environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

(For official use only)

File Reference Number:	
Application Number:	
Date Received:	

Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2010, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2010 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
2. This report format is current as of **1 September 2012**. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority
3. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
4. Where applicable **tick** the boxes that are applicable in the report.
5. An incomplete report may be returned to the applicant for revision.
6. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.
7. This report must be handed in at offices of the relevant competent authority as determined by each authority.
8. No faxed or e-mailed reports will be accepted.
9. The signature of the EAP on the report must be an original signature.
10. The report must be compiled by an independent environmental assessment practitioner.
11. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
12. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
13. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.

14. Two (2) colour hard copies and one (1) electronic copy of the report must be submitted to the competent authority.
15. Shape files (.shp) for maps must be included on the electronic copy of the report submitted to the competent authority.

PROJECT INFORMATION

Project name:	Final Basic Assessment Report for proposed Augrabies PV1 (Pty) Ltd Photovoltaic (Solar) Energy Plant near Augrabies, Northern Cape
DEA Reference:	14/12/16/3/3/1/453
NEAS Reference:	DEA/EIA/0000978/2012
DENC Reference:	NC/NAT/ZFM/KAI!/AUG1/2013
SAHRA Reference:	9/2/048/0001
Applicant:	Mulilo Renewable Energy (Pty) Ltd
Project company:	Augrabies PV1 (Pty) Ltd
Prepared by:	Rosenthal Environmental Philip Rosenthal (of Rosenthal Environmental) Kozette Myburgh (of Ecosense cc)
Contact:	Philip Rosenthal Contact: 082 6768966 Fax: 0866164452 mail@PhilipRosenthal.com Postnet 114, P/Bag X18, Rondebosch, 7701
Specialist consultants:	Agricultural Research Council: Institute for Soil, Climate & Water Albert van der Stok Visual Impact Assessments Archaeological Contracts Office Associates cc Bergwind Botanical Surveys David Hoare Consulting cc Ecosense cc Natura Viva cc Toni Belcher Freshwater ecologist
Date :	July 2014
Status:	Final

TABLE OF CONTENTS

Table of Figures

Abbreviations

Abbreviation	*Meaning*
APA	*Agricultural Potential Assessment*
BAR	*Basic Assessment Report*
CAA	*Civil Aviation Authority*
CARA	*Conservation of Agricultural Resources Act (43 of 1983)*
COHSTA	*Cooperative Governance, Human Settlements and Traditional Affairs*
DAFF	*Department of Agriculture, Forestry and Fisheries*
DEA	*Department of Environment Affairs (National department) (formerly DEAT)*
DENC	Department of Environment & Nature Conservation, Northern Cape Province
DWA	*Department of Water Affairs (formerly DWAF)*
EA	*Environmental Authorisation (formerly RoD)*
EAP	*Environmental Assessment Practitioner*
EIA	*Environmental Impact Assessment*
EMPr	*Environmental Management Programme*
GIS	*Graphical Information System*
GNR	*Government Notice Regulation*
HIA	*Heritage Impact Assessment*
IBA	*Important Bird Area*
IPP	*Independent Power Producer*
kV	*Kilo Volt*
LPI	*Land Parcel Identification No. (Also known as 21 digit Surveyor General No)*
NEM:BA	*National Environmental Management: Biodiversity Act (Act 10 of 2004)*
NEM:WA	*National Environmental Waste Act (59 of 2008)*
NEMA	*National Environmental Management Act (107 of 1998)*
NHRA	*National Heritage Resources Act (25 of 1999)*
NVFFA	*National Veld and Forest Fires Act, Act 101 of 1998*
NWA	*National Water Act (36 of 1998)*
PSDF	*Provincial Spatial Development Framework*
PV	*PhotoVoltaic (Solar)*
PV1	*PhotoVoltaic Alternative Site 1 proposed on the farm Rooipad Wes 15/9*
PV2	*PhotoVoltaic Alternative Site 1 proposed on the farm Rooipad Wes 15/9*
REFIT	*Renewable Energy Feed in Tariffs*
SAHRA	*South African Heritage Resources Agency*

Abbreviation	*Meaning*
SALA	*Subdivision of Agricultural Land Act (70 of 1970)*
SANPARKS	*South African National Parks*
SDF	*Spatial Development Framework*
SKA	*Square Kilometre Array (Radio Telescope Project)*
VIA	*Visual Impact Assessment*
WESSA	*Wildlife and Environment Society of South Africa*

INTRODUCTION

Mulilo Renewable Energy (Pty) Ltd through its project company Augrabies Solar PV1 (Pty) Ltd intends constructing a 10 Megawatt Photovoltaic (PV) Solar Energy Generation Facility close to the Blouputs Electrical substation near Augrabies in the Northern Cape Province.

Summary of project proposal

The proposed solar generation facility would consist of an array of black coloured panels up to three metres high covering an area of 19.9 hectares.

A 22 Kilovolt (kV) power line up comprising wooden poles up to 8.5 metres high with a three wires on top, would connect the power plant to an existing 22 kV power line running to the Blouputs substation passing across the westerly portion of the farm. The power lines would look similar to other small power lines in the area.

The initial proposal included an access road approximately 400 metres long and 6 metres wide that would connect the PV plant to the nearby road. Nevertheless, after environmental assessment the recommendation is to rather make use of an existing farm access track with minor reinforcement where necessary. There would be several kilometres of internal roads about 4metres wide within the PV plant.

Indigenous tree screening around the PV site was included in the initial proposal. Nevertheless, after environmental assessment it was recommended not to do this, but to rather plant scattered trees at strategic locations to screen the facility. The initial proposal included an irrigation pipeline of between 4 and 6.5 kilometres, but after environmental assessment it was recommended to connect into the existing farm pipeline infrastructure as far as possible, which would then require only 233 metres of pipeline on the site and 1.2 km on an adjacent farm.

It is possible that the applicant may ultimately decide to build a facility smaller than the proposed 10MW /19.9 hectare project.

Location

The proposed facility would be constructed on the farm Portion 9 of the Farm Rooipad no 15 (LPI C0360000000000150009)*, approximately 2 kilometres south of the Augrabies Falls National Park, but north of the R359 tar road running East-west. The transmission line may impact farm 431, also depending on Eskom requirements (LPI* C0360000000043100000).

Two alternatives were considered: The first, (preferred by the proponent because of the shorter power line) would be about 1.5 km east of the turnoff to the Blouputs turnoff into National Park and the second about 4km east of the turnoff. The alternatives would require power lines of 1.7-2.1 kilometres and 4.2-4.6 kilometres respectively, depending on Eskom requirements.

Use of the electricity generated

Electricity would be fed into the Eskom grid at the Blouputs substation to be used by those living in the Kakamas and Augrabies area.

Need for the project and reasons for the proposed location

The Department of Energy wishes to reduce South Africa's dependence on burning polluting fossil fuels such as coal and has called for private sector proposals to provide clean renewable energy. This project is one of these proposals.

The Kakamas/ Augrabies area is one of the best places in South Africa to get all year round bright sunlight. It is therefore one of the best places for Solar electricity generation. This farm was chosen within the Kakamas area because it is close to the Blouputs substation, where the electricity can be fed straight into the grid.

Visual impacts

The project falls within the 'Viewshed protection area' of the Augrabies National Park, which gives special priority to minimising visual impacts. A Visual specialist study has been undertaken and the recommendations included in the project proposal.

The only lighting planned would be motion activated security lighting that would only be activated in the rare event of a security breach.

Key decision making and commenting authorities

The project falls within the Kai! Garib Local Municipal area, which is part of the ZF Mgcawu District Municipality (formerly Siyanda District Municipality) in the Northern Cape Province. The competent environmental authority is the national Department of Environment Affairs (DEA), with the Northern Cape Department of Environment Affairs and Nature Conservation as a commenting authority. Comment is also required from the Department of Water Affairs, Department of Agriculture, the Civil Aviation Authority and the Square Kilometre Array (SKA) Radio Telescope Project. The para-statal, South African National Parks is a neighbour to the project and is both an authority and a key interested party.

Environmental project team

Environmental Assessment Consultants

Mulilo Renewable Energy (Pty) Ltd has appointed Rosenthal Environmental to undertake a Basic Environmental Assessment process. Ecosense CC is assisting with the environmental process.

Philip Rosenthal, an environmental engineer, has an MPhil in Environmental Science, a BSc in Civil Engineering and is certified as an Environmental Assessment Practitioner, with Environmental Assessment Practitioners of South Africa (EAPSA). He has experience in Environmental Impact Assessment, environmental monitoring, public participation, civil engineering, waste management, heritage applications and pre-feasibility studies on energy projects. He currently serves on the Western Cape Planning Advisory Board and has been practicing in environmental work since 1995.

Kozette Myburgh is qualified in the Social Sciences (MPhil Community and Development) with a strong interest in the environment. She is in charge of impact assessment projects for Ecosense cc. She has 5 years experience in impact assessment, environmental management and public participation, dealing with statutory applications and project management of these. She has completed a number of workshops and courses to arm her with knowledge of impact assessment in the environmental and social fields. She has more than 8 years experience in social research, community / public participation, monitoring and evaluation, as well as broad human resources and project management experience.

The specialist consulting team includes:

- *Agricultural potential: Paterson, DG, Agricultural Research Council – Institute for Soil, Climate & Water.*
- *Botanical: David McDonald, Bergwind Botanical Surveys*

- *Ecology: David Hoare, David Hoare Consulting cc*
- *Environmental Management Plan: Christine Rabie, Ecosense Pty Ltd*
- *Freshwater ecology: Toni Belcher Freshwater ecologist (review)*
- *Heritage: Jayson Orton, Archaeological Contracts Office Associates cc*
- *Palaeontology: Almond, John, Natura Viva cc (motivation for exemption)*
- *Visual impacts: Albert van der Stok, Albert van der Stok Visual Impact Assessments*

The qualifications of the specialist team are listed in their respective reports (see Appendix D).

Augrabies National Park boundary mapping error

Many publicly available maps show the proposed site (Farm Rooipad Wes 15/9) as falling within the boundaries of the Augrabies Falls National Park and consequently list the land as having formal conservation status.

Nevertheless, the title deeds for the property clearly show that it is not owned by the National Park and has never been owned by the National Park. Further, the landowners deny ever having entered into any kind of conservation agreement with the Park and the management of the Park knows of no such agreements. It was confirmed by the South African National Parks mapping section that this is a mapping error, which has now been corrected (Bradshaw, 2012). It will take a while for the correction to reflect on all conservation mapping databases.

In the interim, the mapping error has been copied into the databases used by Department of Environment Affairs, South African National Biodiversity Geographical Information System (BGIS), Northern Cape Environment Affairs and Birdlife South Africa. The mapping error has informed other maps generated for national and provincial policy formation. This created complications for the public and authority consultation (see 3 *ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES*, p56)

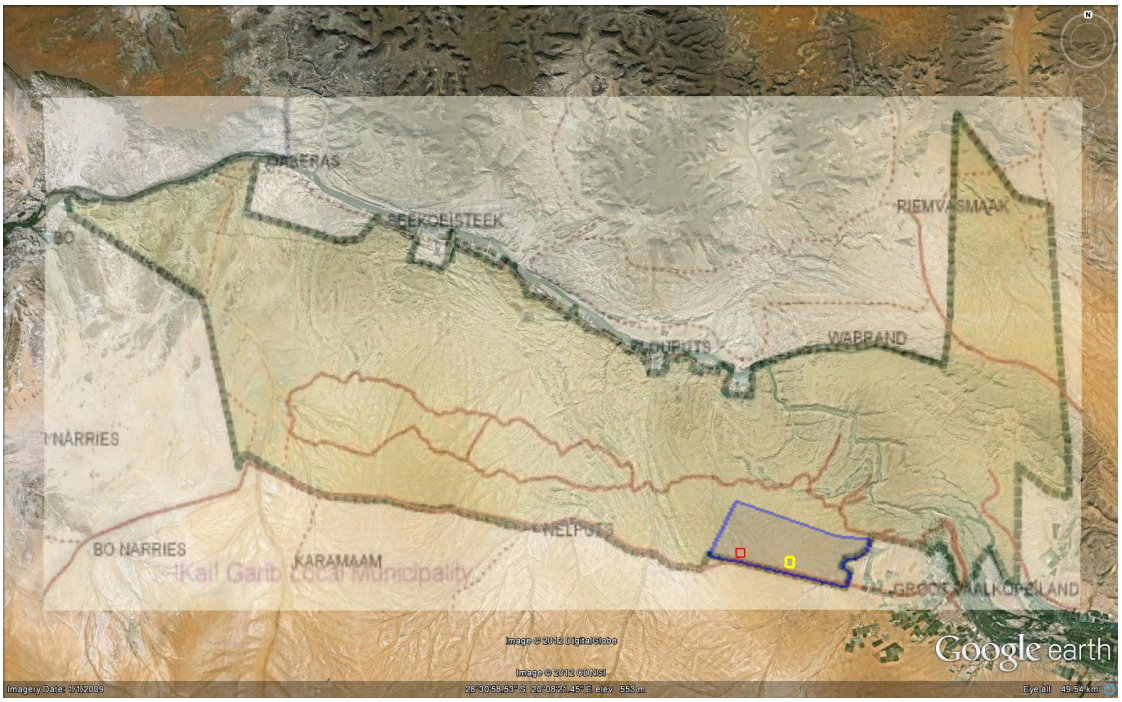

Figure 1: Example of Map of Augrabies National Park incorrectly showing farm 15/9 (in blue) inside the park boundaries (overlain on aerial photography and the site plan)

Figure 2: Map of Augrabies National Park correctly showing farm 15/9 outside the Park boundary

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?	**YES**	~~NO~~

If YES, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I.

1. PROJECT DESCRIPTION

a) Describe the project associated with the listed activities applied for

The proposed solar generation facility would consist of an array of black coloured panels up to three metres high covering an area of just less than 20 hectares (see Figure 1, p2)

A 22 Kilo Volt power line comprising wooden poles up to 8.5 metres high with three wires on top, would connect the power plant to an existing 22 KV power line running to the Blouputs substation passing across the westerly portion of the farm. The power lines would look similar to other small power lines in the area.

An access road approximately 400 metres long and 6 metres wide would connect the PV plant to the nearby road. There would be several kilometres of internal roads about 4 metres wide within the PV plant.

(The above photograph is of a 20 MW PV plant in Beneixama, Spain. The Augrabies proposal would be 10 MW, thus about half this size and in a more arid landscape).

The facility would include a narrow irrigation pipeline of between 4 and 6.5 kilometres running from the adjacent farm Vuursteenkop to the site.

Proposed visual impact mitigation would include scattered tree planting in the vicinity.

Figure 3: Example of a PV plant in a relatively arid landscape
(20 MW Beneixama PV Plant, Spain: Source: http://technology4life.wordpress.com)

b) Provide a detailed description of the listed activities associated with the project as applied for

References to government notices below refer to the corrected Government Notices as published 10 December 2010.

Listed activity as described in GN R.544, 545 and 546	Description of project activity
Example: ***GN R.544 Item 11(3): The construction of a bridge where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.***	***A bridge measuring 5 m in height and 10m in length, no wider than 8 meters will be built over the Orange river***
GN R 544 Item 1(ii): *The construction of facilities or infrastructure for the generation of electricity where… (ii) the output is 10 megawatts or less but the total extent of the facility covers an area in*	*Construction of an up to 10 Mega Watt Photovoltaic Solar Energy Electricity Generation Plant on Rooipad (Portion 9 of Farm 15) near Augrabies, Northern Cape over an area of 19.9 ha.*

Listed activity as described in GN R.544, 545 and 546	Description of project activity
excess of 1 hectare.	
GN R 544 Item 11 (iii),(x) and (xi): *"The construction of:...(iii) bridges… (x) buildings exceeding 50 square metres in size; or…(xi) infrastructure or structures covering 50 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line."*	*Construction of Solar PV infrastructure and related buildings covering 50 square metres or more and road reinforcement within 32 metres of a watercourse. (Access road reinforcement may include reno-mattress (stone filled wire basket) or small culverts. No 'bridges' in the common sense of the word are proposed).*
GN R 544 Item 18 (i) *"The infilling or depositing of any material of more than 5 cubic metres into…or the … excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from: (i) a watercourse…"*	*The infilling of more than 5 m^3 into a watercourse, which may include access road reinforcement and Photovoltaic infrastructure.*
GN R 544 Item 23(ii) *"The transformation of undeveloped, vacant or derelict land to –…. (ii) … industrial …use… outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares. "*	*Transformation of 19.9 ha of undeveloped land will be required for the Solar Energy Electricity Generation Plant (industrial).*
GN R 546 Item 4 (a) (ii) (gg) *The construction of a road wider than 4 metres with a reserve less than 13,5 metres… (a) in the Northern Cape province… (ii) outside urban areas, in (gg) areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve*	*Construction of approximately 400m of road 6m wide (>4m), outside an urban area, 1890m (<10 km) from the Augrabies National Park in the Northern Cape Province.* ***[To minimise engineering works in accordance with specialist recommendations, it is intended to make use of an existing track, with reinforcement where needed. In this preferred scenario, this listed activity will not be triggered. Nevertheless, it is being applied for in case it is needed or if the reinforcement and/or maintenance were deemed to be construction.]***
GN R 546 Item 13(a) *"The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous*	*Development within an ecological support area as identified in the Namakwa District Biodiversity Sector Plan. This was adopted by the competent authority (Mbanjwa, Dec*

Listed activity as described in GN R.544, 545 and 546	Description of project activity
vegetation… *(c) in the Northern Cape* *(ii) outside urban areas, the following:* *(a) Critical biodiversity areas and ecological support areas as identified in systematic biodiversity plans adopted by the competent authority."*	*2013).*
GN R 546 Item 13(c)(ii)(ff) *"The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation* *(c) in the Northern Cape* *(ii) Outside urban areas* *(ff) Areas within 10 kilometres from national parks…"*	*Clearance of 19.9 hectares (>1ha) of 100% indigenous vegetation 1890 metres (<10km) from the Augrabies Falls National Park in the Northern Cape Province* ***[The 19.9 ha land would not be entirely cleared, since as much as possible of the existing vegetation would be left 'in-situ' between and underneath the Solar PV infrastructure. The threshold of 1 hectare of cleared land would likely be reached and is thus being applied for.]***
GN R 546 Item 14(a)(i) *"The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation.* *(a) In the Northern Cape* *(i) All areas outside urban areas"*	*Clearance of up to 19.9 hectares (>5ha) of 100% (>75%) indigenous vegetation for purposes of a solar electricity generation plant outside an urban area in the Northern Cape Province*
*GN R 546 Item 16(a) (ii)(ff) and (hh)** *The construction of…* *(iii) buildings with a footprint exceeding 10 square metres in size; or* *(iv) infrastructure covering 10 square metres or more* *where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.* *(a) in the Northern Cape* *(ii) Outside urban areas, in:* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans* *(hh) Areas within 10 kilometres from*	*The construction of buildings and infrastructure (with a footprint >10m^2) in a 'ecosystem service area' identified in the Namakwa District Biodiversity Sector Plan , and within 1890 metres (<10km) of the Augrabies Falls National Park in the Northern Cape Province. (Now Gazetted Mbanjwa, 2013)* ***[It is assumed that the term 'ecological support area' used in the Namakwa Biodiversity Sector Plan has the same meaning as 'ecosystem service area' in listing notice 546. Listing notice 546 refers to both 'ecosystem service areas' and 'ecological support areas' in association with Critical Biodiversity Areas but fails to define or differentiate the terms.*** ***The Department of Environment Affairs (DEA) was unable to confirm this and referred the question to the provincial***

Listed activity as described in GN R.544, 545 and 546	Description of project activity
national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;	***authority (Scheepers, 2012). The provincial authority have not responded.]***

Water related activities were not included in the original February 2012 application but were added to the application during the course of the project when it became apparent that the minor drainage lines on the site may be interpreted as 'watercourses'. The definition of a watercourse in the National Environmental Management Act (NEMA) and the Water Act is broad and open to interpretation. If the small drainage channels on and/or adjacent to the site are deemed within this definition, then this listed activity would be triggered. Photographs of the features which may be interpreted as watercourses are shown in the site feature photographs of Appendix B, Figures 2 & 5. Further information can be found in the ecological and freshwater review specialist reports in Appendix D. In the context of uncertainties on the interpretation of the law, all the above listed activities are being applied for.

2. FEASIBLE AND REASONABLE ALTERNATIVES

"alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

Describe alternatives that are considered in this application as required by Regulation 22(2)(h) of GN R.543. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the, competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

The identification of alternatives should be in line with the Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004. Should the alternatives include different locations and lay-outs, the co-ordinates of the different alternatives must be provided. The co-ordinates should

be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

a) Site alternatives

Two alternative site 'focus areas' were considered, albeit on the same large (1860 ha) Rooipad Wes property (Portion 9 of farm 15, Rooipad). Both alternatives have been indicated on the locality map in Appendix A. Focus area 1 to the west is 165.49 ha, while focus area 2 to the east is 105.81 ha. The 'focus area' alternatives were selected from the larger farm on the criteria of their relatively flat terrain, fewer drainage lines, accessibility from the adjacent road and in-house 'first cut' Geographical Information System (GIS) viewshed calculations.

An initial preferred site location based on engineering criteria was indicated on each of the two 'focus area' alternatives. The environmental assessment team focused their work on the two 'focus area' alternatives and were free to recommend moving the proposed 19.9 ha site within the larger 'focus areas' as mitigation.

Based purely on engineering criteria, Site 1 is preferred because it is closer to the Blouputs substation and thus would require a shorter electricity transmission line.

Associated infrastructure would include: a water pipeline to connect in to the existing farm water pipe infrastructure and the use of an access track (the preferred alternative could use an existing farm access track with reinforcement in places). It would also require water tanks, construction laydown areas (50m x 55m) (to use mostly the internal access/stormwater control areas), a control centre building, electrical inverter houses and a connection centre.

The proposal used in the initial application and specialist study brief had the transmission line connect to the grid by connecting to an existing transmission line running along the boundary the farm Rooipad Wes. Eskom subsequently indicated they may require it to connect at the Blouputs substation, which would require an additional 385m and impacting on an additional erf: farm 431. This alternative proposed by Eskom was assessed by all specialists. Specialist comment is included in Appendix D-14.

Alternative 1 (preferred alternative) Alternative S1[1] (preferred or only site alternative) (after mitigation)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Site 1 is located approximately 1.5 km east of the Blouputs substation turnoff into the National Park. This alternative would require a power line of between 1.7-2.1 kilometres. The exact powerline length would depend on Eskom requirements.		
Before mitigation	*28°36'20.35*	*20°13'59.05"*
After mitigation (preferred location of Site 1)	*28 °36' 27.02"*	*20°13' 55.21"*

[1] "Alternative S.." refer to site alternatives.

