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**ENVIRONMENTAL IMPACT ASSESSMENT PROCESS
PROPOSED PHOTOVOLTAIC (SOLAR) ENERGY FACILITY ON
ANNEX DU PLESSIS DAM FARM NEAR DE AAR,
NORTHERN CAPE
DEA REF NO.: 12/12/20/2498; NEAS REF NO.: DEAT/EIA/0000609/2011**

FINAL BASIC ASSESSMENT REPORT

Report No: 5790B

Submission date: 23 April 2012

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REPORT CONTROL SHEET

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CLIENT REPRESENTATIVE : Mr Warren Morse
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Dam Farm, De Aar, Northern Cape
Final Draft Basic Assessment Report
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ABBREVIATIONS

BAR	Basic Assessment Report
CEMP_r	Construction Environmental Management Programme
CO₂	Carbon Dioxide
CRR	Comments and Responses Report
CSP	Concentrating Solar-thermal Power
DEA	Department of Environmental Affairs (previously Department of Environmental Affairs and Tourism)
DEA&DP	Department of Environmental Affairs and Development Planning
DEANC	Department of Environmental Affairs and Nature Conservations
DoE	Department of Energy
EAP	Environmental Assessment Practitioner
EMP_r	Environmental Management Programme
EIA	Environmental Impact Assessment
ERA	Electricity Regulation Act (No. 4 of 2006)
GN	Government Notice
G:S:B-	General: Small: negative water balance
GWh	Gigawatt hours
ha	Hectares
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IEP	Integrated Energy Plan
IPP	Independent Power Producer
IRP	Integrated Resource Plan
kV	Kilovolt
LSA	Later Stone Age
MSA	Middle Stone Age
MW	Megawatts
MWh	Megawatt hours
NEMA	National Environmental Management Act (No. 107 of 1998) (as amended)
NHRA	National Heritage Resources Act (No. 25 of 1999)
NWA	National Water Act (No 36 of 1998)
OEMP	Operational phase Environmental Management Programme
PV	Photovoltaic
SAHRA	South African Heritage Resources Agency
SACNASP	South African Council for Natural Scientific Professions
SDF	Spatial Development Framework
SO₂	Sulphur Dioxide
UNCBD	United Nations Convention on Biological Diversity
UNFCC	United Nations Framework Convention on Climate Change



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. 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.
3. Where applicable **tick** the boxes that are applicable in the report.
4. An incomplete report may be returned to the applicant for revision.
5. 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.
6. This report must be handed in at offices of the relevant competent authority as determined by each authority.
7. No faxed or e-mailed reports will be accepted.
8. The report must be compiled by an independent environmental assessment practitioner.
9. 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.
10. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.

Updating of the DBAR to the FBAR

Minor changes have been made to the Draft Basic Assessment Report (DBAR) to update the document to the Final Basic Assessment Report (FBAR), as well as address comments raised by I&APs. Information that has been added is underlined, while removed / deleted information is indicated by a 'strikethrough', i.e. ~~report~~.

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 appointment of a specialist for each specialist thus appointed:

All specialist reports contain the signed form "Details of specialist and declaration of interest" (please see Annexure D).

Any specialist reports must be contained in Appendix D (please see Annexure D).

1. ACTIVITY DESCRIPTION

Describe the activity, which is being applied for, in detail¹:

Mulilo proposes to construct three separate solar energy facilities which would utilise photovoltaic (PV) technology on the farms Paarde Valley Farm (referred to as PV2), Badenhorst Dam Farm (referred to as PV3), and Annex du Plessis Dam Farm (referred to as PV4), near De Aar in the Northern Cape (please see Figure 1 included in Annexure A). This Basic Assessment Report (BAR) will describe the proposed PV (solar) energy facility on Annex du Plessis Dam farm (Remainder of Farm No. 179).

The proposed PV facility will consist of a photovoltaic component comprising of numerous arrays of PV panels and associated support infrastructure to generate up to 19.9 MW through the photovoltaic effect. The proposed facility would occupy approximately 64 ha of low arable agricultural land, which is currently used as unimproved grazing land for cattle production. Two alternative sites at Annex Du Plessis Dam farm are being assessed and these are referred to as Site 1 and Site 2 (Please see Figure 1 included in Annexure A).

The proposed facility will also consists of the following:

- For each site, a preferred overhead transmission line route and an alternative route has been

¹ Please note that this description should not be a verbatim repetition of the listed activity as contained in the relevant Government Notice, but should be a brief description of activities to be undertaken as per the project description.

proposed. Verbal confirmation on grid connectivity and capacity has been obtained from Eskom. Indicative Quotes have been applied for from Eskom regarding grid connectivity and capacity. The details of the overhead transmission lines are as follow:

- Site 1: The preferred 132 kV overhead transmission line (less than 1 km in length) (referred to as Tpref1) would connect site 1 to the existing Eskom transmission line crossing the eastern section of the farm. The electricity will be evacuated to Hydra sub-station. Three alternative transmission line routes have been proposed. It is noted that these may change during the course of this process as the proposed transmission line could potentially cross a line proposed by another bidder. For this reason, Mulilo is investigating the possibility of changing the route of the alternative transmission line to the northern side of the existing Eskom line. In addition, Mulilo is also investigating the option of using a 22 kV transmission line this will be determined by the available capacity. Details of the three alternative transmission line routes are provided below:
 - A 132 kV line (3 km in length) [referred to as Alternative T1.1];
 - A 22 kV line (8 km in length) [referred to as Alternative T1.2]; and
 - A transmission line (approximately 3 km in length) [referred to as Alternative T 1.3] The voltage of this line will most likely be 132 kV, but could be reduced to 22 kV depending on the available capacity (please refer to Figure 2 in Annexure A).
- Site 2: The preferred 132 kV overhead transmission line (2.3 km in length) (referred to as Tpref2) would connect Site 2 to the existing Eskom transmission line crossing the eastern section of the farm boundary. The electricity will be evacuated to Hydra sub-station. Three alternative transmission line routes have been proposed. It is noted that these may change during the course of this process as the proposed transmission line could potentially cross a line proposed by another bidder. For this reason, Mulilo is investigating the possibility of changing the routes of the alternative transmission line to the northern side of the existing Eskom line and reducing the capacity of the transmission line to 22 kV. Three alternative transmission lines are thus being proposed to connect site 2 to the De Aar sub-station namely:
 - A 132 kV line (1.5 km in length) [referred to as Alternative T2.1];
 - A 22 kV line (6.7 km in length) [referred to as Alternative T2.2]; and
 - A transmission line (approximately 3 km in length) [referred to as Alternative T2.3] are being proposed. The voltage of this line will most probably be 132 kV, but could be reduced to 22 kV depending on the available capacity (please refer to Figure 3 in Annexure A).
- Storm water infrastructure such as concrete channels would be required to manage the onsite runoff and to direct the flow of storm water.
- Access roads to connect the proposed sites and associated infrastructures to the existing roads. The proposed access roads are indicated in Figure 4 and Figure 5 (please see Annexure A). For site 1 a preferred and an alternative access road has been proposed. The

preferred access road for site 1 would be ± 1.5 km in length and will connect the site to Arend Street. The alternative access road would be ± 4.7 km in length. Only one access road has been proposed for site 2, this would be ± 2.7 km in length and will connect the site to the R48. The proposed access roads will have a gravel surface and will be approximately 6 meters in width.

- Internal access routes will be required within the facility for servicing and maintenance. The routes would link key inverter houses and the solar arrays with roads of between 2 m and 4 m width depending on final detail design.
- The distribution substation will be approximately 50 m x 50 m in size and will ideally be located adjacent to the plant or adjacent to the existing Eskom line if the line passes through the project land. The substation will be a distribution substation and will be securely fenced and operated by Eskom.
- Buildings:
 - Connection center building: 2.5 m x 2.55 m.
 - Control center: 6 m x 10 m x 2.55 m (HxWxL).
 - Guard cabin / offices.
 - An electrical substation.
- Solar resource measuring station:
 - The PV facility will contain a number of resource measuring stations providing remote monitoring and feedback of the plant performance. These stations would likely be incorporated in the inverter houses.
- For health and safety and security reasons, the PV facility will be fenced off from the surrounding farm with an electrified fence of ± 2.9 m height.
- ~~The facility will contain a number of resource measuring stations providing remote monitoring and feedback of the facilities performance. These stations would likely be incorporated in the inverter houses.~~
- Water supply source and associated infrastructure:
 - Potable water will be obtained from the Emthanjeni Municipality. It may be necessary to construct a pipeline in order to transfer the water to the site. The pipeline would be approximately 2.9 km in length. The diameter of the pipeline will be less than 0.36 m and the peak throughput will be less than 120 litres per second (please see Figure 4 and Figure 5 included in Annexure A for the proposed route of the pipeline). *Confirmation from the Local Municipality will be obtained to determine if there is water available to meet the construction and operational phase requirements. Please refer to Annexure G for correspondence between Mulilo and Emthanjeni Municipality regarding the provision of water.*

The construction phase would last between 12 to 30 months. This will depend on whether all three proposed PV facilities are constructed simultaneously (approximately 18-30 months) or separately (approximately 12 months for to construct the facility proposed for Annex du Plessis Dam).

In terms of the National Environmental Management Act (NEMA) (Act 107 of 1998) as amended, the proposed development triggers a number of listed activities, which require authorisation from the competent environmental authority before they can be undertaken. The proposed facility triggers General Notice (GN) 544 1(i), 9, 10, 11 (x and xi) and ~~13 as well as~~ GN 546 10 (a) 4(ii). Since the project is for the generation of energy, and energy projects are dealt with by the national authority, the competent authority is the National Department of Environmental Affairs (DEA). DEA's decision will be based on the outcome of this EIA process.

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. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in 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.

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

Location alternatives

Mulilo Renewable Energy (Pty) Ltd (Mulilo) has considered the option to develop large scale PV power generation in South Africa over the last three years, given the good solar resource which is available over a large portion of the western part of the country. Mulilo identified the significant PV power generation potential in the wide open plains of the Northern Cape, within Emthanjeni Local Municipality, surrounding the town of De Aar based on the following criteria:

- Solar resource potential based on historic satellite data;
- Grid connectivity and close proximity to strong grid access;
- Flat, level, and open land; and
- Unpopulated and non-arable or low arable potential land.

Furthermore, Mulilo undertook various desktop studies to assess the potential sensitivities of fauna, flora, heritage, visual and other technical aspects.

Based on the above, Mulilo identified three sites suitable for solar energy generation. Three separate environmental processes are being undertaken for these proposed solar energy generation projects. The identified sites have been secured, with Mulilo entering into long term agreements with the land owners. Grid connectivity via De Aar and Hydra substations has been discussed with Eskom, who are supportive of this project. This Basic Assessment will assess the project proposed for Annex du Plessis Dam farm.

The location alternative will be assessed against the “No-Go” alternative being the *status quo*.

Site Layout alternatives

Two sites at Annex Du Plessis Dam farm have been considered (referred to as Site 1 and Site 2) and both these sites will be assessed in this report (please see Figure 1 as included in Annexure A). The selection of these sites was based on:

- Technical constraints:
 - Spatial orientation requirements of panels and associated infrastructure (e.g. roads); and
 - Layout relative to other existing infrastructure, such as power lines.
- Environmental constraints:
 - Topographical constraints, including surface and groundwater; and
 - Aesthetics.

~~These site layouts may be updated in the Final Basic Assessment Report based on any environmental sensitivities or technical constraints identified.~~

Activity alternative

Mulilo investigated both photovoltaic solar cells and concentrating solar thermal power (CSP) to generate electricity from light energy. CSP technology uses mirrors or lenses to concentrate the sunlight onto a small area. Electricity produced when the light energy is converted to heat energy which drives a heat engine, usually a steam turbine.

Photovoltaic (PV) solar energy facilities use light energy from the sun to generate electricity through a process known as the PV Effect (the PV Effect is the creation of voltage or electrical current in a material upon exposure to light). The fundamental component of the facility is the PV cell, which is made from silicone and acts as a semi-conductor. These cells absorb light energy which energises the electrons to produce electricity. The individual PV cells can be connected and placed behind a protective glass sheet to form a photovoltaic panel. These panels are relatively durable and can last up to 30 years due to the immobility of parts and the sturdiness of the structure. The panels are mounted into metal frames which are usually a combination of aluminium, galvanised steel, and concrete foundations. Various types of foundations are being investigated, including concrete, thrust supports, or screw pile foundations. The panels are arranged in multiples/arrays onsite to maximize the exposure to solar radiation. The total surface area required for the PV facility and associated infrastructure will be approximately 19 ha (see Figure 2-1 below for basic PV system layout). It should be noted that the PV panels are treated with an anti-reflective coating to reduce the glare and reflectiveness of the panels to mitigate the potential negative visual impact.

The PV arrays are typically connected to each other in strings and the strings connected to DC/AC inverters. The inverters may be mounted on the back of the panel's support substructures / frames or alternatively in a central inverter station (measuring 2.5 m x 2.2 m x 8 m {HxWxL}). The strings are connected to the inverters by low voltage DC cables. Power from the inverters is collected in medium voltage transformers through AC

cables. Cables may be buried or pole-mounted depending on voltage level and site conditions. The medium voltage transformers can be compact transformers distributed throughout the solar field or alternatively located in a central substation.

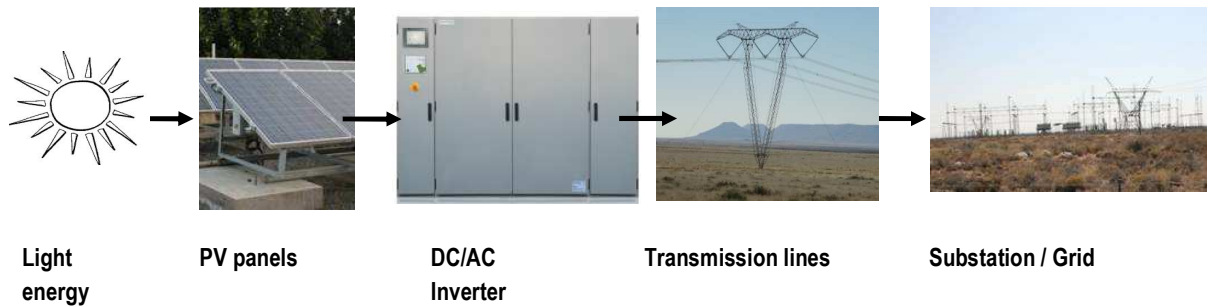


Figure 2-1: Basic PV system layout

One of the primary factors which confirmed PV technology as the preferred technology alternative is that CSP technology requires large volumes of water, which deems this technology less suitable for an arid water scarce environment. PV technology has a lower requirement for water, which makes this technology more suitable for this area.

Technology alternatives

Mounting of PV panels

There are various ways to mount PV panels in order to maximise the area of the PV panel exposed to sunlight for the maximum amount of time. In a fixed axis system the PV panels are installed at a set tilt and cannot move, whereas in a one or two axes tracking system the panels follow the sun to ensure maximum exposure to sunlight (see Figure 2-2 below). All three alternative methods of mounting will be investigated as technology alternatives.

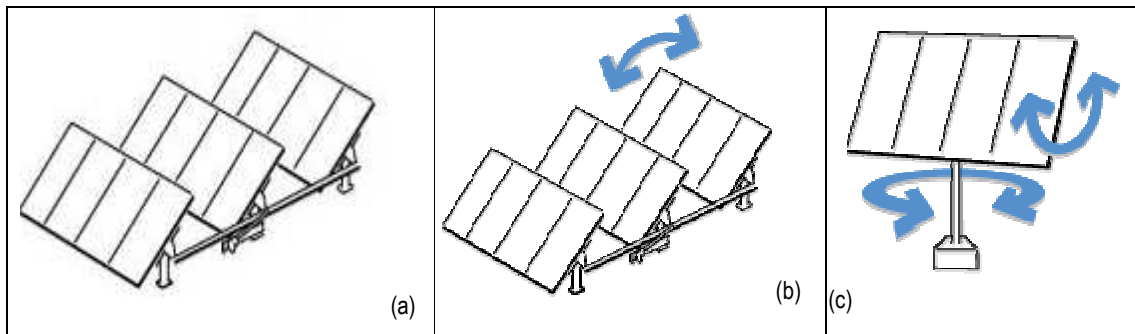


Figure 2-2: Fixed axis PV (a); single axis tracking PV (b) and concentrated dual axis tracking (c).

Foundation alternatives

There are various methods for anchoring PV arrays, but it is important to opt for the best option depending on the soil characteristics of the area. The anchoring structure would need to withstand climatic conditions in order to prolong the lifespan of the panels.

