residents are located in a high exposure zone and are 870m to the north of the proposed site. The proposed power line component is rated **high** due to the alignment of the K2 Grid option's alignment along the N14, and all power lien options crossing crossing over the N14 National Road.

15.4.3 Scenic Quality

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.

15.4.4 Receptor Sensitivity to Landscape Change

Receptor sensitivity to landscape change for all the proposed development options was rated **low.** Current direct usage of the property views are limited by the surrounding vegetation which includes some small trees, between the N14 users and the site. Given the strong mining landscape context of the site and the domination of mining within the local economy, it is likely that public interest in maintaining visual quality is low.

15.4.5 VRM Objectives

The BLM has defined four Classes that represent the relative value of the visual resources of an area and are defined making use of the VRM Matrix below:

i. **Classes I and II** are the most valued
ii. **Class III** represent a moderate value
iii. **Class IV** is of least value

The Classes are not prescriptive and are utilised as a guideline to determine the carrying capacity of a visually preferred landscape that is utilised to assess the suitability of the landscape change associated with the proposed project. The Visual Inventory Classes are defined using the matrix below and with motivation, can be adjusted to Visual Resource Management Classes which take zoning and regional planning into consideration if applicable.

Class I

Class I is assigned when legislation restricts development in certain areas. No Class I areas were defined.

Class II

Class II visual objectives were assigned to the following features:

- There are no Class II areas defined for the site due to the low scenic quality and medium to low receptor sensitivity to landscape change.

The Class II objective is to retain the existing character of the landscape and the level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer, and should repeat the basic elements of form, line, colour and texture found in the predominant natural features of the characteristic landscape.

Class III

Class III visual objectives were assigned to the following landscapes:

- As the site is located in a rural agricultural setting, on a property that is currently zoned agricultural, the proposed PV development site and both proposed transmission line corridors are defined as Class III.

The Class III objective is to partially retain the existing character of the landscape, where the level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer, and changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. This would require that the height restriction of 4m be maintained, to ensure that the proposed development would be visually absorbed by the high contrast generating elements within the landscape, without drawing attention to the surrounding residential receptors.

Class IV

Due to the agricultural zoning of the land, no Class IV areas were identified.

16 HERITAGE CONSIDERATIONS

Mr Stefan de Kock of Perception heritage consultants have been appointed to undertake an integrated heritage assessment of the proposed AEP Kathu Solar PV Energy. The integrated specialist study will encompass three studies (undertaken by separate specialists) that will be collated into a single study. The key disciplines in this study include:

- **Built Environment** and **Landscape considerations** – Mr Stephan de Kock (Perception Heritage Consultants)
- **Archaeology** – Dr Peter Nilssen

- **Palaeontology** – Dr John Almond (Natura viva)

The integrated heritage study has been submitted to the competent heritage authority, SAHRA, to inform their decision making process.

16.1 ARCHAEOLOGICAL SCOPING.

The following is summarised from the Archaeological Scoping Study as undertaken by Dr Nilssen and attached Annexure A3.

16.1.1 Overview of Previous Studies

A considerable amount of archaeological research and heritage-related impact studies have been undertaken in the surroundings of Kathu. Much of the information concerning the history and archaeology of the area was obtained through heritage and archaeological studies associated with environmental impact assessments for a variety of development activities. While a wide range of heritage resources have been identified and documented in the area, it is best known for the abundant, high density and extensive scatters of Early Stone Age or Acheulian stone artefacts at the various Kathu Pan localities as well as Uitkoms 4, which is situated at the Kathu Cemetery. Middle and Later Stone Age materials have also been recorded, but these often occur in low densities and are not associated with other cultural materials or faunal remains. The latter type sites are normally considered to be of low significance. Nevertheless, it is anticipated that the study area may contain significant pre-historic archaeological resoures.

A more detailed description of the archaeological record in the surroundings of Kathu and the present study area will be provided in the AIA report. A selection of previous studies in the nearby surroundings is given in the reference section below, and the findings of these will be summarised in more detail in the AIA report. To the best of my knowledge, no previous archaeological or heritage related work has been done on the relevant portion of the affected property under investigation here.

16.1.2 Potential Impacts on Archaeological Resources

Because tangible heritage 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 AEP Kathu Solar Facility will involve both area and linear developments that could have a permanent negative impact on archaeological resources if they were to occur in the area. This scoping study has shown that archaeological resources do occur in the surrounding environment. The purpose of the broader EIA process is to assess the sensitivity of environmental resources in the affected area, to determine the potential impacts on such resources, and to avoid and/or minimize such impacts by means of management and/or mitigation measures. The future AIA will serve the same purpose concerning archaeological resources.

Because the planning and design phase of the development is being informed by the broader EIA, any direct negative impacts on significant environmental resources can be avoided or minimized by altering the design and layout plans accordingly. A construction phase Environmental Management Plan (EMP) will further avoid or minimize direct negative impacts.

Potential direct negative impacts on archaeological and tangible heritage resources will occur during the construction and installation phase of the proposed development. Indirect and cumulative impacts may occur during the operational phase, but these can be avoided or minimized by means of an EMP that should be implemented during the operational phase of the development.