Alternative 2 Alternative S2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Site 2 is located approximately 4 km east of the Blouputs substation turnoff into the National Park. This alternative would require a power line of approximately 4.2-4.6 kilometres.	*28°36' 43.09"*	*20°15' 27.97"*
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

In the case of linear activities: ***Power lines associated with activity (see Figure 4 below)***

Alternative:	**Latitude (S):**	**Longitude (E):**
Alternative S1 (preferred)		
• Starting point of the activity *(Before mitigation)*	*28°36'27.05"*	*20°13'50.06"*
• Starting point of the activity *(After mitigation – preferred starting point of transmission line)*	*28°36'34.51"S*	*20°13'47.33"E*
The following transmission line coordinates are not affected by the shifting of the preferred site in mitigation.		
• Middle/Additional point of the activity *(Corner point)*	*28°36'39.67*	*20°13'37.71"*
• End point of the activity	*28°36'32.58"*	*20°12'56.05"*
• *Possible extension to substation (Middle) (corner point)**	*28°36'40.13"*	*20°12'52.07"*
• *Possible extension to substation (End)**	*28°36'42.88"*	*20°12'53.11"*
Alternative S2 (if any)		
• Starting point of the activity	*28°36'50.20"*	*20°15'18.14"*
• Middle/Additional point of the activity *(Corner point)*	*28°37'0.67"*	*20°15'18.43"*
• End point of the activity	*28°36'32.58"*	*20°12'56.05"*
• *Possible extension to substation (Middle)**	*28°36'40.13"*	*20°12'52.07"*
• *Possible extension to substation (End)**	*28°36'42.88"*	*20°12'52.07"*
Alternative S3 (if any)		
• Starting point of the activity		
• Middle/Additional point of the activity		
• End point of the activity		

** The initial proposal was for the transmission line to tie in to a 22kV line on the boundary of the project property. During grid connection negotiations after the initial environmental application and specialist studies, Eskom indicated that they may instead require the project to tie in at the Blouputs substation, which would then require an additional 385m of transmission line. This possible extension is indicated between the point marked "S1 S2 PE E" and the point marked 'Substation' in* Figure 4*, p8 in pink.*

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

Since the transmission lines are in straight line legs between the principal coordinates given above, any other position along the straight line route can be easily deduced. The interim points are included in Appendix A-3.

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A.

Coordinates of the site corners in Appendix A-3.

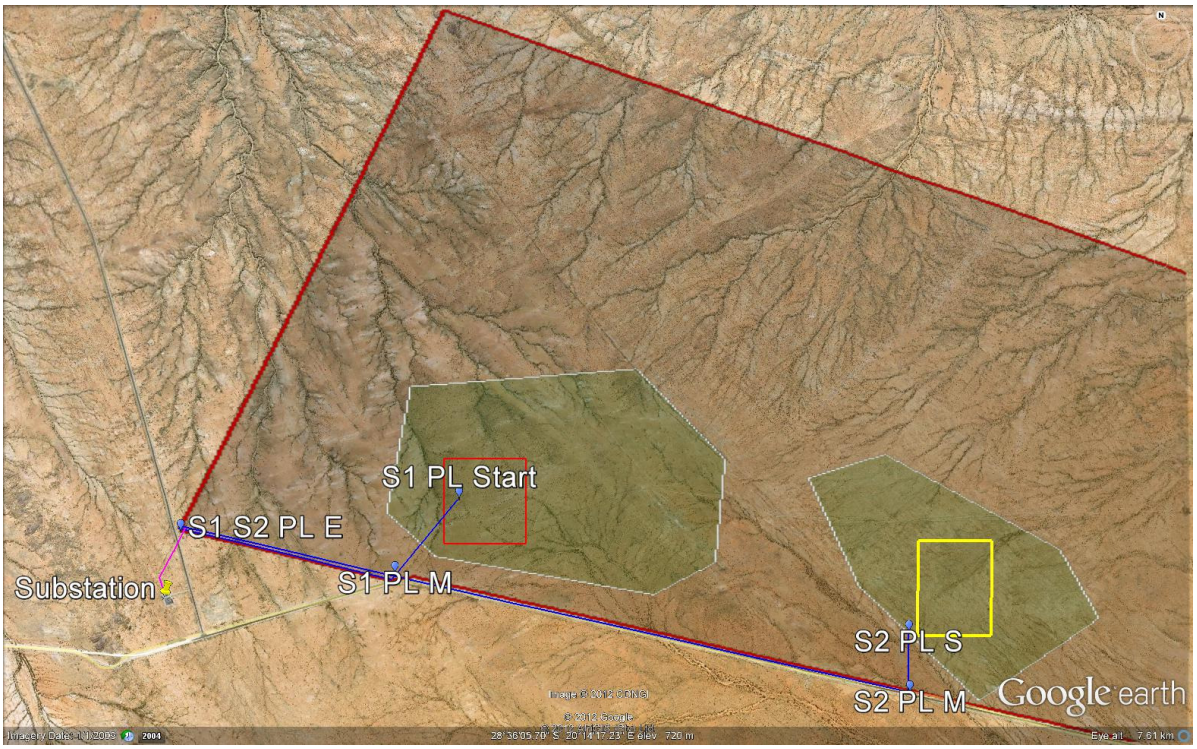

Figure 4: Alternative sites (1 to West and 2 to East), study focus areas (in green) showing power line routes (with possible extension to substation in pink)

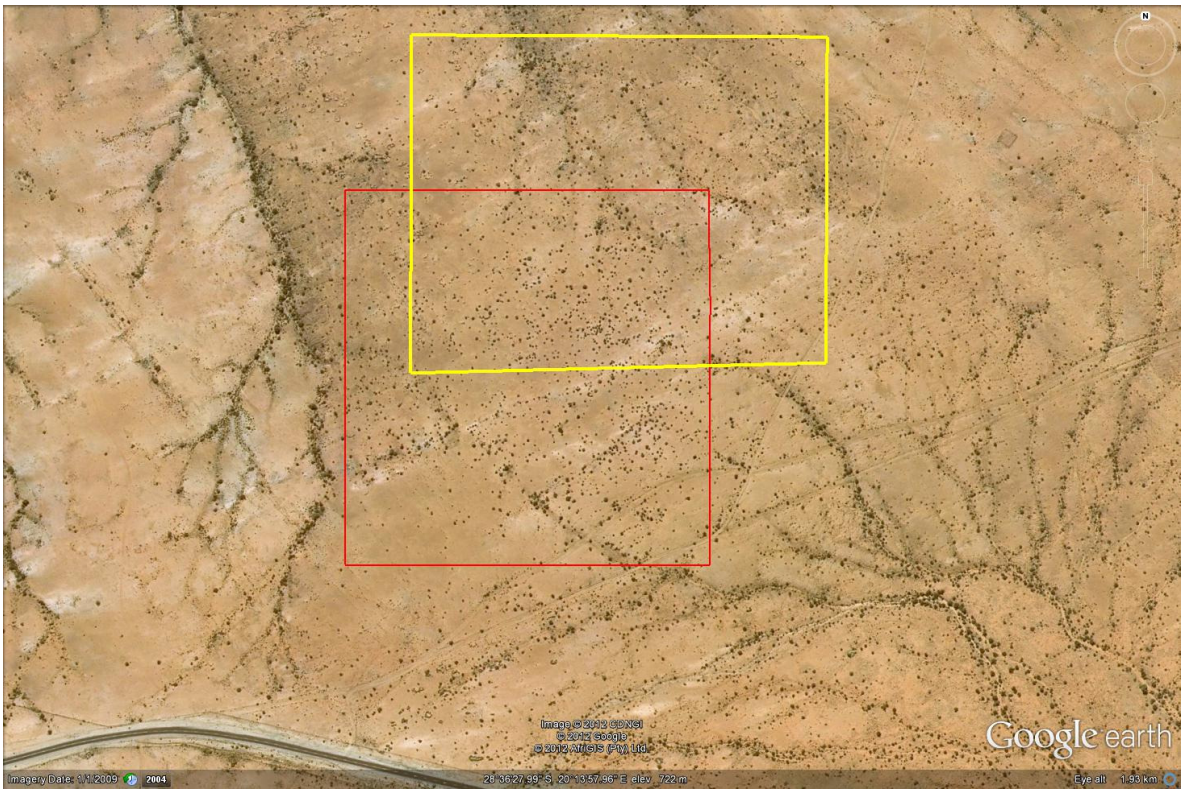

Figure 5: Zoom in on the preferred site PV1 (Yellow outline before mitigation and Red outline after mitigation)

b) Lay-out alternatives

Two technology alternatives were considered *(for detail see section "* c) Technology alternatives*, p10, below):*

- *Design/technology alternative 1: Fixed axis tracking (with layout in North-South lines).*
- *Design/technology alternative 2: Fixed panels (facing North with layout in East-West lines).*

Layout alternatives *relate directly to the design technology alternatives and thus are not evaluated separately from these.*

The two layout alternatives considered would be at the same location and thus the GPS coordinates are the same as those for the site alternatives.

Alternative 1 (preferred alternative)		
Description	**Lat (DDMMSS)**	**Long (DDMMSS)**
Fixed panels must be oriented facing North and laid out in East-West lines.	*Same as site alt.*	*Same as site alt.*
Alternative 2		
Description	**Lat (DDMMSS)**	**Long (DDMMSS)**
Fixed axis tracking must be laid out in North-South lines and would change their orientation with the movement of	*Same as site alt.*	*Same as site alt.*

the sun.		
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

The impacts for the two design alternatives (which are linked to layout alternatives) were found to be identical (in particular see Appendix D-7: 'Visual Impact Assessment: Supplementary Information: Potential for reflective flashes from the PV Installation in the Augrabies National Park'. The impacts were thus not tabulated separately.

c) Technology alternatives

No activity alternatives other than Solar PV were assessed as Mulilo intend to develop renewable energy projects in response to the government's goal in this regard, as well as in response to the proposed REFIT strategy for Independent Power Producers (IPP)s. Due to local climatic conditions the site considered most suitable for the development of a solar energy facility instead of a wind energy facility (as renewable energy alternative).

Other activity alternatives for the site would include no development status quo (grazing). Irrigated cultivation of the site would not be feasible due to low agricultural potential (shallow soil on the site) (Patterson, 2012, p10).

As the project objective is to utilize solar energy for power generation, only two technology alternatives are being considered. The only identified difference in impact between the two technologies would be visual impact – as the two technologies would be oriented in different directions, and thus the sun would be reflected in different directions. The construction, operation and decommissioning of the facility would be similar irrespective of the technology chosen.

The original blank BAR form provided by the Department of Environment Affairs listed the first design alternative (i.e. fixed axis tracking) as the 'preferred alternative'. Nevertheless, there is no 'preferred design alternative' in this instance and these words are accordingly struck out, but remain on the form to reflect was originally there (see below).

Alternative 1 (~~preferred alternative~~)
Design alternative 1 - Fixed axis tracking *Tracking units would be mounted in lines that run north south, so that the panels would track the sun from morning till night. See figure 2 below.*

Single-axis solar tracker with two rows of panels.

Figure 6: Example of tracking unit

Image Source: http://www.gestampsolar.com (These images are to illustrate the difference between PV with and without tracking. The above image is for illustration purposes only – the actual choice of PV manufacturer and panels have not yet been made).

Alternative 2

Design alternative 2 - Fixed panels

The axis of the fixed panels would be in the east west direction i.e. the roads between lines would run in an east west direction. See figure 3 below.

Fixed solar structure on piles with two or three rows of panels. Foundations using piles, which optimizes the volume of concrete and system modulation.

Figure 7: Example of fixed unit

Image Source: http://www.gestampsolar.com (These images are to illustrate the difference between PV with and without tracking. The above image is for illustration purposes only – the actual choice of PV manufacturer and panels have not yet been made).

Alternative 3

d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)

Alternative 1 (preferred alternative)		
Alternative 2		
Alternative 3		

e) No-go alternative

No development *This option is assessed as the No-go option in this report and would entail status quo (grazing).*

Paragraphs 3 – 13 below should be completed for each alternative.

3. PHYSICAL SIZE OF THE ACTIVITY

Note – the physical size of design alternatives in this section would be the same.

a) Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:	**Size of the activity:**
Alternative A1[2] (preferred activity alternative)	*199000 m²* *(19.9 ha)*
Alternative A2 (if any)	*199000 m²* *(19.9 ha)*
Alternative A3 (if any)	m²

It is possible that the applicant may decide to build a Photovoltaic plant smaller than the proposed 10 Mega Watt / 19.9 hectare plant. This would then have a smaller footprint and thus a lower impact.

or, for linear activities: ***Associated power lines***

Alternative:	**Length of the activity:**	**Length of the activity (with extension)***
Alternative A1 (preferred activity alternative)	*1700 m*	*2086 m*
Alternative A2 (if any)	*4200 m*	*4585 m*
Alternative A1 (preferred activity alternative with mitigation)	*1536 m*	*1921 m*

** For an explanation of the possible powerline extension, see* **Figure 4**, *p8 and the accompanying note.*

[2] "Alternative A.." refer to activity, process, technology or other alternatives.

or, for linear activities: ***Associated water pipeline***

Alternative:	**Length of the activity** *(on Rooipad Wes farm 15/9) using a new pipeline.*	**Length of the activity** *(on Rooipad Wes farm 15/9) using existing farm pipes*
Alternative A1 (preferred activity alternative)	*6200 m*	*233 m*
Alternative A2 (if any)	*4120 m*	*0 m*
Alternative A1 (preferred activity alternative with mitigation)	*6010 m*	*390 m*

Water would be required for construction purposes, to occasionally wash dust from the PV panels, for the staff and initially to assist establishment of screening vegetation. The alternatives of building an entirely new pipeline or alternatively using as much of the existing farm pipe infrastructure were considered. In line with the design philosophy of 'minimum engineering' recommended by the specialist team, it was decided to tie in to existing farm infrastructure. The comparative length of pipeline that would be required is shown above. In addition to the above, both alternatives would require the construction of 1240 metres of pipe on the neighbouring farm Vuursteenkop. The pipeline would be laid in a shallow trench, except where there are rocks close to the surface. In these locations, it will be laid on the surface and covered with rocks.

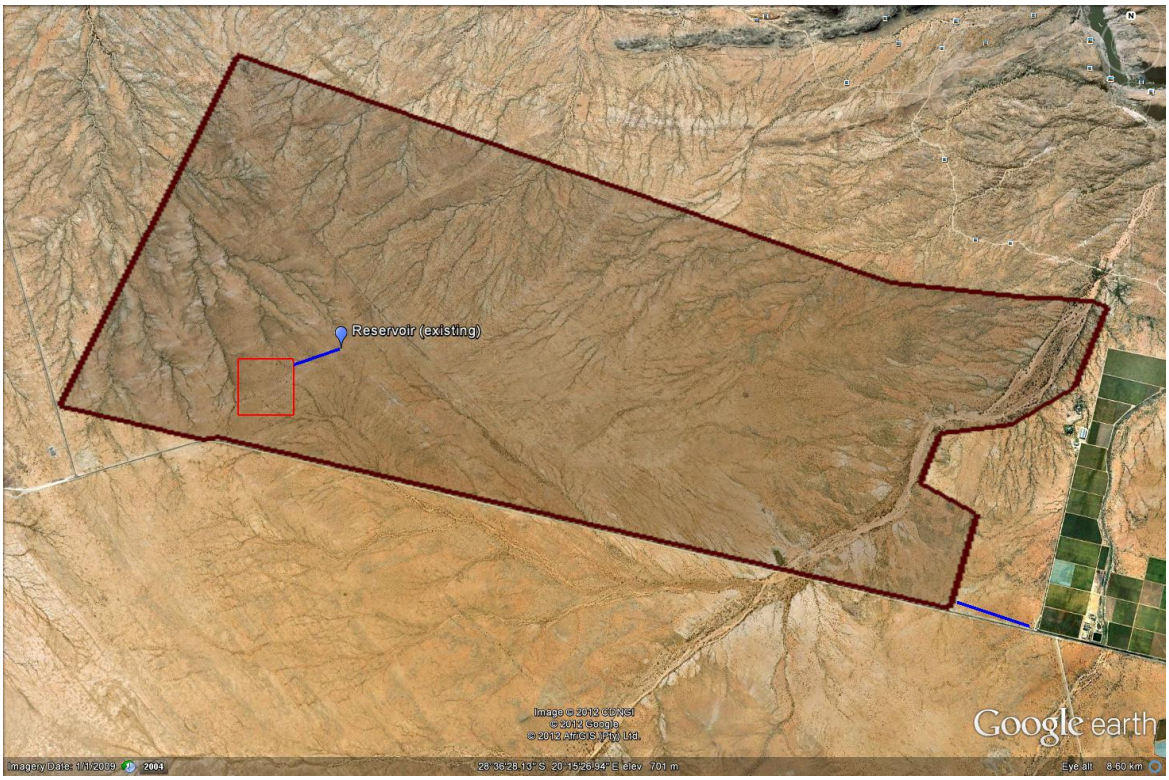

Figure 8: Proposed additional pipeline route required (connection via internal farm pipelines) with Rooipad Wes property boundary indicated

b) Indicate the size of the alternative sites ~~or servitudes~~ (within which the above footprints will occur):

Alternative:	**Size of the site/servitude:**
Alternative A1 (preferred activity alternative)	*1860,0000 m^2*
Alternative A2 (if any)	*1860,0000 m^2*
Alternative A1 (preferred activity alternative with mitigation)	*1860,0000 m^2*

The Solar PV site would be 19.9 ha (199000 m^2 in extent). The overall size of the farm on which the site is located (farm Rooipad Wes) is 1860 hectares in total area. Of this area, two smaller 'focus areas' of 165 hectares and 105 hectares for each alternative site were selected for more detailed analysis in the specialist studies (they are marked in green shading in **Figure 4***, page 8).*

The servitude areas required for the project would include:
** A 19.9 hectare servitude for the Photovoltaic Power Plant.*
** A 4 metre wide servitude for the water pipeline.*
** A 40 metre wide servitude for the power line (this is necessary so that if the power line falls over, it would fall within the servitude).*
** A 10 metre wide servitude for the access road.*

The above requirements for each of the alternatives would add to the following:

c) Indicate the size of the alternative ~~sites or~~ servitudes (within which the above footprints will occur):

Alternative:	**Size of the site/servitude:**	**Size of servitude (with power-line extension)***
Alternative A1 (preferred activity alternative)	*27.7 ha*	*29.2 ha**
Alternative A2 (if any)	*37.2 ha*	*38.7 ha**
Alternative A1 (preferred activity alternative with mitigation)	*26.7 ha*	*28.3 ha**

** For an explanation of the possible powerline extension, see* **Figure 4***, p8 and the accompanying note.*

Since these water pipeline, power line and access road servitudes are linear developments, their areas do not count towards the maximum 20 hectares for listed activity (Activity 23 of GNR 544 and Activity 15 of GNR 545 excludes linear developments).

The above servitudes would need to be registered.

The offices would be powered using the Solar PV electricity generated on the site, which would be stored using batteries (of a small scale not requiring permitting or authorisation). There would thus be no need for a municipal electrical connection.

4. SITE ACCESS

Does ready access to the site exist?	**YES**	NO
If NO, what is the distance over which a new access road will be built		*N/A* m

Describe the type of access road planned:

The initial proposal was for a 6 metre wide tarred road to be constructed to the site. Nevertheless, after environmental assessment, the usage of the existing track was recommended. The same existing track and access gate can be used for both alternative sites.

An upgrade of the existing track may be required to accommodate construction vehicles. The access road would be positioned over an existing track with reno-mattresses where stabilisation of causeways is required.

Figure 9: Existing access track to site

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

5. LOCALITY MAP

Locality Map	
An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.). The map must indicate the following:	
• an accurate indication of the project site position as well as the positions of the alternative sites, if any;	*Appendix A-1 shows national locality, and Appendix A-2, shows the regional settlement and roads. A smaller scale was used to indicate the alternative sites (Appendix A-3).*
• indication of all the alternatives identified;	*Appendix A-2*
• closest town(s;)	*Appendix A-2*
• road access from all major roads in the area;	*Appendix A-2 and A-3*
• road names or numbers of all major roads as well as the roads that provide access to the site(s);	*Appendix A-2 and A-3*
• all roads within a 1km radius of the site or alternative sites; and	*Appendix A-2.* *All detailed roads, including gravel National Park roads, in Visual Specialist Report (Appendix D-7, Figure 9, page 18).*
• a north arrow;	
• a legend; and	
• locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection).	*Appendix A-3*

6. LAYOUT/ROUTE PLAN

Layout or route plan	
A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.	
The site or route plans must indicate the following:	
• the property boundaries and numbers of all the properties within 50 metres of the site;	*Appendix A-5 Property Information*

Layout or route plan	
• the current land use as well as the land use zoning of the site;	*Appendix A-4 Land use & zoning*
• the current land use as well as the land use zoning each of the properties adjoining the site or sites;	*Appendix A-4 Land use & zoning*
• the exact position of each listed activity applied for (including alternatives);	*Appendix C shows schematic layout of Facility; Appendix A3 shows alternative site outlines. Appendix A-7 shows the environmental sensitivity summary.*
• servitude(s) indicating the purpose of the servitude;	*Servitudes would follow the above infrastructure at the widths specified in 3 PHYSICAL SIZE OF THE ACTIVITY, page 12*
• a legend; and	
• a north arrow.	

7. SENSITIVITY MAP

Sensitivity map	***Compliance***
The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:	*Summary in Appendix A-7 and A-3. Features of ecological sensitivity are shown in the ecological and aquatic review specialist reports in Appendix D.*
• watercourses;	*Major drainage channels indicated in appendix A-3. Minor drainage lines in A7. Additional detail on drainage lines in rest of site including alternative PV site in Ecological Study (Appendix D4, p22-23).*
• the 1:100 year flood line (where available or where it is required by DWA);	*Not available; Area not likely to be subject to flooding as at headwater of a sub-catchment and many kilometres from major drainage channel.*
• ridges;	*Key screening ridge line indicated in Appendix A-7 & A-3 and implicitly in contour drawing (A6).*
• cultural and historical features;	*Appendix A-7 & A-3 Cultural and historical features near to the preferred site are shown in* **Figure 15**, *page 48. Further detail in the heritage specialist report in Appendix D.*

Sensitivity map	*Compliance*
• areas with indigenous vegetation (even if it is degraded or infested with alien species); and	*The whole farm of the site is indigenous vegetation and is used for grazing with no cultivation.*
• critical biodiversity areas.	*The whole site falls within an 'Ecosystem Service Area' indicated in Appendix A-9.*
The sensitivity map must also cover areas within 100m of the site and must be attached in Appendix A.	