The following anchoring options were considered by the specialists:

- Isolated concrete bases;

- Continuous concrete bases;
- Concrete pile; and
- Thrusted supporting structures (See Figure xxx below)

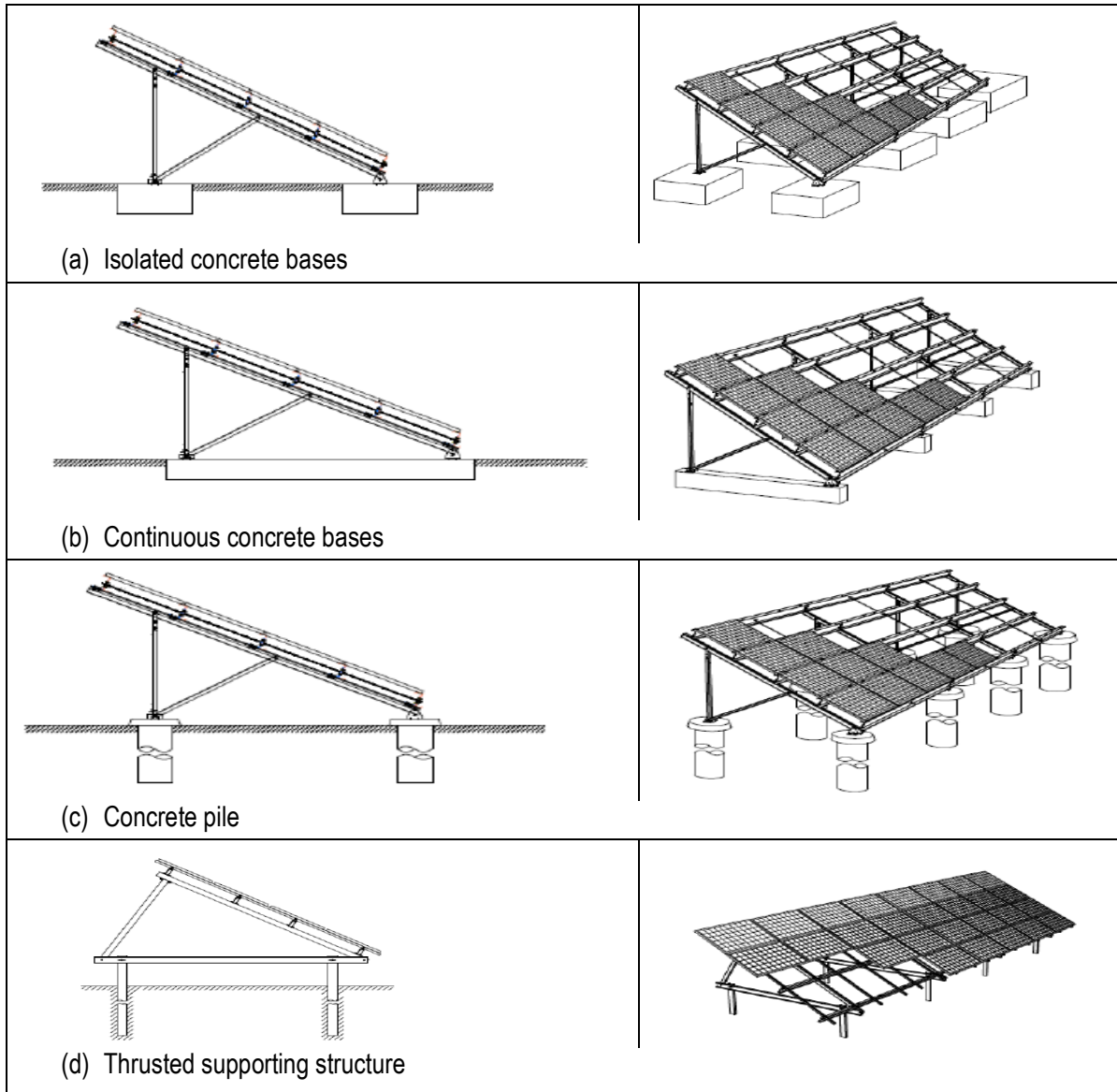


Figure 2-3: Examples of the anchoring options to be considered for the proposed solar plant (courtesy: Mulilo).

It is proposed that the PV panels be placed in parallel rows (Please see **Figure 2-4** below).



Figure 2-4: Example of a single axis tracking system with PV arrays arranged in parallel (courtesy: Mulilo)

Concentrated photovoltaic (CPV) solar system

The CPV system consists of PV panels which have a height of 15.4 m and a width of 22 m. A single anchoring structure would be required (Figure 2-5). These panels have the capacity to generate 68 kW per unit, as such approximately 14 units would be installed per 3 ha of land to generate the requisite supply of electricity.

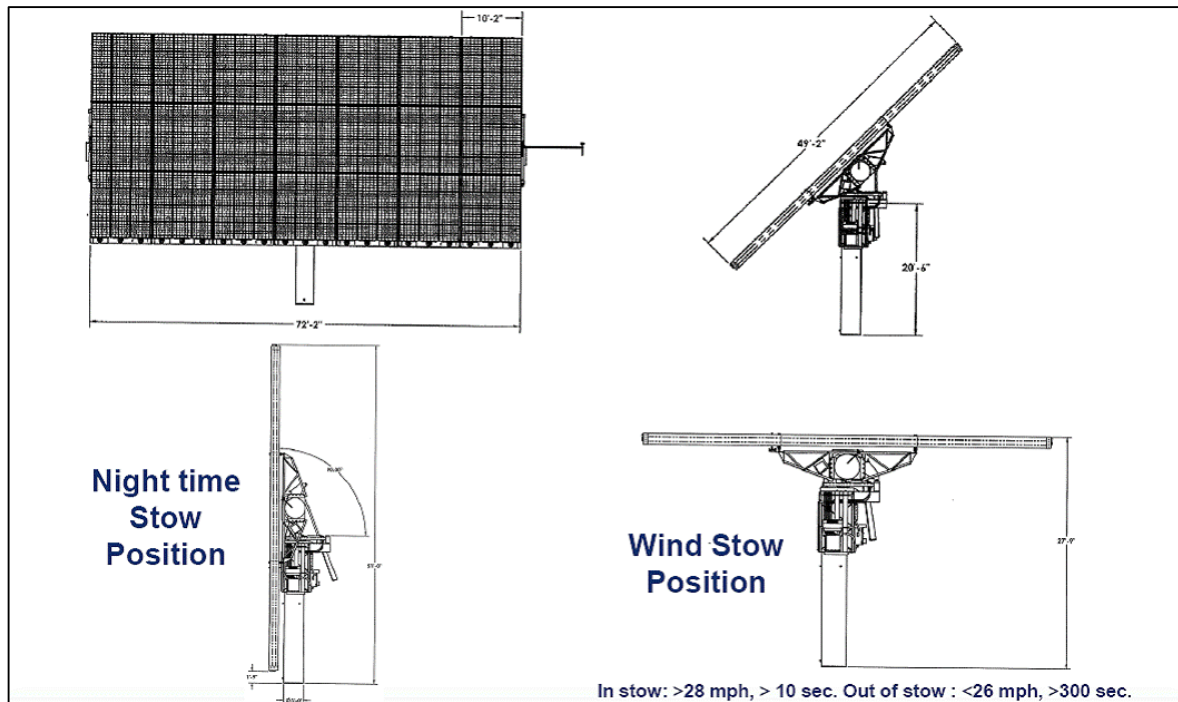


Figure 2-5: CPV system panel dimensions (courtesy: Mulilo)

3. ACTIVITY POSITION

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.

List alternative sites, if applicable.

Site layout alternatives:	Latitude (S):		Longitude (E):	
Alternative (Site 1)	30°	38'15.47"	24°	04'41.00"
Alternative (Site 2)	30°	37'50.77"	24°	03'43.13"

In the case of linear activities:

Transmission lines being proposed for Site 1

Proposed Transmission lines		Latitude (S):		Longitude (E):	
Alternative (Tpref1) (preferred or only route alternative)					
Starting point of the activity	A	30°	38'14.86"	24°	04'55.73"
Middle/Additional point of the activity	B	30°	38'15.15"	24°	05'04.49"
End point of the activity	C	30°	38'14.84"	24°	05'12.56"
Alternative 1 (T1.1) (if any)					
Starting point of the activity	A	30°	38'11.85"	24°	02'32.47"
Middle/Additional point of the activity	B	30°	38'12.17"	24°	03'31.24"
End point of the activity	C	30°	38'15.48"	24°	04'25.92"
Alternative 2 (T1.2) (if any)					
Starting point of the activity	A	30 °	38'33.04"	24 °	00'37.50"
Middle/Additional point of the activity	B	30 °	38'00.40"	24 °	02'01.49"
End point of the activity	C	30°	38'15.48"	24°	04'25.92"
Alternative 3 (T1.3) (if any)					
Starting point of the activity	A	30 °	37'33.58"	24 °	00'54.21"
Middle/Additional point of the activity	B	30 °	37'55.34"	24 °	01'43.97"
End point of the activity	C	30 °	38'13.00"	24 °	02'37.73"

Transmission lines being proposed for Site 2

Proposed Transmission lines		Latitude (S):		Longitude (E):	
Preferred Alternative (Tpref2)					
Starting point of the activity	A	30°	37'49.19"	24°	03'59.86"
Middle/Additional point of the activity	B	30°	37'51.22"	24°	04'39.39"
End point of the activity	C	30°	38'08.21"	24°	05'11.81"
Alternative 1 (T2.1) (if any)					
Starting point of the activity	A	30°	38'13.15"	24°	02'33.22"
Middle/Additional point of the activity	B	30°	38'06.82"	24°	03'00.84"
End point of the activity	C	30°	38'01.49"	24°	03'27.94"
Alternative 2 (T2.2) (if any)					
Starting point of the activity	A	30 °	38'36.23"	24 °	00'37.62"
Middle/Additional point of the activity	B	30 °	37'46.79"	24 °	01'31.34"
End point of the activity	C	30 °	38'01.13"	24 °	03'28.79"
Alternative 3 (T2.3) (if any)					

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Starting point of the activity	A	30°	37'33.58"	24°	00'54.21"
Middle/Additional point of the activity	B	30°	37'55.34"	24°	01'43.97"
End point of the activity	C	30°	38'13.00"	24°	02'37.73"

(Please see Figure 2 and Figure 3 in Annexure A for detailed routes of the preferred and alternative transmission lines).

Proposed access routes being proposed for Site 1

Proposed Access Routes		Latitude (S):		Longitude (E):	
Preferred Alternative					
Starting point of the activity	A	30°	38'28.88"	24°	04'27.25"
Middle/Additional point of the activity	B	30°	38'36.04"	24°	04'53.36"
End point of the activity	C	30°	38'52.79"	24°	05'15.50"
Alternative Access Route					
Starting point of the activity	A	30°	38'31.46"	24°	01'42.94"
Middle/Additional point of the activity	B	30°	38'20.28"	24°	03'05.45"
End point of the activity	C	30°	38'27.97"	24°	04'27.51"

Proposed access routes being proposed for Site 2

Proposed Access Routes		Latitude (S):		Longitude (E):	
Preferred Access Route					
Starting point of the activity	A	30°	38'02.73"	24°	03'57.87"
Middle/Additional point of the activity	B	30°	38'30.40"	24°	04'32.58"
End point of the activity	C	30°	38'52.47"	24°	05'15.98"

(Please see Figure 4 and Figure 5 in Annexure A for detailed routes of the preferred and alternative transmission lines).

4. PHYSICAL SIZE OF ACTIVITY

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

Site Layout Alternative		Size of the activity:
Annex du Plessis Dam farm	Site 1	64 ha (640 000 m²)
	Site 2	64 ha (640 000 m²)
<i>Activity Alternative</i>		
Activity	PV technology	64 ha (640 000 m²)
<i>Technology Alternatives</i>		
Mounting alternatives	Fixed axis PV	± 64 ha (640 000 m²)
	Single axis tracking PV	± 64 ha (640 000 m²)
	Concentrated dual axis tracking	± 64 ha (640 000 m²)
Founding alternatives	Isolated concrete bases	± 64 ha (640 000 m²)
	Continuous concrete bases	± 64 ha (640 000 m²)
	Concrete pile	± 64 ha (640 000 m²)
	Thrusted supporting structures	± 64 ha (640 000 m²)

or, for linear activities:

Transmission lines proposed for Site 1	Length of the activity:
Preferred Alternative (Tpref1)	< 1 000 m
Alternative 1 (T1.1)	3 000 m
Alternative 2 (T1.2)	8 000 m
Alternative 3 (T1.3)	± 3 000 m
Transmission lines proposed for Site 2	Length of the activity:
Preferred Alternative (Tpref2)	2300 m
Alternative 1 (T1.1)	1500 m
Alternative 2 (T1.2)	6700 m
Alternative 3 (T1.3)	± 3 000 m
Access roads proposed for Site 1	Length of the activity:
Preferred Alternative	± 1 500 m
Alternative 1 (T1.2)	± 4700 m
Access roads proposed for Site 2	Length of the activity:
Preferred Alternative	± 2700 m

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

Location Alternative	Size of the site/servitude:
Preferred and only location alternative (Annex Du Plessis Dam Farm)	1 300 ha – 1 400 ha (13 000 000 m² – 14 000 000 m²)

5. SITE ACCESS

Does ready access to the site exist?

√ YES	NO
m	

If NO, what is the distance over which a new access road will be built

Describe the type of access road planned:

Annex Du Plessis Dam farm can be accessed via the R48, but in order to access site 1 and site 2 additional gravel roads would need to be constructed on the farm. ~~Site 1 has one~~ One preferred access road (± 1.5 km in length) and one alternative access road (± 4.7 km in length) has been proposed for site 1. Site 2 only has one preferred access road (± 2.7 km in length) that has been proposed. The selected road would be gravel and range from 4 to 6 metres in width (please refer to Figure 4 and Figure 5 in Annexure A).

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 (please see Figure 4 and Figure 5 in Annexure A).

6. SITE OF 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:

- 6.1 the scale of the plan which must be at least a scale of 1:500;
- 6.2 the property boundaries and numbers of all the properties within 50 metres of the site;
- 6.3 the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
- 6.4 the exact position of each element of the application as well as any other structures on the site;
- 6.5 the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, street lights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;
- 6.6 all trees and shrubs taller than 1.8 metres;
- 6.7 walls and fencing including details of the height and construction material;
- 6.8 servitudes indicating the purpose of the servitude;
- 6.9 sensitive environmental elements within 100 metres of the site or sites including (but not limited thereto):
 - rivers;
 - the 1:100 year flood line (where available or where it is required by DWA);
 - ridges;
 - cultural and historical features;
 - areas with indigenous vegetation (even if it is degraded or invested with alien species);
- 6.10 for gentle slopes the 1 metre contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; and
- 6.11 the positions from where photographs of the site were taken.

7. 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 form. It must be supplemented with additional photographs of relevant features on the site, if applicable. **(Please see Annexure B)**

8. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 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.

9. ACTIVITY MOTIVATION

9(a) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	R 500 000 000, excluding financial and development costs	
What is the expected yearly income that will be generated by or as a result of the activity?	Income generated will depend on the tariff chosen to bid, but the expected tariff of R2.30/kWh will generate R 87.4 million per year.	
Will the activity contribute to service infrastructure?	<input checked="" type="checkbox"/> YES	NO
Is the activity a public amenity?	YES	<input checked="" type="checkbox"/> NO
How many new employment opportunities will be created in the development phase of the activity?	Approximately 452 (please see the table below)	

Employment opportunities during the construction phase	
On site	440
Project Management	6
Purchasing	11
Engineering	25
Total number of jobs	452

Approximately 452 individuals will be employed during the construction phase. Two hundred and twenty of the total jobs will be filled by black individuals. South African citizens will be appointed for 351 of the 452 job opportunities available.

Increased employment opportunities would allow for an improvement in social conditions for those who obtain employment.

During the construction phase between a maximum of 200 and 900 individuals (amounting to a total of 900 person months employment created over the construction period) would be employed depending on the procurement method used as well as the primary contractor. If non-locals are employed they would be housed in temporary dwellings on site or in accommodation within De Aar. An estimate of the anticipated workforce flow of the 24 month construction period is provided in **Figure 2-4**.