Based on results from previous archaeological research and heritage impact studies in the surrounding environment it is likely that significant archaeological sites could be identified during the AIA (see Nilssen 2015a & 2015b and references therein).

17 GEOTECHNICAL INVESTIGATIONS

Due to the potential concerns regarding Dolomite at Depth raised by the council for geoscience, A geotechnical assessment and percussion drilling was undertaken by CGS and is attached in Appendix E11 and from which the following is summarised.

The site is underlain by aeolian sand, calcrete and dolomite at depth, located on a valley floor land facet.

A total of 8 trial pits were profiled and 3 DCP test conducted on site. Two soil samples were collected from a potential problem soil horizon for laboratory analysis, and a dedicated borehole drilled to determine the depth to dolomite bedrock.

A geotechnical percussion borehole was planned to 100m but the hole was terminated at 65m due to difficult drilling conditions. Information received from Kumba indicated that the Dolomite bedrock is located between 60-70m below surface, with a cover of Kalahari deposits that includes a 35m thick hardpan calcrete.

Three soil profiles were identified:

- Profile 1: Aeolian sand over hardpan calcrete
- Profile 2: Aeolian sand and platy calcrete over hardpan calcrete
- Profile 3: Aeolian sand with boulder calcrete overlying hardpan calcrete

Strip foot foundations with reinforcing where required is recommended for the conventional structures. Pre drilled, rammed pilled foundations are recommended for tracker PV structures. The length of the piles varies with the soil profiles; For profile area 1 and 2 a length of 2.5m is recommended, and on profile area 3 a length of 3.0m is recommended to generate sufficient shear resistance. For fixed PV structures smaller rammed piles or strip foot foundations can be used. The expected excavatability for service trenches is soft to hard depending on the thickness of the aeolian sand (ranging from 0.6 to 1.7m thick).

The potential for collapse of side walls of deep excavations is low. No shallow groundwater conditions were encountered. Construction materials should be sourced from commercial suppliers. Plant discard from iron ore mines can be used for road construction.

No mining activities impact the site. The inherent risk class dolomite instability is low. Although all sized of sinkholes can occur the likelihood of it occurring is low because the water table is stable, there are no record of sinkholes with a thick calcrete cover.

For the solar park development shallow bedrock conditions and potential collapsible soil is not critical to the success of the development and thus not regarded as a critical constraint.

The geology along the connection corridor routes is similar to the conditions on site and no geotechnical risks are expected along either route. Access to the site is via existing roads from the N14. Grid connections will occur via a loop-in loop-out connection on site or via a self-built line of 5400m to connect to a new substation planned.

The assessment of the geotechnical conditions on site resulted in three land use areas being defined:

- LAND USE AREA A is classified as DEVELOPABLE with minor PRECAUTIONS due to the relative shallow calcrete conditions that will impact on the installation trenches for the 3 cabling and the low potential for sinkhole formation. The area is suitable for the installation of PV structures using pre-bored rammed piles.
- LAND USE AREA B (AEOLIAN SAND) is classified as DEVELOPABLE with minor PRECAUTIONS due to the impact of the loose settable sand under the foundations of conventional structures and the low potential for sinkhole formation. The area is suitable for the installation of PV structures using pre-bored rammed piles.

From a geotechnical perspective the proposed development areas is suitable for the proposed development.

18 SUMMARY OF POTENTIAL SITE CONSTRAINTS

The following site-specific constraints have been during the initial stage of this environmental process. As part of the risk adverse approach, these site constraints may be used to further refine the proposed solar facility layout – The preferred layout will be developed taking all of these constraints into consideration.

18.1 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.

18.2 FAUNA:

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

18.3 AGRICULTURAL POTENTIAL:

No specific constraints in terms of agricultural potential were identified

18.4 HERITAGE:

No specific site constraints have been identified to date.

18.5 VISUAL:

No specific site constraints have been identified to date.

19 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.

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	Proof of landowner consent for the PV facility is attached in **Annexure G3.** The proposed grid connection is deemed to constitute a linear activity and as such not

Regulated Requirement	Description
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;	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 the property. Photographic evidence of these notices is attached in **Annexure F3**.
(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 owner is the only current occupier of the site. Landowner consent is attached in **Annexure G3**.
(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 **Annexure F4** 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 **Annexure F4** for copies of these notifications
(iv) the municipality which has jurisdiction in the area;	The Gamagara municipality has been notified of this environmental process. Please refer to **Annexure F4** 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 below showing the list of organs of state that were notified as part of this environmental process. Please refer to **Annexure F4** for copies of these notifications.

Regulated Requirement	Description
(vi) any other party as required by the competent authority;	A pre application meeting was held with the competent authority. At this meeting the competent authority provided input into the proposed Stakeholder register. All additional parties identified at this pre-application meeting have been included in the stakeholder register and have received notifications of the availability of this report.
(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 **Annexure F3** 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	Please refer to **Annexure F3**.