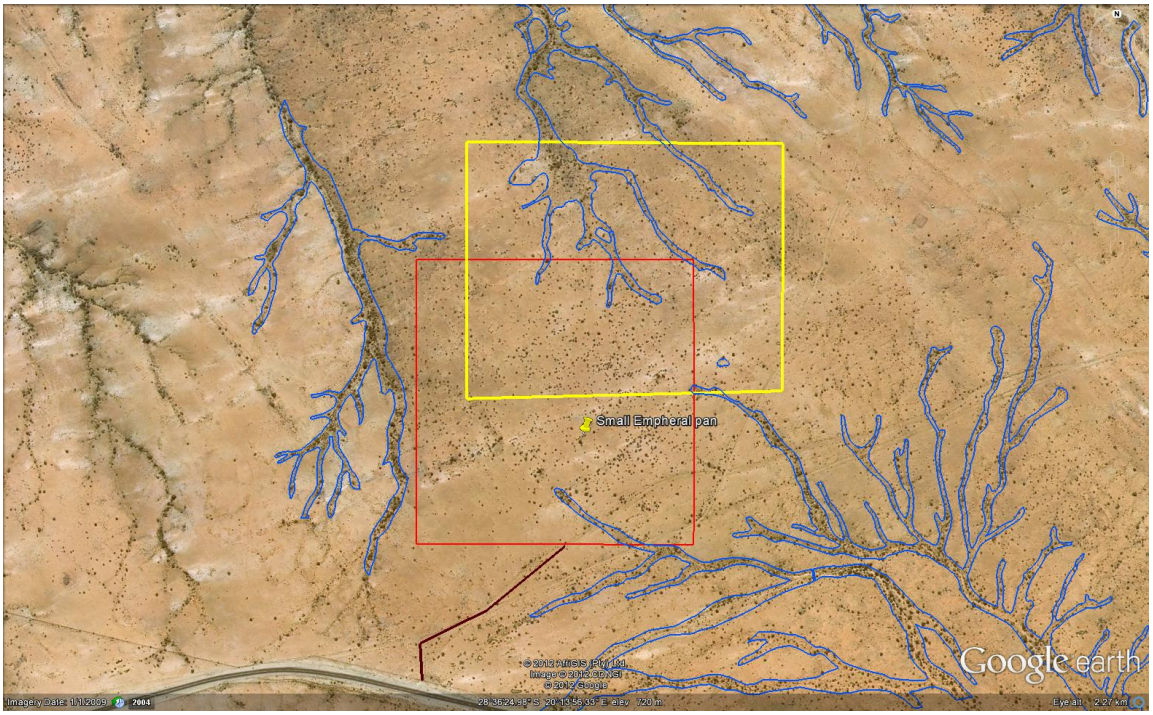

Figure 10: Drainage lines in the vicinity of site alternative 1 (initial proposal in yellow and with mitigation in red)

Sensitive environmental features

Figure 10, page 18 shows the initial proposed site alterative 1 (without mitigation) in yellow and the final proposed site alternative 1 (with mitigation) in red. The proposed 'red' alternative avoids all major drainage lines, but does impact on some minor drainage lines (see illustration of 'Site feature photographs' in appendix B, figure 2) and an small ephemeral pan illustrated in figure 5 of the same appendix. The 'red' alternative was recommended by the aquatic ecologist consultant (see report in Appendix E-8) as the lowest impact location for a 19.9 hectare facility on the proposed site. The drainage lines above were outlined in a desktop study by the Ecological specialist study using aerial photograph (see report in Appendix E-4). If, for any reason it was decided to build a smaller facility than the currently proposed 10 MW/ 19.9 hectare site, then the selected smaller footprint would also need to consider further minimising impacts on such features.

8. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report**.** It must be supplemented with additional photographs of relevant features on the site, if applicable.

9. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of at least 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

10. ACTIVITY MOTIVATION

Motivate and explain the need and desirability of the activity (including demand for the activity):

Activity motivation			
1. Is the activity permitted in terms of the property's existing land use rights?	YES	**NO**	Please explain
The project would need to apply for town planning land use rights to use agricultural land for renewable energy purposes. This cannot take place prior to Environmental Authorisation.			
2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	**YES**	NO	Please explain
According to the Northern Cape Provincial Spatial Development Framework (PSDF)(2012), economic development typically responds to the availability of Environmental Capital (e.g. water, suitable agricultural soil, mining resources, etc.) and Infrastructural Capital (e.g. roads, electricity, bulk engineering services, etc.) (page 67). Over time, this has resulted in the evolution of distinct Development Regions and Corridors. One of these corridors is the "Solar corridor" as some of the best solar radiation areas is found in the area from Prieska to Upington and along to Riemvasmaak. The proposed development is located close to this corridor. *The PSDF favours the use of renewable energy over non-renewable. The policy recognises portions of the Northern Cape including the proposed site as having the best Solar resource in the country (see Map C1.2) and recognises the potential for solar resource such as water availability, access to the electricity grid, good roads (p32).* *The need for the project is driven by national policies in favour of renewable energy, which are supported by the PSDF.* *The final Northern Cape PSDF was completed on 31 July 2012 during the course of the process.*			

Activity motivation			
The Northern Cape Provincial Planning Department was consulted, questioned the compliance of the project with the Provincial SDF. A motivation was sent and discussed with the planning consultants who authored the PSDF (see Appendix E-6-15).			
(b) Urban edge / Edge of Built environment for the area	**YES**	NO	Please explain
The proposed development would be outside the Urban edge for the area. Nevertheless, it is accepted planning practice that certain exceptional categories of industrial activities including electrical infrastructure (such as substations, powerlines), agro-industrial buildings, and renewable energy specifically are appropriate outside of the urban edge and thus do not set a precedent that would lead to conventional being placed outside the urban edge. While it is outside the urban edge, it does not therefore compromise the urban edge and is thus considered in line with the urban edge.			
(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	YES	**NO**	Please explain

Siyanda Integrated Development Plan (2012-17)

The Siyanda Integrated Development Plan (IDP) (2012-2017) is a detailed (424 page) report which summarises the principal economic issues and challenges, administrative structures, environmental opportunities and constraints and planned projects for the Siyanda District Municipal area (since renamed ZF Mgcawu District Municipality). The list of municipal projects include numerous new clinics, housing, roads, stormwater and electricity provision. Kai Garib Local Municipality priority issues are housing, basic services. Proposals for Augrabies include an upgraded wastewater treatment works, a waste transfer station, improved drainage, a cemetery and a crèche. The Orange River area is a significant supplier of table grapes to the European market.

Of relevance to the Augrabies Solar project, the IDP criticises the National Spatial Development Plan for failure to recognise the potential of the Siyanda District for investment in Solar renewable energy. Investigations into the feasibility of Solar energy are encouraged with the target date of 2014 – for communities and farms as well as the national grid. It highlights the strategic tourist importance of the Augrabies Falls National Park and the potential of the Kokerboom Food and Wine Route, which are adjacent to the proposed project (Siyanda District Municipality, 2012).

The local municipality does not have a local IDP or SDF and thus by relies on the higher order District Municipality IDP and the Provincial SDF, which have been consulted.

(d) Approved Structure Plan of the Municipality	YES	NO	Please explain
N/A. There is no approved Structure Plan for the municipality.			

Activity motivation			
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	**YES**	NO	Please explain

Siyanda Environmental Management Framework (EMF) 2008

The Siyanda Environmental Management Framework (EMF) describes the physical, biological and socio-economic characteristics of the Siyanda District. It highlights the climatic constraint of the arid nature of the area, which evaporates more water than it receives in rainfall and consequently cultivated agriculture is dependent on irrigation from the Orange River. The high level of sunshine is identified as an opportunity for solar power generation.

Seven categories of 'environmental control zones' are specified, in which various potential environmental problems and consequent precautionary measures are specified. Sensitivity issues include: groundwater resources, high potential vegetation conservation areas and wind erosion risk areas. Most of the vast district is mapped at a coarse scale, but Orange River basin is mapped in much greater detail since it is in general much more ecologically sensitive. Certain urban areas are excluded from controls. The Augrabies Solar PV site falls into Zone 7, which is the 'low control zone'. The framework also specifies and maps four Geographical Areas in terms of the National Environmental Management Act (NEMA) in which additional Environmental Impact Assessment (EIA) activities are to be specified. The Augrabies Solar PV site falls into Area D in which no additional activities are specified (Environomics, 2008)

(f) Any other Plans (e.g. Guide Plan)	**YES**	NO	Please explain

Kokerboom Food and Wine Route

The Kokerboom Food and Wine Route includes the R359 adjacent to the proposed site and the road between the Blouputs substation and the Orange River. This route does not have statutory status but is promoted for tourism purposes. The route runs from Upington, on the N14, pass Kanoneiland, Keimoes and Friersdal to Riemvasmaak making a circle via Vredesvallei, Blouputs-on the R359 the Augrabies Falls, Kakamas, Neilersdrift, Eksteenskuil, Kanoneiland and back to Upington. The southern leg roughly follows the route of the Orange River. (OpenAfrica, 2013). It includes a diversity of views including vineyards, desert, the Orange River, but also housing, agro-industrial buildings and electrical infrastructure. The project sought to minimise impact on this route via setback and screening, but the priority was to protect the views from the Augrabies National Park. Comment from Kai Garib Municipality expressed the opinion that the proposed Augrabies Solar PV facility could itself become a tourist attraction and add interest to the route.

Augrabies Falls National Park Management Plan (2013-2013)

The Augrabies Falls Management Plan is a South African National Parks Policy

Activity motivation			
Document, rather than a statutory Town Planning document. In terms of this policy, the proposed site falls within two 'buffer zones.'(see Map 6, page 71 of the Management Plan). Firstly it is within the Viewshed protection area of the National Park, an area in which projects need to be carefully evaluated for visual impacts on the National Park. This motivated the very detailed visual impact study for this project (see Appendix D 7). Secondly, it falls within the 'priority natural areas' buffer zone, within which developments need to be carefully evaluated for land-use compatibility with the National Park. The proposed Solar PV project proposes a 'light engineering' approach which does not change the topography or clear all vegetation, and would allow natural vegetation to grow between the Solar panels. Decommissioning would leave the footings in situ, allowing rapid return to the natural state after removal of the panels. It is argued that this 'light engineering approach' combined with the limited size (to a maximum of 20 hectares) in a location out of sight of the viewsites of the National Park would be a compatible land use.			
3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	**YES**	NO	Please explain
The proposed land use fits within the time frame and vision of the Siyanda Integrated Development Plan (2012-17) and the Provincial Spatial Development Framework (2012). ***Motivation:*** *The only available Spatial Development Framework (SDF) is the Northern Cape Provincial Development Framework. This policy promotes the use of Solar energy in a broad brush 'solar corridor' in the area.* *The Provincial Planning Department questioned compliance with this policy and a motivation was sent and discussed with the planning consultants for the PSDF, who did not dispute it (in Appendix D-6-15). Further motivation on PSDF form has been requested and will be provided, but this will not form part of the Basic Assessment Report. Their requested motivation requires the reformatting of information already in the Basic Assessment report into a different format prescribed by a form in the PSDF.* *The mapping error in the National Park boundary referred to in* Augrabies National Park boundary mapping error*, page x has transferred to numerous other databases including that of the Northern Cape PSDF. This led the PSDF to incorrectly map the site as a conservation 'core area' along with the National Park. The response in Appendix D-6-15 motivates why this mapping was in error, and this was not disputed by the consultants who authored this PSDF.* *Other planning documents include the* Siyanda Environmental Management Framework (EMF) 2008*, see page 21 and* Siyanda Integrated Development Plan (2012-17)*, see page 20 in this Basic Assessment below.*			

Activity motivation			
4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)	**YES**	NO	Please explain
The project fits within the national priority of 'renewable energy'. The community in the area would be amongst the users of this renewable energy, via the national electrical grid. It would also make a small contribution to employment in the local community outside of the harvest peak season. The public consultation process did not reveal any competing community needs for the same land resources.			
5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	**YES**	NO	Please explain
The only municipal service that will be needed is a very small quantity for waste disposal. Please see appendix J-6 for confirmation that the municipality has capacity.			
6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	YES	**NO**	Please explain
The project would feed electricity into the national electrical grid, which is outside the jurisdiction of municipal planning. It would not make use of any municipal services other than a very minor quantity for waste disposal purposes. The municipality has provided a letter confirming they have capacity for such waste disposal (see Appendix J-6). The municipality has been consulted on the project. There is therefore no need for the municipality to formally incorporate the project into their infrastructure planning.			
7. Is this project part of a national programme to address an issue of national concern or importance?	**YES**	NO	Please explain
The project forms part of the national Renewable Energy Independent Power Producer programme, which is motivated to diversify the electrical production and reduce dependence on the burning of polluting fossil fuels.			
8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	**YES**	NO	Please explain
The surrounding land use is mainly low intensity agriculture (grazing). The only other significant industrial feature is the Blouputs substation 1.5 km away, which at 0.23 hectares area is much smaller than the proposed 19.9 hectare solar plant. The substation is nevertheless highly visible at the intersection of two roads. Vuursteenkop farm 6.1 km			

Activity motivation			
away is a mixed landscape with irrigated vineyards, some of which are covered in shade cloth, which look blue-grey from a distance and certain agri-industrial buildings (see Appendix B). The Augrabies National Park boundary is 1.3 km to the West and 2.1 km to the North, although the more intensively used visitor areas are 5.9 km or more from the proposed Site alternative 1. During the process, a new viewsite was developed approximately 2.6 km North of the preferred site. This is however not visible from the site. *The site falls within the 15 km 'viewshed protection area' as defined by the Augrabies Falls National Park management plan (SANParks, 2008). While this 'viewshed protection area' does not have statutory planning status, SANParks has a strong interest in commenting on developments within this area. It also falls within a defined 'ecological support area' of the Namakwa Biodiversity Sector Plan (Northern Cape Province, 2008). While the site is outside of the boundaries Namakwa area, it was given such a rating by the Sector Plan, probably because of its proximity to the Orange River and the conservation area of the Augrabies Falls National Park.* *There is thus a mixture of relatively low intensity land uses in the vicinity, in which case land uses need to be planned and mitigated for visual impacts in relation to the National Park. The project team has analysed the 1860 hectare farm to find the 19.9 hectare portion with the lowest overall environmental impact (site 1 with mitigation), with the strongest weighting in this analysis given to visual impacts. The environmental practitioners believe that the proposed Solar PV facility with mitigation will fit into the surrounding area at this particular location. Certain other locations on the same farm would have a much higher visual impact and thus not fit with the Augrabies National Park.*			
9. Is the development the best practicable environmental option for this land/site?	**YES**	NO	Please explain
This question partially pre-empts the impact assessment and final conclusions and recommendation of this Basic Assessment Report given at the end of the report with detailed motivation in Sections D and E. The no-go alternative for the land is its existing land use, which is 'grazing' of wild horses, one of the few animals not at risk from predators. The same property of 1860 ha would have 1840 ha remaining for this continued land use. The land is not within the proposed Protected Area Expansion Area of the National Park, which rather proposes to expand westwards alongside the Orange River. The proposed site has is in an arid location, has very shallow and poor quality soil and is thus not suitable for cultivation. The alternative of grazing does not bring employment and non-polluting energy production benefits to the land. The proposed development is therefore considered the best practicable environmental option for the proposed site.			
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	**YES**	NO	Please explain
This question partially pre-empts the impact assessment and final conclusions and recommendation of this Basic Assessment Report given at the end of the report with detailed motivation in Sections D and E. It is submitted that the benefits of non-polluting renewable energy provision and modest employment creation of the proposed project at this carefully chosen location with mitigation outweigh the negative impacts identified.			

Activity motivation			
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	YES	**NO**	Please explain
The Visual Impact Assessment specifically recommends that no expansion of the Solar Facility should be allowed beyond the proposed 19.9 hectare development. Most other areas within the same 1860 hectare farm 15/9 would have very different visual impacts.			
12. Will any person's rights be negatively affected by the proposed activity/ies?	YES	**NO**	Please explain
There is nobody living on the farm Rooipad Wes 15/9 and the adjacent farm to the east is owned by the same owner. The adjacent National Park has been consulted on the project.			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	YES	**NO**	Please explain
While the project is an industrial facility outside of the urban edge, certain special types of infrastructure including agri-industrial buildings, electrical power substations and alternative energy facilities are accepted in planning practice worldwide as an exception to the normal exclusion of industrial facilities outside the urban edge and thus should not set a precedent. Such facilities do not impact negatively on agriculture and in fact can strengthen the viability of agriculture by providing supplementary income to farming. The agricultural specialist study found that the land to be used for the PV plant did not have significant agricultural potential. The soil at the proposed site is very shallow. There is also an existing industrial facility an electrical sub-station 1.5km from the proposed PV facility.			
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	YES	**NO**	Please explain
The project is a Renewable Energy Project and accordingly could potentially be designated a Strategic Infrastructure Project (SIP), category 8 "Green energy in support of the South African economy". Nevertheless, no renewable energy project can be allocated SIP status until after it has been granted Preferred Bidder Status, and no project can be granted Preferred Bidder Status until after it has received Environmental Authorisation. If the project is authorised, it could potentially be granted SIP status in future.			
15. What will the benefits be to society in general and to the local communities?			Please explain
Benefits for society in general *The availability of additional electricity to the Eskom grid will serve to both strengthen the grid, as well as assist the small scale alleviation of pressure of electricity generation from coal fired power stations. Due to the small scale of the proposed project, the significance of this direct positive impact would be low. On the other hand the cumulative effect of the numerous proposed renewable energy facilities across the country would be more significant.* *South Africa is a signatory to international agreements to promote renewable energy in the interests of reducing environmental impact on energy generation and this project, if*			

Activity motivation	
constructed, would contribute towards these goals.	
Benefits for local communities *Limited job opportunities may be available during construction phase and a smaller number for the operation phase (see 8 SOCIO-ECONOMIC CHARACTER, page 48).* *While the employment on the project will have some benefit, many proposed developments with modest employment opportunities unreasonably raise the expectations of employment in rural local communities. Furthermore, such local communities also often misinterpret the environmental public participation process as an opportunity to apply for jobs in the proposed development. Any statements relating to employment opportunities need to be careful to avoid creating such misunderstandings.* *The electricity generated would be fed into the grid at the Blouputs substation to be used by local communities.*	
Beneficiaries of the project would include: • *Less pressure to Eskom;* • *The farm owner would get rental income for the use of the land;* • *Modest employment benefits to the local community;* • *Project proponents;* • *People living in the coal mining areas would benefit from less increase in air pollution as compared with coal burning power generation.* • *Global beneficiaries: Fractional contribution towards reducing increases in rate of global carbon emissions.*	
16. Any other need and desirability considerations related to the proposed activity?	Please explain
Need and desirability considerations have been adequately discussed in the answers to other questions in this section for the purposes of this Basic Assessment report. Two departments of the Northern Cape Provincial Government have requested the completion and submission of a motivation on their form Toolkit D16 (part of the Northern Cape Provincial Spatial Development Framework), which will be submitted to them as part of the land use planning application.	
17. How does the project fit into the National Development Plan for 2030?	Please explain
The project would make a small incremental contribution towards the National Development Plan 2030 goal Chapter 4: Economic Infrastructure goal 18: "Move to less carbon-intensive electricity production through procuring at least 20 000MW of renewable energy…". This is a goal listed for investment prioritisation and aims to reduce carbon emissions from 0.9kg per kilowatt-hour to 0.6kg per kilowatt-hour. The plan also promotes waste recycling where possible, which is being implemented on the project (National Planning commission, 2011).	
18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.	
The Basic Assessment process undertaken for this project has sought to identify predict and evaluate the impacts on the environment including socio-economic and cultural heritage issues. It has evaluated both macro scale site and project alternatives and micro scale	

Activity motivation
mitigation to minimise negative impacts. There has been detailed public participation of the local community, neighbours and other relevant stakeholders and authorities. A detailed Environmental Management Programme is proposed for the implementation of the project.
19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.
The Environmental Basic Assessment process has considered the principles of NEMA Section 2 including promotion of social, environmental and economic sustainability. This has included consideration of issues of ecological diversity (e.g. see specialist studies and impact assessment), avoidance of pollution and non-renewable resource consumption (e.g. renewable energy will reduce pollution), minimisation of landscape disturbance (e.g. through carefully chosen location and a reversible minimum engineering approach), recycling of waste (e.g. vegetation to be used for mulch on adjacent farm), mitigation of impacts (e.g. see recommendations for mitigation). Participation and consultation of all interested parties has been promoted including special measures to include those who prefer oral to written communication (e.g. loudhailer advertising and verbal explanation in language of preference). Environmental impacts have been evaluated (e.g. see impact assessment section). Additional follow up communications have been made to ensure that stakeholder interested parties are aware of issues that affect them beyond the minimum requirements of the formal public participation process. The process included consultation with women and youth in the community.

11. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
Constitution of the Republic of South Africa	*Section 24 of the Bill of rights specifies that "Everyone has the right to an environment that is not harmful to their health or well-being; and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development." The proposed project will reduce the increases of pollution from carbon emissions and the environmental process has been guided by the principles of sustainable development.*	*National Government*	*1996*
National Environmental Management Act	*The proposed project will trigger listed activities detailed the Project description in Section A, "b) Provide a detailed description of the listed*	*National Department of*	*1998*

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
(No 107 of 1998) as amended	*activities associated with the project as applied for", page 2 thus requiring a Basic Assessment Process. Compliance with elements of the principal National Environmental Management Act is detailed in questions 18 & 19 of the 'Activity motivation' section above.*	*Environmental Affairs*	
National Water Act (No 36 of 1998)	*Minor drainage channels and a small ephemeral pan may be impacted by the proposed PV infrastructure within the proposed 19.9 ha site area and the proposed reinforcement of its existing access road.* *An application for a water use authorisation for section 21(c) and (i) water use activities will be submitted to the Department of Water Affairs.*	*Department of Water Affairs*	*1998*
Conservation of Agricultural Resources Act (No 43 of 1983)	*The Conservation of Agricultural Resources Act combats the spread of invader weeds. While precautionary steps will be taken as part of best practice specifications, the desert environment at Augrabies does not have a problem of invasive alien vegetation as these plants cannot grow without irrigation.* *An Agricultural Potential Assessment has been undertaken to determine the impact of the proposed PV facility and transmission line on the agricultural potential of the affected farm.*	*Department of Agriculture Forestry and Fisheries*	*1983*
Environment Conservation Act (No 73 of 1989)	*The Environmental Conservation Act provides for noise regulations, which are included in the Environmental Management Programme as part of best practice specifications. Nevertheless, the distances to the closest residential how and proposed light on land construction method make this a less significant issue.*	*National Department of Environmental Affairs*	*1989*
National Environmental Management: Biodiversity Act (Act 10 of 2004)	*The objective of the NEMBA is to manage and conserve biological diversity and resources in a sustainable manner. A number of Government Notices have been issued in terms of the Act, such as a list of ecosystems that are threatened; an endangered and vulnerable species list.* *Botanical, Ecological and Aquatic Specialist studies have been undertaken to ensure biodiversity conservation. The vegetation type on the site is categorised 'least threatened'. NEMA provides for control of alien vegetation. Precautions will be taken, but the desert environment does not have a problem of alien invasion.*	*South African National Parks*	*2004*

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
National Environmental Management: Protected Areas Act (no 57 of 2003)	*The National Environmental Management Protected Areas Act is relevant to the neighbouring Augrabies National Park. The site of the proposed Augrabies Solar PV development is not within a protected area.*	*South African National Parks*	*2003*
Northern Cape Conservation Act (No 9 of 2009)	*The Northern Cape Conservation Act regulates animal hunting and trapping, protected plant species and alien invasive species.* *The Environmental Management Programme includes specifications to enforce compliance with this. .*	*Northern Cape Dept of Environment and Conservation*	*2009*
Veld and Forest Fire Act (Act No 101 of 1998)	*The Veld and Forest Fire Act requires the landowner to take steps to prevent fire from spreading to neighbouring properties. Cautionary steps will be taken and are specified in the Environmental Management Programme .*	*Department of Agriculture Forestry and Fisheries*	*1998*
National Heritage Resources (Act No. 25 of 1999)	*Both the length of the proposed powerline and the area of the proposed development trigger the requirement for a full Heritage Impact Assessment (HIA), which has been undertaken and submitted to the South African Heritage Resources Agency (SAHRA).*	*South African Heritage Resources Agency*	*1999*
National Environmental Management: Waste Management Act (Act No. 59 of 2008)	*The National Environmental Management: Waste Act regulates waste management to protect health and the environment. It calls for reduction, re-use and recycling of waste and sets out requirements for storage, collection and transportation of waste. These principals of reduction, re-use and recycling have been incorporated into the project planning. .*	*DEA*	*2008*
Occupational Health and Safety Act (No. 85 of 1993) (the OHS Act)	*The health and safety of all people involved in the project including visitors before and after construction will be protected.*	*Department of Labour*	*1993*
White Paper on Energy Policy of the Republic of South Africa	*The White Paper on Energy Policy promotes diversification of energy sources including renewable energy generation and the production of power from independent power producers. This early policy, however did not foresee the full scope of the utility scale Solar PV generation into the national grid, which is now being implemented.*	*Department of Energy (DoE)*	*1998*
White Paper on Renewable Energy	*The White Paper on renewable energy policy proposed utility scale Solar PV generation and other renewable energy projects.*	*Department of Minerals and Energy (DME)*	*2003*

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
NEMA Environmental Impact Assessment Regulations Guidelines and Information Document Series	*The NEMA Environmental Impact Assessment Regulations Guidelines and Information Document Series guide the environmental process.*	*DEA&DP*	*2010 & 2011*

12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	**YES**	NO
If YES, what estimated quantity will be produced per month?	*100m^3 chipped vegetation volume first month. Thereafter general construction waste (estimated as 20 m^3 per month) for the duration of the construction phase will be generated.*	

How will the construction solid waste be disposed of (describe)?