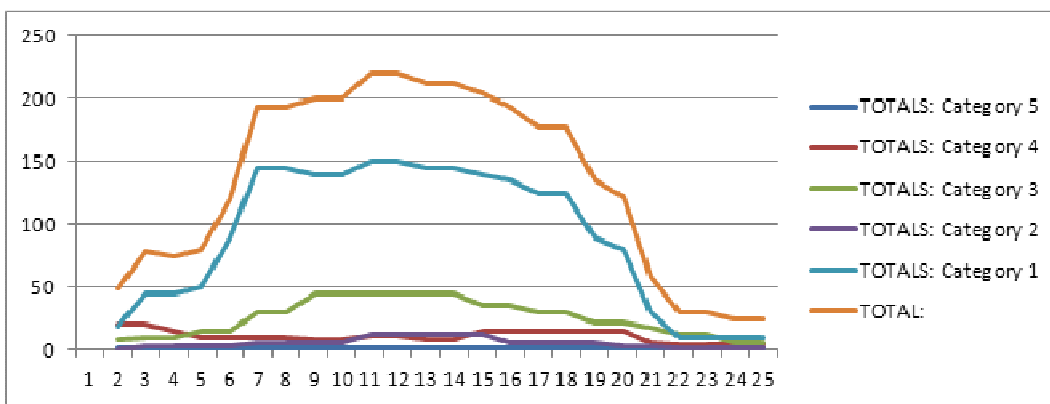


Figure 2-4: Estimated workforce flow for the 24 month construction period (Courtesy: Mulilo)

Category's:	Level
Senior Management	<u>5</u>
Engineers, Quantity Surveyors	<u>4</u>
Artisans, Foremen, Technicians	<u>3</u>
Junior staff	<u>2</u>
Civil works operator and labourer	<u>1</u>

It is estimated that between 65 and 75% (130 – 150 category 1 and 2 workers) will be sourced locally and provided with the necessary training. This workforce will already have accommodation in the area and will be transported by bus to and from the site on a daily basis. The remaining 25 – 35% (50 – 70 high level staff {category 3, 4, and 5}) will be housed within the locally available accommodation in the towns and surrounding farm areas (hotels, guest houses, etc.). A construction camp housing between 10 and 30, potentially all staff categories may be required for the duration of the construction period. The footprint of the construction camp would be approximately 1 – 1.5 ha in extent and would be located within the temporary laydown area.

BASIC ASSESSMENT REPORT

What is the expected value of the employment opportunities during the development phase?	1 – 5 %
What percentage of this will accrue to previously disadvantaged individuals?	± 20 %
How many permanent new employment opportunities will be created during the operational phase of the activity?	6-24
Approximately 6-24 individuals will be employed for operations and maintenance during the operational phase of the activity. Six to twelve of these individuals will be black and ten of these individuals will be South African citizens.	
What is the expected current value of the employment opportunities during the first 10 years?	Unknown at this stage
What percentage of this will accrue to previously disadvantaged individuals?	50 %

BASIC ASSESSMENT REPORT

9(b) Need and desirability of the activity

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

NEED:			
1.	Was the relevant provincial planning department involved in the application?	YES	<input checked="" type="checkbox"/> <u>NO</u>
2.	Does the proposed land use fall within the relevant provincial planning framework?	<input checked="" type="checkbox"/> <u>YES</u>	NO
3.	If the answer to questions 1 and / or 2 was NO, please provide further motivation / explanation:		
<p>Within the Emthanjeni Spatial Development Framework (SDF), the following aspects were identified as land use needs for the residents:</p> <ul style="list-style-type: none"> • Creation of a sustainable environment in Emthanjeni; and • Economic Development (Macroplan, 2007)². <p>By constructing a photovoltaic facility it would create employment opportunities during the construction and operational phase resulting in economic development which will contribute to a sustainable environment.</p>			

DESIRABILITY:			
1.	Does the proposed land use / development fit the surrounding area?	YES	<input checked="" type="checkbox"/> <u>NO</u>
2.	Does the proposed land use / development conform to the relevant structure plans, SDF and planning visions for the area?	<input checked="" type="checkbox"/> <u>YES</u>	NO
3.	Will the benefits of the proposed land use / development outweigh the negative impacts of it?	<input checked="" type="checkbox"/> <u>YES</u>	NO
4.	If the answer to any of the questions 1-3 was NO, please provide further motivation / explanation:		
<p>The site is open and almost flat grassy landscape devoted to agriculture, but also surrounded by semi-unused land in the show-grounds site with its Eskom infrastructure, and on the edge of the industrial part of town, with its railway sidings and industrial estates. This site has some value for agriculture, but does not have a strong or identifiable sense of place. Measured by lack of accessibility and the relative absence of settlement, the site would be valued as an undeveloped edge to the urban area. The compatibility of the proposed project refers to the extent to which the proposed PV facility is in line with the surrounding land use. As mentioned above, the existing landscape setting is peri-urban, with on-site agriculture, and industrial character from Eskom and Transnet infrastructure. It is open, flat, used for grazing and vegetated by low shrubs and grasses, and is located within a landscape where views are quite long. This development proposes to change the use of this landscape to that of a PV Facility, which is an industrial land use.</p> <p>The power lines component of the proposed development will fit in because in proximity to the development site is the existing De Aar and Hydra sub-stations and the industrial sites. This development will extend the industrial character of parts of the locality. This development is judged to have a moderately appropriate capacity for compatibility with the surrounding landscape; the</p>			

² Macroplan. 2007. Spatial development Framework for Emthanjeni Municipality.

BASIC ASSESSMENT REPORT

	development can blend in, to a lesser degree, and only with care (please see the Visual Impact Assessment as included in Annexure D).		
5.	Will the proposed land use / development impact on the sense of place?	<input checked="" type="checkbox"/> YES	NO
6.	Will the proposed land use / development set a precedent? No, similar applications for renewable energy projects for the De Aar region have received Environmental Authorisation.	YES	<input checked="" type="checkbox"/> NO
7.	Will any person's rights be affected by the proposed land use / development?	YES	<input checked="" type="checkbox"/> NO
8.	Will the proposed land use / development compromise the "urban edge"?	YES	<input checked="" type="checkbox"/> NO
9.	If the answer to any of the question 5-8 was YES, please provide further motivation / explanation:		
	<p>A landscape may be valued for many reasons, which may include landscape quality, scenic quality, tranquillity, wilderness value, or consensus about its importance either nationally or locally, and other conservation interests and cultural associations. The character of the landscape is described as rural and agricultural and the views are long. The potential exists that the proposed PV facility and associated infrastructure would be visible from many kilometres away.</p> <p>The site does not have a strong or identifiable sense of place. It is noted that the local landscapes are extensive enough to provide a setting for these developments (please see the Visual Impact Assessment as included in Annexure D).</p>		

BENEFITS:			
1.	Will the land use / development have any benefits for society in general?	<input checked="" type="checkbox"/> YES	NO
2.	<p>Explain:</p> <p>The need for renewable energy is well documented and reasons for the desirability of solar energy include:</p> <ol style="list-style-type: none"> 1. Utilisation of resources available to South Africa; 2. Meeting nationally appropriate emission targets in line with global climate change commitments; and 3. Enhancing energy security by diversifying generation. <p><i>Each of the above mentioned reasons for pursuing solar energy generation in South Africa is further discussed below.</i></p> <p>1. Utilisation of resources available to South Africa</p> <p>As illustrated in Figure 9-1 South Africa is subject to some of the highest levels of solar radiation in the World with an average daily solar radiation that varies between 4.5 and 6.5 kWh/m². This is particularly high in comparison to the average daily solar radiation for parts of the United States which is estimated at 3.6 kWh/m² and about 2.5 kWh/m² for Europe and the United Kingdom (Department of Minerals and Energy, 2003). South Africa therefore has considerable solar resource potential which can be harnessed.</p>		

South Africa currently generates most of its required electricity from coal of which there is a ready supply of at the local level. However, national government is on the verge of augmenting the existing generation capacity of thermal and nuclear power plants with renewable energy power generation, thus creating the framework that will lead to an increase in the supply of clean energy for the nation.

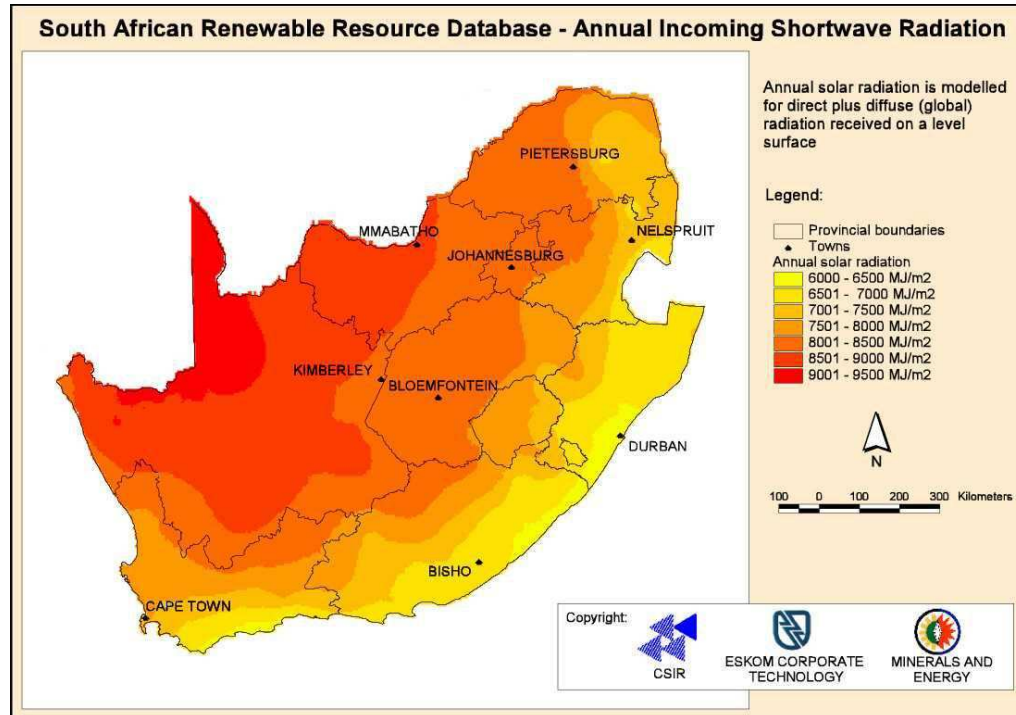


Figure 9-1: Annual solar radiation for South Africa (Department of Minerals and Energy, 2003)

2. Meeting nationally appropriate emission targets in line with global climate change commitments

As can be seen by the numerous policies and legislation described in Section 10 the need for renewable energy is well documented. Due to concerns such as climate change, and the on-going exploitation of non-renewable, resources, there is increasing international pressure on countries to increase their share of renewable energy generation. The De Aar PV projects are expected to contribute positively towards climate change mitigation.

Solar energy is a source of “green” electricity as for every 1 MWh of “green” electricity generated instead of traditional coal powered stations, one can:

- Save 1 290 liters of water;
- Avoid 8.22 kg of Sulphur Dioxide (SO²) emissions;
- Avoid 1 000 kg of Carbon Dioxide (CO²) emissions including transmission losses;
- Avoid 142 kg of ash production; and
- Contribute to social upliftment.

	<p>3. Enhancing energy security by diversifying generation</p> <p>The establishment of the proposed De Aar PV solar power facilities would strengthen the existing electricity grid for the area. Moreover, the project will contribute positively towards meeting the national energy target as set by the DoE, of a 30 % share of all new power generation being derived from independent power producers (IPPs). Renewable energy is recognized internationally as a major contributor in protecting the climate, nature and the environment, as well as providing a wide range of environmental, economic and social benefits that can contribute towards long-term global sustainability.</p> <p>Should the proposed PV site and development identified by Mulilo be acceptable, it is considered viable that long term benefits for the community and society in De Aar would be realised as highlighted above. The proposed projects would also have international significance as it contributes to South Africa being able to meet some of its international obligations by aligning domestic policy with internationally agreed strategies and standards as set by the United Nations Framework Convention on Climate Change (UNFCCC), Kyoto Protocol, and United Nations Convention on Biological Diversity (UNCBD) all of which South Africa is a signatory to.</p> <p>Additional potential benefits include:</p> <ul style="list-style-type: none"> • Reducing the demand on scarce resources, such as water as the generation of energy from PV facilities uses less water per MW/h than coal-fired facilities; • Reducing pollution as the generation of electricity from PV facilities produces far less pollution per MW/h than coal-fired facilities; • Local economic development; and • Local skills development. 		
3.	Will the land use / development have any benefits for the local communities where it will be located?	√ YES	NO
4.	<p>Explain:</p> <p>Creating a more sustainable economy</p> <p>The Northern Cape, and particularly the De Aar area, has large tracts of land which are very dry and the farmers do their best to earn a living from the land. The towns are generally small and operate on a survival socio-economic level. The need to improve the quality of life for all, and especially for the poor, is critical in South Africa. It is expected that the proposed project will contribute directly to the upliftment of the individuals and the societies in which they live.</p> <p>The De Aar region has a high unemployment rate of 26 %. The proposed PV facilities in De Aar would not only be a source of income to the landowners, but it would also create job opportunities for the local community as the construction and operation of the PV facilities require a wide range of skill levels which De Aar can, to a degree, supply. Approximately 200 to 900 job opportunities (<u>amounting to a total of 900 person months employment created over the construction period</u>) will be created during the construction phase depending on the procurement method and the primary contractor.</p>		

	A training strategy initiated by the EPC contractor will be implemented to ensure community upliftment. Skills development and the transfer thereof will be one of the top priorities and local community involvement will be enhanced as far as possible.
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10. 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:	Administering authority:	Date:
Policies		
National Environmental Management Act (No. 107 of 1998) (NEMA), as amended	Department of Environmental Affairs (DEA) Department of Environmental Affairs and Development Planning (DEA&DP)	1998
National Environmental: Biodiversity Act (No. 10 of 2004)	DEA DEA&DP	2004
National Water Act (No. 36 of 1998)	Department of Water Affairs (DWA)	1998
National Heritage Resources Act (No. 25 of 1999)	South African Heritage Resources Agency (SAHRA)	1999
Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA)	Department of Agriculture	1983
National Energy Act (No. 34 of 2008)	Department of Energy (DoE)	2008
Electricity Regulation Act (ERA) (No. 4 of 2006)	Department of Energy (DoE)	2006
Guidelines		
NEMA Environmental Impact Assessment Regulations Guidelines and Information Document Series on:	DEA&DP	2011

<ul style="list-style-type: none"> • Guideline on Transitional Arrangements (October 2011) • Guideline on Alternatives (October 2011) • Guideline on Public Participation (October 2011) • Guideline on Exemptions (October 2011) • Guideline on Need and Desirability (October 2011) • Guideline on Appeals (October 2011) 		
<p>NEMA Environmental Impact Assessment Regulations Guidelines and Information Document Series on:</p> <ul style="list-style-type: none"> • Information Document on Generic Terms of Reference for EAP's and Project Schedules (August 2010) 	DEA&DP	2010
<p>National Environmental Guidelines:</p> <ul style="list-style-type: none"> • Integrated Environmental Information Management (IEIM), Information Series 5: Companion to the NEMA EIA Regulations of 2010 (DEA, 2010); and • Implementation Guidelines: Sector Guidelines for the EIA Regulations (draft) (DEA, 2010). 	DEA	2010
<p>National Environmental Guideline:</p> <ul style="list-style-type: none"> • Integrated Environmental Information management, Information Series 12: Environmental Management Plans 	DEA	2004
<p>National Environmental Guidelines:</p> <ul style="list-style-type: none"> • IEIM, Information Series 2: Scoping (Department of Environmental Affairs and Tourism (DEAT, 2002); • DEAT. 2002. IEIM, Information Series 3: Stakeholder Engagement (DEAT, 2002); • IEIM, Information Series 4: Specialist Studies (DEAT, 2002); • IEIM, Information Series 11: Criteria for determining Alternatives in EIA (DEAT, 2004); • IEIM, Information Series 12: Environmental Management Plans (DEAT, 2004); • Integrated Environmental Management Guideline Series, Guideline 4: Public Participation, in support of the EIA Regulations. Unpublished (DEAT, 2005); and • Integrated Environmental Management Guideline Series, Guideline 7: Detailed Guide to Implementation 	DEAT	2004-2007

of the Environmental Impact Assessment Regulations. Unpublished (DEAT, 2007).		
Other relevant documents		
Kyoto Protocol	UNFCCC	1997
White Paper on the Energy Policy of the Republic of South Africa (1998)	Department of Minerals and Energy	1998
White Paper on Renewable Energy (2003)	Department of Minerals and Energy	2003
Integrated Energy Plan for the Republic of South Africa (2003)	Department of Minerals and Energy	2003
Final Integrated Resources Plan	Department of Energy	2011

11. WASTE, EFFLUENT, EMISSIONS AND NOISE MANAGEMENT

11(a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
If yes, what estimated quantity will be produced per month? Low quantities of solid waste, similar to office/domestic amounts, would be created and collected by the municipality. There are no components in the plant that would require continuous recycling and there are no processes that would generate a significant amount of waste.	m^3	
How will the construction solid waste be disposed of (describe)?		
<p>Construction solid waste will be dealt with in the Construction Environmental Management Programme (CEMP_r) which will incorporate waste minimisation strategies including reduction, recycling, and re-use principles.</p> <p>It is envisaged that the construction waste will be transported and disposed of at a local licensed landfill by the EPC contractor as stated in the EPC contract. The contractor shall ensure that waste generated at working areas are collected and disposed at a licensed facility at least once a week.</p>		

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

The Emthanjeni Municipality has three licensed landfill sites with a G:S:B- (General: Small: Negative water balance) classification³. It is envisaged that construction waste will be disposed of at one of the three landfill sites. Confirmation of the availability of landfill space will be obtained from the municipality by the client prior to commencing with construction. It is noted that the EPC contractor will be responsible for waste management during the construction phase.