Regulated Requirement	Description
made.	
(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 **Annexure F3**.
(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 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.	This will be complied with if final reports are produced later on in the environmental process.
(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	All reports that are submitted to the competent authority will be subject to a public participation process. These include: - Draft Scoping Report - Scoping Report - Plan of Study for Environmental Impact Report - Environmental Impact Report - Environmental Management Plan - All specialist reports that form part of this environmental process.

Regulated Requirement	Description
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.	

19.1 REGISTRATION OF KEY STAKEHOLDERS

A number of key stakeholders were automatically registered and will be given an opportunity to comment on the Draft Scoping Report. This list was agreed upon with the competent authority during the pre-application meeting. Copies and proof of these notifications are included in **Appendix E**. A list of key stakeholders registered for this process included in the table below.

Table 14: 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, Biodiversity Directorate.	Birdlife Africa.	Endangered Wildlife Trust.

19.2 Availability Of Pre Application Draft Scoping Report

Automatically registered I&AP's were notified of the availability of the Draft Scoping Report for review and comment from 24 November 2015 – 15 December 2015.. 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 Draft scoping report was made available for a 21 day comment period.

19.3 COMMENTS AND RESPONSES ON DRAFT SCOPING REPORT

A number of comments and responses were received on the Draft Scoping Report. Copies of these comments and the responses thereto are included in Annexure F5

19.4 AVAILABILITY OF SCOPING REPORT

The scoping report was made available for a further 30 day comment period extending from **19 February 2016 – 22 March 2016**. Copies of the report are available at the following locations:

- Cape EAPrac Website: www.cape-eaprac.co.za/active
- Kathu Library at 1 Hendrik van Eck Rd,Kathu; and
- Gamagara Municipality; Civic Centre cnr of Hendrick van Eck and Frikkie Meyer Road, Kathu

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.

19.5 COMMENTS AND RESPONSES ON SCOPING REPORT

All comments and responses on the scoping report (including those received from the DEA are included in Appendix F.

20 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 21-days** review and comment period, so that these can included in the Final Scoping Report 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 D**.

21 PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT

In compliance with section (i) of Appendix 2 of regulation 982, the following plan of study for undertaking the Environmental Impact Assessment Report is provided. In terms of these regulations the following must be included in this plan of study.

(i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;
(ii) a description of the aspects to be assessed as part of the environmental impact assessment process;
(iii) aspects to be assessed by specialists;
(iv) a description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;
(v) a description of the proposed method of assessing duration and significance;
(vi) an indication of the stages at which the competent authority will be consulted;
(vii) particulars of the public participation process that will be conducted during the environmental impact assessment process; and
(viii) a description of the tasks that will be undertaken as part of the environmental impact assessment process;
(ix) identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

21.1 DESCRIPTION OF THE ALTERNATIVES TO BE CONSIDERED AND ASSESSED

The following Alternatives have been considered in this scoping report and where relevant will be assessed in the impact assessment phase of this environmental process:

- Site Alternatives;
- Layout Alternatives;
- Technology Alternatives; and
- No Go Alternative

Please refer to the section above in this report, where alternatives are discussed in detail.

21.2 ASPECTS TO BE ASSESSED

All potential impacts to on the economic, social and biophysical environments that have been identified in this scoping report will be assessed in the Environmental Impact Assessment phase of this Environmental Process.

21.3 ASPECTS TO BE ASSESSED BY SPECIALISTS;

The following specialists will be providing assessment of impacts in their respective disciplines:

- Faunal – Mr Simon Todd;
- Avifaunal – Mr Simon Todd;
- Botanical – Mr Simon Todd;

- Visual – Mr Stephen Stead (VRMA) ; and
- Archaeological – Dr Peter Nilssen.
- Freshwater Ecology – Dr Brian Colloty
- Dolomitic Risk Assessment – GCS
- Paleontological – Dr John Almond; and
- Agricultural Potential – Mr Christo Lubbe.

21.4 ASSESSMENT METHODOLOGY

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

- **Nature of the impact**
  This is an appraisal of the type of effect the construction, operation and maintenance of a development would have on the affected environment. This description should include what is to be affected and how.
- **Extent of the impact**
  Describe whether the impact will be: local extending only as far as the development site area; or limited to the site and its immediate surroundings; or will have an impact on the region, or will have an impact on a national scale or across international borders.
- **Duration of the impact**
  The specialist should indicate whether the lifespan of the impact would be short term (0-5 years), medium term (5-15 years), long terms (16-30 years) or permanent.
- **Intensity**
  The specialist should establish whether the impact is destructive or benign and should be qualified as low, medium or high. The specialist study must attempt to quantify the magnitude of the impacts and outline the rationale used.
- **Probability of occurrence**
  The specialist should describe the probability of the impact actually occurring and should be described as improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of any prevention measures).

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.
- **Degree of confidence in predictions**
  The specialist should state what degree of confidence (low, medium or high) is there in the predictions based on the available information and level of knowledge and expertise.

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.

21.5 CONSULTATION WITH COMPETENT AUTHORITY.

The competent authority has been identified as the National Department of Environmental Affairs. Engagement with the competent authority will be ongoing throughout the environmental process and will include the following as a minimum:

- Pre Application Meeting (Completed);
- Provided with a copy of the Draft Scoping Report for Review and comment (Pre-application);
- Submission of application form and engagement on the contents of the application form;
- Provided with a copy of Scoping report for review and decision making;
- Provided with a copy of the Environmental Impact Report for review and decision making; and
- Undertaking a site inspection with the competent authority if deemed necessary.