Solid waste produced during the construction phase is mainly expected to be cleared vegetation, concrete rubble, construction material off-cuts or damaged components and packaging.

The bulk of the solid waste would be vegetation cleared during the first month of construction. Vegetation cleared from the site that can be chipped will be chipped on site and used for mulch and/or compost on the adjacent grape farm Vuursteenkop.

The remainder of refuse collected on site at would be removed at least once a month and disposed of at a licensed landfill site or accepted by a reputable recycling/recovery company.

Where will the construction solid waste be disposed of (describe)?

Vegetation cleared from the site that can be chipped will be used for mulch and/or compost on the adjacent grape farm Vuursteenkop to the east of the site. The landowner of both the proposed PV Site on Rooipad Wes and the Grape farm Vuursteenkop, Mr Martin Oosthuizen, has agreed to this re-use (correspondence dated 5 April 2012). Such re-use of the material, would save valuable landfill space and thus is considered environmentally much more desirable and in line with waste policy than disposal to a landfill.

The remainder of the construction solid waste will be disposed of at a licensed landfill site or accepted by a reputable recycling/recovery company.

Will the activity produce solid waste during its operational phase?	**YES**	NO
If YES, what estimated quantity will be produced per month?	*Less than 3 m^3*	

How will the solid waste be disposed of (describe)?

Refuse collected on site at would be removed at least once a month and disposed of at a licensed landfill site or accepted by a reputable recycling/recovery company. The Kai Garib municipality has confirmed they have capacity at the Kakamas landfill for this (Appendix G-9).

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

Kakamas landfill

Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)?

Vegetation cleared from the site that can be chipped will be chipped and used for mulch and/or compost on the adjacent grape farm Vuursteenkop to the east of the site.

Any waste that cannot be feasibly re-used/recycled will be disposed of to a licensed landfill site.

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

The recycling of waste where possible, instead of disposal at a landfill is environmentally desirable and in line with relevant government waste policies.

Can any part of the solid waste be classified as hazardous in terms of the NEM:WA?	YES	**NO**

If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

Is the activity that is being applied for a solid waste handling or treatment facility?	YES	**NO**

If YES, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

The offices of the proposed PV facility would make use of the power of the PV facility stored in batteries. These batteries when they reach the end of their design-life would constitute a very small quantity of hazardous waste. The scale of this would be similar to domestic or truck motor vehicle battery storage and not trigger any special permitting requirements. They should preferably be recycled at a battery recycling centre.

b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?	YES	**NO**
If YES, what estimated quantity will be produced per month?	*N/A*	m^3
Will the activity produce any effluent that will be treated and/or disposed of on site?	**YES**	NO

If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

The regulations in terms of the Waste Act, Government Notice No 718 dated 03 July 2009 Category A, Activity 11 read. "The treatment of effluent, wastewater or sewage with an annual throughput capacity of more than 2 000 cubic metres but less than 15 000 cubic metres".

The quantity of sewage effluent that would be produced by a staff toilet would be less than this threshold of the Waste Act and will thus not require a waste licences or a Scoping and EIA application.

Since the detail design of the project is not complete, it is possible that the sewage may be treated on site or transported off site to the municipal sewage system. Either way, the quantities would be too small to trigger any National Environmental Management Waste Act (NEM:WA) or National Environmental Management Act (NEMA) listed activities.

Will the activity produce effluent that will be treated and/or disposed of at another facility?	YES	**NO**

If YES, provide the particulars of the facility:

Facility name:	*N/A*		
Contact person:	*N/A*		
Postal address:	*N/A*		
Postal code:	*N/A*		
Telephone:	*N/A*	**Cell:**	*N/A*
E-mail:	*N/A*	**Fax:**	*N/A*

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

The facility will not generate a significant amount of waste water, other than the water used for washing the panels twice a year. Given the 'minimal engineering' design of the PV plant with minimal hard surfacing, most of this is likely to be absorbed by the soil and it will not be feasible to re-use this water. Detergents will not be used for cleaning of panels, only water.

c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere other that exhaust emissions and dust associated with construction phase activities?	YES	**NO**
If YES, is it controlled by any legislation of any sphere of government?	YES	NO

If YES, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.
If NO, describe the emissions in terms of type and concentration:

Some dust would be released during construction. This could be mitigated as described in the Environmental Management Programme. However, as roads and neighbouring residents are relatively far from the work site and the footprint disturbance is small in relation to the greater site, it is unlikely that adjacent land users will be affected by dust generated from the site.

d) Waste permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA?	YES	**NO**

If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority

N/A

e) Generation of noise

Will the activity generate noise?	YES	**NO**
If YES, is it controlled by any legislation of any sphere of government?	YES	NO

If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.
If NO, describe the noise in terms of type and level:

Some noise would be generated during construction, but this would be limited to the site. Since the site is located a distance away from any dwellings, it would not have any significant impacts.

13. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

Municipal	Water board	Groundwater	River, stream, dam or lake	**Other**	The activity will not use water

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:	litres	
No water will be extracted directly from any "groundwater, river, stream, dam, lake or any other natural feature", but the project will make use of agricultural irrigation water from the adjacent Vuursteenkop farm, which originates from the Orange River. Such water is extracted from the Orange River using existing infrastructure and in terms of existing permits and water rights. The Vuursteenkop farmer has confirmed that he has water use rights capacity for such water usage and that this will not significantly impact on his agricultural activities (Oosthuizen, pers.comm).		
Construction phase (5.5 months)	*1800 kilo litres per month*	
Operational phase	*69 kilo litres per month*	
Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?	**YES***	NO

If YES, please provide proof that the application has been submitted to the Department of Water Affairs.

** Depending on the interpretation of the Department of Water Affairs, It is possible that a water use licence or general authorisation may be required not for extraction of water, but for impacts on watercourses (Belcher, 2012, p5). Water Permits will be applied for which will include: "Section 21 c – impeding or diverting the flow in a watercourse; and Section 21i – changing the bed, banks or characteristics of a watercourse"*

14. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

Not applicable – the facility is designed to use renewable energy.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

The facility would use renewable energy to generate power.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

IMPORTANT NOTES:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

Section B Copy No. (e.g. A):		***It is not required to complete this section separately for different parts of the site – sufficient space is available to provide information for both site alternatives.***

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section? **YES** | NO

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

Please see Appendix D for specialist reports and appendix I for specialist declarations. The declaration of the EMP consultant is included in Appendix G.

1. *Agricultural Report – Dr Paterson, Agricultural Research Council*
2. *Botanical Report – Dr Dave Mc Donald*
3. *Ecological Report - Dr David Hoare*
4. *Fossil Report – Mr John E Almond*
5. *Heritage Report – Mr Jason Orton*
6. *Visual Report – Mr Albert van der Stok*
7. *Aquatic Review Report – Ms Toni Belcher*

Property description/physical address:

Province	Northern Cape
District Municipality	*ZF Mgcawu District Municipality (Previously Siyanda District Municipality before 1 July 2013)*
Local Municipality	*Kai! Garib Local Municipality*
Ward Number(s)	*1*
Farm name and number	*Rooipad Wes* *Rooipad Wes: Portion 9 of the Farm Rooipad no 15 (C0360000000001500009), approximately 2 kilometres south of the Augrabies Falls National Park, but north of the R359 secondary tar road running East-west.*
Portion number	*Portion 9 of the Farm Rooipad no 15*
SG Code	*C0360000000001500009*

Province	Northern Cape
District Municipality	*ZF Mgcawu District Municipality (Previously Siyanda District Municipality before 1 July 2013)*
Local Municipality	*Kai! Garib Local Municipality*
Ward Number(s)	*1*
Farm name and number	*Farm 431, Padrooi.* *The transmission line may impact a 385m strip on farm 431, Padrooi*
Portion number	*N/A*
SG Code	*C03600000000043100000*

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

Current land-use zoning as per local municipality IDP/records: *Agriculture I*

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required? **YES** | NO

The land of the proposed development land must be rezoned to 'agricultural: special zone: mixed use: primary use agriculture; secondary use renewable energy (solar)'. The area to be developed and rezoned must be professionally surveyed and registered with the deeds office and the surveyor general. A consent use application can only be granted for five years, which would be inadequate for a project with a 20 year lifespan. An environmental authorisation is required before such rezoning is granted (Grobbelaar, 2012).

Servitudes will need to be registered for the footprint of the facility, the access road, the power line and the water pipeline.

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

Alternative S1

2.1 Ridgeline		2.4 Closed valley		2.7 Undulating plain / low hills	X
2.2 Plateau		2.5 Open valley		2.8 Dune	
2.3 Side slope of hill/mountain		2.6 Plain	X	2.9 Seafront	

Alternative S2

2.1 Ridgeline		2.4 Closed valley		2.7 Undulating plain / low hills	X
2.2 Plateau		2.5 Open valley		2.8 Dune	
2.3 Side slope of hill/mountain		2.6 Plain	X	2.9 Seafront	

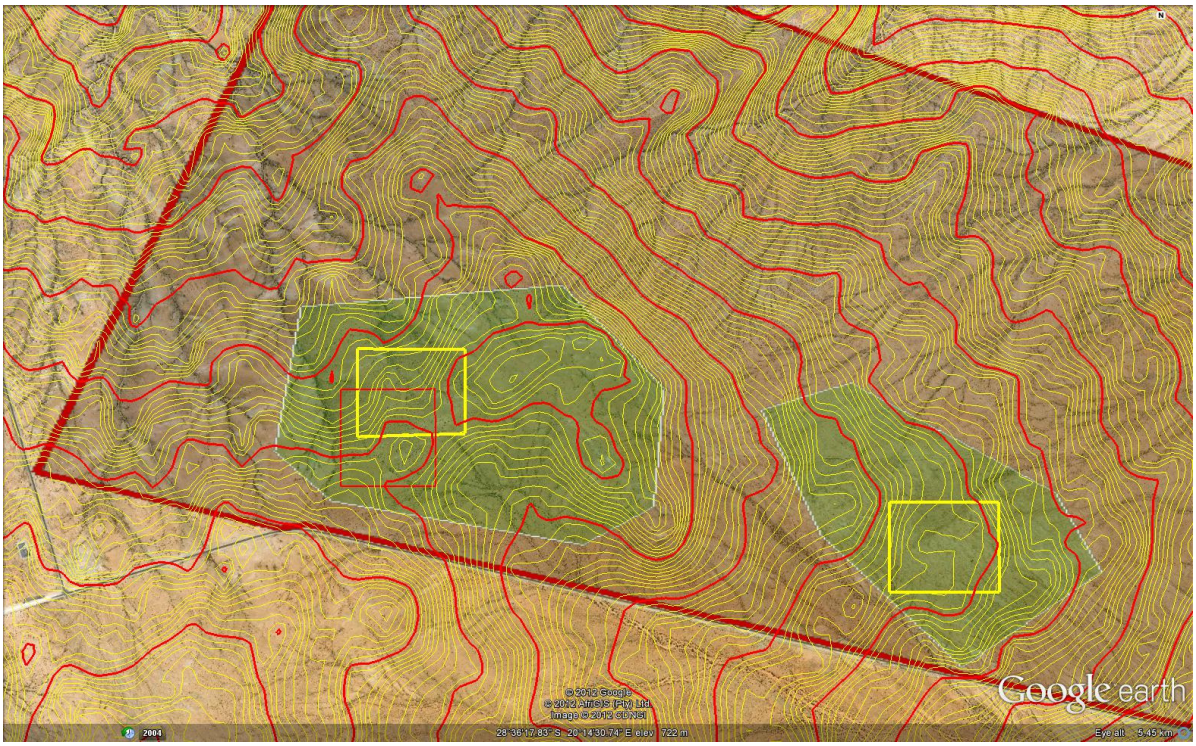

Figure 11: Contours based on satellite data (5m intervals in red and 0.5m intervals interpolated in yellow)

Topography of the site

The Figure 11, page 39 shows that the land is fairly flat (remembering that the squares each represents a 19.9 hectare area), but with some minor ridges running from North-west to South-east. These ridges provide the opportunity to screen site alternative PV1 from the Augrabies Park from a vantage point to the North-West, which is where the most sensitive viewer locations are within the park.

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following?

	Alternative S1:		**Alternative S2 (if any):**		**Alternative S3 (if any):**	
Shallow water table (less than 1.5m deep)	YES	**NO**	YES	**NO**	YES	NO
Dolomite, sinkhole or doline areas	YES	**NO**	YES	**NO**	YES	NO
Seasonally wet soils (often close to water bodies)	YES	**NO**	YES	**NO**	YES	NO
Unstable rocky slopes or steep slopes with loose soil	YES	**NO**	YES	**NO**	YES	NO
Dispersive soils (soils that dissolve in water)	YES	**NO**	YES	**NO**	YES	NO
Soils with high clay content (clay fraction more than 40%)	YES	**NO**	YES	**NO**	YES	NO
Any other unstable soil or geological feature	YES	**NO**	YES	**NO**	YES	NO
An area sensitive to erosion	**YES**	NO	**YES**	NO	YES	NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted.

Also related to the geological stability of the site, the Council for Geoscience reports that Augrabies is currently experiencing an 'earthquake swarm'. This is a series of small earthquakes, the nearest of which was recorded centering approximately 4.5km East of the preferred site (Council for Geoscience, 2014). While this is recorded for completeness, it is not considered a constraint to development of Solar PV. Solar PV infrastructure, being very light and supported with steel is better able to withstand earthquake shaking than the brick and mortar infrastructure that has withstood these earthquakes on adjacent farms. Solar PV arrays do exist in other earthquake risk zones such as California, where such risks are calculated into the engineering design (FEMA, 2014).

4. GROUNDCOVER

Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Alternative S1

Natural veld - good condition[E]	Natural veld with scattered aliens[E]	Natural veld with heavy alien infestation[E]	Veld dominated by alien species[E]	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

Alternative S2

Natural veld - good condition[E]	Natural veld with scattered aliens[E]	Natural veld with heavy alien infestation[E]	Veld dominated by alien species[E]	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an "[E] "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

See McDonald, David J. 2012. 'Baseline Botanical Assessment for the Proposed Augrabies Photovoltaic Power Project At Farm Rooipad 15 Portion 9, Augrabies, Northern Cape Province' in Appendix D.

5. SURFACE WATER

Indicate the surface water present on and or adjacent to the site and alternative sites?

Perennial River	YES	**NO**	UNSURE
Non-Perennial River	**YES***	NO	UNSURE
Permanent Wetland	YES	**NO**	UNSURE
Seasonal Wetland	**YES***	NO	UNSURE
Artificial Wetland	YES	**NO**	UNSURE
Estuarine / Lagoonal wetland	YES	**NO**	UNSURE

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

** The while the above are answered 'Yes', the scale of these features must be considered from the description and photographs provided below.*

Figure 12 Small endorhic/ephemeral pan on the site (immediately after rain)

Pans are broadly classified as wetlands in South Africa. They are isolated, oval shaped, shallow depressions, generally lacking an inlet or outlet. Water in these systems is gained through localised rainfall and possibly subsurface flows and is lost to evaporation. Because of these characteristics, pans are often restricted to arid regions with complete desiccation (dehydration) occurring seasonally. They are generally restricted to the drier western parts of South Africa where rainfall is less than 500mm per year. Inundation is generally ephemeral (short-lived) and they may remain dry for many years between temporary filling from localised rainfall. Tadpole shrimps were found in the endorheic pan. (Belcher, 2012).

Figure 13 Small drainage channel on the site

The preferred area for the placement of the Photovoltaic facility has been placed on only the very upper reaches of the three drainage channels where the channels are still small both in terms of size and the volume of water that they are likely to carry during rainfall events. These channels are only likely to contain water during and for a very short time period after rainfall events. The impact of the proposed projects on these upper reaches of the three minor and relatively insignificant tributaries of the Orange River is thus deemed to be negligible (Belcher, 2012).

The maximum depth of the drainage lines on the preferred PV site (with mitigation) is less than 400mm. The locations of the drainage lines in relation to the site is shown in Figure 10: Drainage lines in the vicinity of site alternative 1 (initial proposal in yellow and with mitigation in red)*, p18.*

The Photovoltaic (PV) plant preferred location has been be specifically placed to avoid the larger drainage areas on the farm. The transmission pylons would also be positioned to avoid these larger "drainage" areas. See image below (for Alternative S1 – preferred alternative): Power Line (Pink), water pipeline (blue), access road (brown), site footprint red.

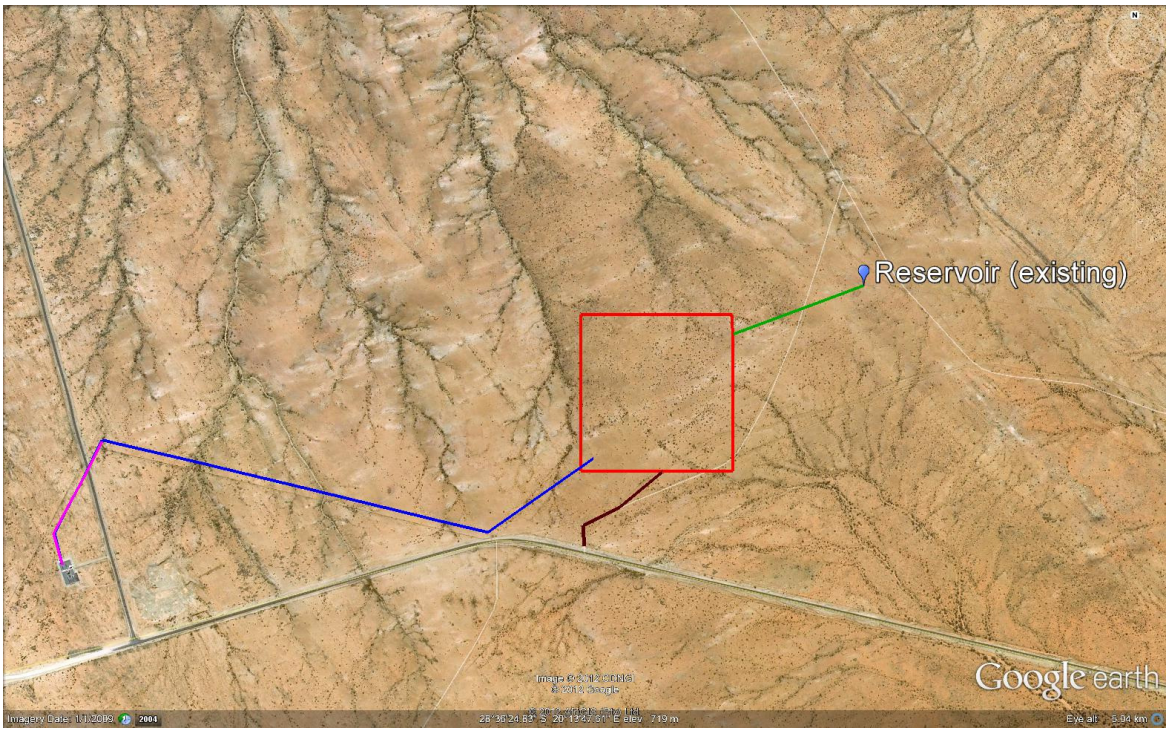

Figure 14: **Proposed power lines, road and footprint (Site alternative 1 after mitigation shown)**

6. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

Alternative S1		
Natural area *The vegetation is generally in moderate to good condition but there are signs in some areas of overgrazing.*	**Dam or reservoir** *Small reservoir for windmill borehole 400m away. No significant impacts expected.*	Polo fields
Low density residential	Hospital/medical centre	Filling station [H]
Medium density residential	School	Landfill or waste treatment site
High density residential	Tertiary education facility	Plantation
Informal residential[A]	Church	Agriculture *Grazing only. No cultivation nearby.*
Retail commercial & warehousing	Old age home	**River, stream or wetland** *Site includes a small endhoreic pan and some shallow drainage lines.*
Light industrial	Sewage treatment plant[A]	Nature conservation area
Medium industrial [AN]	Train station or shunting yard [N]	**Mountain, koppie or ridge** *The specific site of the proposed PV Plant is generally flat to gently*

Alternative S1		
		undulating, but the greater area has several low rocky ridges running from north west to south east within the property boundary of farm 9/15.
Heavy industrial [AN]	Railway line [N]	Museum
Power station	Major road (4 lanes or more) [N]	Historical building
Office/consulting room	Airport [N]	Protected Area *National Park is 1 km from the site.*
Military or police base/station/compound	Harbour	Graveyard *There is no graveyard, but there is a single stone cairn believed to be a Khoi grave 192m from the site. It will not be impacted by the project (see Heritage report, Appendix D-5).*
Spoil heap or slimes dam[A]	Sport facilities	**Archaeological site** *See heritage report, Appendix D-5*
Quarry, sand or borrow pit	Golf course	Other land uses (describe)

Alternative S2		
Natural area *The vegetation is generally in moderate to good condition but there are signs in some areas of overgrazing.*	Dam or reservoir *Dam 1.2 km from site (often dry). No significant impacts expected.*	Polo fields
Low density residential	Hospital/medical centre	Filling station [H]
Medium density residential	School	Landfill or waste treatment site
High density residential	Tertiary education facility	Plantation
Informal residential[A]	Church	Agriculture *Grazing only. No cultivation nearby.*
Retail commercial & warehousing	Old age home	**River, stream or wetland** *Site includes shallow drainage lines.*
Light industrial	Sewage treatment plant[A]	Nature conservation area *Nearest nature conservation area is 1.7 km from the site.*
Medium industrial [AN]	Train station or shunting yard [N]	**Mountain, koppie or ridge** *The specific site of the proposed PV Plant is generally flat to gently undulating, but the greater area has several low rocky*

Alternative S2		
		ridges running from north west to south east within the property boundary of farm 9/15.
Heavy industrial [AN]	Railway line [N]	Museum
Power station	Major road (4 lanes or more) [N]	Historical building
Office/consulting room	Airport [N]	Protected Area *National Park is 1.7 km from the site.*
Military or police base/station/compound	Harbour	Graveyard *There is one 1955 grave 1.2 km from the site. It will not be impacted by the project. (see Heritage report, Appendix D-5)*
Spoil heap or slimes dam[A]	Sport facilities	**Archaeological site** *See heritage report, Appendix D-5*
Quarry, sand or borrow pit	Golf course	Other land uses (describe)

If any of the boxes marked with an "N "are ticked, how will this impact / be impacted upon by the proposed activity?

Not applicable. No boxes are ticked.

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Not applicable. No boxes are ticked.

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Not applicable. No boxes are ticked.