Will the activity produce solid waste during its operational phase? The quantities of waste generated during the operational phase should not exceed the weekly allowable limit that is removed by the municipality, this will be confirmed prior to the commencement of the operational phase.	YES	<input checked="" type="checkbox"/> NO
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If yes, what estimated quantity will be produced per month?	±0 m ³
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How will the solid waste be disposed of (describe)?

It is envisaged that the construction waste will be transported and disposed of at a local licensed landfill by the EPC contractor as stated in the EPC contract. The contractor shall ensure that waste generated at working areas are collected and disposed at a licensed facility at least once a week.

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

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.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?	YES	<input checked="" type="checkbox"/> NO
--	-----	---

If yes, inform the competent authority and request a change to an application for scoping and EIA.

Is the activity that is being applied for a solid waste handling or treatment facility?	YES	<input checked="" type="checkbox"/> NO
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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.

³ <http://www.sawic.org.za/?menu=88>

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11(b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?	YES	<input checked="" type="checkbox"/> NO
If yes, what estimated quantity will be produced per month?	m ³	
Will the activity produce any effluent that will be treated and/or disposed of on site?	YES	<input checked="" type="checkbox"/> 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.		
Will the activity produce effluent that will be treated and/or disposed of at another facility?	<input checked="" type="checkbox"/> YES	NO
<p>Temporary composition <u>composting</u> toilets will be installed adjacent to the laydown areas during the construction phase and permanent composition <u>composting</u> toilets will be installed adjacent to the site office for the duration of the construction phase. These toilets will be serviced regularly and waste will be disposed of at the De Aar wastewater treatment works. <u>Confirmation from Emthanjeni Municipality will be obtained prior to the commencement of the construction phase.</u></p>		
If yes, provide the particulars of the facility:		
Facility name:		
Contact person:		
Postal address:		
Postal code:		
Telephone:	Cell:	
E-mail:	Fax:	
Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:		

11(c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere?	YES	<input checked="" type="checkbox"/> NO
<p>No emissions would be generated during the operational phase as PV solar energy facilities generate electricity from solar energy. The proposed facility would in fact assist in reducing South Africa's carbon emissions in the long term by contributing positively to the Government's renewable energy target.</p>		

If yes, is it controlled by any legislation of any sphere of government? YES NO

If yes s, 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 emissions in terms of type and concentration:

BASIC ASSESSMENT REPORT

11(d) Generation of noise

Will the activity generate noise?	<input checked="" type="checkbox"/> YES	NO
If yes, is it controlled by any legislation of any sphere of government?	YES	<input checked="" type="checkbox"/> 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:		
<p>Noise generation by construction vehicles, operation of machinery and site staff would be limited to the construction phase (approximately 12 - 30 months). The construction period are highly dependent on Eskom, in terms of their grid connection activities and lead times of the key components (transformers and inverters). Thus the construction period can only be estimated at this stage. It is however considered to be a short-term impact. Mitigation measures will be discussed in the CEMPr <u>and in section D below</u> to limit the noise generated during the construction phase and in section D below.</p>		

12. WATER USE

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

<input checked="" type="checkbox"/> 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:					
<p>Water will be obtained from the Emthanjeni Municipality (there is a verbal confirmation that the municipality has sufficient capacity to provide potable water for this proposed development). <u>Please refer to Annexure H for correspondence between Mulilo and Emthanjeni Municipality regarding the provision of water.</u></p> <p>Water requirements would be:</p> <ul style="list-style-type: none"> • Construction phase: Approximately 1800 kl - 3600kl • Operational phase: Approximately 4 kl per day 					<p>4 kilo litres per day during the operational phase</p>
Does the activity require a water use permit from the Department of Water Affairs?					YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>

Water will be sourced from the municipality, who has verbally confirmed that there is sufficient water available to meet these requirements (Formal Letters of confirmation are currently outstanding). Please refer to Annexure H for correspondence between Mulilo and Emthanjeni Municipality regarding the provision of water.

During the operational phase, 4 kl of water are required per day for domestic purposes and washing of the panels. Water will be sourced from the Emthanjeni Municipality.

13. ENERGY EFFICIENCY

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

The proposed PV solar energy facility would use light energy from the sun to generate electricity through a process known as the PV Effect (the PV Effect is the creation of voltage or electrical current in a material upon exposure to light). This will assist the Government in achieving their target of 20 409 MW renewable energy by 2030. The nature of the project ensures energy efficiency.

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

Due to the nature of the project this question is not applicable.

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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 C and indicate the area, which is covered by each copy No. on the Site Plan.

Annex Du Plessis Dam farm is relatively uniform and is predominantly flat with some gently undulating topography in the far western section (Orton, J. 2012). For this reason, Section B will be completed for the farm as a whole.

Section C Copy No. (e.g. A):

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

<p>3. Has a specialist been consulted to assist with the completion of this section?</p> <p>The following list of specialist studies were undertaken:</p> <ul style="list-style-type: none"> • Visual Impacts Assessment; • Ecological Impacts Assessment; • Heritage Impacts Assessment; • Hydrological Impacts Assessment; • Agricultural Impacts Assessment; • Avifaunal Impacts Assessment; • Paleontological Impacts Assessment; and • Aquatic Impacts Assessment. <p>(Please refer to Annexure D for the specialist reports).</p>	<p>✓ <u>YES</u></p>	<p>NO</p>
<p>If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed:</p>		
<p>All specialist reports must be contained in Appendix D. (Please see Annexure D for the specialist reports and the signed "Declarations of Interest").</p>		

BASIC ASSESSMENT REPORT

	Site 1	Site 2	
Property description/ physical address:	<p>Property description: For the PV4 site, the entire site is gently sloping with no particular topographical features of note. There is a slightly raised area in the south-western quadrant of the site. The elevation on site varies from 1 231 to 1 260 m above sea level (Hoare, 2012).</p> <p>Location: Annex du Plessis Dam farm is located on the R48 just North of De Aar, Northern Cape.</p>	<p>Property description: For the PV4 site, the entire site is gently sloping with no particular topographical features of note. There is a slightly raised area in the south-western quadrant of the site. The elevation on site varies from 1 231 to 1 260 m above sea level (Hoare, 2012).</p> <p>Location: Annex Du Plessis Dam farm is located on the R48 just North of De Aar, Northern Cape.</p>	
(Farm name, portion etc.)	Annex Du Plessis Dam Farm, remainder of Farm No. 179 Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application.	Annex Du Plessis Dam Farm, remainder of Farm No. 179 Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application.	
	In instances where there is more than one town or district involved, please attach a list of towns or districts to this application.		
Current land-use zoning:	Agricultural land (SiVest, 2012).	Agricultural land (SiVest, 2012).	
	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?		<div style="text-align: center;">√ YES</div>	NO
Must a building plan be submitted to the local authority?		<div style="text-align: center;">√ YES</div>	NO

Locality map:	<p>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:</p> <ul style="list-style-type: none"> • an indication of the project site position as well as the positions of the alternative sites, if any; • road access from all major roads in the area; • road names or numbers of all major roads as well as the roads that provide access to the site(s); • all roads within a 1km radius of the site or alternative sites; and • 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) <p>(Please see Figure 1 Annexure A)</p>
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1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative Site 1:

√ 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
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Alternative Site 2:

√ 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
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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
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2. LOCATION IN LANDSCAPE

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

- 2.1 Ridgeline
- 2.2 Plateau
- 2.3 Side slope of hill/mountain
- 2.4 Closed valley
- 2.5 Open valley
- 2.6 **Plain (Site 1 and Site 2)**
- 2.7 Undulating plain / low hills
- 2.8 Dune
- 2.9 Seafront

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

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

	Alternative Site 1:		Alternative Site 2 (if any):	
	YES	<input checked="" type="checkbox"/> NO	YES	<input checked="" type="checkbox"/> NO
Shallow water table (less than 1.5m deep)	YES	<input checked="" type="checkbox"/> NO	YES	<input checked="" type="checkbox"/> NO
Dolomite, sinkhole or doline areas	YES	<input checked="" type="checkbox"/> NO	YES	<input checked="" type="checkbox"/> NO
Seasonally wet soils (often close to water bodies)	YES	<input checked="" type="checkbox"/> NO	YES	<input checked="" type="checkbox"/> NO
Unstable rocky slopes or steep slopes with loose soil	YES	<input checked="" type="checkbox"/> NO	YES	<input checked="" type="checkbox"/> NO
Dispersive soils (soils that dissolve in water)	YES	<input checked="" type="checkbox"/> NO	YES	<input checked="" type="checkbox"/> NO
Soils with high clay content (clay fraction more than 40%)	YES	<input checked="" type="checkbox"/> NO	YES	<input checked="" type="checkbox"/> NO
Any other unstable soil or geological feature	YES	<input checked="" type="checkbox"/> NO	YES	<input checked="" type="checkbox"/> NO
An area sensitive to erosion	<input checked="" type="checkbox"/> YES	NO	<input checked="" type="checkbox"/> YES	NO

Please refer to the Agricultural Impact Assessment report included in Annexure D.

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).

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).

Natural veld - good condition ^E	<input checked="" type="checkbox"/> 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

The vegetation on site 1 and site 2 is dominated equally by grasses and karoo shrubs of low stature. The general vegetation cover is therefore quite low. The vegetation on site is in moderate to poor condition and appears to have been heavily grazed by domestic livestock. There are small numbers of alien species present on site, including *Argemone ochroleuca* (Mexican poppy) and *Datura ferox* (large thorn apple). There were no trees on site (Hoare, 2012). Please refer to the Ecology Impact Assessment in Annexure D.

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.

5. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that does 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:

- 5.1 Natural area
- 5.2 Low density residential
- 5.3 **Medium density residential**
- 5.4 High density residential
- 5.5 Informal residential^A
- 5.6 Retail commercial & warehousing
- 5.7 **Light industrial**
- 5.8 Medium industrial^{AN}
- 5.9 Heavy industrial^{AN}
- 5.10 Power station
- 5.11 Office/consulting room
- 5.12 Military or police base/station/compound
- 5.13 Spoil heap or slimes dam^A
- 5.14 Quarry, sand or borrow pit
- 5.15 **Dam or reservoir (small, breeched farm dam)**
- 5.16 Hospital/medical centre
- 5.17 School
- 5.18 Tertiary education facility
- 5.19 Church
- 5.20 Old age home
- 5.21 Sewage treatment plant^A
- 5.22 Train station or shunting yard^N
- 5.23 Railway line^N
- 5.24 Major road (4 lanes or more)^N
- 5.25 Airport^N
- 5.26 Harbour
- 5.27 Sport facilities
- 5.28 Golf course
- 5.29 Polo fields
- 5.30 Filling station^H
- 5.31 Landfill or waste treatment site
- 5.32 Plantation
- 5.33 **Agriculture**
- 5.34 River, stream or wetland
- 5.35 Nature conservation area
- 5.36 Mountain, koppie or ridge
- 5.37 Museum
- 5.38 **Historical building**
- 5.39 Protected Area
- 5.40 Graveyard

- 5.41 **Archaeological site⁴**
- 5.42 Other land uses (describe)

(Please see Figure 6 in Annexure A)

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

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

If YES, specify and explain:

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

If YES, specify and explain:

6. 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 palaeontological sites, on or close (within 20m) to the site?	YES	√ <u>NO</u>
	Uncertain	
If YES, explain:		

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

The Heritage Impact Assessment (HIA) was undertaken by Mr Jayson Orton of ACO Associates cc. Mr John Almond of Natura Viva cc undertook the Palaeontological Impact Assessment (PIA). The HIA and PIA are included in Annexure D. The findings and recommendations of the studies are briefly summarised below.

⁴ Most archaeology found at Annex du Plessis Dam farm is of little consequence and the one main area of concern is located outside of either of the proposed sites (Orton, 2012).

Briefly explain the findings of the specialist:

Archaeology

Most archaeology found at Annex Du Plessis Dam farm is background scatter, but some areas contained discrete artefact scatters and Later Stone Age (LSA) stone circles. These areas are of significance and should be avoided by the proposed development.

The following historical occurrences combine to form a single historical complex of sites of high significance which includes the main house, dump, large kraal, four small outbuildings, two possible graves and a quarry for building stone. The spatial layout of the various components formed a 19th century farm werf. The single most important component of this complex is the dump, which is approximately circular and 20 m in diameter with a maximum height above natural ground level of between 0.4 m and 0.5 m. Although some burrows exist in the dump, it is not possible to know what the density of material is like beneath the surface. No artefacts were visible in the burrows. Glass seemed to dominate, but large numbers of ceramics were also present. Also noted were a blue marble, a musket ball, a clothing hook, some bullet cartridges, a bottle bearing the name 'Rotterdam' and a button with 'Markhams Cape Town' on it. This site offers an excellent opportunity to document the material culture of a 19th century Karoo family and should be preserved for future research purposes (Orton, J. 2012).

The main recommendation from the Heritage Specialist was that the development should avoid the undulating and higher lying land in the western part of the study area; and the area around the historical farm werf should be cordoned off, protected from all harm, and treated as an outright no-go area. The development will avoid the undulating and higher lying land in the western part of the study area and the recommendation to cordon the historical farm werf will be included in the CEMPr.

Palaeontology

The potentially fossiliferous sediments of the Late Palaeozoic Karoo Supergroup (Ecca and Beaufort Groups) that underlie the study area is almost entirely mantled in a thick layer of superficial deposits of probable Pleistocene to Recent age. These include various soils, gravels and – at least in some areas - a very well-developed calcrete hardpan. The upper Ecca Group bedrocks in the De Aar area contain locally abundant fossil wood (of palaeontological interest for dating and palaeoenvironmental studies), as well as low diversity trace fossil assemblages typical of the Waterford Formation, rather than the Tierberg Formation as mapped.

Trace fossils, silicified wood and rare vertebrate remains (therapsids) of the Middle Permian Pristerognathus Assemblage Zone have recently been recorded from this succession in the De Aar area. Extensive dolerite sills and dykes of the Early Jurassic Karoo Dolerite Suite are entirely unfossiliferous, as are rare intrusive kimberlite pipe rocks of Cretaceous age.

The diverse superficial deposits within the study area (e.g. soils, gravels, alluvium, calcrete hardpans) as a whole are of low palaeontological sensitivity.

Given the low overall palaeontological sensitivity of the region around De Aar, and the widespread occurrence elsewhere in the Great Karoo of the fossils so far recorded there, the successive or concurrent development of the PV site near De Aar that have been proposed by Mulilo does not pose a significant cumulative impact on local fossil heritage (Almond, 2012).

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Will any building or structure older than 60 years be affected in any way?

YES	✓ <u>NO</u>
YES	✓ <u>NO</u>

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.

Please refer to Appendix D for the Heritage Impact Assessment Report.

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by—

- (a) fixing a notice board (of a size at least 60cm by 42cm; and must display the required information in lettering and in a format as may be determined by the competent authority) at a place conspicuous to the public at the boundary or on the fence of—
 - (i) the site where the activity to which the application relates is or is to be undertaken; and
 - (ii) any alternative site mentioned in the application;
- (b) giving written notice to—
 - (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
 - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
 - (v) the municipality which has jurisdiction in the area;
 - (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
 - (vii) any other party as required by the competent authority;
- (c) placing an advertisement in—
 - (i) one local newspaper; or
 - (ii) any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
- (d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or local municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official *Gazette* referred to in subregulation 54(c)(ii); and
- (e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to—
 - (i) illiteracy;
 - (ii) disability; or
 - (iii) any other disadvantage.

2. CONTENT OF ADVERTISEMENTS AND NOTICES

A notice board, advertisement or notices must:

- (a) indicate the details of the application which is subjected to public participation; and
- (b) state—
 - (i) that the application has been submitted to the competent authority in terms of these Regulations, as the case may be;

- (ii) whether basic assessment or scoping procedures are being applied to the application, in the case of an application for environmental authorisation;
- (iii) the nature and location of the activity to which the application relates;
- (iv) where further information on the application or activity can be obtained; and
- (v) the manner in which and the person to whom representations in respect of the application may be made.

3. PLACEMENT OF ADVERTISEMENTS AND NOTICES

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the competent authority in terms of these regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made, unless a notice has been placed in any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of the EIA regulations.

Advertisements and notices must make provision for all alternatives.

Please refer to Annexure G for proof of adverts and site notices placed.

4. DETERMINATION OF APPROPRIATE MEASURES

The practitioner must ensure that the public participation is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate. Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

5. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments and respond to each comment of the public before the application 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 this application. The comments and response report must be attached under Appendix E.

The Comments and Responses Report (CRR) ~~is will be~~ included in Appendix E of the Final Basic Assessment Report.

6. AUTHORITY PARTICIPATION

Please note that a complete list of all organs of state and or any other applicable authority with their contact details must be appended to the basic assessment report or scoping report, whichever is applicable.

Authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input.