21.6 PUBLIC PARTICIPATION TO BE CONDUCTED DURING THE EIA

Please refer to the section above of this report where the ongoing public participation process, including aspects that will take place within the EIA phase, is discussed in detail.

21.7 TASKS TO BE UNDERTAKEN IN THE EIA PHASE

In terms of the 2014 EIA regulations, 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 -

(i) the EAP who prepared the report; and

(ii) the expertise of the EAP, including a curriculum vitae;

(b) the location of the activity, including:

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

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

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

(c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is -

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

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

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

(i) all listed and specified activities triggered and being applied for; and

(ii) a description of the associated structures and infrastructure related to the development;

(e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;

(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;

(g) a motivation for the preferred development footprint within the approved site;

(h) a full description of the process followed to reach the proposed development footprint within the approved site, including:

(i) details of the development footprint alternatives considered;

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

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

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

(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts -

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

(cc) can be avoided, managed or mitigated;

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

(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

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

(ix) if no alternative development locations for the activity were investigated, the motivation for not considering such; and

(x) a concluding statement indicating the preferred alternative development location within the approved site;

(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 -

(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and

(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;

(j) an assessment of each identified potentially significant impact and risk, including -

(i) cumulative impacts;

(ii) the nature, significance and consequences of the impact and risk;

(iii) the extent and duration of the impact and risk;

(iv) the probability of the impact and risk occurring;

(v) the degree to which the impact and risk can be reversed;

(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and

(vii) the degree to which the impact and risk can be mitigated;

(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;

(l) an environmental impact statement which contains -

(i) a summary of the key findings of the environmental impact assessment:

(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and

(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

(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;

(n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;

(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

(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;

(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;

(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;

(s) an undertaking under oath or affirmation by the EAP in relation to:

(i) the correctness of the information provided in the reports;

(ii) the inclusion of comments and inputs from stakeholders and I&APs;

(iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and

(iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;

The Environmental Impact Report for the proposed AEP Kathu Solar PV energy facility will consider and comply with the legislated requirements.

21.8 MEASURES TO AVOID, REVERSE, MITIGATE OR MANAGE IDENTIFIED IMPACTS

As shown in this scoping report, the proposed AEP Kathu Solar PV Energy Facility followed a risk adverse approach, whereby primary specialist input was utilised to ensure that the project is developed in such a way as to avoid impacts, thus reducing the need for further mitigation and management.

The EAP and participating specialists, as part of the impact assessment phase, will provide mitigation measures to ensure that the potential impacts are further reduced. An environmental management programme will be developed to ensure management and monitoring of additional impacts.

The following additional specialist management plans will form part of the overall Environmental Management Programme:

- Stormwater Management Plan;
- Washwater Management Plan;
- Traffic and Transportation Management Plan;
- Alien Vegetation Management Plan;
- Habitat Restoration Plan;
- Plant Rescue and Protection Plan; and
- Open Space Management Plan.

21.9 CONTENTS OF THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

The final impact assessment report should as a minimum include the following sections:

- Executive Summary;
- Introduction And Description Of Study;

- Methodology;
- Results;
- Assessment of Impacts (Direct, In-direct & Cumulative, including mitigation measures to reduce negative impacts and measures to enhance positive impacts and the completion of impact tables);
- Comparative Assessment between project Alternatives;
- Discussion and Recommendation for Preferred Alternative;
- Specialist recommendation for Pre-Construction, Construction and Operational Phases); and
- Conclusion.

21.10 BRIEF FOR SPECIALIST STUDIES TO BE UNDERTAKEN AS PART OF THE EIA PHASE

- Each specialist is required to consider the project in as much detail as is required to inform his/her impact assessment.
- Specialists must ensure that they are aware of the necessary **planning, environmental and service requirements** associated with the proposal.
- Specialists must ensure that they **liaise with other relevant specialists** (via the EAP) if it seems necessary to use information from another discipline.
- Impact Assessments must **consider all the identified alternatives** in order to provide a comparative assessment of impacts **as well as the no-go option.**
- Specialists should consider **national and international guidelines and standards** relevant to their respective focus area. For example: *The Environmental, Health and Safety Guidelines (2007) IFC, World Bank Group* etc.
- Any **assumptions** made and any uncertainties or **gaps in knowledge**, as well as **limitations** regarding the specialist studies, must be clearly described and explained.
- The proximity of the site in relation to **key features** must be considered.
- The **Draft Impact Assessment report** of each specialist are subject to public/stakeholder review and comment – all comments received will be considered by each specialist, responded to and the final impact assessment report updated accordingly.

22 PLAN OF STUDY FOR SPECIALIST IMPACT ASSESSMENTS

The relevant participating specialists will undertake impact assessments of the proposal in their specific field of expertise.