Does the proposed site (including any alternative sites) fall within any of the following:		
Critical Biodiversity Area (as per provincial conservation plan)	YES	**NO**
The site does not fall within a Critical Biodiversity Area, but it does fall within an 'Ecosystem Service Area' in terms of the Namakwa Biodiversity Sector Plan. An extract of the relevant map with the site superimposed is indicated in Appendix A-9.		

Does the proposed site (including any alternative sites) fall within any of the following:		
Core area of a protected area?	YES	**NO**
A GIS database mapping error incorrectly indicates the site within the Augrabies National Park. This error has been widely distributed and replicated on most GIS databases (see **Augrabies National Park boundary mapping error**, *page x).*		
Buffer area of a protected area?	**YES**	NO
The proposed PV site is within the buffer area of the Augrabies National Park, where land use decisions must be carefully managed to avoid impacts on the National Park. There are two sub-categories of buffer area: 'Viewshed protection area' and 'Priority national areas'. The proposed PV site falls within both of these sub-categories of buffer area. (Please refer to appendix A-8).		
Planned expansion area of an existing protected area?	YES	**NO**
Existing offset area associated with a previous Environmental Authorisation?	YES	**NO**
Buffer area of the SKA?	YES	**NO**
"Legally speaking, there is no such thing as an SKA buffer zone. The Northern Cape Province, excluding Sol Plaaitjie municipality (Kimberley), was declared as Astronomy Advantage Area in terms of Section 5 of the AGA Act. *Since then, both the Core and Central Karoo Astronomy Advantage Areas have been declared (in terms of Sections 7 and 9 of the Act), which extend approximately 500km across. The Co-ordinated Astronomy Advantage Area will be declared in due course, which will cover the entire Northern Cape Province, excluding Sol Plaaitjie municipality." (SKA, Personal Communication, 2014).* *The project does fall in the Northern Cape Province. A letter from the SKA office says: 'The nearest SKA stations has been identified as Rem-Opt-9 at approximately 49km from the proposed PV installation; Based on the distances to the nearest SKA stations, and the information currently available on the detailed design of the PV installations, this facility poses a low risk of detrimental impact on the SKA…" (SKA, 7 July 2014) (Appendix E-6-18).*		

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A.

See Appendix A-8 and A-9.

7. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:	YES	**NO**
	Uncertain	

The modified proposed PV Site Alternative 1 (after mitigation – in red opposite) has no identified 'heritage sites' on or within 20 metres of the site. It does include one location identified as stone age 'background scatter'.

The initial proposed PV Site Alternative 1 (before mitigation – in yellow opposite) included one mapped group of stone artefacts (rated low significance) (see RPD2011/001 below).

Summary list of all heritage occurrences found on Rooipad 15/9 in the vicinity of near to the site (see Heritage Specialist study in Appendix D-5 for details). None of the following heritage occurrences are within 20 metres of the proposed preferred site, but they do fall within the 'focus area' which the specialists surveyed to assist the site selection:

Number	***Location***	***Description***	***Heritage significance***
RPD2011/001	*S28 36 20.5 E20 14 05.6*	*LSA artefact scatter*	*Low*
RPD2011/002	*S28 36 17.6 E20 13 40.7*	*Stone cairn / grave*	*(potentially) Very high*
RPD2011/003	*S28 36 07.5 E20 14 19.5*	*LSA artefact scatter*	*Low-Medium*
RPD2011/004	*S28 36 14.8 E20 14 33.4*	*LSA artefact scatter*	*Low-Medium*
RPD2011/005	*S28 36 17.6 E20 14 37.4*	*LSA artefact scatter*	*Low-Medium*

There were also some other locations on and near the proposed site, which were deemed 'background scatter' by the heritage specialist (Source: Orton, 2012(a)). "Background scatter" occurs widely across the Karoo and due to lack of good context is almost always of very low significance.

The heritage specialist consultant confirmed that the only heritage feature identified within the 'focus areas' of the study considered a culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act is the 'stone cairn' (suspected of being a grave)' labelled RPD2011/002 (Orton, 2012(b)). Nevertheless, this is 190 metres from the proposed preferred site (with mitigation) and thus does not fall within the 20 metre threshold in the question above.

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist:

The heritage specialist study found that the proposed development footprint will have negligible impacts on archaeological resources. Only 1 resource (RPD2011/001 - a Stone Age scatter with low significance) is located within the development footprint of the initially proposed Alternative S1 (without mitigation). It is not within the proposed Alternative S1 (with mitigation).

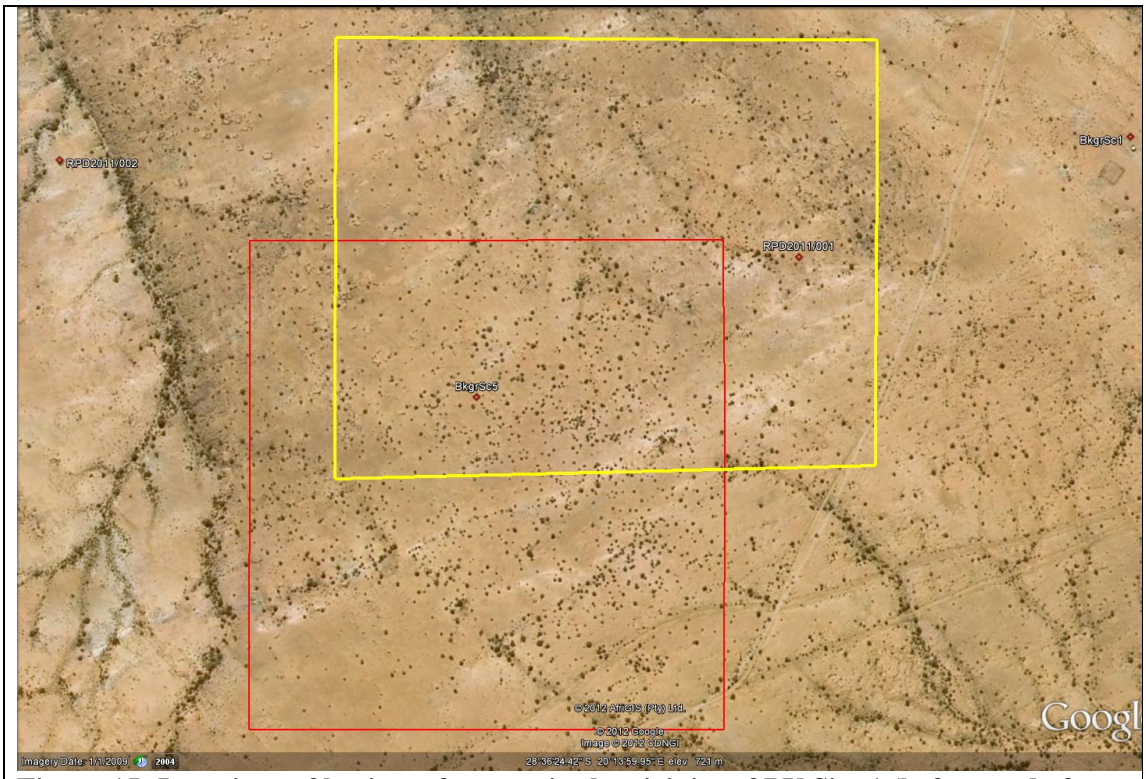

Figure 15: Locations of heritage features in the vicinity of PV Site 1 (before and after mitigation)

Will any building or structure older than 60 years be affected in any way?	YES	**NO**
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	YES	**NO**

If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

8. SOCIO-ECONOMIC CHARACTER

a) Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

Level of unemployment:

The principal local community concerns raised during the public participation process related to employment opportunities. Despite the fact that the public participation adverts specifically said that no jobs could be applied for during the consultation period, numerous employment enquires and offers of business services were received which persisted for months afterward, not at all discouraged at being told that work opportunities could not be applied for during the environmental process. This indicates an employment shortage.

There is an opposite shortage of labour during harvest season and consequently grape farms in the area import tens of thousands of migrant labourers from North-West Province for this short period. Nevertheless, there is a high level of unemployment outside of grape harvest season.

Economic profile of local municipality:

The economy is mainly dependent on irrigated agriculture using water pumped from the Orange River. Fruit is shipped from the Orange River valley to markets in Europe and the Far East. The Orange River towns in the arc from Upington, Keimoes, Kakamas to Augrabies form a cultural, geographic, agricultural and economic community which is distinct from other communities in the Northern Cape. It is an irrigated lush valley bounded by desert stretching for hundreds of kilometres to the North and South. Agro-industrial services, such as packing, logistics, supplies, administration and irrigation support the agricultural economy. Table grape production, the largest contributor to the agricultural economy, is very labour intensive as compared with other more mechanised forms of agriculture. The growth potential of agriculture is however limited by the lack of rainfall and the limited water allocations farmers are allowed to draw from the Orange River.

Mining is also significant contributor to the economy of the Northern Cape and the district municipality, but not to the local municipal area. Tourism is the next largest contributor and the fastest growing sector, which has been identified as having significant potential but is not sufficient to act as a driver for the economy.

Mining in the area is in terminal decline. The retail sector in the small rural towns struggle to compete with retail outlets in the major urban centres in the province (Siyanda District Municipality, 2012). There has been a steady decline in the number of people in formal employment in Siyanda District Municipality and elsewhere in the Northern Cape. This motivates the need to diversify away from dependence on agriculture and mining (Siyanda, 2006).

There were limited statistics available on the local municipality, with more available on the District Municipality and Province. The South African local government handbook citing the Census 2011 fact sheet, lists the unemployment rate in the local municipality at 10%. This does not correlate with the trends in the District Municipality and province or the situation described by the public participation participants. The Siyanda Integrated Economic Development Plan reported 29% for the District Municipality in 2001 with a rising unemployment trend.

The employment situation is unstable with farmers in the area importing labour during the grape harvest season and a shortage of employment at other times of year. This instability is socially undesirable, and the diversification of economic activities is needed to stabilise the community. Solar renewable energy is one opportunity for such economic diversification in the area, which is being pursued on the proposed project. Other diversification opportunities would include forms of agriculture other than table grapes, such as citrus plantations – which then yield fruit at other times of year.

The need for economic diversification and job creation was repeatedly raised by the local

community during the public participation process.

Level of education:

Educational qualifications of the Northern Cape's labour force
Category %
None 20.4
Primary 30.8
Secondary 40.6
Diploma 4.6
Degree 1.8
Unspecified 1.8
Total 100
(Source: Siyanda Integrated Economic Development Plan (2006).

Education in the Kai Garib Municipality (aged 20 +):
No Schooling 9.00%
Higher Education 3.90%
Matric 15.50%
(Source: The South African Local Government Handbook, 2011, citing the 2011 census)

There is a correlation between illiteracy and malnutrion of children (Siyanda Integrated Development Plan, 2012).

b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	R *290 million*	
What is the expected yearly income that will be generated by or as a result of the activity?	R *55 million*	
Will the activity contribute to service infrastructure?	**YES**	NO
Is the activity a public amenity?	YES	**NO**
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	*50 equivalent person-years varying on technology.*	
What is the expected value of the employment opportunities during the development and construction phase?	*R 5 million*	
What percentage of this will accrue to previously disadvantaged individuals?	*50 %*	
How many permanent new employment opportunities will be created during the operational phase of the activity?	*12*	
What is the expected current value of the employment opportunities during the first 10 years?	R *30 million*	
What percentage of this will accrue to previously disadvantaged individuals?	*50 %*	

9. BIODIVERSITY

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult http://bgis.sanbi.org or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report.

The map available from SANBI BGIS referred to above is derived mainly from aerial and satellite imagery and was corrected by the Botanical specialist consultant after ground truthing on site, thus providing a more accurate map of the site (The original SANBI map is indicated in Figure 4 and the corrected map is in Figure 14 in the botanical specialist report (Appendix D-3), both superimposed on the initially proposed PV sites). The final site location after mitigation was moved at the recommendation of the specialists marginally southwards, but is still in the same vegetation type i.e. undegraded 'Blouputs Karroid Thornveld' as indicated in the corrected map.

a) Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)

Systematic Biodiversity Planning Category				If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan
Critical Biodiversity Area (CBA)	**Ecological Support Area (ESA)**	Other Natural Area (ONA)	No Natural Area Remaining (NNR)	*The entire site and environs is designated as 'Ecosystem Service Area', in the Namakwa District Biodiversity Sector Plan. This is assumed to be the same as 'Ecological Support Area', although the relevant authorities did not respond to requests to confirm this. This plan designates a very narrow corridor along the Orange River as Critical Biodiversity Area: Category 2 (CBA2) and a much wider area alongside the river as Ecosystem Service Area. Thus the reason for the designation of the area appears to be proximity to the Orange River. Nevertheless, since the proposed project only impacts on a tiny fraction of this Ecosystem Service Area, which is positioned many kilometres from the CBA2 area, the proposed development is not expected to prejudice the functioning of the CBA.*

A map showing the site in context of the 'Ecosystem Service Area' is found in Appendix A9.

b) Indicate and describe the habitat condition on site

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	*100%*	*Site of the proposed PV facility is 100% natural vegetation with no alien infestation.*
Near Natural (includes areas with low to moderate level of alien invasive plants)	*0 %*	*The site is not infested with aliens.*
Degraded (includes areas heavily invaded by alien plants)	*0 %*	*The site is not infested with aliens.*
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	*0%*	*Site of the proposed PV facility has a short section of 'twee-spoor' track running through it. The farm Rooipad 9 of 15 includes minor farm infrastructure such as an animal pen, a small graveyard, a small dam, windmills and reservoirs. Nevertheless, the land area covered by these is insignificant.*

c) Complete the table to indicate:

(i) the type of vegetation, including its ecosystem status, present on the site; and

(ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		**Aquatic Ecosystems**						
Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	Critical	Wetland (including rivers, depressions, channelled and unchanneled wetlands, flats, seeps pans, and artificial wetlands)			Estuary		Coastline	
	Endangered							
	Vulnerable							
	Least Threatened	**YES**	NO	UNSURE	YES	**NO**	YES	**NO**

The proposed PV site includes some shallow drainage channels and a small ephemeral pan (see further detail in " ***SURFACE WATER****", p41 and the Aquatic Specialist Study (Appendix D-8)).*

d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

Vegetation habitat: *The vegetation type for the proposed Site 1 is 'Blouputs Karroid Thornveld', while the vegetation type for the alternative Site 2 is 'Bushman Arid Grassland'. Both are classified 'Least threatened', have an extensive range and are well conserved elsewhere (for further detail see the Botanical Specialist Report, Appendix D-3).*

Aquatic habitat: *The habitats on the proposed Site 1 include some shallow drainage channels (less than 400mm) and a small 'ephemeral pan' (see summary and photographs in* ***SURFACE WATER****, p41). Site 2 also includes similar shallow drainage channels. The impact of the proposed project on the proposed PV site was rated by the aquatic specialist as 'negligible'.*

The preferred PV Site 1 may include protected trees, particularly Boscia albitrunca, and must be surveyed prior to construction and permits for relocation or removal must be applied for. Plant species such as 'Aloe claviflora' must be relocated.

Protected species that have the potential to occur on the site, as listed by the Ecologist include: Hartmans Mountain Zebra, Honey Badger, Cape Fox, Ludwigs Bustard and the Kori Bustard. Nevertheless, the farm fences would obstruct an animal the size of a Zebra from accessing the farm that includes the site. The other species are highly mobile, would have adequate habitat elsewhere on the same farm and would move away once construction commenced.

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT AND NOTICE

Publication name	*Gemsbok Newspaper*	
Date published	*1 November 13*	
Site notice position	**Latitude**	**Longitude**
Gate near Site 1	*28°36'41.91"S*	*20°13'47.36"E*
Gate near Site 2	*28°37'11.51"S*	*20°16'12.55"E*
Gate near Blouputs Substations	*28°36'42.58"S*	*20°12'57.13"E*
Date placed	*29 October 2013*	

Apart from the three site notices, public notices were also placed in 24 different public notice boards in the vicinity, with a detailed list in Appendix E-1-3. The community notice board notices are much more likely to be seen than the site notices.

Include proof of the placement of the relevant advertisements and notices in Appendix E1.

A copy of the text of the advertisement and notices placed in compliance with the above requirements is shown in Appendix E1-1.

The Gemsbok Newspaper has a distribution from Kuruman in the East to Port Nolloth in the West and from Keetmanshoop in the North to Calvinia to the South with a total circulation of 14,700 (Nel, Wisa, pers comm.). The Orange River towns in the arc from Upington, Keimoes, Kakamas to Augrabies form a cultural, geographic, agricultural and economic community which is distinct from other communities in the Northern Cape. These Orange River towns are the target advertising community and the Gemsbok newspaper has covers them more than adequately.

The Mulilo Augrabies Photovolatic plant is not expected to have any impacts beyond the municipal area in which it is located. The distribution of the Gemsbok Newspaper is considered adequate advertising for this project.

The Newspaper advertisement was published on 1 November 13, with the front page headline article on 22 November 13. It was published in Afrikaans only, since almost everyone in the area speaks this language.

** In addition to normal formal advertising methods (newspaper advertisement; public notices in shops; site notices; flyers), numerous phone calls were made before, during and after the formal process to key interested and affected parties to ensure they were aware of the project, had received the documentation, ensure they were satisfied with the process and to discuss their concerns. Information was also sent by email where this was available.*

** The Gemsbok Newspaper in addition to the paid advertisement, ran a front page headline article on the Augrabies Solar PV project, including almost all the information in the Background Information document, ensuring maximum publicity.*

2. DETERMINATION OF APPROPRIATE MEASURES

Provide details of the measures taken to include all potential I&APs as required by Regulation 54(2)(e) and 54(7) of GN R.543.

The Ward Councillor, Mr Walter Klim requested the following special measures:

- *Since the majority of people in the area understand Afrikaans only, that the public meeting be conducted in Afrikaans or with translation into Afrikaans.*
- *Advertising should include notice boards at the town of Vredesvallei on the north side of the Orange River and at the Municipal payments office at Augrabies.*
- *Community representatives should be able to come before the formal public meeting to discuss the project.*

These requests are agreed to. Otherwise Mr Klim said that the proposed public participation measures were adequate. Transportation over the thinly populated area would be a problem for some but it would be adequate if community representatives came to the public meeting. On receipt of the public invitation, he would ensure that the correct community representatives were also invited (Klim, 2012).

A Ward committee meeting was scheduled immediately after the Public Meeting and most of the Ward committee arrived early to attend the Augrabies PV public meeting as well.

The public meeting took place at the Augrabies Municipal Hall on 19th November 2013, the most accessible location to residents of Augrabies. It was advertised using site notices, public notices, flyers and a loud hailer driving around town immediately before the meeting. An Open Day commenced at 3pm with a Formal Public meeting commencing at 6pm. The formal presentation was repeated on request during the Open Day session. This split meeting format allowed more personal interaction with the participants. (A detailed account of the public meeting format including the agenda and challenges encountered is found in Appendix E-6-1, E-6-2, E-6-3).

***Special additional meetings and site visits** were held on request with: Frans van Rooyen of South African National Parks; Jan Du Plessis, Neighbouring landowner and landowner for possible transmission line extension; Martin Oosthuizen, Landowner (Rooipad 9/15); Shaun Cloete of Water Affairs; Johan Nel, Vuursteenkop farm (farm manager); Vivian McPherson, Kai Garib Municipality. These additional meetings were warranted in view of the location of the site adjacent to the Augrabies National Park.*

The computer generated model videos showing the project from all positions on the adjacent roads were couriered to officials in SANParks and presented at a meeting to the manager of the Augrabies Park. This is a new development in public participation methods.

Key stakeholders (other than organs of state) identified in terms of Regulation 54(2)(b) of GN R.543:

Title, Name and Surname	Key stakeholder status	Affiliation	Contact details (tel number or e-mail address)
Jan du Plessis	*Landowner*	*Burger Du Plessis Familie Trust (Padrooi)*	*054-4517004*
Doppies Nel	*Neighbour*	*D&S Beleggingstrust*	*0544517261*
Martin James Oosthuizen	*Landowner*	*Martin Oosthuizen Trust*	*054-4517035*
Dr Howard H. Hendricks	*Landowner*	*Snr GM: Policy & Governance, Conservation Services Division, SANParks*	*(0)12 426-5165*
Frans van Rooyen	*Landowner*	*Park Manager: Augrabies Falls National Park*	*(0)54 452 9200*
Daniel Goldstuck	*Other Solar PV project*	*Aurora Power Solutions (Pty) Ltd*	*27 (0) 21 421-9764*
Samantha Ralston	*Ecological advocacy*	*Birdlife South Africa*	*011-7891122*
Roelof Letter	*Padrooi Solar PV project EAP*	*Escience Associates (Pty) Ltd*	*011 718 6380*
Wiaan van Rensburg	*Farmers Association*	*Farmers Association*	*082-9207798*
Walter D. Klim	*Local councillor*	*Kai Gariep Municipality*	*(054) 431 6300*
Rosanne Jephtha	*Tourism*	*Kakamas Information Centre*	*054-4316306*
Maxie Compion	*Tourism*	*Kokerboom Food & Wine Route*	*054 461 0000*
Stephanie Aken	*Ecological advocacy*	*Wildlife and Energy Programme Manager, Endangered Wildlife Trust*	*011 372 3600*

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E2. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

It is submitted that a response letter from the relevant authority or stakeholder also confirms proof of notification (See Appendix E-6).

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

The location of the site within 2km of the Augrabies National Park makes the impacts on this park a key concern. Visual Impacts were a key concern for South African National Parks authority, with botanical impacts also being a concern.