List of authorities informed:

- Department of Environmental Affairs (DEA);
- National Department of Agriculture, Forestry and Fisheries: Directorate: Land Use and Soil Management;
- Emthanjeni Local Municipality;
- Pixley ka Seme District Municipality;
- Department of Environmental Affairs and Nature Conservation (DEANC);
- Eskom Holdings Limited;
- South African Heritage Resources Agency (SAHRA);
- Department Heritage Northern Cape;
- Department of Agriculture (Northern Cape); and
- Department of Water Affairs: Deputy Director Lower Orange WMA.

List of authorities from whom comments have been received:

No comments were received during the initial commenting period is still in process during which the public will be were granted 40 days to comment on the Draft Basic Assessment Report. Any comments received on the DBAR will be included in the FBAR.

The Comments and Reponses Report, included in Annexure E, has been updated to indicate that no comments were received.

7. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for linear activities, or where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that subregulation 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.

Has any comment been received from stakeholders?	YES	✓ NO
If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):		
<p><u>I&APs were afforded 40 days to provide input on the Draft Basic Assessment Report. The initial commenting period is still in process during which the public will be granted 40 days to comment on the Draft BAR. The comment period is was from 2 March 2012 till 16 April 2012. Please submit any comments or concerns to Aurecon on or before 16 April 2012. No comments were receive and it was recorded in the Comments and Responses Report (Annexure E).</u></p>		

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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. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

List the main issues raised by interested and affected parties.

No comments were received during the initial comment period. No issues have been raised by I&APs as the initial commenting period is still in process. The following potential impacts on the biophysical and socio-economic environments have been identified:

Construction phase

Direct impacts

- Litter / waste pollution and disposal;
- Storage and utilisation of hazardous substances on site;
- Impact of dust on air quality;
- Impact of noise during construction (construction vehicles, etc.);
- Impact of increased vehicular traffic and heavy load transport;
- Social impacts (employment opportunities and influx of workers.);
- Impact on flora;
- Impact on fauna
- Impact on avifauna;
- Surface water runoff, including sedimentation and erosion;
- Impact on freshwater ecosystems;
- Impact on archaeological, cultural and historic sites;
- Impact on palaeontological significant geological units;
- Impact on agricultural land;
- Impact on municipal services; and
- Visual impact.

Indirect impacts

- Impact on the economy.

Operational Phase

Direct impacts

- Impact on surface and groundwater water quality;
- Visual impacts;
- Impact on flora;
- Impact on fauna and avifauna;
- Social impacts (employment opportunities, etc.);
- Impact on municipal services; and

- Impact of litter and waste pollution on the surrounding environment.

Indirect impacts

- Impact on energy production; and
- Increased risk of flooding and the impact that flooding may have on the PV facility.

Cumulative impacts

- Potential visual impact of additional solar facilities in the region.

Decommissioning and Closure phase

Direct impacts

- Impact of vehicles on local traffic conditions;
- Impact of dust and noise on the surrounding environment;
- Impact on visual aesthetics and sense of place;
- Disturbance of flora, fauna, and avifauna;
- Loss of employment opportunities; and
- Impact of litter and waste on the surrounding environment.

Indirect impacts

- Impact on energy production.

Section 2 of the NEMA requires the consideration of cumulative impacts as part of any environmental assessment process. Cumulative effects are commonly understood as *"the impacts which combine from different projects and which result in significant change, which is larger than the sum of all the impacts"* (DEAT Guideline on Cumulative Effects 2004). Cumulative impacts can be incremental, interactive, sequential or synergistic. EIAs have traditionally failed to come to terms with such impacts, largely as a result of the following considerations:

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

Despite these challenges, cumulative impacts have been afforded increased attention and for certain impacts a section has been added which discusses any cumulative issues, and where applicable, draws attention to other issues that may contextualise or add value to the interpretation of the impact.

Response from the practitioner to the issues raised by the interested and affected parties (A full response must be given in the Comments and Response Report that must be attached to this report as Appendix E):

Please refer to ~~be included in Annexure E of this~~ the Final BAR.

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

List the potential direct, indirect and cumulative property/activity/design/technology/operational alternative related impacts (as appropriate) 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.

Construction Phase

Direct impacts			
Potential Impact	Significance rating of impacts (Very-Low, Low, Medium, Medium-High, High, Very High)	Proposed Mitigation	Significance rating of impacts after mitigation (Very-Low, Low, Medium, Medium-High, High, Very High)
<p>Litter, waste pollution and disposal The construction phase of the proposed facility is likely to result in the generation of litter and waste which could pollute the surrounding environment if not managed properly. Windblown litter is not only a threat to the aesthetics of the site, but also to the livestock. Should livestock consume any plastic material it could lead to their death which, in turn, would result in financial losses to the owner.</p>	<p>Medium (negative)</p>	<ul style="list-style-type: none"> • Responsible waste disposal practices will be the responsibility of the EPC contractor. • Provide adequate waste bins. • Set up system for regular waste removal to an approved facility. • Minimise waste by sorting wastes into recyclable and non-recyclable wastes, <u>if practical</u> (an independent contractor can be appointed to conduct this recycling). • No waste may be buried or burned under any circumstances. • An approved waste disposal contractor must be employed to remove and recycle waste oil, if practical. • A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the construction site. • Littering by the employees shall not be allowed under any circumstances. • The <u>Environmental Control Officer (ECO)</u> shall monitor the neatness of the work sites as well as the Contractor campsite. • Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly to prevent vermin and odours. • A certificate of disposal by shall be obtained the Contractor and kept on file, if relevant. <p>Hazardous waste</p> <ul style="list-style-type: none"> • Hazardous wastes e.g. mixed cement shall only be disposed at 	<p>Very low (negative)</p>

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		<p>landfill sites registered for hazardous wastes.</p> <ul style="list-style-type: none"> • All waste hazardous materials must be carefully stored as advised by the ECO, and then disposed of at a licensed landfill site. • All necessary precaution measures shall be taken to prevent soil or surface water pollution from hazardous materials used during construction. • No hazardous waste may be buried or burned under any circumstances. • The Material Safety Data Sheet (MSDS) for any hazardous materials must be kept on site at all times. • The contractor must ensure that the employees are informed on how to responsibly dispose of any containers containing hazardous substances. • All major spills of any materials, chemicals, fuels or other potentially hazardous or pollutant substances must be cleaned immediately and the cause of the spill investigated. • Preventative measures must be identified and submitted to the ECO. 	
<p>Storage and utilisation of hazardous substances on site During the construction period, the use and storage of substances, such as shutter oil, curing compounds, and diesel, on-site could have negative impact on the surrounding environment, if these substances spill and enter the environment.</p>	<p style="text-align: center;">Low (negative)</p>	<ul style="list-style-type: none"> • Educate employees regarding specification requirements of the materials they handle. • Secure materials during transport. • Identify appropriate storage areas for stockpiling of materials, storage of hydrocarbons and storage of hazardous substances and ensure that these areas are appropriately prepared for their purpose. • Storage of materials must take into consideration the prevailing wind directions to reduce windblown dust. • Prevent and limit spillage of hazardous substances or substances with the potential to cause contamination of the environment. • Develop emergency protocols for 	<p style="text-align: center;">Very low (negative)</p>

		<p>dealing with spillages particularly where these pose a pollution risk or involve hazardous substances.</p> <ul style="list-style-type: none"> • All oil changes must take place within a designated area on an impervious surface such as a concrete slab. • Contaminated runoff from the construction site should be prevented from entering freshwater systems. • Containers that contained toxic or harmful materials shall not be rinsed and re-used. • Such containers shall not be stored or disposed on site. These containers shall be destroyed to prevent re-use and disposed in accordance with the manufacturer's instructions at a permitted waste disposal facility. • Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals, and any hazardous materials to be used must be provided to prevent the soil and groundwater contamination. • Hazardous materials (such as oils, paints, grease, fuels, and chemicals) should be stored in designated areas which are bunded. Wall of the bunded area shall be of earth or concrete, and shall be designed to be liquid tight and to withstand a full hydrostatic head of water. The volumetric capacity of the bunded area will be a minimum of 110% of the volume of the largest tank. Should more than one tank be enclosed in the bunded area, then the capacity should be calculated on the volume of all the tanks stored within the bunded area. • All fuel storage area must be roofed to avoid creation of dirty stormwater. • Storage areas containing hazardous substances / materials must be clearly signposted. • The concrete batching plant must be contained within a bunded area. • Concrete mixing must only take 	
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		<p>place within designated areas.</p> <ul style="list-style-type: none"> • Ready mixed concrete must be utilised where possible. • No stockpiling shall occur outside of the working area or within drainage channels. 	
<p>Impact of dust on air quality Construction vehicles are likely to make use of the existing farm roads to transport equipment and material to the construction site. Earthworks would also be undertaken. These activities would exacerbate dust especially in the dry winter months.</p> <p>Earthworks, such as the clearance of vegetation, would also be undertaken. These activities would most likely exacerbate dust, especially in the dry and hot summer months.</p>	<p>Low (negative)</p>	<ul style="list-style-type: none"> • Piles of topsoil must be sprayed with water in order to prevent dust creation. • Minimization of the areas disturbed at any one time. • Protection of exposed soil against wind erosion by covering it with straw. • Location and treatment of any material stockpiles shall take into consideration the prevailing wind directions. 	<p>Very low (negative)</p>
<p>Impact of noise during construction An increase in noise pollution would be expected from the operation of heavy machinery during the construction period, as well as due to the increased traffic. The severity of this impact is likely to be reduced due to the low numbers of people in close proximity to the proposed sites, with residents at De Aar being the closest receptors at <1 km from Annex Du Plessis Dam farm.</p>	<p>Very low (negative)</p>	<ul style="list-style-type: none"> • Equipment shall be fitted with requisite silencers and directional settings. • Construction activities shall be restricted to normal working hours (between 08h00 and 17h00) during week days and Saturdays. In instances where work outside of these hours is required, appropriate notices shall be placed at the site entrance. • On-going vehicle maintenance will be done as required to prevent broken exhaust pipes from generating additional noise pollution. 	<p>Very low (negative)</p>
<p>Impact of increased vehicular traffic and heavy load transport Construction vehicles are likely to make use of the existing roads, including the N10, to transport equipment and material to the construction site. Approximately 450 truckloads transporting in total 900 40-foot containers would be required during the construction period.</p> <p>Between two and five digger loaders/ bulldozers would be required for land clearing and five to ten trucks with cranes would be required for the assembly of the</p>	<p>Low (negative)</p>	<ul style="list-style-type: none"> • Ensure that road junctions have good sightlines. • Transport the materials in the least amount of trips as possible. • Transport components overnight as far as possible. • Ensure that all drivers are aware of the “No-Go” areas, permissible roads, and where the offloading area is. • Impose speed limits on the construction site. • Manage site access to prevent congestion of vehicles and trucks. 	<p>Low (negative)</p>

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<p>facility. The impact on traffic is however not expected to be insignificant as these truckloads would be distributed throughout the construction period lasting between <u>12</u> & 30 months.</p> <p>Cumulative impacts The cumulative potential impact of the proposed energy projects on transport is considered to be of medium (negative) significance, with or without mitigation.</p>		<ul style="list-style-type: none"> • Access of all construction and material delivery vehicles should be strictly controlled, especially during wet weather to avoid compaction and damage to the topsoil structure. • Roads not to be used shall be marked with a "NO ENTRY for construction vehicles" sign. • Access roads are to be kept litter free. • Transportation of materials must be done by the least amount of trips to prevent the construction vehicles from congesting the main roads leading to De Aar. • The contractor must ensure that there is ample space to off load the materials to prevent trucks being delayed and interrupting the traffic flow. 	
<p>Social impacts in terms of employment opportunities and the influx of workers The establishment of the proposed PV solar energy facility would provide a number of direct and indirect jobs and would require a wide level of skills. During the construction phase (<u>12 to 30 months</u>) between a maximum of 200 and 900 individuals (<u>amounting to a total of 900 person months employment created over the construction period</u>) would be employed. Temporary dwellings would be constructed adjacent to the laydown areas in order to house any non-locals employed.</p>	<p style="text-align: center;">Medium (positive)</p>	<ul style="list-style-type: none"> • Provide appropriate training, which would enable individuals to apply their skills to other construction and development projects in the region once construction is complete. • Base recruitment on sound labour practices and with gender equality in mind. • Create a local Community Trust which has an equity share in the project life to benefit historically disadvantaged communities. • Prevent unauthorised individuals from entering the construction site. • Health, safety and skills training including HIV/AIDS awareness programme must be compulsory for all construction workers. • Implement a policy of "no employment at the gate". • Maximise local employment thereby limiting influx of construction workers to De Aar. 	<p style="text-align: center;">Medium (positive)</p>
<p>Impact on flora The farm falls within the Nama-Karoo Biome and the Northern Upper Karoo vegetation type occurs within the far, which is considered to be a "Least Threatened vegetation type".</p>	<p style="text-align: center;">Low-Medium (negative)</p>	<ul style="list-style-type: none"> • The construction impacts must be contained to the footprint of the proposed facility. • Areas outside the construction footprint should be fenced and access to these areas should be 	<p style="text-align: center;">Low (negative)</p>

<p>The construction of the PV facility will require that vegetation within the development footprint be cleared, which may result in habitat fragmentation and the establishment of alien vegetation.</p> <p>It is noted that the vegetation of the site is in moderate to poor condition and appears to have been heavily grazed by domestic livestock.</p> <p>Cumulative impacts The impact on natural vegetation is due primarily to the solar arrays. If the three proposed facilities are assessed together then the significance of the impact for the combined project would remain <i>medium</i>.</p> <p>It was concluded that cumulative impacts will not result in impacts having a significance that is greater than for each of the individual proposed solar PV energy facilities (Hoare, 2012).</p>		<p>limited as much as possible.</p> <ul style="list-style-type: none"> • Where disturbance is unavoidable, disturbed areas should be rehabilitated as quickly as possible. • Any alien plants within the facility must be immediately controlled to avoid establishment of a soil seed bank. Control measures must follow established norms and legal limitations in terms of the method to be used and the chemical substances used. • Invasive alien vegetation that currently existing within the immediate area of the construction activities should be removed. • An on-going monitoring programme should be implemented to detect and quantify any aliens that may become established and provide information for the management of aliens. 	
<p>Impact on fauna There is one mammal species of low conservation concern that could occur in available habitats in the study area, namely Geoffroy's Horseshoe Bat. Based on the proposed distribution of infrastructure (flat areas) and the habitat preferences of this species (ridges), it was assessed as highly unlikely that this species would be affected by construction or operation of the proposed project. The species may forage over the site (low likelihood), but it will not roost there (Hoare, 2012).</p> <p>There are also two small mammal species (Black-footed Cat and the Cape Fox) that could potentially occur on site that are protected under the NEM: BA and any impacts on a specimen of this species or that may negatively affect the survival of the species would require a permit. It was assessed that it was possible that these species may traverse the site while foraging, but that it was unlikely that they would occur there as permanent residents. This is primarily due to the close proximity of the site to the town of De Aar. The proximity of humans and domestic animals, such as dogs, are factors that would lead to these</p>	<p>Low to medium (negative)</p>	<ul style="list-style-type: none"> • The construction site must be demarcated and all construction employees must be informed that they may not go outside of the site boundaries. • Any alien plants within the control zone of the facility must be immediately controlled to avoid establishment of a soil seed bank. Control measures must follow established norms and legal limitations in terms of the method to be used and the chemical substances used. • An on-going monitoring programme should be implemented to detect and quantify any aliens that may become established and provide information for the management of aliens. • Catching of wild animals (including reptiles, amphibians, birds and invertebrates, etc.) by any means, including setting of snares, poisoning, shooting and trapping is illegal and this should not be allowed. • The contractor is to report any problem animals (e.g. a snake that 	<p>Low (negative)</p>

<p>animals moving away.</p> <p>The Giant Bullfrog is the only amphibian species with a distribution that includes the study area and which could occur on site. This species is classified as Least Concern globally and Near threatened in South Africa. It is, however, protected under the NEM: BA. The Giant Bullfrog inhabits a variety of vegetation types where it breeds in seasonal, shallow, grassy pans in flat, open areas. It also utilises non-permanent vleis and shallow water on margins of waterholes and dams. It prefers sandy substrates although they sometimes inhabit clay soils. No individuals or favourable breeding habitats were found on site. Communication with a number of farmers in the area did not identify any local knowledge of the species occurring there. It was therefore assessed that there was a low probability of it occurring on site.</p> <p>There are no reptile species of conservation concern that have a distribution that includes the study area.</p> <p>There are therefore no threatened, near threatened or protected species of potential concern that are likely to occur on site.</p>		<p>will not move off site on its own) to the ECO who will organise for their relocation.</p>	
<p>Impact on avifauna</p> <p>The bird species within the study area comprises a rich Nama-Karoo assemblage which reflects the major habitat types within the De Aar region. A total of 134 species have been recorded from the first and second South African Bird Atlas Projects within a 25 km radius of the study area. Of the 134 species, nine are red-list species, 42 endemics or near endemics and three red-listed endemics (Black Harrier, Ludwig's Bustard and Blue Crane).</p> <p>The primary proposed avifaunal impacts would arise from:</p> <p>(a) disturbance caused by vehicular and people traffic during construction,</p> <p>(b) displacement caused from habitat loss and disturbance during the construction phase and from maintenance activities, and</p> <p>(c) risk of collision with powerlines associated with the PV facility and behavioural displacement (alteration of flight</p>	<p>Medium (negative)</p>	<ul style="list-style-type: none"> Restricting the construction footprint to a bare minimum. Reducing and maintaining noise disturbance to a minimum. Minimising the length of any new powerlines installed, and ensuring that all new lines are marked with bird flight diverters along their entire length. It is imperative that all new powerline infrastructure is adequately insulated and bird friendly when configured. Carefully monitoring the local avifauna pre- and post-construction, and implementing appropriate additional mitigation as and when significant changes are recorded in the number, distribution or breeding behaviour of any of the priority species listed in this report, or when collision or electrocution mortalities are recorded for any of the priority species listed in this 	<p>Low-medium (negative)</p>