22.1 TERMS OF REFERENCE FOR SPECIALIST IMPACT ASSESSMENTS

Please refer to the table below for a summary of the terms of reference that specialists will consider as part of their studies. Please also refer to the detailed plans of study for each specific specialist in the sections below.

Table 15: Summary of terms of reference for specialist assessments.

Specialist Study	Aim of the Study / Input	Terms of Reference
Ecological / Biophysical	Determine the impacts that the construction, operation and decommissioning of the proposed AEP Kathu Solar PV Energy Facility, substation / auxiliary building site, transmission line and associated infrastructure will have on vegetation and	• Approximately 225ha will be disturbed during construction and shaded during operation. • A six metre wide access road will be required to access the facility • 5m wide access gravel roads and internal road network will need to be constructed

	fauna. The above assessment must include the NO-GO alternative and include a cumulative assessment.	to and between the PV panel arrays. These roads may cross small drainage lines, which may require Low-Level-Crossing-Structures / drifts, with associated anti-erosion gabion structures, where necessary. • An on-site substation of approx. as well as auxiliary buildings with a footprint of approximately 1ha will be constructed. • A transmission line of approximately from the on-site substation to the new MTS substation will be required. • Based on the findings of the Scoping Ecological Report assess potential impacts on fauna & flora from the construction, operation and decommissioning activities. • Describe avoidance measures required, as well as mitigation / management measures that may be implemented to avoid or reduce any negative impacts on vegetation and fauna.
Heritage	Assess the proposed AEP Kathu Solar PV Energy Facility and associated infrastructure (on-site substation, auxiliary buildings, transmission line, roads etc.) during construction, operation and decommissioning on Heritage Resources and the Cultural Landscape and provide recommendations for avoidance &/ mitigation.	• On the basis of the public participation process for the Scoping phase, conclude the Heritage Impact Assessment, which includes: • Analysis of Cultural Landscape, Visual – Spatial and Cumulative Impacts; • Liaison with other specialists regarding the Archaeological and Paleontological and Impact Assessments. • Describe mitigation / management measures that may be implemented to avoid or reduce any negative impacts.
Archaeological	Assess the proposed AEP Kathu Solar PV Energy Facility and associated infrastructure (on-site substation, auxiliary buildings, transmission line, roads etc.) during construction, operation and decommissioning on Archaeological Resources and provide recommendations for avoidance &/ mitigation.	• Outline the requirements for the Archaeological monitoring (should this be necessary) during earthmoving activities so as to avoid or minimize negative impact on potential subsurface archaeological resources. • Describe mitigation / management measures that may be implemented to avoid or reduce any negative impacts.
Palaeontology	Undertake a Paleontological desktop assessment of the study site	• Determine the significance of the site in terms of potential paleontological resources. • Provide recommendation for the conservation of any resources identified.
Planning	Re-zoning and Long-term Lease Applications.	• Start preparing Re-zoning & Lease Applications based on preferred, mitigated layout of the solar facility. • Follow-up with Gamagara Municipality and Department of Agriculture regarding progress of the Re-zoning & Lease Applications for the Solar Facility on Agricultural land.
Visual	Undertake a Visual Impact assessment of the proposed AEP Kathu Solar PV Energy Facility.	• Determine sensitive visual resources in the surrounding. • Undertake a view shed analysis of the proposed development. • Assess the visual significance of the proposed project.

		• Provide mitigation measures if necessary.
Freshwater	Undertake a freshwater impact assessment.	• The freshwater impact report should assess the impacts for both of the proposed development alternatives and the no-go option, which have been proposed and include the requirements highlighted in the Departments letter, namely: • Identification and sensitivity rating of all water courses for the impact phase of the proposed development; • Identification, assessment of all potential impacts to the water courses and suggestion of mitigation measures; and • Recommendations on the preferred placement of photovoltaic panels and associated infrastructure.
Geotechnical	Undertake geotechnical investigation with the key purpose of determining the risk from potential dolomitic substrates.	A predetermined number of percussion boreholes will be drilled to a depth of 100m each and the penetration rate recorded at a constant downforce. Samples will be collected and logged at one meter intervals down the hole. The holes will then be backfilled or used as groundwater monitoring boreholes after completion. Results of this will inform whether or not a stability Risk Assessment will be required.
Avifaunal	Undertake an avifaunal impact assessment to determine the potential impacts of the facility and its associated infrastructure.	The avifaunal specialist should undertake a desktop analysis as well as 3 days monitoring on the site on compliance with the currently adopted Birdlife SA guidelines.

22.2 PLAN OF STUDY FOR ECOLOGICAL IMPACT ASSESSMENT

The Ecological specialist, Mr Simon Todd will undertake the following activities as part of the ecological impact assessment.