Summary of main issues raised by I&APs	Summary of response from EAP
Visual impacts *(principal concern of SANParks)*	*In response to the understood visual sensitivity of the viewshed protection area of the Augrabies National Park, a much more thorough Visual Impact Assessment was commissioned than that which would be*

Summary of main issues raised by I&APs	Summary of response from EAP
	normal for a Basic Assessment on a 19.9 hectare Photovoltaic project. Visual impacts were also given a priority weighting greater than that of other environmental impacts in the site selection. The findings of the Visual Impact Assessment are found in Appendix D-7 and are summarised in the impact assessment section of this Basic Assessment Report. During the course of the project, a new viewsite was developed and a supplementary visual report undertaken to address this. The preferred Site 1 will not be visible from any of the view sites of the National Park. It may have some visibility from a distance on the horizon along stretch of gravel road within in the park. SANParks requested an additional statement on the risk of glare, which has been provided and is at the back of appendix D-7. This study concluded that there was no glare risk to any of the National Park roads or view sites. Interesting, Kai Garib municipality was of the opinion that the Solar PV facility may become a tourist attraction.
Botanical impacts *(secondary concern of SANParks & Department of Agriculture, Fisheries & Forestry).*	*The botanical habitat comprising the site is well conserved elsewhere particularly in the National Park and is not threatened or endangered. The project is using a 'light engineering' approach and will not completely clear vegetation from the site but only the minimum necessary. Footings will be left in the ground on decommissioning to allow rapid restoration. No protected trees were identified on site, but were identified in the vicinity and a more thorough check of the site will be made prior to construction, and permits applied for. There are no large Kokerboom trees (a much-loved cultural symbol of the region) on the proposed site.*
Fauna impacts *(bird impacts and particularly the proximity to the Important Bird Area of Augrabies Park primary concern of Birdlife South Africa).*	*The proposed engineering works will not create a noise that could scare animals in the National Park. Sensitive animal species that may occasionally use the site are mobile and will move away from the proposed PV site to plentiful other similar habitat when construction begins. Mitigation has been recommended to minimise impacts.*
Legislative compliance *of the project (principal concern of authorities).*	*The project includes a comprehensive Environmental Management Programme which addresses legislative compliance in detail. Permits would be applied for from Water Affairs, the Department of Agriculture, Fisheries & Forestry. Applications will be submitted to the local municipality and the provincial planning.*
Employment creation *and benefits for employees (principal concern of residents of Augrabies).*	*Despite explicit statements in all advertising of the public participation process, rumours spread in Augrabies town that the public participation process was in fact an employment recruitment process. Partly disappointed job seekers urged use of local labour and enquired about various employee benefits. It is premature to respond in detail to these benefit questions. The proponent does plan to use local labour where such skills are available. Job creation will be modest with only 50 person years of temporary employment and twelve permanent jobs*

Summary of main issues raised by I&APs	Summary of response from EAP
	anticipated.
Public Participation *Process issues.*	*The Final Report was requested to be lodged at the Augrabies Municipality rather than the Kakamas Library, which was done. An interested party asked whether negative comments would be recorded in the report. A presentation was requested for the full council of the Kai Garib Municipality, which would be done at land use application stage.*
Provincial Planning Policy *compliance.*	*Provincial Planning policy (Northern Cape Provincial Spatial Development Framework) promotes the use of Solar Power in a broad-brush 'Solar corridor' area. The policy that currently gives the proposed site the same status as the Augrabies Park, needs correction relating to a boundary demarcation mapping error (see below). With the correction of this mapping error, the environmental consultant believes that the proposal does fit the policy.*
Mapping error	*The site has been included in the boundary of an Important Bird Area (IBA) and also in an ecological 'Core Area' of the Provincial Spatial Development Framework. The southern boundaries of both of these areas appear to be based on a mapping an error in the SANParks database showing the Augrabies National Park boundary (See* Augrabies National Park boundary mapping error*, see page x). This view was expressed both to Birdlife South Africa and to the consultants who wrote the Provincial Spatial Development Framework, who did not dispute the interpretation. The National Park has a much higher species diversity and population of birds than the proposed site. (See correspondence in Appendices E-6-14 and E-6-15).*
Local knowledge	*Local people other than the farmers did not indicate any special heritage or ecological knowledge of the site.*

More detailed answers to issues raised as well as answers to less substantial issues are given in the 'Comments & Response Report' Appendix E-3.

4. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to the Final BAR as Appendix E3.

Comments received on the Draft Basic Assessment Report as well as responses to these are included in detailed Comments and Response Report is in Appendix E-3, which duplicates most of the other material excluding generic guideline comments. For ease of reference, the detailed comments are broken up and re-categorised by subject. The full unedited detailed comment letters on the Draft Basic Assessment Report are found in Appendix E-6, starting with a schedule of detailed comments. In some cases, reply letters are included with the detailed comments. The Civil Aviation Authority commented well before the formal comment period and is thus included separately in Appendix E-17, while the Square Kilometre Array commented later and is in Appendix E-18.

5. AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
DWA Northern Cape	*Mr Shaun Cloete*	*054-3385812*		*cloetes@dwa.gov.za*	*Private Bag X5912 Upington 8800*
Department of Agriculture, Forestry & Fisheries, Directorate: Land Use & Soil Management	*Mashudu Marubini*	*012-3197619*		*mashuduma@daff.gov.za*	*P/Bag X120 Pretoria 0001*
Department of Agriculture, Forestry and Fisheries (DAFF) Northern Cape	*Jacoline Mans*	*054-3385860*		*jacolinema@daff.gov.za*	*P.O. Box 2782 Upington 8800*
DEA:The Director For Integrated Environmental Authorisations	*Ms Milicent Solomons*	*012-310-3268*	*012-320-7539*	*msolomons@environment.gov.za*	*Private Bag X447 Pretoria 0001*
Eskom: EIA Review	*John Geeringh*	*011-15167233*	*086-6614064*	*john.geeringh@eskom.co.za*	*PO Box 1091 Johannesburg 2001*
Eskom: Land Distribution Manager: Western Region	*Barbara Van Geems*	*+27 21 980 3911*		vGeemsB@eskom.co.za	*PO Box 22 Brackenfell 7560*
South African Heritage Resources Agency (SAHRA)	*Jenna Lavin*	*021-4624509*	*021-4624509*	*jlavin@sahra.org.za*	*P O Box 4637 Cape Town 8000*
Snr GM: Policy & Governance, Conservation Services Division South African National Parks (SANParks)	*Dr Howard H. Hendricks*	*(0)12 426-5165*	*012 3432823*	*howard.hendricks@sanparks.org*	*PO Box 787 Pretoria 0001*
The Northern Cape Department of Environmental Affairs and Nature Conservation	*Ms Dorien Werth*	*053-8077430*	*053 8313530*	*DWerth@ncpg.gov.za*	*Private Bag X6102 Kimberley 8300*
Square Kilometre Array	*Mr Adrian Tiplady*	*011 442 2434*	*011 442 2454*	*atiplady@ska.ac.za*	*17 Baker Street Rosebank Johannesburg South Africa 2196*
Civil Aviation Authority	*Lizell Stroh*	*011 – 545 1000*		*mail@caa.co.za*	*Private Bag X 73 Halfway House 1685*

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
Land use application commenting authorities					
Municipal Planning/Environment/ Development	*Mr Vivian McPherson*	*054-4616425*		*McPherson@ kaigarib.gov.za*	*Private Bag X6 Kakamas 8870*
The Northern Cape Department of Cooperative Governance Human Settlements and Traditional Affairs	*Schalk Grobbelaar*	*082 9270903*		*sgrobbelaar@ ncpg.gov.za*	*Private Bag X5005 Kimberley 8300*
National Department of Rural Development and Land Reform, Branch: Spatial Planning Land Use Management Services	*Mr. Gerhard de Bruin*	*053-8325084*	*086 560 5196*	*GJdeBruin@ruraldevelopment.gov.za*	*Flaxley House 30 Du Toitspan Road Kimberley 8301*

The 'land use application commenting authorities' are listed separately above, because they require additional submissions for the land use planning application process before they will issue final comment on the project. It has been mutually agreed that it is not necessary to wait for such final comment prior to a decision on the Environmental Basic Assessment application, since their final comment will be considered at land use application stage (Appendix D-8-4).

The authorities were sent hard copies or soft copies of the Basic Assessment Report or both hard and soft copies according to their preferences. In certain cases, multiple persons in the same authority were included in the consultation process project (see full I&AP list in Appendix E-5), but only the principal person is included in the list above.

Some additional organs of state were included in the consultation and I&AP list in addition to those listed above, but are not included in the list above since they were not considered 'key stakeholders'.

The South African Heritage Resources Agency (SAHRA) is no longer accepting submissions by email or postage, but require the uploading of reports to their web-based SAHRIS system. They have commented on the project.

Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix E4.

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

The Square Kilometre Array (SKA) project was consulted late in the process in response to the above requirement and their response is included in Appendix E-16.

List of authorities from whom comments have been received:

Authorities from which responses have been received include:
• *Civil Aviation Authority* • *Department of Environment Affairs (DEA) Acceptance of Environmental application letter 14 Feb 12 (Appendix J-1).* • *Department of Water Affairs* • *Eskom* • *Kai Garib Municipality* • *Northern Cape Environmental Affairs* • *Northern Cape Planning* • *South African Heritage Resources Agency* • *South African National Parks* • *Square Kilometre Array*

Note: *The Northern Cape Provincial Planning function is shared between the Northern Cape 'Department of Cooperative Governance, Human Settlements and Traditional Affairs (COHSTA) and also under the National Department of Rural Development and Land Reform Spatial Planning - Northern Cape section. Both of these departments were asked to comment, but the 'Department of Cooperative Governance, Human Settlements and Traditional Affairs' chose not to comment referring the matter to Spatial Planning. Spatial Planning provided preliminary comment, indicating they would only issue final comment on receipt of documentation on their standard form: Toolkit D-16. It was mutually agreed that this will be submitted as part of the land use planning application after decision by the Department of Environmental Affairs.*

6. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for any activities (linear or other) where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the competent authority.

Proof of any such agreement must be provided, where applicable. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

A list of registered I&APs must be included as appendix E5.

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

Non-authority stakeholders who provided detailed comment:
• *Birdlife South Africa submitted generic guidelines and noted that Augrabies Park is an Important Bird Area (Appendix E-6-14)* • *SANParks Ranger (in personal capacity) was concerned about visual impacts on a new viewsite in the Park (Appendix E-6-10 and special additional visual study in Appendix D-*

7)

- *The Wildlife and Environment Society responded that they did not have capacity to respond. (E-6-9)*
- *The local Councillor, Walter Klim was concerned that labour should be local as far as possible.*

The project generated a high level of public and authority interest in contrast to the modest or low level of interest in other Solar PV Projects in the vicinity. Factors may include the proximity to the National Park, good advertising, accessible meetings, the assistance of the local councillor in the process and a false rumour that the public meeting was a job application registration meeting.

South African National Parks were informally consulted at the outset of the process, who indicated their primary concern were visual impacts and thus wanted 'no corners cut' on this study, which should also include assessment from the tourist roads. To a lesser extent they were also concerned the botanical impact assessment was done thoroughly (Holness, 2012).

The project complied with this request. Both the visual and botanical studies included site visits. A full Visual Impact Assessment was conducted compliant with the Western Cape Guidelines which are the most stringent in the South Africa, by a specialist consultant who has conducted over a hundred such studies including many controversial high profile projects. The study included not only assessment of impacts from the roads, but computer generated videos showing the worst case scenario of visual impacts of the proposed development from every point along the adjacent roads (available on request). The computer model was however limited by the resolution of aerial imagery and contour information, but this was mitigated by the use of conservative assumptions.

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

Summary of alternatives identified in Section A(2):

Site alternatives

- *Site alternative 1: (1.5km east of the Blouputs substation turnoff into the National Park)*
- *Site alternative 2: (4km east of the Blouputs substation turnoff into the National Park)*

Design/technology alternatives:

- *Design/technology alternative 1: Fixed axis tracking (with layout in North-South lines).*
- *Design/technology alternative 2: Fixed panels (facing North with layout in East-West lines).*

Single axis tracking technology or fixed array technology are both acceptable alternatives as neither would result in a glare risk to the National Park. The specialist assessment of the two alternatives was the same. Therefore these alternatives were not assessed separately in the rating and mitigation tables that follow.

Layout alternatives *relate directly to the design technology alternatives and thus are not evaluated separately from these. Fixed panels must be oriented facing North and laid out in East-West lines. Fixed axis tracking must be laid out in North-South lines and would change their orientation with the movement of the sun.*

The impacts for the two design alternatives (which are linked to layout alternatives) were found to be identical (in particular see Appendix D-7: 'Visual Impact Assessment: Supplementary Information: Potential for reflective flashes from the PV Installation in the Augrabies National Park'. Therefore, they are not assessed separately in the following tables.

No go alternative

- *No development.*

Other alternatives evaluated

An additional site alternative between site 1 & 2 was considered at the screening stage prior to the commencement of the formal Basic Assessment process, but screened out because coarse viewsheds indicated it had a visually higher impact than the Site alternatives 1 & 2. After specialists identified site 1 as the preferred site, six different location alternatives were considered to refine the position of site 1.

For the purpose of the following summary table, Visual Impact is divided into two sections because of the difference in sensitivity of the receptors:

- *From the viewsites of the National Park, which is a sensitive visual receptor.*
- *From the public roads adjacent to the site, which are not considered sensitive visual receptors because the R359 road is already substantially visually impacted by the industrial feature of the Blouputs substation and associated transmission lines.*

The Specialist Visual Impact Assessment provided impact ratings for seventeen sub-categories of impact including separate ratings for night impact (See Appendix D-7). For the purpose of the summary impact table below, the two most important of these categories are included.

The technical Visual specialist ratings in the table summary below must however be also interpreted in the context of the feedback from the public participation process. During the consultation process, no-one raised any concern about visual impacts from any location other than from the National Park – in fact an official from the local municipality expressed the opinion that the Solar PV facility may itself become a tourist attraction from the adjacent R359 road (a positive perception of visual impact), rather than a negative perception. South African National Parks officials, supported by others, expressed a very high level of concern to limit visual impacts on the Augrabies National Park view sites. Accordingly, the need to minimise impacts on the viewsites of the National Park was given a much higher weighting in decision-making than the other vantage points.

An aquatic ecologist was appointed to refine the ecological recommendations regarding the drainage lines and an ephemeral pan. The following summary table summarises the findings of the ecological specialist report regards terrestrial ecology (including PV array and Powerline impacts) and summarises the aquatic ecology report regarding impacts on aquatic impacts.

There was some overlap in the impact assessment between the different specialists. For example, visual landscape impacts formed part of both the Heritage Impact Assessment and the Visual Impact Assessment. Impacts on drainage lines form part of the assessment in the Botanical, Ecological and Aquatic specialist reports. The findings of each overlapping assessment is summarised and the full rating tables duplicated unedited in the Impact Assessment in Appendix F. In places, there are slight variations in the ratings and recommendations given. For purposes of integration and the following summary table, the Environmental Assessment Practitioner has used the inputs from the Specialist, whose speciality fits most closely that particular issue. Accordingly, the summary assessment of Visual impacts gives greater weight to the Visual Impact Assessment and Drainage line impacts from the Aquatic Specialist. Inputs from the Environmental Management Programme specialist have also been included in the mitigation recommendations.

Planning & design phase

Description of impact: Same for both alternatives Site 1 and Site 2

Unrealistic employment expectations:

Description of impact: *Environmental Impact processes in rural areas can create unrealistic expectations of benefits such as the scale of employment opportunities and trade and the mis-perception that the environmental process was an opportunity for employment.*

Significance: *Medium*

Mitigation: *Care was taken during the public participation process to try to keep such expectations realistic, which included clarification in all public notices and correspondence, at the public meetings, and in numerous telephone conversations and SMS communications.*

Local political representatives were also asked to assist in dampening expectations.

Nevertheless, despite all efforts dampen expectations, unrealistic perceptions and rumours of opportunities at the proposed PV project did spread in the Augrabies area and resulted in employment and trade enquiries which persisted for months afterward from the entire geographic region in which the process was advertised. This response nevertheless provided useful information to the impact assessment process on the employment needs in the area outside of grape harvest season and the desire to use local suppliers and labour where possible.

Significance after mitigation: *Low*

The Basic Assessment form question above relates to the 'impacts that may result from the planning and design' phase. While the impacts during the planning and design phase are limited, the mitigation of impacts for the successive phases must be included in 'planning and design phase'.

The following table assesses two Site alternatives (Site 1 (Preferred) and Site 2(Alternative)). The two technologies considered result in exactly the same assessment and ratings and so are not listed separately.

Construction phase

Activity	Impact summary (Construction phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 1 (Preferred alternative)		*(Construction phase)*	
Visual Impact from Park View sites	***Direct impacts:*** *The proposed PV Site 1 would not be visible from any of the Augrabies National Park viewsites.*	*Not visible.*	• *At the preferred location and within the 3m height limit, there will be no impact and thus no mitigation proposed.* • *The initial proposal limited the Solar PV arrays to 3m high. This was a significant design limitation as many Solar PV facilities exceed this. A relaxation of this requirement may have led the facility to be visible from the National Park.*	*Not visible.**
	Indirect impacts: *No indirect impacts identified.*	*N/A*	*N/A*	*N/A*
	Cumulative impacts: *Since the proposed PV site is not visible from the view sites in the National Park, it cannot have a cumulative impact.*	*Nil. Not visible.*	*N/A*	*Nil. Not visible.**
Visual Impact (from public roads)	***Direct impacts:*** *The project will be visible in places 'edge-on' along the R359 public road. The view of the site from the road would be broken up by existing vegetation. (see Figure 10 in Visual Specialist Report).* • *[**The rating depends on the position of the viewer. The reason for the rating during construction phase as 'high' at certain locations is that the unexpected nature of the construction activities will draw attention of any viewers, whereas during the operational phase the facility should eventually become an accepted part of the overall visual environment.*	*Low to high**(-)*	• *The primary mitigation measure in terms of visual issues is the use of site 1 (preferred alternative) which will visually influence a smaller area than site 2, avoid any visual impact on the more frequented areas of the park, and require a shorter length of transmission line to the Blouputs Substation.* • *Suitable locally indigenous thorn trees should be planted on specific sight lines scattered across the landscape to break up the visual impact rather than completely hide the facility. The locations of this planting should be decided after the facility is complete. The management plan for the facility should include a*	*Low to high*(-)*

Activity	Impact summary (Construction phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 1 (Preferred alternative)		*(Construction phase)*	
	• *Although the sense of place would be affected by the inclusion of an 'industrial' element within the local environment, the change, except for along the R359, would only affect a limited number of viewpoints and is therefore considered within acceptable limits. The R359 route is punctuated by industrial infrastructure including powerlines, agro-industrial buildings, shadecloth over vineyards and the Blouputs substation 1.5km from the proposed site.*		*link with the Augrabies Park to find acceptable solutions to any issues that may arise.* • *After detailed design, but before construction, the viewshed calculated by the Visual Impact Assessment must be re-checked to ensure that the final design complies with the assumptions and recommendations of the VIA.* • *Excavation and the use of concrete should be minimised.* • *The gate and any signage on the R359 should be similar to other local usage and not draw attention to the facility.* • *The colours and finishes of the infrastructure (excluding the black panels) should be chosen to blend into the natural environment.* • *Fencing should be visually permeable, similar to other agricultural fencing in the area. Barbed wire should not be used, but electric fencing is acceptable.* • *No outdoor night lighting other than motion sensor activated security lighting should be used. The use of lighting must be monitored over the entire lifetime of the project.* • *Prior to construction, the site must be photographed to serve as a baseline for rehabilitation on decommissioning. On decommissioning, it must be restored to a state as near to this previous state as possible. All waste must be removed, with the exception of footing foundations that are well buried with soil*	

Activity	Impact summary (Construction phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 1 (Preferred alternative)		*(Construction phase)*	
			below the surface, which may be left in-situ. • *Lay-down areas should take place within the 20 hectare extent of facility.* • *Areas where disturbance and access is not necessary should be fenced off from access by construction workers.* • *Topsoil disturbance should be minimised, but that which is necessary should be stockpiled or spread so that it can be used for rehabilitation after decommissioning.* • *Care should be taken to avoid unintentionally importing alien plants in construction material.* • *Litter should be strictly controlled during and after construction.* • *Use of fire should be strictly controlled to avoid veld fires.* • *Waste should be regularly removed from site either to re-use or to take to a recognised dump site, and should not be allowed to accumulate on site.*	
	Indirect impacts: *No indirect impacts identified.*	*N/A*	*N/A*	*N/A*
	Cumulative impacts: *There is another proposal for a Solar facility on the opposite side of the R359 closer to the Blouputs substation. The other facility would be much larger in scale of area, height and design impact. If both were constructed, they would both be a feature of this stretch of road incrementally increasing the industrial feature impact of the Blouputs*	*Low(-)*	*The Augrabies PV project already includes detailed visual impact mitigation proposals (listed above under direct impacts) and no further mitigation is proposed to address cumulative impacts. To mitigate visual and other cumulative impacts, other Solar PV projects should consider following the detailed mitigation recommendations in this Basic Assessment Report.*	*Low(-)*

Activity	Impact summary (Construction phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 1 (Preferred alternative)		*(Construction phase)*	
	substation in the landscape.			
Botanical	***Direct impacts:*** *Loss of up to 20 ha of Blouputs Karroid Thornveld, which is classified 'least threatened'. No threatened species were found or expected to be found. The duration of the project impact would be 'long-term' including the project lifespan of 20 years plus a longer period for the slow-growing thornbushes to grow back.*	*Moderate (-)*	• *Relocating plant species such as 'Aloe claviflora'.* • *Prior to construction, the site must be surveyed for protected trees, particularly Boscia albitrunca, and permits for relocation or removal must be applied for.* • *Avoiding hard surfacing the roads.* • *Taking a 'minimal engineering approach' including using the existing access road, not unnecessarily surfacing the internal roads, not changing the topography and only removing the vegetation as necessary rather than clearing and levelling the whole site.* • *There are a number of shallow drainage lines on the site, which fit the definition of a watercourse. Impacts on these must be minimised although they cannot be entirely avoided.* • *Not planting an irrigated screening hedge (initially proposed for visual impact mitigation).*	*Low (-)*
	Indirect impacts: *No indirect impacts on vegetation were identified.*	*N/A*	*N/A*	*N/A*
	Cumulative impacts: *No other PV sites known to be planned for this vegetation type (Blouputs Karroid Thornveld), which is also well conserved in the National Park.*	*Very low (-)*	*N/A*	*Very low(-)*

Activity	Impact summary (Construction phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 1 (Preferred alternative)		*(Construction phase)*	
Ecological (Terrestrial)	***Direct impacts:*** *Terrestrial ecological impacts include the impacts of the PV arrays and the powerlines. The footprint of the PV arrays is small in relation to the overall habitat area available. Birds and animals that potentially occur on the site are relatively mobile and will move away during construction.* *Bird collisions with powerlines may be a risk to some bird species. There are existing powerlines in the vicinity and the additional length of powerline may only add slightly to this existing impact.*	*Low (-)*	• *Ensure construction activities are contained within the footprint of the proposed infrastructure and do not spread to the surrounding natural areas.* • *Devices should be attached to the overhead power line to make it more visible to birds.* • *All areas to be protected during construction must be demarcated by a suitably qualified person prior to construction.* • *If social weaver nests cause a problem for the PV infrastructure, they must be removed as early as possible to avoid harm to eggs or young.*	*Low (-)*
	Indirect impacts: *If precautions were not taken to prevent spread of alien vegetation, this could lead to an indirect impact.*	*Medium (-)*	*Care should be taken to avoid unintentionally importing alien plants in construction material.*	*Low (-)*
	Cumulative impacts: *No other PV sites known to be planned for this habitat type (Blouputs Karroid Thornveld), which is also well conserved in the National Park.*	*N/A*	*N/A. No further mitigation to address cumulative impacts is proposed on this project. Other projects are recommended to take similar mitigatory measures.*	*N/A*
Ecological (Aquatic)	***Direct impacts:*** *The initially proposed PV site 1 would have impacted on drainage lines of depth approximately 1 metre. The mitigated PV site 1 would impact smaller drainage lines up to 400mm depth.* *Loss of habitat would be of localised impact of a moderate to low intensity and low overall significance. The pans being small in extent are not highly significant.*	*Low (-)*	• *The proposed PV site 1 was moved southwards to minimise impacts on drainage lines to a least impact location recommended by the aquatic specialist. The visual and botanical specialist approved the change. The aquatic specialist report rated the impact at this location 'Negligible'.* • *A 'minimum engineering' approach is recommended, such that the site will not be levelled or unnecessarily resurfaced.*	*Negligible (-)*

Activity	Impact summary (Construction phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 1 (Preferred alternative)		*(Construction phase)*	
	The proposed preferred site location with mitigation will impact on at least one small pan and some minor drainage lines. Since the site will not be levelled and a minimum engineering approach is being followed, these impacts will be limited and not total loss.		• *There are a number of shallow drainage lines on the site, which fit the definition of a watercourse. Impacts on these must be minimised although they cannot be entirely avoided.* • *While the proposed project will unavoidably impact on certain freshwater features (minor drainage lines and a pan), those features that need to be protected depending on their size, should be delineated prior to construction with a buffer of between 10 and 30 metres.* • *Authorisations will be required from the Department of Water Affairs.* • *Pylons must be positioned at minimum 50 metres outside significant watercourse boundaries, which should be delineated prior to construction.* • *A stormwater management plan must be compiled for the proposed solar array that must include details of how water velocities will be reduced to avoid soil erosion.*	
	Indirect impacts: *If soil erosion were not properly managed, this could lead to indirect impacts on watercourses.*	*Low (-)*	*A stormwater management plan must be compiled for the proposed solar array that must include details of how water velocities will be reduced to avoid soil erosion.*	*Negligible (-)*
	Cumulative impacts: *The proposed approach for the Augrabies Solar PV project with mitigation would have negligible impact with mitigation. Provided that other Solar PV projects follow a similar mitigation, cumulative impacts are not expected to be significant.*	*Low (-)*	*Other Solar PV projects are recommended to follow similar mitigation in site selection and construction mitigation.*	*Negligible (-)*