<p>paths) during the operational phase.</p> <p>Cumulative avifauna It is important that the results of pre-construction monitoring (see Annexure D) are applied to project-specific impact mitigation in a way that allows for the potential cumulative effects on the local/regional avifauna of any other solar and/or wind energy projects proposed in the region. Additional PV development projects are planned in and around De Aar, which when viewed in isolation, may pose a limited threat to the avifauna of the area. However, in combination with the development of a number of renewable energy facilities in the region the formation of significant barriers to birds either in the form of displacement from foraging areas or reducing energy-efficient travel between resource areas.</p>		<p>report (please see the LEMP included in Annexure F).</p> <ul style="list-style-type: none"> • Construction should not take place during the breeding seasons of the resident avifaunal community and in particular for priority species (see Appendix 3 of the Avifaunal Impact Assessment included in Annexure D). 	
<p>Surface water runoff, including sedimentation and erosion</p> <p>A large area will be cleared during the construction phase which might result in an increase in surface water runoff, erosion and an increase in sedimentation.</p> <p>Cumulative impacts Impact on water quality, specifically an increase in total dissolved solids as a result of increased sediment load being deposited in the surface water resourced.</p>	<p>Low (negative)</p>	<ul style="list-style-type: none"> • Service roads must be properly maintained to avoid erosion impacts. • A comprehensive storm-water management plan must be compiled for the solar array. This must indicate how water velocities will be reduced before storm water is allowed to enter natural channels and how natural processes for water infiltration of the affected landscape will be accommodated. • The entire site shall not be cleared at one time, but shall be cleared as required. • Rehabilitation of completed sections with appropriate local indigenous vegetation shall start immediately and bare soil shall be covered by straw as protection against wind while vegetation re-establishes (or as required by the rehabilitation specialist). • The top 300 mm of the soil layer shall be stockpiled for rehabilitation purposes. • Soil remaining after construction and rehabilitation activities has been completed, shall be dispersed evenly, as a very thin layer of soil. • Identify stockpile areas for construction materials and 	<p>Very low (negative)</p>

		<p>excavated material outside any drainage lines.</p> <ul style="list-style-type: none"> • Dispose of waste excavated material at appropriate waste disposal sites. • Ensure that substances that pose a risk of water contamination are appropriately stored and disposed of. • Contaminated runoff from the construction site should be prevented from entering freshwater systems. • Construction workers should be provided with ablution facilities at the construction site which are located away from freshwater systems and are regularly services. • Where construction activities occur within drainage channel, the disturbance to the ecosystems must be limited and flow within the drainage channel should not be impeded. • Identify sensitive areas prior to construction in order to implement the necessary precautions. • All erosion control mechanisms need to be regularly maintained. • The Contractor shall, as an on-going exercise, implement erosion and sedimentation control measures to the satisfaction of the ECO and Engineer. • Any erosion channels developed during the construction period shall be restored to a proper condition. • Stabilisation of cleared areas to prevent and control erosion and/or sedimentation shall be actively managed. The method of stabilisation shall be determined in consultation with the ECO. • Water must be re-used, recycled or treated where possible. • Promote a water saving mind set with construction workers. • Where pollution of a water body may potentially occur, the contractor shall ensure adequate measures (e.g. containment, drainage diversion systems, attenuation, settlement dams, oil 	
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		<p>absorbent products) are in place to prevent pollution.</p> <ul style="list-style-type: none"> • Any spillages of pollutants, irrespective of size, shall be contained and cleaned immediately. • Areas where cement is mixed and containers washed shall be confined to a minimum sized area, which is bunded, so that contaminated runoff is contained. <u>The ECO and Engineer need to develop a system to contain and treat cement contaminated water.</u> • Vehicles and equipment shall be serviced regularly to avoid contamination of soil and water from oil and or hydraulic fluid leaks. • Servicing must be done in dedicated service areas on site or else off site if no such area exists. • Oil changes must take place on a concrete platform and over a drip tray to avoid pollution. • The Contractor shall ensure that drinking water is available for all staff on site. 	
<p>Impact on freshwater ecosystems The site falls within the catchment of the Brak River, which is a seasonal tributary of the Orange River system. The river flows along the northern boundary of the study area with a number of small ephemeral tributaries and associated wetland areas. Two ephemeral streams are located within the boundary of the site. According to the Habitat Integrity Assessment, these ephemeral streams are largely natural (B category) and are considered to be of low Ecological Importance and Sensitivity.</p> <p>The following impacts are likely to be associated with the proposed development: (a) disturbance of freshwater related habitats during the construction phase, (b) disturbance of freshwater related habitats and possibly impedance / diversion of flow at river crossings, and (c) disturbance of freshwater related habitats through regular access of the site.</p> <p>Cumulative impacts</p>	<p style="text-align: center;">Low (negative)</p>	<ul style="list-style-type: none"> • Construction activities should be as far as possible limited to the delineated site and access routes. • If possible, place infrastructure a minimum of 50 m from watercourses. • Minimise the extent and duration of construction activities in the river systems and should occur within the low flow season. • There should be minimal use of machinery within the river channels and riparian areas. • Rehabilitate disturbed stream bed and banks and re-vegetation with suitable indigenous vegetation. • A buffer of 30 m should be maintained adjacent to the identified rivers and streams and 75 m for the wetland areas (see Annexure D for the Aquatic Impact Assessment). • Contaminated runoff from the construction site(s) should be 	<p style="text-align: center;">Very low (negative)</p>

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<p>Should all three PV facilities be approved, it is anticipated that they would be constructed simultaneously. Most of the proposed activities are outside of the identified freshwater features and provided that construction and operation activities remain within allocated areas and any disturbed areas within the freshwater features are rehabilitated, the overall impact should be limited and of low significance.</p>		<p>prevented from entering the rivers.</p> <ul style="list-style-type: none"> • Construction workers should be provided with ablution facilities at the construction site which are located at least 100 m away from the river systems and are regularly serviced. • Where transmission lines need to be constructed over/through drainage channels, disturbance should be limited and flow within the drainage channel should not be impeded. • Where access roads need to be constructed through ephemeral streams, disturbance should be limited. All crossings over drainage channels should be such that the flow should not be impeded. 	
<p>Impact on archaeological, cultural and historic sites Most archaeology found at Annex Du Plessis Dam farm is of little consequence and the one main area of concern is located outside of either of the alternatives (see section 6 and Annexure D).</p>	<p style="text-align: center;">Low (negative)</p>	<ul style="list-style-type: none"> • Precautions shall be taken to prevent the removal or damage of any archaeological and/or palaeontological material discovered during constructing. • All roads and power line footings must avoid the sensitive areas identified in the Heritage Impact Assessment (see Annexure D) as well as any other dolerite ridges in the vicinity since they are most likely to house heritage. • All workmen and equipment must operate within the footprint area to be developed so as to avoid any unnecessary disturbance of heritage resources. • The development should avoid the undulating and higher lying land in the western part of the study area. • The area around the historical farm werf (see GPS co-ordinates in Table 15 of the Heritage Impact Assessment included in Annexure D) should be cordoned off, protected from all harm and treated as an outright no-go area. • The ECO must be informed if archaeological resources are found on the surface or exposed by fresh excavations during construction activities. 	<p style="text-align: center;">Low (negative)</p>

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		<ul style="list-style-type: none"> • Should substantial fossil remains be discovered during construction, these should be safeguarded (preferably in situ) and the ECO should alert SAHRA so that appropriate mitigation (e.g. recording, sampling or collection) can be taken by a professional palaeontologist. • No-Go areas must be demarcated and all site personal must be informed thereof. 	
<p>Impact on palaeontological significant geological units The study area is largely underlain by mudrocks and sandstones of the upper Ecca Group that are intruded by Jurassic dolerites in the southwest. There is also an isolated kimberlite pipe close to the R48, but as usual this does not have an obvious surface expression.</p> <p>Where soils are comparatively thin, as in the south-eastern corner of the property, dark Ecca mudrocks with thin-bedded, pale sandstones and occasional ferruginous limestone concretions are observed.</p> <p>Cumulative impacts Given the low overall palaeontological sensitivity of the region around De Aar, and the widespread occurrence elsewhere in the Great Karoo of the fossils so far recorded there, the successive or concurrent development of all three PV sites near De Aar that have been proposed by Mulilo Renewable Energy (Pty) Ltd does not pose a significant cumulative impact on local fossil heritage (see Section 6 and Annexure D).</p>	<p>Low (negative)</p>	<ul style="list-style-type: none"> • The ECO responsible for the developments should be alerted to the possibility of fossil remains being found on the surface or exposed by fresh excavations during construction. • Should substantial fossil remains (e.g. vertebrate bones and teeth, large blocks of petrified wood) be discovered during construction, these should be safeguarded (preferably in situ) and the ECO should alert SAHRA so that appropriate mitigation (e.g. recording, sampling or collection) can be taken by a professional palaeontologist. 	<p>Low (negative)</p>
<p>Impact on agricultural land The proposed development's primary impact on agricultural activities will involve the construction of the solar fields and associated infrastructure. This will entail the clearing of vegetation and levelling of the site. This will effectively eliminate the impacted land's agricultural potential in terms of crop production and grazing for as long the development persists. The construction of the solar field will only influence a portion</p>	<p>Very low (negative)</p>	<ul style="list-style-type: none"> • Clearing activities should be kept to a minimum. • If heavy rains are expected activities should be put on hold to reduce the risk of erosion. • If additional earthworks are required, any steep or large embankments that are expected to be exposed during the 'rainy' months should either be armoured with fascine like structures. 	<p>Very low (negative)</p>

<p>of each of the farms total areas. The remaining land will continue to function as they did prior to the development.</p> <p>Cumulative impacts A number of solar and renewable energy projects have been proposed in the De Aar area and thus, the cumulative impact of these developments, on surrounding farms could become detrimental to local agricultural resources, if the loss of usable grazing land is not taken into account when determining optimum herd size.</p> <p>Three new 132 kV transmission lines will be constructed in order to connect the new solar PV facilities to the Eskom grid. According to spatial Land Use data and in-field verification these routes are dominated by unimproved grazing land. Owing to this the crossing of agricultural land by these power lines will have a very limited impact on agricultural production as grazing can still take place under the power lines.</p>		<ul style="list-style-type: none"> • If earth works are required then storm water control and wind screening should be undertaken to prevent soil loss from the site. 	
<p>Impact on municipal services Additional potable water would be required for domestic purposes (ablution and drinking) during the construction phase. Water will be sourced from the municipality, who have verbally confirmed that there is sufficient water available to meet these requirements (formal letters of confirmation <u>from the Emthanjeni Municipality</u> are currently outstanding). <u>Please refer to Annexure H for the correspondence between Mulilo and Emthanjeni Municipality regarding the provision of water.</u></p> <p>During the construction phase the effluent generation mainly from toilet use would increase.</p>	<p>Low (negative)</p>	<ul style="list-style-type: none"> • Ensure that agreements with the Emthanjeni Municipality are in place. 	<p>Very low (negative)</p>
<p>Visual impact The proposed facility would be constructed over a period of <u>12</u> & to 30 months during which time the land would be cleared of vegetation, the site roads would be upgraded and new site roads constructed where required, and foundations for the PV panels other infrastructure would be excavated followed by the installation of the panels. The site, laydown area(s), and construction plant</p>	<p>Medium (negative)</p>	<ul style="list-style-type: none"> • Minimise the construction period, where possible. • Clearing of vegetation must be kept to a minimum in order to preserve as much of the typical local landscape character as possible. • The first 50 – 100 mm of topsoil should be retained and used for rehabilitation of disturbed areas. 	<p>Medium (negative)</p>

<p>would be most visible within a 5 km radius of the site.</p> <p>The character of the landscape is described as rural and agricultural and the views are long. The potential exists that the proposed PV facility and associated infrastructure would be visible from many kilometres away. Furthermore, the proposed development will be a permanent change in the local landscape.</p> <p>The site does not have a strong or identifiable sense of place. It is noted that the local landscapes are extensive enough to provide a setting for these developments.</p>		<ul style="list-style-type: none"> • Use surplus material where possible in construction or on site (e.g. in grading gravel roads). If there are no uses for the surplus material, then it should spread evenly over the site. • Where site offices are required, limit these to single storey and use temporary screen fencing to screen offices from the wider landscape. • Ensure prompt re-vegetation of disturbed areas. • Buildings should as far as possible, be clad and roofed in materials that will blend in with the local landscape. • All PV panels must be treated with an antireflective coating to reduce the glare and reflectiveness of the panels. • Careful consideration should be given to the visual implications of the siting of the construction camp. • Site offices, if required, should be limited to single storey and they should be sited carefully using temporary screen fencing to screen from the wider landscape. • The construction camp shall be kept neat and clean at all times. • Site equipment and materials will be kept away from property entrances. • The contractor shall select materials for site infrastructure that limit reflection and blend in with the environment where possible. 	
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Indirect impacts			
<p>Impact on the economy The establishment of the proposed PV facility would provide a number of direct, indirect and induced jobs. Direct jobs are created during manufacturing, construction and installation, operation and maintenance. During the construction phase (12 to 30 months) between a maximum of 200 and 900 individuals <u>(amounting to a total of 900 person months employment created over the construction period)</u> would be employed.</p> <p>Increased employment opportunities would allow for an improvement in social conditions for those who obtain employment. As the majority of labour would be accommodated within De Aar, an increase in spending would result in De Aar thereby stimulating the local economy. The project would also result in an increase in the revenue of the Local Municipality through increased rates and taxes. This in turn could result in an increase in municipal spending on social programmes.</p> <p>The proposed project would also result in a large amount of expenditure in South Africa, both to procure services (e.g. transportation services) and materials (e.g. road building materials).</p> <p>Cumulative impacts Several other renewable energy projects (wind farm, PV, and CSP facilities) are proposed for the De Aar area. The potential cumulative impact of these proposed projects on employment and socio-economic conditions in the local area would remain of medium (positive) significance.</p>	<p>Low (positive)</p>	<ul style="list-style-type: none"> • Obtain a list of locally available labour and skills from the municipality. • Give preference to local communities for employment opportunities. • Provide appropriate training, which would enable individuals to apply their skills to other construction and development projects in the region once construction is complete. • Base recruitment on sound labour practices and with gender equality in mind. 	<p>Medium (positive)</p>

OPERATIONAL PHASE IMPACTS

Direct impacts			
Potential Impact	Significance rating of impacts (Very-Low, Low, Medium, Medium-High, High, Very High)	Proposed Mitigation	Significance rating of impacts after mitigation (Very-Low, Low, Medium, Medium-High, High, Very High)
<p>Impact on surface and groundwater quality De Aar relies entirely on groundwater abstraction to meet the town's potable water needs.</p> <p>Water of a suitable quality would be required during the operational phase for the cleaning of solar panels to maintain the efficiency of the facility. The use of water and the selection of appropriate cleaning products need to be managed appropriately to prevent any contamination to groundwater. Water would be sourced from the municipality.</p> <p>The volume of stormwater runoff from the site may be increased due to the large area covered by the impermeable surface area of the solar panels. This may lead to erosion and subsequent sedimentation of local water resources. Furthermore, in the event that water falls directly from the solar panels onto soil (without plant cover), local scouring or erosion may occur beneath the solar panels, which could lead to the development of erosion channels.</p>	<p>Low (negative)</p>	<ul style="list-style-type: none"> • The detergent used to clean the panels should be non-abrasive, anti-beeding and organic. • The proposed site shall be inspected after high energy rain events to identify erosion channels/ runnels that might have formed and shall be rehabilitated appropriately and with immediate effect, e.g. planting of indigenous vegetation. • Stormwater management infrastructure must be maintained to mitigate both the flow and water quality impacts of stormwater runoff leaving the PV facility. 	<p>Very-low (negative)</p>
<p>Visual impacts There would be an extensive array of photovoltaic panels on the proposed development site that might have a negative visual impact.</p>	<p>Medium (negative)</p>	<ul style="list-style-type: none"> • No bright colours shall be used for the security building or fence. • Colours such as greys or dull green shall be used. • Outside lighting shall face downwards and any open bulb shall be covered. • Flattening and grading of the site shall be kept to the minimum, while maintaining the natural profile and slope as far as possible. • Once construction is completed, the site shall be suitably rehabilitated and/or landscaped with locally indigenous vegetation. 	<p>Medium (negative)</p>