22.2.1 Assessment methodology

Direct, indirect and cumulative impacts of the issues identified above, will assessed during the Impact Assessment phase of the project according to the following standard methodology:

- The **nature** which shall include a description of what causes the effect what will be affected and how it will be affected.
- The **extent** wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The **duration** wherein it will be indicated whether:
    - the lifetime of the impact will be of a very short duration (0- 1 years).
    - the lifetime of the impact will be of a short duration (2-5 years).
    - medium-term (5-15 years).
    - long term (> 15 years); or
    - permanent

- The **magnitude** quantified as small and will have no effect on the environment, minor and will not result in an impact on processes, low and will cause a slight impact on processes, moderate and will result in processes continuing but in a modified way, high (processes are altered to the extent that they temporarily cease) and very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** of occurrence, which shall describe the (likelihood of the impact actually occurring. Probability will be estimated as very improbable (probably will not happen), improbable (some possibility, but of low likelihood), probable (distinct possibility), highly probable (most likely) and definite (impact will occur regardless of any prevention measures).

The significance which shall be determined through a synthesis of the characteristics described above and will be assessed as follows:

- **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 and will result in the "no-go" option on the development or portions of the development regardless of any mitigation measures that could be implemented. This level of significance must be well motivated.

and;

- the status, which will be described as either **positive**, **negative** or **neutral**.
- the degree to which the impact can be **reversed**.
- the degree to which the impact may cause **irreplaceable loss of resources**.
- the degree to which the impact can be **mitigated**.

22.2.2 Proposed activities for the EIA phase

Although the current study includes information collected on-site as well as a desktop assessment, the proposed development area has been specifically investigated and fieldwork during the EIA phase will be an important activity required to validate and refine the findings of this report. This will include the following studies and activities:

- **Characterise** the vegetation and plant communities present within the site in greater detail. On-site surveys will be conducted to generate a species list for the site as well as identify and where necessary map different plant communities present at the site if they are associated with different sensitivity classes.
- **Identify and map** the presence of any **unique** and special habitats at the site such as gravel patches, rock fields and other localised habitats.
- **Locate, identify and map** the location of **significant populations** of species of conservation concern, so that the final development footprint can be adjusted so as to avoid and reduce the impact on such species. Some species of concern may be widespread and others localised and the distribution of such species will be established during the site visit.

- Evaluate the likely **presence** of listed **faunal** species at the site such as the Giant Bullfrog, and identify associated habitats that should be avoided to prevent impact to such species.
- Evaluate, based on the site attributes, what the most applicable **mitigation measures** to reduce the impact of the development on the site would be and if there are any areas where specific precautions or mitigation measures should be implemented.
- **Assess** the **impacts** identified in the scoping phase in light of the site-specific findings and the final layout to be provided by the developer.

22.3 PLAN OF STUDY FOR ARCHAEOLOGICAL / HERITAGE IMPACT ASSESSMENT

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 measures where necessary.

To assess the nature and significance of the archaeological record in the affected area, it was necessary to conduct a comprehensive foot survey. The latter focused on the provisional development layout plan including the 225ha portion of the affected property as well as the power line route and access roads.

The potential for different landforms, sediments or landscape features to contain archaeological traces is 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 are evaluated in terms of their content and context. Attributes to be 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.

Open vegetation and large expanses of exposed ground surfaces provided excellent archaeological visibility and allowed for a good understanding of the archaeological record in the area based on surface observations. Due to good archaeological visibility and, as it turned out, very sparse archaeological occurrences, survey walk tracks were spaced between about 50 and 80m apart and were fixed with a hand held GPS to record the search area. After gaining an understanding of the nature of the archaeological record, the survey transects were set further apart. The position of archaeological occurrences, observations and photo localities were also fixed by GPS. Digital audio notes of observations and a comprehensive, high quality digital photographic record were made.

Once archaeological traces have been 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 end product of the AIA is a report that forms part of the Integrated Heritage Impact Assessment and that meets standards required by the South African Heritage Resources Agency (SAHRA) in terms of the National Heritage Resources Act, No. 25 of 1999. The AIA report will detail results from the literature review and fieldwork, and will assess potential negative impacts associated with the proposed development and make recommendations in mitigation where necessary.

22.4 PLAN OF STUDY FOR FRESHWATER ASSESSMENT

The freshwater impact report should assess the impacts for both of the proposed development alternatives and the no-go option, which have been proposed and include the requirements highlighted in the Departments letter, namely:

- Identification and sensitivity rating of all water courses for the impact phase of the proposed development;
- Identification, assessment of all potential impacts to the water courses and suggestion of mitigation measures; and
- Recommendations on the preferred placement of photovoltaic panels and associated infrastructure.

The impact assessment will need to consider the potential negative as well as positive impacts that would result from each of the proposed alternatives and must include avoidance and/or mitigation measures to reduce the negative impacts, as well as measures that would enhance the positive impacts, for each alternative.

The potential impacts and recommended mitigation measures must be separated into:

- Pre-construction
- Construction
- Operational, and
- Decommissioning phases

Cumulative impacts must also be described and mitigation measures provided where possible.

Specific management and monitoring requirements/guidelines must be provided. These requirements / guidelines may be used as conditions of approval for the Environmental Authorisation (should it be granted) and the Environmental Management Programme.

The risk adverse approach that the project developers have taken will require that potential impacts should first be avoided rather than mitigated to acceptable levels. If the impact cannot be avoided entirely, then mitigation measures can be proposed in order to reduce the significance of the impact.