Activity	Impact summary (Construction phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 1 (Preferred alternative)		*(Construction phase)*	
Paleontological	***Direct impacts:*** *Based on the geology, the finding of any fossils in the area was improbable and thus a full paleontological study was not necessary.*	*Negligible (-)*	*All South African fossil heritage is protected by the National Heritage Resources Act, 1999. Should substantial fossil remains (e.g. vertebrate bones and teeth) be encountered during construction, the responsible ECO should inform SAHRA at the earliest opportunity to consider possible mitigation measures.*	*Negligible (-)*
	Indirect impacts: *No indirect impacts were identified.*	*N/A*	*N/A. No mitigation required.*	*N/A*
	Cumulative impacts: *No cumulative impacts were identified.*	*N/A*	*N/A. No mitigation required.*	*N/A*
Agricultural	***Direct impacts:*** • *The main impact would be the loss of potentially arable land due to construction. However due to the dry and hot climate, the shallow soils and limited water available such an impact would be of limited significance. The site can be rehabilitated for agricultural use on decommissioning.* • *Site 1 has very shallow soils.*	*Medium (-)*	• *To conserve the soil, an absolute minimum of vegetation should be removed.* • *A minimum engineering approach should allow for a return to agricultural use on decommissioning.* • *Care should be taken with the use of any chemicals on site either during construction or operation to avoid polluting the soil.* • *If soil erosion does begin either from wind or water, steps should be taken to control this.*	*Low (-)*
	Indirect impacts: *Wind erosion due to loss of vegetation.*	*Low (-)*	*To conserve the soil, an absolute minimum of vegetation should be removed.*	*Low (-)*
	Cumulative impacts: *Loss of agriculturally productive soils and land that is no longer able to be utilised due to construction of infrastructure and/or wind erosion. Agricultural development is limited by the supply of water rather than land. Within this arid context, there is adequate alternative*	*Low (-)*	*No cumulative impact mitigation proposed for this PV project beyond those to address direct agricultural impacts. To address cumulative impacts, other PV projects are recommended to follow a similar approach.*	*Low (-)*

Activity	Impact summary (Construction phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 1 (Preferred alternative)		*(Construction phase)*	
	land for cumulative additional PV infrastructure without prejudicing agricultural productivity.			
Heritage (Archaeology)	***Direct impacts:*** *The heritage assessment identified numerous groups of scattered stone age tools on the site, which were deemed low to medium significance. The one feature near to Site 1 that is rated 'very high' significance' is a stone age cairn (probably a Khoi grave) that must be protected. The stone cairn is not on the site footprint and would be protected.*	*Negligible (-)*	• *The stone cairn indicated on* Figure 15, *page 48 must be protected as a no-go area for construction workers.* • *If any human remains are revealed during earthworks, excavations in the immediate vicinity should be halted and the find reported to an archaeologist or to SAHRA (telephone: 021 462 4502). Exhumation may be required at the expense of the developer.*	*N/A*
	Indirect impacts: *No indirect impacts were identified.*	*N/A*	*N/A*	*N/A*
	Cumulative impacts: *No cumulative impacts were identified.*	*N/A*	*N/A*	*N/A*

Activity	Impact summary (Construction phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 2		*(Construction phase)*	
Visual Impact from Park View sites	***Direct impacts:*** *Site 2 would be potentially visible from some elevated areas close to the visitors facilities, however the local vegetation should block most of these views. An additional viewsite 'Swartrante' was developed in the Augrabies Park during the course of the project. An additional Visual Impact study*	*Medium (-)*	*The recommended mitigation is the implementation of Site 1 rather than Site 2. Site 1 would not be visible from the National Park.* *If Site 2 was implemented, please refer to mitigation measures recommended for Site 1.*	*Low (-)*

Activity	Impact summary (Construction phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 2		*(Construction phase)*	
	was undertaken to evaluate this. It was found that a facility at Site 2 would be partially visible at a distance of approximately 2.4km.			
	Indirect impacts: *No indirect impacts identified.*	*N/A*	*N/A*	*N/A*
	Cumulative impacts: *There is another proposal for a Solar facility on the opposite side of the R359 closer to the Blouputs substation. The other facility would be much larger in scale of area, height and design impact. If both were constructed, they would potentially both be visible from certain National Park viewsites. Accordingly there would be a negative cumulative impact and the Site 2 alternative and the* *Both the proposed Padrooi Solar PV and CPV projects would be visible from key view sites of the National Park, but the impact would be mitigated by the distance of 10 kilometres, making them appear as black lines on the horizon. If alternative Site 2 of the Augrabies PV project were chosen, it would also be visible from the key view sites of the National Park. In this scenario, there would be a negative cumulative impact of three black lines on the landscape from the key National Park view sites. The Augrabies PV Basic Assessment recommends Site 1 and not Site 2, and thus no such cumulative impact would occur.*	*Medium (-)*	*The recommended mitigation is the implementation of Site 1 rather than Site 2. Site 1 would not be visible from the National Park thus creating no cumulative impact.* *If Site 2 was implemented, please refer to mitigation measures recommended for Site 1. The ratings in the adjacent columns assume that Site 2 is implemented (not recommended).*	*Medium (-)*
Visual	***Direct impacts:*** *The project will be visible in places 'edge-on' along the R359 public road. The view of the site from the road would*	*Low to high (-)***	*The principal visual mitigation is the selection of Site 1 rather than Site 2. Nevertheless, the ratings in the adjacent columns assume the selection of Site 2.*	*Low to high (-)*

Activity	Impact summary (Construction phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 2		*(Construction phase)*	
Impact (from public roads)	*be broken up by existing vegetation. (see Figure 11 in Appendix E-7 Visual Specialist Report).* • *[**The rating depends on the position of the viewer. The reason for the rating during construction phase as 'high' at certain locations is that the unexpected nature of the construction activities will draw attention of any viewers, whereas during the operational phase the facility should eventually become an accepted part of the overall visual environment.* *Although the sense of place would be affected by the inclusion of an 'industrial' element within the local environment, the change, except for along the R359, would only affect a limited number of viewpoints and is therefore considered within acceptable limits. The R359 route is punctuated by industrial infrastructure including powerlines, agro-industrial buildings, shadecloth over vineyards and the Blouputs substation 1.5km from the proposed site.* *The selection of Site 2, would require a longer power line than Site 1 and accordingly would have a higher visual impact from the R359 road.*		*If Site 2 was implemented, please refer to mitigation measures recommended for Site 1. The ratings in the adjacent columns assume that Site 2 is implemented (not recommended).*	
	Indirect impacts: *No indirect impacts identified.*	*N/A*	*N/A*	*N/A*
	Cumulative impacts: *If Site 2 were selected, this would eliminate the potential cumulative impact of both the Padrooi Solar projects, the Blouputs substation and the Augrabies PV project all being*	*Medium (-)*	*The preferred mitigation is to select Site 1, which would have lesser visual impacts including lesser cumulative visual impacts. Nevertheless, the rating in the adjacent columns assumes that Site 2 is selected.*	*Medium (-)*

Activity	Impact summary (Construction phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 2		*(Construction phase)*	
	visible from the same vantage point. Nevertheless, it would have the greater the potential cumulative impact of a longer stretch of the R359 being visually affected by industrial electrical development. It is considered more desirable to position industrial electrical infrastructure in the same area.		*The Augrabies PV project already includes detailed visual impact mitigation proposals and no further mitigation is proposed to address cumulative impacts. To mitigate visual and other cumulative impacts, other Solar PV projects should consider following the detailed mitigation recommendations in this Basic Assessment Report.*	
Botanical	***Direct impacts:*** *Loss of up to 20 ha of Bushmanland Arid Grassland, which is classified 'Least threatened'. No threatened species were found or expected to be found. The vegetation on the site is more common than on Site 1 and there are fewer drainage lines, giving the site a lower impact from a purely botanical perspective. The duration of the impact would be 'long-term'.*	*Low (-)*	*Please refer to mitigation measures under Alternative Site 1 above.*	*Low (-)*
	Indirect impacts: *No indirect impacts were identified.*	*N/A*	*N/A*	*N/A*
	Cumulative impacts: *While a number of PV facilities are proposed for this vegetation type (including hundreds of kilometres away), it is so extensive that the cumulative impact of these facilities is not significant.*	*Negligible (-)*	*N/A*	*Negligible (-)*
Ecological (Terrestrial)	***Direct impacts:*** *Terrestrial ecological impacts include the impacts of the PV arrays and the powerlines. The footprint of the PV arrays is small in relation to the overall habitat area available. Birds and animals that potentially occur on the site are*	*Low (-)*	• *Ensure construction activities are contained within the footprint of the proposed infrastructure and do not spread to the surrounding natural areas.* • *Devices should be attached to the overhead power*	*Low (-)*

Activity	Impact summary (Construction phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 2		*(Construction phase)*	
	relatively mobile and will move away during construction. *Bird collisions with powerlines may be a risk to some bird species. There are existing powerlines in the vicinity and the additional length of powerline may only add slightly to this existing impact. The assessment and ratings for Site 2 are the same as Site 1, except that Site 2 has fewer drainage lines and is thus considered marginally more suitable than Site 1 on ecological criteria. Nevertheless, Site 2 has a longer power line, which would marginally increase such impacts.*		*line to make it more visible to birds.* • *All areas to be protected during construction must be demarcated by a suitably qualified person prior to construction.* • *If social weaver nests cause a problem for the PV infrastructure, they must be removed as early as possible to avoid harm to eggs or young.*	
	Indirect impacts: *If precautions were not taken to prevent spread of alien vegetation, this could lead to an indirect impact.*	*Medium (-)*	*Care should be taken to avoid unintentionally importing alien plants in construction material.*	*Low (-)*
	Cumulative impacts: *While a number of PV facilities are proposed for this vegetation type (including hundreds of kilometres away), it is so extensive that the cumulative impact of these facilities is not significant.*	*N/A*	*N/A. No further mitigation to address cumulative impacts is proposed on this project. Other projects are recommended to take similar mitigatory measures.*	*N/A*
Ecological (Aquatic)	***Direct impacts:*** *The proposed development would impact on some shallow drainage lines. Site 2 has fewer drainage lines than Site 1, and is thus considered more suitable than Site 1 on purely ecological criteria.*	*Low (-)*	• *A 'minimum engineering' approach is recommended, such that the site will not be levelled or unnecessarily resurfaced.* • *There are a number of shallow drainage lines on the site, which fit the definition of a watercourse. Impacts on these must be minimised although they cannot be entirely avoided.* • *While the proposed project will unavoidably impact on certain freshwater features (minor drainage lines*	*Negligible (-)*

Activity	Impact summary (Construction phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 2		*(Construction phase)*	
			and a pan), those features that need to be protected depending on their size, should be delineated prior to construction with a buffer of between 10 and 30 metres. • *Authorisations will be required from the Department of Water Affairs.* • *Pylons must be positioned at minimum 50 metres outside significant watercourse boundaries, which should be delineated prior to construction.* • *A stormwater management plan must be compiled for the proposed solar array that must include details of how water velocities will be reduced to avoid soil erosion.*	
	Indirect impacts: *If soil erosion were not properly managed, this could lead to indirect impacts on watercourses.*	*Low (-)*	*A stormwater management plan must be compiled for the proposed solar array that must include details of how water velocities will be reduced to avoid soil erosion.*	*Negligible (-)*
	Cumulative impacts: *The proposed approach for the Augrabies Solar PV project with mitigation would have negligible impact with mitigation. Provided that other Solar PV projects follow a similar mitigation, cumulative impacts are not expected to be significant.*	*Low (-)*	*Other Solar PV projects are recommended to follow similar mitigation in site selection and construction mitigation.*	*Negligible (-)*
Paleontological	***Direct impacts:*** *Based on the geology, the finding of any fossils in the area was improbable and thus a full paleontological study was not necessary.*	*Negligible (-)*	*All South African fossil heritage is protected by the National Heritage Resources Act, 1999. Should substantial fossil remains (e.g. vertebrate bones and teeth) be encountered during construction, the responsible ECO should inform SAHRA at the earliest opportunity to consider possible mitigation measures.*	*Negligible (-)*

Activity	Impact summary (Construction phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 2		*(Construction phase)*	
	Indirect impacts: *No indirect impacts were identified.*	*N/A*	*N/A. No mitigation required.*	*N/A*
	Cumulative impacts: *No cumulative impacts were identified.*	*N/A*	*N/A. No mitigation required.*	*N/A*
Agricultural	***Direct impacts:*** • *The main impact would be the loss of potentially arable land due to construction. However due to the dry and hot climate, the shallow soils and limited water available such an impact would be of limited significance. The site can be rehabilitated for agricultural use on decommissioning.* • *Site 1 has very shallow soils.*	*Medium (-)*	• *To conserve the soil, an absolute minimum of vegetation should be removed.* • *A minimum engineering approach should allow for a return to agricultural use on decommissioning.* • *Care should be taken with the use of any chemicals on site either during construction or operation to avoid polluting the soil.* • *If soil erosion does begin either from wind or water, steps should be taken to control this.*	*Low (-)*
	Indirect impacts: *Wind erosion due to loss of vegetation.*	*Low (-)*	• *To conserve the soil, an absolute minimum of vegetation should be removed.*	*Low (-)*
	Cumulative impacts: *Loss of agriculturally productive soils and land that is no longer able to be utilised due to construction of infrastructure and/or wind erosion. Agricultural development is limited by the supply of water rather than land. Within this arid context, there is adequate alternative land for cumulative additional PV infrastructure without prejudicing agricultural productivity.*	*Low (-)*	• *No cumulative impact mitigation proposed for this PV project beyond those to address direct agricultural impacts. To address cumulative impacts, other PV projects are recommended to follow a similar approach.*	*Low (-)*
Heritage (Archaeolog	***Direct impacts:*** *The heritage assessment recorded that stone age artefacts on site 2 were too low in density to record any.*	*Negligible (-)*	*If any human remains are revealed during earthworks, excavations in the immediate vicinity should be halted and the find reported to an archaeologist or to SAHRA (telephone: 021 462 4502). Exhumation may be required*	*N/A*

Activity	Impact summary (Construction phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 2		*(Construction phase)*	
y)			*at the expense of the developer.*	
	Indirect impacts: *No indirect impacts were identified.*	*N/A*	*N/A*	*N/A*
	Cumulative impacts: *No cumulative impacts were identified.*	*N/A*	*N/A*	*N/A*

Activity	Impact summary (Construction phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance

	No-go option			
	Direct impacts: • *Loss of job opportunities to the local community during the construction phase.* • *Loss of opportunity for non-polluting electricity generation in a prime location with high solar radiation and near to an existing electrical substation, thus requiring a short transmission line.* • *Loss of opportunity to diversify economic activity away from agriculture in the local municipality.*	*Medium (-)*	*No mitigation proposed.*	*Medium (-)*
	Indirect impacts: *None identified.*	*N/A*	*N/A*	*N/A*
	Cumulative impacts: *If numerous other Solar PV projects were refused, South Africa would not meet its emissions and electricity diversification targets, which it has committed to.*	*Medium (-)*	*No mitigation proposed. This is a national policy issue.*	*Medium (-)*

Operational phase

Activity	Impact summary (Operational phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 1 (preferred alternative)		**[Operation phase]**	
Visual Impact from Park View sites	***Direct impacts:*** *The proposed PV Site 1 would not be visible from any of the Augrabies National Park viewsites.*	*Not visible*	*No impact from the Park viewsites.*	*Not visible*
	Indirect impacts: *No indirect impacts identified.*	*N/A*	*N/A*	*N/A*
	Cumulative impacts: *Since the proposed PV site is not visible from the view sites in the National Park, it cannot have a cumulative impact.*	*None*	*N/A*	*None*
Visual Impact (from public roads)	***Direct impacts:*** *The project will be visible in places 'edge-on' along the R359 public road. The view of the site from the road would be broken up by existing vegetation. (see Figure 10 in Visual Specialist Report in Appendix D-7).* *The visual impact with mitigation at operational phase is rated less than at construction phase, since road users will become accustomed to the facility.*	*Low to high* (-)*	• *There should be no night lighting except motion sensor security lighting.* • *Care should be taken to avoid unintentionally importing alien plants in construction material.* • *Litter should be strictly controlled.* • *Use of fire should be strictly controlled to avoid veld fires.* • *Strategic planting of thorn trees as already occur on the site to mitigate visual impacts.* • *Waste should be regularly removed from site either to re-use or to take to a recognised dump site, and should not be allowed to accumulate on site.*	*Low to medium (-)*
	Indirect impacts: *No indirect impacts identified.*	*N/A*	*N/A*	*N/A*

Activity	Impact summary (Operational phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 1 (preferred alternative)		**[Operation phase]**	
	Cumulative impacts: *Refer to cumulative impacts for the Construction phase for Site 1 above.*	*Low (-)*	*Refer to cumulative impacts for the Construction phase for Site 1 above.*	*Low (-)*
Botanical	***Direct impacts:*** *Refer to direct impacts under the Construction phase for Site 1 above.*	*Moderate (-)*	• *Precautions should be taken to prevent the introduction of any material that includes alien seeds.* • *Stabilisation of soils disturbed by construction.* • *Re-establishment of vegetation in areas disturbed by construction preferably using seed in the topsoil on the site rather than introduction from elsewhere.* • *Stabilisation of soil vulnerable to wind erosion.* • *Strategic planting of indigenous thorn trees to mitigate visual impacts.*	*Low (-)*
	Indirect impacts: *Alien infestation from material imported to site.*	*Moderate (-)*	• *Precautions should be taken to prevent the introduction of any material that includes alien seeds.*	*Low (-)*
	Cumulative impacts: *No cumulative impacts were identified.*	*N/A*	*N/A*	*N/A*
Ecological (Terrestrial)	***Direct impacts:*** *Terrestrial ecological impacts include the impacts of the PV arrays and the powerlines. The footprint of the PV arrays is small in relation to the overall habitat area available. Birds and animals that potentially occur on the site are relatively mobile and will move away during construction.* *Bird collisions with powerlines may be a risk to some bird species.*	*Low (-)*	• *Ensure operational activities are contained within the footprint of the proposed infrastructure and do not spread to the surrounding natural areas.* • *The maintenance of vegetation should try to allow as much as possible to recover.* • *If wild animals are encountered on site, they are to be left alone, unless they are a threat in which case they must be dealt with as prescribed in the Environmental Management Programme.*	*Low (-)*

Activity	Impact summary (Operational phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 1 (preferred alternative)		**[Operation phase]**	
			• *If social weaver nests cause a problem for the PV infrastructure, they must be removed as early as possible to avoid harm to eggs or young.*	
	Indirect impacts: *If precautions were not taken to prevent spread of alien vegetation, this could lead to an indirect impact.*	*Medium (-)*	• *Care should be taken to avoid unintentionally importing alien plants in construction material.*	*Low (-)*
	Cumulative impacts: *No other PV sites known to be planned for this habitat type (Blouputs Karroid Thornveld), which is also well conserved in the National Park.*	*N/A*	*N/A. No further mitigation to address cumulative impacts is proposed on this project. Other projects are recommended to take similar mitigatory measures.*	*N/A*
Ecological (Aquatic)	***Direct impacts:*** *Refer to direct impacts under the Construction phase for Site 1 above.*	*Low (-)*	*Storm water management and potential wind erosion impacts must be monitored to ensure soil erosion does not occur.*	*Negligible (-)*
	Indirect impacts: *If soil erosion were not properly managed, this could lead to indirect impacts on watercourses.*	*Low (-)*	*Storm water management and potential wind erosion impacts must be monitored to ensure soil erosion does not occur.*	*Negligible (-)*
	Cumulative impacts: *The proposed approach for the Augrabies Solar PV project with mitigation would have negligible impact with mitigation. Provided that other Solar PV projects follow a similar mitigation, cumulative impacts are not expected to be significant.*	*Low (-)*	*Other Solar PV projects are recommended to follow similar mitigation in site selection and construction mitigation.*	*Negligible (-)*
Paleontological	***Direct impacts:*** *From the Geology, the Paleontological Impact Assessment motivated that fossils were not expected to be found on the site and thus the impacts were not rated formally in a rating table. The Operational Phase would be even less likely to*	*Negligible (-)*	*In the unlikely event that fossils are found during operational phase, the South African Heritage Resource Agency must be notified to consider mitigation measures.*	*Negligible (-)*

Activity	Impact summary (Operational phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 1 (preferred alternative)		**[Operation phase]**	
	uncover fossils than the construction phase.			
	Indirect impacts: *No indirect impacts were identified.*	*N/A*	*N/A. No mitigation required.*	*N/A*
	Cumulative impacts: *No cumulative impacts were identified.*	*N/A*	*N/A. No mitigation required.*	*N/A*
Agricultural	***Direct impacts:*** *The main operational phase risk would be the loss of potentially arable land due to erosion by wind or water.*	*Medium (-)*	• *Care should be taken with the use of any chemicals on site either during construction or operation to avoid polluting the soil.* • *If soil erosion does begin either from wind or water, steps should be taken to control this.*	*Low (-)*
	Indirect impacts: *No indirect impacts were identified.*	*N/A*	*N/A*	*N/A*
	Cumulative impacts: *No indirect impacts were identified.*	*N/A*	*No indirect impacts were identified.*	*N/A*
Heritage (Archaeology)	***Direct impacts:*** *The heritage assessment identified numerous groups of scattered stone age tools on the site, which were deemed low to medium significance. The one feature near to Site 1 that is rated 'very high' significance' is a stone age cairn (probably a Khoi grave) that must be protected. It is not on the site footprint and would be protected.*	*Negligible (-)*	• *The stone cairn indicated on* Figure 15, *page 48 must be protected. It is outside the PV site area.*	*N/A*
	Indirect impacts: *No indirect impacts were identified.*	*N/A*	*N/A*	*N/A*
	Cumulative impacts: *No cumulative impacts were identified.*	*N/A*	*N/A*	*N/A*

Activity	Impact summary (Operational phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 2			
Visual Impact from Park View sites	***Direct impacts:*** *Site 2 would be potentially visible from some elevated areas close to the visitors facilities, however the local vegetation should block most of these views. An additional viewsite 'Swartrante' was developed in the Augrabies Park during the course of the project. An additional Visual Impact study was undertaken to evaluate this. It was found that a facility at Site 2 would be partially visible at a distance of approximately 2.4km.*	*Medium (-)*	*The recommended mitigation is the implementation of Site 1 rather than Site 2 (Site 1 would not be visible from the National Park). Nevertheless, if Site 2 were implemented, the same list of visual impact mitigation would apply.* *Please refer to mitigation measures under Site 1.*	*Low (-)*
	Indirect impacts: *No indirect impacts identified.*	*N/A*	*N/A*	*N/A*
	Cumulative impacts: *Since the proposed PV site is not visible from the view sites in the National Park, it cannot have a cumulative impact.*	*N/A*	*N/A*	*N/A*
Visual Impact (from public roads)	***Direct impacts:*** *The project will be visible in places 'edge-on' along the R359 public road. The view of the site from the road would be broken up by existing vegetation. (see Figure 11 in Appendix E-7 Visual Specialist Report).*	*Low to high (-)*	*Please refer to operational phase mitigation measures under Site 1.*	*Low to medium (-)*
	Indirect impacts: *No indirect impacts identified.*	*N/A*	*N/A*	*N/A*
	Cumulative impacts: *Refer to cumulative impacts for Site 2 in Construction phase above.*	*Medium (-)*	*Refer to mitigation under construction phase for Site 2 above.*	*Medium (-)*