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		<ul style="list-style-type: none"> • All panels should be treated with an anti-reflective layer. • Buildings should as far as possible, be clad and roofed in materials that will blend in with the local landscape. • New structures should be placed where they are least visible to the greatest numbers of people, in places where topography can offer shielding. 	
<p>Impact on flora</p> <p>During the operational phase the main impact to the flora would be the establishment of alien vegetation. Major factors contributing to invasion by alien invader plants includes inter alia high disturbance (such as clearing for construction activities) and negative grazing practices. Exotic species are often more prominent near infrastructural disturbances than further away.</p> <p>Cumulative impacts</p> <p>Cumulative impacts due to a combination of all three solar energy facilities are not considered to be significant (Hoare, 2012).</p>	Low-Medium (negative)	<ul style="list-style-type: none"> • Once construction is complete, disturbed areas shall be rehabilitated and maintained with appropriate local indigenous vegetation. • Invasive alien vegetation should be monitored on an on-going basis. • Invasive alien vegetation must be removed from the site as required. 	Low (negative)
<p>Impact on fauna and avifauna</p> <p>Operational activities would result in a negative direct impact on the avifauna of the farm. The impact may result in the displacement of priority species. There is a probable likelihood that birds would be killed should transmission lines be placed above ground and not appropriately marked.</p> <p>During the operational phase agricultural activities, outside the boundaries of the PV site, can proceed as normal as the proposed sites are relatively small in relation to the entire farm and the facility will be fenced to prevent grazing animals or any other animals from entering the facility.</p>	Medium-High (negative)	<ul style="list-style-type: none"> • Implement an avifauna monitoring programme to determine if there are any significant changes in the number, distribution or breeding behaviour of priority avifauna species (see the Operational phase EMP in Annexure F). 	Medium (negative)
<p>Social impacts in terms of employment opportunities</p> <p>The site is located in a rural area and as such the population density is very low, with</p>	Low (positive)	<ul style="list-style-type: none"> • Preference should be given to local communities for employment opportunities as far as possible. • Recruitment should be based on 	Low (positive)

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<p>neighbouring farms located great distances from each other. The De Aar area has large areas of land which are very dry and the farmers struggle to earn a living from the land. Employment opportunities in the immediate area predominately stem from farming.</p> <p>The project would generate between 6 and 24 jobs during the operational phase, which is expected to last the full period of the Power Purchase Agreement which is 20 years. Direct employment opportunities would include the jobs created during the operational phase (operation and maintenance workers and security staff).</p> <p>It is anticipated that the proposed project would contribute directly to the upliftment of the individuals and the societies in which they live. During project development, skills development and transfer would be one of the priorities and local community involvement would be enhanced.</p> <p>Indirect employment opportunities include economic opportunities for local businesses, such as restaurants, Guest Houses, and service providers.</p>		<p>sound labour practices and with gender equality in mind.</p> <ul style="list-style-type: none"> • Employees should receive the necessary training to promote skills developing. 	
<p>Impact on municipal services During the operational phase, 4 kilo litres of water are required per day for domestic purposes and washing of the panels.</p>	<p>Low (negative)</p>	<ul style="list-style-type: none"> • Ensure that agreements with the Emthanjeni Municipality are in place. 	<p>Very low (negative)</p>
<p>Impact of litter and waste pollution on the surrounding environment Maintenance work may require the replacement of defected parts which may cause pollution if not disposed of appropriately.</p>	<p>Low (negative)</p>	<ul style="list-style-type: none"> • All waste material and litter shall be removed from site once maintenance work is finished. • An appropriate number of waste bins shall be provided and cleaned at least once a week. • Waste will be taken to a licensed landfill site. 	<p>Very low (negative)</p>

Indirect impacts			
<p>Impact on energy production</p> <p>Historical trends in electricity demand in South Africa have shown a consistent increase in demand. There have been some years where the demand levels off or decreases, but over the long term there has been an increasing trend on electricity demand. Such a decrease in electricity demand was seen in 2009 during the global recession, however, the electricity demand has since resumed. As a result, the reserve margin remains low and the supply capacity is still limited. This situation that is expected to continue until new base load capacity can be brought online from 2012 onwards. The reserve margin will again be constrained after 2018 should no new base load power stations be constructed. The proposed PV solar energy facility would be able to provide power to assist in meeting the energy demand within South Africa.</p> <p>Cumulative impacts</p> <p>A number of other renewable energy projects are proposed for the area. The potential cumulative impact of these proposed projects on South Africa's energy production would remain of low (positive) significance.</p>	<p>Low (positive)</p>	<ul style="list-style-type: none"> • No mitigation measures are recommended. 	<p>Low (positive)</p>
<p>Increased risk of flooding and the impact that flooding may have on the PV facility</p> <p>The site that has been identified for the proposed PV facility is relatively flat. While this may be beneficial from a site layout perspective, it does create an increased risk of flooding. In the past two years, De Aar has experienced severe flooding with devastating effects twice.</p> <p>Although De Aar and the surrounding area have a low mean annual precipitation of 303 mm, intermittent flooding is a problem in the area. In the past two years, De Aar has twice experienced severe flooding with devastating effects.</p> <p>Based on an inspection of the contours and site visit, it was concluded that there is not an obvious watercourse that runs through</p>	<p>Low (negative)</p>	<ul style="list-style-type: none"> • Watercourse crossings shall not impede or divert the flow of water. • The proposed site shall be inspected after high energy rain events to identify erosion channels/ runnels that might have formed and shall be rehabilitated appropriately and with immediate effect, e.g. planting of perennial vegetation suitable for grazing. 	<p>Low (negative)</p>

<p>the site that warrants a floodline inspection.</p> <p>Cumulative impacts No cumulative impacts on the flood hydrology are anticipated.</p>			
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DECOMMISSIONING PHASE IMPACTS

The decommissioning phase will entail the following:
 After the 20 year agreement with Eskom has ended, the facility will be decommissioned. Panels will be disconnected from the grid connection and the panels will be removed from the support structures. After the panels have been disassembled, the structures will be dismantled. The foundations will be removed and the transformer and distributions centres will be removed by an authorised company.

After disconnecting the machinery and removing the inverters, panels and other equipment, the inverter buildings will be demolished. The rubble will be transported to a licensed landfill site.

After all of the rubble has been removed the land should be rehabilitated to its original substratum characteristics (or as near as possible).

Direct impacts			
Potential Impact	Significance (no mitigation)	Mitigation measures	Significance (with mitigation)
<p>Impact of vehicles on local traffic conditions</p> <p>The PV site would be decommissioned at the end of the Power Purchase Agreement (20 years from the date of commissioning). The decommissioning is expected to take between 6 to 12 months during which vehicles will be required to remove the panels and other waste products.</p>	<p>Low (negative)</p>	<ul style="list-style-type: none"> • Ensure that road junctions have good sightlines. • Transport the materials in the least amount of trips as possible. • Adhere to the speed limit. • Implement traffic control measures where necessary. • Transport components overnight as far as possible. 	<p>Very low (negative)</p>
<p>Impact of dust and noise on the surrounding environment</p> <p>An increase in noise pollution would be expected from machinery and vehicles during the decommissioning period, as well as due to the increased traffic.</p> <p>The removal of the structures would most likely exacerbate dust, especially in the dry and hot summer months. The dust impact would be managed through the EMP, which would include procedures for dealing with</p>	<p>Very-low (negative)</p>	<ul style="list-style-type: none"> • Equipment shall be fitted with requisite silencers and directional settings. • Decommissioning activities shall be restricted to normal working hours (between 08h00 and 17h00) during week days and Saturdays. In instances where work outside of these hours is required, appropriate notices shall be placed at the site entrance. • Disturbed areas resulting from the removal of the solar panels shall be 	<p>Very low (negative)</p>

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dust pollution events.		rehabilitated appropriately with vegetation suitable for grazing.	
<p>Impact on visual aesthetics and sense of place</p> <p>The removal of the solar panels may have a positive impact on the sense of place experienced by surrounding landowners, as well as by-passers. However, should the site not be rehabilitated appropriately, the view experienced by landowners, visitors and by passers would be negatively impacted.</p>	Neutral	<ul style="list-style-type: none"> Disturbed areas resulting from the removal of the solar panels shall be rehabilitated appropriately with vegetation suitable for grazing. The disturbance site shall be limited to the actual area required to remove the solar panels. Areas outside the removal footprint shall be treated as “No-go” areas. All material, machinery and waste must be removed from the site once the decommissioning phase has been completed. 	Neutral
<p>Impact on flora, fauna, and avifauna</p> <p>The decommissioning of the site will have a positive impact on the flora, fauna and avifauna as the site will be rehabilitated to a near natural state.</p>	Very low (positive)	<ul style="list-style-type: none"> Disturbed areas resulting from the removal of the solar panels shall be rehabilitated appropriately with vegetation suitable for grazing. The disturbance site shall be limited to the actual area required to remove the solar panels. Areas outside the removal footprint shall be treated as “No-go” areas. The fences will be removed to ensure that the animals can move freely into the site. Soils shall not be compacted during the removal of facility infrastructure. All waste shall be removed from the site and disposed of recycled in an appropriate manner. 	Low (positive)
<p>Loss of employment opportunities</p> <p>The decommissioning of the facility will result in the loss of employment opportunities. However, during the 20 operational years, the employees would have had an opportunity to acquire new skills, attend training sessions and will have a reference to assist them in securing a new job opportunity.</p>	Low (negative)	<ul style="list-style-type: none"> Provide employees with a reference letter to assist them with securing alternative employment. 	Low (negative)
<p>Impact of litter and waste on the surrounding environment</p> <p>The decommissioning phase will consist of various activities that generate waste. These wastes must be removed from the site and disposed in a legal and responsible manner</p>	Low (negative)	<ul style="list-style-type: none"> All waste shall be removed from the site and disposed of in an appropriate manner. The module components would be removed and recycled as the silicon and aluminium could be re-used in the production of new modules. 	Very low (negative)

in order to prevent environmental degradation.			
Indirect impacts			
Impact on energy production The discontinuing of energy production might have an impact on the energy security of South Africa. Seeing that this facility would be able to generate 19.9 MW of electricity the significance of the impact is not expected to be high.	Very low (negative)	No mitigation measures proposed.	Very low (negative)

3. 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.

IMPACT SUMMARY TABLE

High negative	Red
Medium – High negative	Grey
Medium negative	Orange
Low – Medium negative	Purple
Low negative	Blue
Very Low – Low negative	Turquoise
Very Low negative	Green
Positive impact	Yellow
Neutral	Pink

<i>Construction Phase: Direct Impacts</i>	<i>Significance of Impact</i>	
	<i>No Mitigation</i>	<i>With mitigation</i>
Litter, waste pollution and disposal	Medium (negative)	Very low (negative)
Storage and utilisation of hazardous substances on site	Low (negative)	Very low (negative)
Impact of dust on air quality	Low (negative)	Very low (negative)
Impact of noise during construction	Very low (negative)	Very low (negative)
Impact of increased vehicular traffic and heavy load transport	Low (negative)	Very low (negative)
Social impacts in terms of employment opportunities and the influx of workers	Medium (positive)	Medium (positive)

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Impact on flora	Medium to Low (negative)	Low (negative)
Impact on fauna	Medium to Low (negative)	Low (negative)
Impact on avifauna	Medium- High (negative)	Medium (negative)
Surface water runoff, including sedimentation and erosion	Low (negative)	Very low (negative)
Impact on freshwater ecosystems	Medium to Low (negative)	Low (negative)
Impact on archaeological, cultural and historic sites	Very low (negative)	Very low (negative)
Impact on palaeontological significant geological units	Low (negative)	Low (negative)
Impact on agricultural land	Very low (negative)	Very low (negative)
Impact on municipal services	Low (negative)	Very low (negative)
Visual impact	Medium (negative)	Medium (negative)
<i>Construction Phase: Indirect Impacts</i>		
Impact on the economy	Low (positive)	Medium (positive)
<i>Operational Phase: Direct Impacts</i>		
Impact on surface and groundwater quality	Low (negative)	Low (negative)
Visual impacts	Medium (negative)	Medium (negative)
Impact on flora	Low-Medium (negative)	Low (negative)
Impact on fauna and avifauna	Medium (negative)	Medium to Low (negative)
Social impacts in terms of employment opportunities	Low (positive)	Low (positive)
Impact on municipal services	Low (negative)	Very low (negative)
Impact of litter and waste pollution on the surrounding environment	Low (negative)	Very low (negative)
<i>Operational Phase: Indirect Impacts</i>		
Impact on energy production	Low (positive)	Low (positive)
Increased risk of flooding and the impact that flooding may have on the PV facility	Low (negative)	Low (negative)
<i>Decommissioning Phase: Direct Impacts</i>		

Impact of vehicles on local traffic conditions	Low (negative)	Very low (negative)
Impact of dust and noise on the surrounding environment	Low (negative)	Very low (negative)
Impact on visual aesthetics and sense of place	Neutral	Neutral
Impact on flora, fauna, and avifauna	Very low (positive)	Low (positive)
Loss of employment opportunities	Low (negative)	Low (negative)
Impact of litter and waste on the surrounding environment	Low (negative)	Very low (negative)
<i>Decommissioning Phase: Direct Impacts</i>		
Impact on energy production	Very low (negative)	Very low (negative)

Construction Phase:

It is most likely that all identified construction related impacts would be limited to the duration of this phase. A summary of all the potential impacts from the proposed project assessed above is included in the Impact Summary Table. While some difference in magnitude of the potential impacts would result from the proposed alternatives this difference was not considered to be significant for most of the potential impacts. Impact on freshwater ecosystems was rated as medium to low (negative), but this can be reduced to low (negative) significance through mitigation measures. The impact of job creation on the local community was identified as having a medium (positive) significance rating. The visual and avifaunal impacts were both deemed to have a medium (negative) significance rating without and with mitigation measures.

Operational Phase:

Potential operational phase related impacts were generally considered to be of Low to Very Low (negative) significance.

Positive impacts with significance ratings of Low (positive) include:

- Social impacts in terms of employment opportunities; and
- Impact on energy production

These impacts are expected to occur for the full duration of the solar energy facility's operational phase, with some negative impacts experiencing a reduction in their significance rating based on the implementation of the proposed mitigation measures. The visual impact was deemed to have a medium (negative) significance rating without and with mitigation measures.

Decommissioning Phase:

Significance ratings for potential impacts, that are likely to occur during the decommissioning and closure phase are overall considered to be Low to Very Low (negative) and relates directly to the physical removal of the solar panels. The impact on visual aesthetics and sense of place are rated as having a neutral significance.

Alternative A (preferred alternative)


No-go alternative (compulsory)

The “No-go” alternative implies that no development will take place on the proposed site, i.e. no solar energy facility. It would thus not be possible to generate the proposed 19.9 MW renewable energy that could feed into the national grid and assist Eskom in achieving their 2013 goal for renewable energy.

In terms of land use, the landowner would most likely continue to use the site for grazing production.