In addition, the surface hydrology / freshwater study should include confirmation of the following:

- Confirm whether the proposal triggers Section 19, 21(i) and 21(c) of the national water act and if so, whether a General Authorisation (GA) or Water Use Licence Approval (WULA) would likely required from the Department of Water and Sanitaiton for the development of PV infrastructure in the vicinity of the Pans.
- The opportunities and constraints for the solar development must be described and shown spatially.

22.5 PLAN OF STUDY FOR GEOTECHNICAL INVESTIGATION

As reflected in the Counsel for Geoscience letter dated 01/06/2015, raised a concern that due to the lack of detailed geological information for the area, there is uncertainty regarding the possible presence of dolomite that may occur at great depths. The council therefore recommend that a few exploratory percussion boreholes to confirm the absence of dolomite to 100m. A geotechnical expert from Worley Parsons consulting engineers was approached to provide input in to the requirements in this regard.

This will follow a two phase approach where phase two will only be initiated if dolomite is encountered during the percussion testing.

Phase 1: Drilling percussion Boreholes

A predetermined number of percussion boreholes will be drilled to a depth of 100m each and the penetration rate recorded at a constant downforce. Samples will be collected and logged at one

meter intervals down the hole. The holes will then be backfilled or used as groundwater monitoring boreholes after completion.

Phase 2: Dolomite stability Assessment

If dolomite is intersected a dolomite stability assessment will be conducted. This phase will however only be initiated if dolomite is encountered during the percussion drilling.

22.6 PLAMN OF STUDY FOR VISUAL IMPACT ASSESSMENT:

22.7 IMPACT ALTERNATIVES

The following alternatives were defined from the preliminary specialist findings during the scoping phase:

- PV
  - Preferred Layout (PV height 4m)
  - Preferred Layout (PV height 10m)
- Substations
  - On site substation K1
  - On site substation K2
- Road access
  - Access road preferred
- Grid connection to Sekgame Substation
  - Selfbuild grid connection 132kV Route K1
  - Selfbuild grid connection 132kV Route K1 Alternative
  - Selfbuild grid connection 132kV Route K2

22.7.1 Nature of the visual impact

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

Construction:

- Loss of site landscape character due to the removal of vegetation and the construction of the PV structures and associated infrastructure.
- Wind-blown dust due to the removal of large areas of vegetation.
- Possible soil erosion from temporary roads crossing drainage lines.
- Windblown litter from the laydown and construction sites.

Operation:

- Light spillage making a glow effect that would be clearly noticeable within the surrounding dark sky night landscapes.
- Massing effect in the landscape from a large-scale modification.
- On-going soil erosion.
- On-going windblown dust.
- Sunlight glint off PV structures.

Decommissioning:

- Movement of vehicles and associated dust.
- Wind-blown dust from the disturbance of cover vegetation / gravel.

Cumulative:

- A long term change in landuse setting a precedent for other similar types of solar and wind energy projects.

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

Construction

- Possible soil erosion from temporary roads crossing drainage lines.
- Windblown litter from the lay-down and construction sites.

Operation

- On-going soil erosion.
- On-going windblown dust.
- Sunlight glint off cables and structures.

Decommissioning

- Movement of vehicles and associated dust.
- Windblown dust from the disturbance of cover vegetation/gravel.

Cumulative

- Massing effects from numerous power lines converging on the substations.
- Cluttering effects from add-hoc routings that are not aligned with existing Eskom power line corridors.

22.7.2 Impact Assessment Rating Criteria

Visual impact significance impacts were defined making use of the DEA&DP Guideline for involving Visual and Aesthetic Specialists in EIA processes. *(Oberholzer. 2005).*

Extent	**Geographical area of influence.** **Site Related (S):** *extending only as far as the activity* **Local (L):** limited to i*mmediate surroundings.* **Regional (R):** *affecting a larger metropolitan or regional area* **National (N):** *affecting large parts of the country* **International (I):** *affecting areas across international boundaries*
Duration	**Predicted lifespan** **Short term (S):** *duration of the construction phase.* **Medium term (M):** *duration for screening vegetation to mature.* **Long term (L):** *lifespan of the project.* **Permanent (P):** *where time will not mitigate the visual impact.*

Magnitude	**Magnitude of impact on views, scenic or cultural resources** **Low (L):** *where visual and scenic resources are not affected.* **Moderate (M)**: *where visual and scenic resources are affected* **High (H)**: *where scenic and cultural resources are significantly affected.*
Probability	**Degree of possible visual impact:** **Improbable (I):** *possibility of the impact occurring is very low.* **Probable (P):** *distinct possibility that the impact will occur.* **Highly probable (HP):** *most likely that the impact will occur.* **Definite (D):** *impact will occur regardless of any prevention measures.*
Significance	**A synthesis of nature, duration, intensity, extent and probability** **Low (L):** will not have an influence on the decision. **Moderate (M):** should have an influence on the decision unless it is mitigated. **High (H):** would influence the decision regardless of any possible mitigation.
Confidence	Key uncertainties and risks in the VIA process, which may influence the accuracy of, and confidence in, the VIA process.