Activity	Impact summary (Operational phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 2			
Botanical	***Direct impacts:*** *Refer to direct impacts for Site 2 in Construction phase above.*	*Low (-)*	*Refer to mitigation under operational phase for Site 1 above.*	*Low (-)*
	Indirect impacts: *No indirect impacts were identified.*	*N/A*	*N/A*	*N/A*
	Cumulative impacts: *While a number of PV facilities are proposed for this vegetation type (including hundreds of kilometres away), it is so extensive that the cumulative impact of these facilities is not significant.*	*Negligible (-)*	*N/A*	*Negligible (-)*
Ecological (Terrestrial)	***Direct impacts:*** *Refer to direct impacts for Site 2 in Construction phase above.*	*Low (-)*	*Refer to mitigation for Site 1 in Operational phase above.*	*Low (-)*
	Indirect impacts: *If precautions were not taken to prevent spread of alien vegetation, this could lead to an indirect impact.*	*Medium (-)*	*Care should be taken to avoid unintentionally importing alien plants in construction material.*	*Low (-)*
	Cumulative impacts: *While a number of PV facilities are proposed for this vegetation type (including hundreds of kilometres away), it is so extensive that the cumulative impact of these facilities is not significant.*	*N/A*	*N/A. No further mitigation to address cumulative impacts is proposed on this project. Other projects are recommended to take similar mitigatory measures.*	*N/A*
Ecological (Aquatic)	***Direct impacts:*** *Refer to direct impacts under construction phase above.*	*Low (-)*	*Storm water management and potential wind erosion impacts must be monitored to ensure soil erosion does not occur.*	*Negligible (-)*
	Indirect impacts: *If soil erosion were not properly managed, this could lead to indirect impacts on watercourses.*	*Low (-)*	*Storm water management and potential wind erosion impacts must be monitored to ensure soil erosion does not occur.*	*Negligible (-)*

Activity	Impact summary (Operational phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 2			
	Cumulative impacts: *The proposed approach for the Augrabies Solar PV project with mitigation would have negligible impact with mitigation. Provided that other Solar PV projects follow a similar mitigation, cumulative impacts are not expected to be significant.*	*Low (-)*	*Storm water management and potential wind erosion impacts must be monitored to ensure soil erosion does not occur.*	*Negligible (-)*
Paleontological	***Direct impacts:*** *From the Geology, the Paleontological Impact Assessment motivated that fossils were not expected to be found on the site and thus the impacts were not rated formally in a rating table. The Operational Phase would be even less likely to uncover fossils than the construction phase.*	*Negligible (-)*	*In the unlikely event that fossils are found during operational phase, the South African Heritage Resource Agency must be notified to consider mitigation measures.*	*Negligible (-)*
	Indirect impacts: *No indirect impacts were identified.*	*N/A*	*N/A. No mitigation required.*	*N/A*
	Cumulative impacts: *No cumulative impacts were identified.*	*N/A*	*N/A. No mitigation required.*	*N/A*
Agricultural	***Direct impacts:*** *The main operational phase risk would be the loss of potentially arable land due to erosion by wind or water.*	*Medium (-)*	• *Care should be taken with the use of any chemicals on site either during construction or operation to avoid polluting the soil.* • *If soil erosion does begin either from wind or water, steps should be taken to control this.*	*Low (-)*
	Indirect impacts: *No indirect impacts were identified.*	*N/A*	*N/A*	*N/A*
	Cumulative impacts: *No indirect impacts were identified.*	*N/A*	*No indirect impacts were identified.*	*N/A*

Activity	Impact summary (Operational phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	Site Alternative 2			
Heritage (Archaeology)	***Direct impacts:*** *The heritage assessment recorded that stone age artefacts on site 2 were too low in density to record any.*	*Negligible (-)*	*No mitigation is specified.*	*N/A*
	Indirect impacts: *No indirect impacts were identified.*	*N/A*	*N/A*	*N/A*
	Cumulative impacts: *No cumulative impacts were identified.*	*N/A*	*N/A*	*N/A*

Activity	Impact summary (Operational phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	No-go option			
	Direct impacts: • *Loss of job opportunities to the local community during the operational phase.* • *Loss of opportunity for non-polluting electricity generation in a prime location with high solar radiation and near to an existing electrical substation, thus requiring a short transmission line.* • *Loss of opportunity to diversify economic activity away from agriculture in the local municipality.*	*Medium (-)*	*No mitigation proposed.*	*Medium (-)*
	Indirect impacts: *None identified.*	*N/A*	*N/A*	*N/A*
	Cumulative impacts: *If numerous other Solar PV projects were refused, South*	*Medium (-)*	*No mitigation proposed. This is a national policy issue.*	*Medium (-)*

Activity	Impact summary (Operational phase)	Pre-mitigation Significance	Proposed mitigation	Post-mitigation Significance
	No-go option			
	Africa would not meet its emissions and electricity diversification targets, which it has committed to.			

Decommissioning and closure phase

The decommissioning phase (expected after the expiry of the 20 year contract with the Department of Energy). The following description of decommissioning would apply to both the preferred alternative (Site 1) and the other alternative (Site 2).

The decommissioning phase will include a repeat of many of the impacts of the construction phase (i.e. the activities on site) and the reversal of many of the impacts resulting from the construction of the project.

It will result in the loss of the positive socio-economic impacts of jobs created during the operational phase of the development. The actual decommissioning process will however probably create a short-term net increase in employment as the infrastructure is dismantled and probably recycled.

There will be a short term visual impact of construction vehicles travelling to and from the site.

The impact of loss of agricultural grazing land will be reversed. The visual impact of the project from the vantage point of the Augrabies Park and adjacent road will be reversed. It will be returned to as near as possible to its pre-construction visual state.

The entire project is being designed with a 'minimum engineering' philosophy, which will result considerably less work to decommission the project and rehabilitate the site than would have been the case with a 'regular engineering' philosophy. In particular, the minimisation of the use of concrete and other hard surfaced roads will conserve most of the fertile soil crust and existing vegetation.

Engineering design with decommissioning in mind will help to minimise decommissioning impacts.

The Environmental Management Plan has made numerous recommendations to minimise the impacts of the decommissioning phase of the project including: sub-surface concrete footings, which will not need to be removed. Since the site will not be levelled for construction, minimal earthworks would be necessary for decommissioning. Grasses should re-establish over disturbed areas fairly quickly, but the slow growing thorn bushes will take much longer to re-establish. From a distance, however the impacts on the site are not expected to be noticeable. Ducts are recommended for cabling which will simplify their removal on decommissioning. The use of chemicals (for example for cleaning panels) is to be undertaken with caution to avoid damage to the potential of the soil.

Prior to construction, the entire site will be photographed and this will be kept as a record to assist the decommissioning process to restore the site to as close as possible as it was before construction.

A detailed decommissioning plan will be submitted to the Environmental Authority prior to commencement.

The above mitigation measures are expected to minimise the impacts of decommissioning.

Decommissioning impacts would be the same for both alternatives, except that Site 1 which is covered in slow growing thorn bushes would take longer to rehabilitate to its former state, in comparison with Site 2 which is covered in grassland.

A complete impact assessment in terms of Regulation 22(2)(i) of GN R.543 must be included as Appendix F.

2. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

The proposed project is for the construction of a 10 Megawatt Photovoltaic plant including a power line and ancillary infrastructure such as transformers, water tanks, a water pipeline and a single storey office. The non-linear components of the project would cover an area of 19.9 hectares. The electricity generated would be discharged to the Eskom grid at the Blouputs substation.

Two feasible site alternatives Site 1 (to the west) and 2 (to the east) were considered by the project which are indicated on Figure 4, page 8 . As a result of the findings of the specialist environmental assessment, site 1 was chosen but the mitigation required moving it approximately 180m south and 80m west of the initial site 1 (see Figure 5, p9). Site 1 (after mitigation) is thus the preferred and recommended alternative.

Specialist studies conducted for the project which included full impact ratings tables included: Agricultural potential; Botanical; Ecology; Heritage; and Visual. Other studies including descriptive ratings only included: Freshwater ecology and Palaeontology. The freshwater ecology study was a supplementary study and the Paleontological study was a desktop based motivation for exemption (these studies are found in Appendix E).

Alternative Site 1 (preferred alternative)

Visual impact summary: *The viewshed of Site 1, (see Visual Specialist Report, Appendix D-7, Figure 8) shows that it would not be visible from the main view sites in the park, but that it may be visible from some locations along a 400 metre stretch of gravel road within the park. It will also be visible from the adjacent public road running north-south through the park and from places on the R359. It would only be visible edge-on, which from a distance of kilometres would feature as a line on the horizon. Site 1 is strongly preferred to Site 2 from a visual perspective, as in this area the site can be hidden from the more sensitive viewer locations in the park by a ridge running from north-west to south-east. The duration of the impact would be the 20 year contract life of the facility and the subsequent time of rehabilitation of the existing vegetation. The impacts are probable. The overall significance of the visual impact would be 'medium-high' with mitigation during*

construction and 'medium-low' during operation.

Botanical impact summary: *The vegetation present at Site 1 is Blouputs Karroid Thornveld, which is classified 'Least threatened'. No threatened species were found or expected to be found. The duration of the project impact would be 'long-term' including the project lifespan of 20 years plus a longer period for the slow-growing thornbushes to grow back. Likelihood of occurrence is probable. The significance with mitigation is 'low'.*

Ecological impact summary: *Sensitive features identified on the site include drainage lines and a small pan (see* Figure 10*, p18). Ratings were given separately for five different categories:*

Type of impact (with mitigation)	Duration	Likelihood	Significance
Solar Arrays: Loss of habitat for threatened animals	*Permanent*	*Improbable*	*Low*
Solar Arrays: Damage to watercourses/pans	*Long-term*	*Highly probable*	*Medium*
Power line: Loss of habitat for threatened animals	*Long-term*	*Highly improbable*	*Low*
Power line: Bird collisions	*Long-term*	*Improbable*	*Low*
Power line: Damage to wetlands/watercourses	*Long-term*	*Improbable*	*Low*

The overall impacts are thus low to medium. The main issue is thus damage to watercourses/pans from Solar Arrays.

Aquatic ecology impact summary: *Loss of habitat would be of localised impact of a moderate to low intensity and low overall significance. The pans being small in extent are not highly significant.*

The proposed preferred site location with mitigation will impact on at least one small pan and some minor drainage lines. Since the site will not be levelled and a minimum engineering approach is being followed, these impacts will be limited and not total loss.

Paleontological impacts: *Based on the geology, the finding of any fossils in the area was improbable and thus a full paleontological study was not necessary.*

Agricultural impacts: *The main impact would be the loss of potentially arable land due to construction. However due to the dry and hot climate, the shallow soils and limited water available such an impact would be of limited significance. The site can be rehabilitated for agricultural use on decommissioning.*

Type of impact (with mitigation)	Duration	Likelihood	Significance
Soil loss	*Long term*	*Probable*	*Low*
Soil erosion by wind	*Long term*	*Unlikely*	*Low*

Heritage impacts: *The heritage assessment identified numerous groups of scattered stone age tools on the site, which were deemed low to medium significance. The one feature near to Site 1 that is rated 'very high' significance' is a stone age cairn (probably a Khoi grave) that must be protected. It is not on the site footprint and would be protected.*

Type of impact (with mitigation)	Duration	Likelihood	Significance
Archaeology	*Permanent*	*Improbable*	*Negligible*
Landscape	*Long*	*Definite*	*Negligible**

** The mitigation recommended by the Basic Assessment followed that of the Visual Impact Assessment rather than the Heritage Assessment (i.e. scattered trees rather than a line of trees). Nevertheless, the Heritage consultant confirmed that he supports this alternative recommendation (Orton, 2012d).*

Alternative Site 2 (other alternative)

Visual impact summary: *The viewshed of Site 2, (Appendix D-7, Figure 8, page17) shows that it would potentially visible from a much wider area including the popular and sensitive 'moon rock' and Ararat road view sites in the National Park. Nevertheless, because of the terrain, it would only be visible edge-on, which from a distance of kilometres would look like a line on the horizon – broken in places by intervening vegetation. Other existing features visible from the same view sites include vineyards covered in grey shade cloth. The 'zones of visual influence' as well as the intensity of impact (with mitigation) from these locations are rated 'low'. Site 2 would also be visible from some of the surrounding Augrabies agricultural areas, although with mitigation, the intensity of this impact is rated 'low'. During construction, the overall significance of the impact of Site 2 with mitigation would be the same as Site 1, but during operational phase, Site 2 is rated 'medium' whereas site 1 is rated 'medium-low'. Apart from these stated differences, the impact ratings for the two sites are similar. There is no risk of reflective glare to any of the National Park view sites or internal tourist roads, but there may be glare just after sunrise some times of year on the public road between Blouputs Substation and the Orange River.*

Botanical impact summary: *The vegetation present at Site 2 is Bushmanland Arid Grassland, which is classified 'Least threatened'. No threatened species were found or expected to be found. The vegetation on the site is more common than on Site 1 and there are fewer drainage lines, giving the site a lower impact from a purely botanical perspective. The duration of the impact would be 'long-term'. Likelihood of occurrence is probable. The significance with mitigation is 'low'.*

Ecological impact summary: *The ratings for Site 2 are the same as Site 1, except that Site 2 has fewer drainage lines and is thus considered more suitable than Site 1 on ecological criteria.*

Paleontological impacts: *Based on the geology, the finding of any fossils in the area was improbable and thus a full paleontological study was not necessary.*

Heritage impacts: *The heritage impact ratings for Site 2 would be the same as for Site 1. The stone age tools found on the site were of lesser significance than for Site 1.*

Agricultural impacts: *The expected agricultural impacts for Site 2 are the same as for site 1.*

Alternative C

No-go alternative (compulsory)

If the proposed 10 MW Photovoltaic plant is not constructed would result in the continued existing use of the 20 hectare footprint of the site for agricultural grazing land.

Depending on how one interprets the default 'no-go alternative', if the equivalent 10 MW electricity required to meet grid demand was generated instead using a coal fired power station, that would result in additional carbon emissions and a reduction in the capacity towards meeting the governments national renewable energy targets. No local jobs would be created.

Retention of the status quo of grazing usage would have no visual, heritage or ecological impacts, unless there was over-grazing which would likely lead to soil erosion.

The agricultural specialist study said that the shallow soils made the area unsuitable for irrigated agriculture.

SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?	**YES**	NO

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment).

N/A. There is adequate information for decision.

Summary process of decision for site location selection

At Pre-feasibility stage, the project identified two feasible alternative sites, PV1 and PV2, each with a 'focus area' around them within which the sites could be moved. These were selected on the basis of aerial photography and preliminary engineering viewshed analysis. Site PV1 was preferred on engineering criteria as it is closer to the electrical grid and thus requires a shorter power line. Specialist studies were then undertaken on these two feasible alternatives.

- *The Agricultural and Paleontological Specialist Studies did not find a significant difference between the two sites and thus did not influence the site selection.*
- *The Visual Specialist Study strongly recommended site PV1 to the South-West of a ridge which would hide it from key visitor sites in the Augrabies Park. This 'screened out' PV2 and part of the PV1 focus area.*
- *The Heritage Specialist Study found only one site of heritage significance within the specialist study focus areas, which resulted in the 'screening out' of the vicinity of this location, which was to the West of PV1.*
- *The Botanical Specialist study found that site PV2 would be of lower impact than site PV1, but the difference was only marginal. If site PV1 was to be chosen, the Botanical specialist recommended that the site be moved southwards to avoid impacting on a major drainage channel. This latter recommendation was accepted and screened out a further portion of the PV1 focus area.*
- *The Ecological Specialist study identified the high sensitivity of drainage lines and ephemeral pans on the sites, for which it recommended positioning of solar arrays as far as technically possible outside of buffer areas around defined watercourses and pans. Such drainage lines were identified on both PV1 and PV2. Site 2 was preferred on purely ecological criteria, but either site was acceptable.*
- *On the basis of these recommendations, given the weighting of Visual Impacts due to the location of the site within the Augrabies Falls viewshed protection area, site PV1 was recommended in preference to site PV2. About six different variations of PV1 were considered by the engineering and environmental assessment team to refine this site selection within the identified constraints.*
- *Given the sensitivity of the drainage lines and small ephemeral pans identified by the Botanical Study and the Ecological specialist study, it was decided to appoint an aquatic ecologist to provide further input on refining the 20 hectare preferred location for the preferred site PV1. This specialist recommended the location shown as PV1 (with mitigation) in* Figure 5*, page 9. This recommendation was accepted by the environmental practitioners and engineering teams.*

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application.

Recommendations

Note on recommendations

- *Since detail design has not yet been undertaken, the proviso 'where technically feasible' is included for certain recommendations. Recommendations already considered in the site location selection explained above are not repeated here.*
- *Most of the recommendations below are derived from the specialist reports, but are not copied verbatim since there were conflicting recommendations on some points, where the environmental practitioners needed to make a judgement on the most effective and reasonable mitigation and in other cases the same recommendation was repeated by more than one specialist consultant, but is only listed under one category.*

Engineering design recommendations

- *Site location alternative 1 with (mitigation) is recommended as shown in the drawings on* Figure 5*, p9 (detailed reasons for this decision are given on page 96, above).*
- *Existing infrastructure should be used where technically feasible rather than building new infrastructure: including the use of existing farm water pipeline infrastructure where available as shown in* Figure 8*, page 13 and existing access tracks. The water pipeline extension should use the minimum trench necessary but must be buried under drainage lines. The trench soil should not be compacted.*
- *It is possible that the applicant may decide to build a facility smaller than the proposed 10MW /19.9 hectare project. This would have a lesser impact and should be permitted in terms of the Environmental Authorisation. Should it be decided to so, then the footprint of the smaller facility should seek to further reduce impacts on freshwater features identified in* Figure 10*, page 18. Such a smaller and lower impact alternative design has been completed and approved by the environmental practitioner but is not being submitted as the application is for up to 10MW/19.9 project.*
- *At time of finalisation of the Basic Assessment Report, the proponent's preference was for 'fixed panels' rather than 'single axis tracking'. Nevertheless, since no significant difference in environmental impact was found for the two technologies, it is recommended that both alternatives should be allowed for in the authorization.*

Agricultural impact related recommendations

- *To conserve the soil, an absolute minimum of vegetation should be removed.*
- *Care should be taken with the use of any chemicals on site either during construction or operation to avoid polluting the soil.*
- *If soil erosion does begin either from wind or water, steps should be taken to control this.*

Ecologically related recommendations

- *A stormwater management plan must be compiled for the proposed solar array that must include details of how water velocities will be reduced to avoid soil erosion.*
- *There are a number of shallow drainage lines on the site, which fit the definition of a watercourse. Impacts on these must be minimised although they cannot be entirely avoided.*

Recommendations

- *Authorisations will be required from the Department of Water Affairs and will be applied for in due course.*
- *While the proposed project will unavoidably impact on certain freshwater features (minor drainage lines and a pan), those features that need to be protected depending on their size, should be delineated prior to construction with a buffer of between 10 and 30 metres.*
- *Devices should be attached to the overhead power line to make it more visible to birds.*
- *All areas to be protected during construction must be demarcated by a suitably qualified person prior to construction.*
- *Pylons must be positioned at minimum 50 metres outside significant watercourse boundaries, which should be delineated prior to construction.*
- *Prior to construction, the site must be surveyed for protected trees, particularly Boscia albitrunca, and permits for relocation or removal must be applied for.*
- *If social weaver nests cause a problem for the PV infrastructure, they must be removed as early as possible to avoid harm to eggs or young.*

Visual impact related recommendations

- *The planting of screening trees requiring long-term irrigation around the facility or along the R359 road is not supported as this could result in a higher visual impact than the facility itself. Suitable locally indigenous trees should be planted on specific sight lines scattered across the landscape to break up the visual impact rather than completely hide the facility. The locations of this planting should be decided after the facility is complete. The management plan for the facility should include a link with the Augrabies Park to find acceptable solutions to any issues that may arise.*
- *After detailed design, but before construction, the viewshed calculated by the Visual Impact Assessment must be re-checked to ensure that the final design complies with the assumptions and recommendations of the VIA.*
- *Single axis tracking technology or fixed array technology are both acceptable alternatives as neither would result in a glare risk to the National Park.*
- *Excavation and the use of concrete should be minimised.*
- *The gate and any signage on the R359 should be similar to other local usage and not draw attention to the facility.*
- *The colours and finishes of the infrastructure (excluding the black panels) should be chosen to blend into the natural environment.*
- *Fencing should be visually permeable, similar to other agricultural fencing in the area. Barbed wire should not be used, but electric fencing is acceptable.*
- *No outdoor night lighting other than motion sensor activated security lighting should be used. The use of lighting must be monitored over the entire lifetime of the project.*
- *Prior to construction, the site must be photographed to serve as a baseline for rehabilitation on decommissioning. On decommissioning, it must be restored to a state as near to this previous state as possible. All waste must be removed, with the exception of footing foundations that are well buried with soil below the surface, which may be left in-situ.*
- *Lay-down areas should take place within the 20 hectare extent of facility.*
- *Areas where disturbance and access is not necessary should be fenced off from access by construction workers.*
- *Topsoil disturbance should be minimised, but that which is necessary should be stockpiled or spread so that it can be used for rehabilitation after decommissioning.*

Recommendations
• *Care should be taken to avoid unintentionally importing alien plants in construction material.* • *Litter should be strictly controlled during and after construction.* • *Use of fire should be strictly controlled to avoid veld fires.* • *Waste should be regularly removed from site either to re-use or to take to a recognised dump site, and should not be allowed to accumulate on site.* ***Heritage and Paleontological related recommendations*** • *The stone cairn indicated on* Figure 15*, page 48 must be protected as a no-go area for construction workers.* • *If any human remains are revealed during earthworks, excavations in the immediate vicinity should be halted and the find reported to an archaeologist or to SAHRA (telephone: 021 462 4502). Exhumation may be required at the expense of the developer.* • *All South African fossil heritage is protected by the National Heritage Resources Act, 1999. Should substantial fossil remains (e.g. vertebrate bones and teeth) be encountered during construction, the responsible ECO should inform SAHRA at the earliest opportunity to consider possible mitigation measures.*

Is an EMPr attached?	**YES**	NO

The EMPr must be attached as Appendix G.

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Any other information relevant to this application and not previously included must be attached in Appendix J.

_____

NAME OF EAP

_____ _____

SIGNATURE OF EAP DATE

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SECTION F: APPENDIXES

The following appendixes must be attached:

Appendix A: Maps

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports (including terms of reference)

Appendix E: Public Participation

Appendix F: Impact Assessment

Appendix G: Environmental Management Programme (EMPr)

Appendix H: Details of EAP and expertise

Appendix I: Specialist's declaration of interest

Appendix J: Additional Information