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
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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):

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:

The proposed mitigation measures listed below are recommended to manage the identified impacts associated with the proposed photovoltaic facility during the Construction Phase:

- Responsible waste disposal practices will be the responsibility of the EPC contractor.
- *Provide adequate waste bins.*
- *Set up system for regular waste removal to an approved facility.*
- *Minimise waste by sorting wastes into recyclable and non-recyclable wastes (an independent contractor can be appointed to conduct this recycling).*
- *No waste may be buried or burned under any circumstances.*
- *An approved waste disposal contractor must be employed to remove and recycle waste oil, if practical.*
- *A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the construction site.*
- *Littering by the employees shall not be allowed under any circumstances.*
- *The ECO shall monitor the neatness of the work sites as well as the Contractor campsite.*
- *Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly to prevent vermin and odours.*
- *A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant.*
- *Hazardous wastes e.g. mixed cement shall only be disposed at landfill sites registered for hazardous wastes.*
- *All hazardous waste materials must be carefully stored as advised by the ECO, and then disposed of at a licensed landfill site.*
- *All necessary precaution measures shall be taken to prevent soil or surface water pollution from hazardous materials used during construction.*
- *No hazardous waste may be buried or burned under any circumstances.*
- *The Material Safety Data Sheet (MSDS) for any hazardous materials must be kept on site at all times.*
- *The contractor must ensure that the employees are informed on how to responsibly dispose of any containers containing hazardous substances.*
- *All major spills of any materials, chemicals, fuels or other potentially hazardous or pollutant substances must be cleaned immediately and the cause of the spill investigated.*
- *Preventative measures must be identified and submitted to the ECO.*
- *Educate employees regarding specification requirements of the materials they handle.*
- *Secure materials during transport.*
- *Identify appropriate storage areas for stockpiling of materials, storage of hydrocarbons and storage of hazardous substances and ensure that these areas are appropriately prepared for their purpose.*

- *Storage of materials must take into consideration the prevailing wind directions to reduce windblown dust.*
- *Prevent and limit spillage of hazardous substances or substances with the potential to cause contamination of the environment.*
- *Develop emergency protocols for dealing with spillages particularly where these pose a pollution risk or involve hazardous substances.*
- *All oil changes must take place within a designated area on an impervious surface such as a concrete slab.*
- *Containers that contained toxic or harmful materials shall not be rinsed and re-used.*
- *Contaminated runoff from the construction site should be prevented from entering freshwater systems.*
- *Such containers shall not be stored or disposed on site. These containers shall be destroyed to prevent re-use and disposed in accordance with the manufacturer's instructions at a permitted waste disposal facility.*
- *Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals, and any hazardous materials to be used must be provided to prevent the soil and groundwater contamination.*
- *Hazardous materials (such as oils, paints, grease, fuels, and chemicals) should be stored in designated areas which are bunded. Wall of the bunded area shall be of earth or concrete, and shall be designed to be liquid tight and to withstand a full hydrostatic head of water. The volumetric capacity of the bunded area will be a minimum of 110% of the volume of the largest tank. Should more than one tank be enclosed in the bunded area, then the capacity should be calculated on the volume of all the tanks stored within the bunded area.*
- *All fuel storage area must be roofed to avoid creation of dirty stormwater.*
- *Storage areas containing hazardous substances / materials must be clearly signposted.*
- *The concrete batching plant must be contained within a bunded area.*
- *Concrete mixing must only take place within designated areas.*
- *Ready mixed concrete must be utilised where possible.*
- *No stockpiling shall occur outside of the working area or within drainage channels.*
- *Piles of topsoil must be sprayed with water in order to prevent dust creation.*
- *Minimization of the areas disturbed at any one time.*
- *Protection of exposed soil against wind erosion by covering it with straw.*
- *Equipment shall be fitted with requisite silencers and directional settings.*
- *Construction activities shall be restricted to normal working hours (between 08h00 and 17h00) during week days and Saturdays. In instances where work outside of these hours is required, appropriate notices shall be placed at the site entrance.*
- *On-going vehicle maintenance will be done as required to prevent broken exhaust pipes from generating additional noise pollution.*
- *Ensure that road junctions have good sightlines.*
- *Transport the materials in the least amount of trips as possible.*
- *Transport components overnight as far as possible.*
- *Ensure that all drivers are aware of the "No-Go" areas, permissible roads, and where the offloading area is.*
- *Impose speed limits on the construction site.*
- *Manage site access to prevent congestion of vehicles and trucks.*
- *Access of all construction and material delivery vehicles should be strictly controlled, especially during wet weather to avoid compaction and damage to the topsoil structure.*
- *Roads not to be used shall be marked with a "NO ENTRY for construction vehicles" sign.*
- *Access roads are to be kept litter free.*
- *Transportation of materials must be done by the least amount of trips to prevent the construction vehicles*

from congesting the main roads leading to De Aar.

- *The contractor must ensure that there is ample space to off load the materials to prevent truck being delayed and interrupting the traffic flow.*
- *Provide appropriate training, which would enable individuals to apply their skills to other construction and development projects in the region once construction is complete.*
- *Base recruitment on sound labour practices and with gender equality in mind.*
- *Create a local Community Trust which has an equity share in the project life to benefit historically disadvantaged communities.*
- *Prevent unauthorised individuals from entering the construction site.*
- *Health, safety and skills training including HIV/AIDS awareness programme must be compulsory for all construction workers.*
- *Implement a policy of “no employment at the gate”.*
- *Maximise local employment thereby limiting influx of construction workers to De Aar.*
- *The construction impacts must be contained to the footprint of the proposed facility.*
- *Areas outside the construction footprint should be fenced and access to these areas should be limited as much as possible.*
- *Where disturbance is unavoidable, disturbed areas should be rehabilitated as quickly as possible.*
- *Any alien plants within the facility must be immediately controlled to avoid establishment of a soil seed bank. Control measures must follow established norms and legal limitations in terms of the method to be used and the chemical substances used.*
- *Invasive alien vegetation that currently existing within the immediate area of the construction activities should be removed.*
- *An on-going monitoring programme should be implemented to detect and quantify any aliens that may become established and provide information for the management of aliens.*
- *The construction site must be demarcated and all construction employees must be informed that they may not go outside of the site boundaries.*
- *Any alien plants within the control zone of the facility must be immediately controlled to avoid establishment of a soil seed bank. Control measures must follow established norms and legal limitations in terms of the method to be used and the chemical substances used.*
- *Catching of wild animals (including reptiles, amphibians, birds and invertebrates, etc.) by any means, including setting of snares, poisoning, shooting and trapping is illegal and this should not be allowed.*
- *The contractor is to report any problem animals (e.g. a snake that will not move off site on its own) to the ECO who will organise for their relocation.*
- *Implement a bird monitoring programme (details of which are included in the Specialist Report in Annexure D).*
- *Reducing and maintaining noise disturbance to a minimum.*
- *Construction should not take place during the breeding seasons of the resident avifaunal community and in particular for priority species.*
- *Minimising the length of any new powerlines installed, and ensuring that all new lines are marked with bird flight diverters along their entire length. It is imperative that all new powerline infrastructures is adequately insulated and bird friendly when configured.*
- *Carefully monitoring the local avifauna pre- and post-construction, and implementing appropriate additional mitigation as and when significant changes are recorded in the number, distribution or breeding behaviour of any of the priority species listed in this report, or when collision or electrocution mortalities are recorded*

for any of the priority species listed in this report.

- *Service roads must be properly maintained to avoid erosion impacts.*
- *A comprehensive storm-water management plan must be compiled for the solar array. This must indicate how water velocities will be reduced before storm water is allowed to enter natural channels and how natural processes for water infiltration of the affected landscape will be accommodated.*
- *The entire site shall not be cleared at one time, but shall be cleared as required.*
- *Rehabilitation of completed sections with appropriate local indigenous vegetation shall start immediately and bare soil shall be covered by straw as protection against wind while vegetation re-establishes (or as required by the rehabilitation specialist).*
- *The top 300 mm of the soil layer shall be stockpiled for rehabilitation purposes.*
- *Soil remaining after construction and rehabilitation activities has been completed, shall be dispersed evenly, as a very thin layer of soil.*
- *Identify stockpile areas for construction materials and excavated material outside any drainage lines.*
- *Dispose of waste excavated material at appropriate waste disposal sites.*
- *Ensure that substances that pose a risk of water contamination are appropriately stored and disposed of.*
- *Contaminated runoff from the construction site should be prevented from entering freshwater systems.*
- *Where construction activities occur within drainage channel, the disturbance to the ecosystems must be limited and flow within the drainage channel should not be impeded.*
- *Identify sensitive areas prior to construction in order to implement the necessary precautions.*
- *All erosion control mechanisms need to be regularly maintained.*
- *The Contractor shall, as an on-going exercise, implement erosion and sedimentation control measures to the satisfaction of the ECO and Engineer.*
- *Any erosion channels developed during the construction period shall be restored to a proper condition.*
- *Stabilisation of cleared areas to prevent and control erosion and/or sedimentation shall be actively managed. The method of stabilisation shall be determined in consultation with the ECO.*
- *Water must be re-used, recycled or treated where possible.*
- *Promote a water saving mind set with construction workers.*
- *Where pollution of a water body may potentially occur, the contractor shall ensure adequate measures (e.g. containment, drainage diversion systems, attenuation, settlement dams, and oil absorbent products) are in place to prevent pollution.*
- *Any spillages of pollutants, irrespective of size, shall be contained and cleaned immediately.*
- *Servicing must be done in dedicated service areas on site or else off site if no such area exists.*
- *Oil changes must take place on a concrete platform and over a drip tray to avoid pollution.*
- *The Contractor shall ensure that drinking water is available for all staff on site.*
- *Construction activities should be as far as possible limited to the delineated site and access routes.*
- *If possible, place infrastructure a minimum of 50 m from watercourses.*
- *Minimise the extent and duration of construction activities in the river systems and should occur within the low flow season.*
- *There should be minimal use of machinery within the river channels and riparian areas.*
- *Rehabilitate disturbed stream bed and banks and re-vegetation with suitable indigenous vegetation.*
- *A buffer of 30 m should be maintained adjacent to the identified rivers and streams and 75 m for the wetland areas (see Annexure D for the Aquatic Impact Assessment).*

- *Contaminated runoff from the construction site(s) should be prevented from entering the rivers.*
- *Construction workers should be provided with ablution facilities at the construction site which are located at least 100 m away from the river systems and are regularly serviced.*
- *Where transmission lines need to be constructed over/through drainage channels, disturbance should be limited and flow within the drainage channel should not be impeded.*
- *Where access roads need to be constructed through ephemeral streams, disturbance should be limited. All crossings over drainage channels should be such that the flow should not be impeded.*
- *Precautions shall be taken to prevent the removal or damage of any archaeological and/or palaeontological material discovered during constructing.*
- *All roads and power line footings must avoid the sensitive areas identified in the Heritage Impact Assessment (see Annexure D) as well as any other dolerite ridges in the vicinity since they are most likely to house heritage.*
- *All workmen and equipment must operate within the footprint area to be developed so as to avoid any unnecessary disturbance of heritage resources.*
- *The development should avoid the undulating and higher lying land in the western part of the study area.*
- *The area around the historical farm werf (see GPS co-ordinates in Table 15 of the Heritage Impact Assessment included in Annexure D) should be cordoned off, protected from all harm and treated as an outright no-go area.*
- *Should substantial fossil remains be discovered during construction, these should be safeguarded (preferably in situ) and the ECO should alert SAHRA so that appropriate mitigation (e.g. recording, sampling or collection) can be taken by a professional palaeontologist.*
- *No-Go areas must be demarcated and all site personal must be informed thereof.*
- *If heavy rains are expected activities should be put on hold to reduce the risk of erosion.*
- *If additional earthworks are required, any steep or large embankments that are expected to be exposed during the 'rainy' months should either be armoured with fascine like structures.*
- *If earth works are required then storm water control and wind screening should be undertaken to prevent soil loss from the site.*
- *Use surplus material where possible in construction or on site (e.g. in grading gravel roads). If there are no uses for the surplus material, then it should spread evenly over the site.*
- *Where site offices are required, limit these to single storey and use temporary screen fencing to screen offices from the wider landscape.*
- *Buildings should as far as possible, be clad and roofed in materials that will blend in with the local landscape.*
- *All PV panels must be treated with an antireflective coating to reduce the glare and reflectiveness of the panels.*
- *Careful consideration should be given to the visual implications of the siting of the construction camp.*
- *Site offices, if required, should be limited to single storey and they should be sited carefully using temporary screen fencing to screen from the wider landscape.*
- *The construction camp shall be kept neat and clean at all times.*
- *Site equipment and materials will be kept away from property entrances.*
- *The contractor shall select materials for site infrastructure that limit reflection and blend in with the environment where possible.*

Indirect impacts- mitigation measures

- *Obtain a list of locally available labour and skills.*
- *Give preference to local communities for employment opportunities.*
- *Provide appropriate training, which would enable individuals to apply their skills to other construction and development projects in the region once construction is complete.*
- *Base recruitment on sound labour practices and with gender equality in mind.*

The proposed mitigation measures listed below are recommended to manage the identified impacts associated with the proposed photovoltaic facility during the Operational Phase:

- *The detergent used to clean the panels should be non-abrasive, anti-beeding, and organic.*
- *The proposed site shall be inspected after high energy rain events to identify erosion channels/ runnels that might have formed and shall be rehabilitated appropriately and with immediate effect, e.g. planting of indigenous vegetation.*
- *Stormwater management infrastructure must be maintained to mitigate both the flow and water quality impacts of stormwater runoff leaving the PV facility.*
- *No bright colours shall be used for the security building or fence. Colours such as greys or dull green shall be used.*
- *Outside lighting shall face downwards and any open bulb shall be covered.*
- *Flattening and grading of the site shall be kept to the minimum, while maintaining the natural profile and slope as far as possible.*
- *Once construction is completed, the site shall be suitably rehabilitated and/or landscaped with locally indigenous vegetation.*
- *All panels should be treated with an anti-reflective layer.*
- *Buildings should as far as possible, be clad and roofed in materials that will blend in with the local landscape.*
- *New structures should be placed where they are least visible to the greatest numbers of people, in places where topography can offer shielding.*
- *Invasive alien vegetation should be monitored on an on-going basis.*
- *Invasive alien vegetation must be removed from the site as required.*
- *The fence must be maintained and fixed as required.*
- *Preference should be given to local communities for employment opportunities as far as possible.*
- *Recruitment should be based on sound labour practices and with gender equality in mind.*
- *Employees should receive the necessary training to promote skills developing.*
- *Composition ablutions would be used to handle the additional effluent.*
- *Water wastage must be prevented*
- *All waste material and litter shall be removed from site once maintenance work is finished.*
- *An appropriate number of waste bins shall be provided and cleaned at least once a week.*
- *Waste will be taken to a licensed landfill site.*

Indirect impacts- mitigation measures


- *Watercourse crossings shall not impede or divert the flow of water.*
- *The proposed site shall be inspected after high energy rain events to identify erosion channels/ runnels that might have formed and shall be rehabilitated appropriately and with immediate effect, e.g. planting of*

perennial vegetation suitable for grazing.

The proposed mitigation measures listed below are recommended to manage the identified impacts associated with the proposed relocation of the siren from the Decommissioning Phase:

- *Ensure that road junctions have good sightlines.*
- *Transport the materials in the least amount of trips as possible.*
- *Adhere to the speed limit.*
- *Implement traffic control measures where necessary.*
- *Transport components overnight as far as possible.*
- *Equipment shall be fitted with requisite silencers and directional settings.*
- *Decommissioning activities shall be restricted to normal working hours (between 08h00 and 17h00) during week days and Saturdays. In instances where work outside of these hours is required, appropriate notices shall be placed at the site entrance.*
- *Disturbed areas resulting from the removal of the solar panels shall be rehabilitated appropriately with vegetation suitable for grazing.*
- *The disturbance site shall be limited to the actual area required to remove the solar panels. Areas outside the removal footprint shall be treated as "No-go" areas.*
- *All material, machinery and waste must be removed from the site once the decommissioning phase has been completed.*
- *Disturbed areas resulting from the removal of the solar panels shall be rehabilitated appropriately with vegetation suitable for grazing.*
- *The disturbance site shall be limited to the actual area required to remove the solar panels. Areas outside the removal footprint shall be treated as "No-go" areas.*
- *The fences will be removed to ensure that the animals can move freely into the site.*
- *Soils shall not be compacted during the removal of facility infrastructure.*
- *All waste shall be removed from the site and disposed of recycled in an appropriate manner.*
- *Provide employees with a reference letter to assist them with securing alternative employment.*
- *The module components would be removed and recycled as the silicon and aluminium could be re-used in the production of new modules.*

Is an EMPr attached?

 YES	NO
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The EMPr must be attached as Appendix F. **Please see Annexure F.**

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SECTION F: WAY FORWARD

All registered I&APs on the database were informed of the availability of the Final BAR by means of letters/ email/ fax. The FBAR has been made available to the public at the same venues as the DBAR, as well as on Aurecon's website from **23 April 2012**. The comment period on the FBAR starts on **23 April 2012** till **15 May 2012**.

The FBAR was submitted to the competent authority, namely the DEA for their consideration and review on **18 April 2012**. The DEA will review the FBAR, who must, do one of the following:

- (i) Accepting the FBAR;
- (ii) Notify the applicant that the report has been referred for specialist review;
- (iii) Request amendments to the report; or
- (iv) Reject the report if it does not materially comply with regulations.

If the report is accepted, DEA must within 45 days:

- (a) Grant authorisation in respect of all or part of the activity applied for; or
- (b) Refuse authorisation in respect of all or part of the activity.

Once DEA issues their decision on the proposed project, all registered I&APs on the project database will be notified of the outcome of the decision within 12 calendar days of the date of the decision should an Environmental Authorisation (EA) be issued. Should anyone (a member of public, registered I&AP or the Applicant) wish to appeal DEA's decision, a Notice of Intention to Appeal in terms of Chapter 7 of the EIA Regulations (GN No. 543) in terms of NEMA must be lodged with the Minister of Water and Environmental Affairs within 20 calendar days of the decision being issued and the substantive Appeal must be lodged within 30 days of the Notice.

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SECTION G: APPENDIXES

The following appendixes must be attached as appropriate:

Appendix A: Site plan(s)

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports

Appendix E: Comments and responses report

Appendix F: Construction Environmental Management Programme (CEMP_r) and Operational Environmental Management Programme (OEMP_r)

Appendix G: Public Participation Process

Appendix H: Additional Information

Appendix I: Revised Application Form