Source: DEA&DP Guideline for involving Visual and Aesthetic Specialists in EIA Processes

22.8 PLAN OF STUDY FOR AVIFAUNAL IMPACT ASSESSMENT

22.8.1 SCOPE OF WORK

The assessment will be conducted according to the EIA Regulations, published by the Department of Environmental Affairs and Tourism (2014) in terms of the Environmental Conservation Act No. 73 of 1989 as well as within the BirdLife South Africa best-practice guidelines for the assessment of avifaunal impacts from renewable energy development, “Guidelines to minimize the impact on birds of Solar Facilities and Associated Infrastructure in South Africa” (Smit, 2012).

The study will include data searches, desktop studies, site visit/field survey of the property and baseline data collection, and provide:

- A description of the site in terms of the avifaunal habitats present;
- A consolidated list of bird species and priority bird species (priority species will include nationally and/or globally threatened, rare, endemic or range-restricted birds species) likely to occur on the proposed site, with information on the relative value (in terms of breeding, nesting, roosting and foraging) of the site for these birds;
- A description of the likely seasonal variation in the presence/absence of priority species and preliminary observations of their movements;
- A preliminary delineation of areas that are potentially highly sensitive, no-go areas that may need to be avoided by the development;

A description of the nature of the impact that the proposed development may have on the bird species present; and

- A description of any mitigation measures that may be required to manage impacts related to the monitoring and assessment of the site.

22.8.2 APPROACH

The avifaunal study will be conducted using a two-phased approach:

1. A desktop analysis of the local avifauna, using relevant, pre-existing information and datasets such as Hockey et al. (2005), Southern African Bird Atlas Project data (SABAP 1; Harrison et al., 1997, and SABAP 2; http://sabap2.adu.org.za/v1/index.php), Coordinated Waterbird Counts (CWAC; Taylor et al., 1999), Coordinated Avifaunal Roadcounts (CAR; Young et al., 2003), Birds in Reserves Project (BIRP), Important Bird Areas (IBA; Barnes 1998), IUCN Red List (Taylor, 2014) associated specialist studies as well as available published and unpublished literature relating to bird interactions with solar energy facilities.
2. An initial 1-day site visit has already been conducted and a follow-up site visit of at least 2 days to validate the preliminary findings of the desktop analysis as well as to search for key species and resources and to develop an on-site understanding of the local avifauna. Walked transects, vehicle transects and vantage point surveys conducted in various habitats across the site will be conducted and are designed to:

- Quantify aspects of the local avifauna (such as species diversity and abundance);
- Identify nest sites present on site;
- Confirm the presence, abundance, habitat preference and movements of priority species;
- Identify important avian flyways across the site; and
- Delineate any obvious, highly sensitive, no-go areas to be avoided by the development.

22.8.3 OUTPUTS

Reports and outputs will be generated for each development and will include the following:

Impact Assessment Report:

The EIA Report will be produced according to national guidelines and standards and will include the site-specific findings, including a description of the environment as related to avifauna, full identification of key avifaunal impacts and issues, a sensitivity/constraints map, and an outline of any additional studies that may be required before construction.

A description of the potential impacts of the development on avifauna and recommended mitigation measures will be provided which will be separated into the following project phases:

- Construction
- Operation
- Decommissioning

Cumulative impacts will be described and mitigation measures provided where possible.

Consideration will be given to all comments received and the final reports will be submitted electronically.

Avifaunal Sensitivity Map:

Where relevant, all findings will be spatially represented, indicating sensitive receptors/areas, no-go areas, constraints and any other data that would be relevant in terms of the proposed development. All spatial information will be submitted as shape files or KML files according to preference.

Consolidated Species List:

A list of all the species likely to occur within the development area, indicating conservation status, endemicity, susceptibility to relevant and potential impacts of the development and whether or not the species was recorded on site.

23 PROCESS TO BE FOLLOWED

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

- Once the DEA accepts the Scoping Report and Plan of Study for Environmental Impact Report, the relevant specialists will undertake and complete their respective impact assessments;
- Discussions will be held with the various specialists and project team members in order to determine how best the development concept should be amended / refined to avoid significant impacts;
- The EIR will 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.

24 CONCLUSION & RECOMMENDATIONS

This scoping exercise is currently being undertaken to present concept proposals to the public and potential Interested & Affected Parties and to identify environmental issues and concerns raised as a result of the proposed development alternatives to date. 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 AEP Kathu Solar PV Energy Facility ite has been analysed from Ecological, Agricultural Potential, Heritage, perspectives, and site constraints and potential impacts identified.

Cape EAPrac is of the opinion that the information contained in this Scoping Report and the documentation attached hereto is sufficient to allow the general public and key stakeholders to apply their minds to the potential negative and/or positive impacts associated with the development, in respect of the activities applied for.

This Draft Scoping Report (DSR) was made available for stakeholder review and comment for a period of 21-days, extending from **24 November 2015 – 15 December 2015**. All comments received, have been considered and included in this scoping report

An application was submitted and the Scoping report was made available for a further 30 days extending from **19 February 2016** – **22 March 2016**.

Copies of all comments received during this period are included in appendix E.

25 ABBREVIATIONS

AFNP	Augrabies Falls National Park
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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