

FINAL BASIC ASSESSMENT REPORT

For the development of a photovoltaic solar facility and associated infrastructure
on a portion of Portion 24 of the farm Zoutpansfontein 34, Registration Division RD, Northern Cape



NEAS Reference: DEA/EIA/0001106/2012
DEA Reference: 14/12/16/3/3/1/505

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environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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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.
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7. No faxed or e-mailed reports will be accepted.
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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.
11. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.

PROJECT DETAILS

NEAS Reference No.	:	DEA/EIA/0001106/2012
DEA Reference No.	:	14/12/16/3/3/1/505
Project Title	:	The development of a photovoltaic solar facility and associated infrastructure on a portion of Portion 24 of the farm Zoutpansfontein 34, Registration Division RD, Northern Cape Province situated within the Sol Plaatje Local Municipality area of jurisdiction.
Authors	:	Ms. Carli Steenkamp Dr. Francois Retief
Specialists	:	Soilkraft CC (Geotechnical study) Mr. J. van Schalkwyk (Heritage Impact Assessment) Anthene Ecological CC (Ecological Fauna and Flora Habitat Survey) Dr. L.A. Sandham (Visual Impact Assessment)
Client	:	Subsolar Energy (Pty) Ltd.
Report Status	:	Final Basic Assessment Report
Submission date	:	4 July 2012

When used as a reference this report should be cited as: Environamics (2012) Final Basic Assessment Report: Proposed Photovoltaic Solar facility and associated infrastructure on a portion of Portion 24 of the farm Zoutpansfontein 34, Registration Division RD, Northern Cape Province.

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TABLE OF CONTENTS

PROJECT DETAILS.....	ii
TABLE OF CONTENTS.....	iii
LIST OF FIGURES.....	iv
LIST OF TABLES.....	iv
APPENDICES.....	iv
GLOSSARY OF TERMS AND ACRONYMS.....	v
CONTEXT FOR THE PROPOSED DEVELOPMENT.....	vi
EXECUTIVE SUMMARY.....	vii
SECTION A: ACTIVITY INFORMATION.....	1
1. Activity description.....	1
2. Feasible and reasonable alternatives.....	3
3. Activity position.....	9
4. Physical size of the activity.....	10
5. Site access.....	10
6. Site or route plan.....	10
7. Site photographs.....	11
8. Facility illustration.....	11
9. Activity motivation.....	11
10. Applicable legislation, policies and/or guidelines.....	14
11. Waste, effluent, emissions and noise management.....	15
12. Water use.....	17
13. Energy efficiency.....	18
SECTION B: SITE/ AREA/ PROPERTY DESCRIPTION.....	18
1. Gradient of the site.....	19
2. Location in landscape.....	19
3. Groundwater, soil and geological stability of the site.....	20
4. Groundcover.....	20
5. Land use character of surrounding area.....	20
6. Cultural/historical features.....	22
SECTION C: PUBLIC PARTICIPATION.....	22
1. Advertisements and notices.....	22
2. Content of advertisements and notices.....	23
3. Placement of advertisements and notices.....	24
4. Determination of appropriate measures.....	24
5. Comments and response report.....	24
6. Authority participation.....	25
7. Consultation with other stakeholders.....	26
SECTION D: IMPACT ASSESSMENT.....	27
1. Issues raised by interested and affected parties.....	27
2. Impacts that may result from the planning, design, construction, operational, decommissioning and closure phases as well as proposed management of identified impacts and proposed mitigation measures.....	27
3. Environmental Impact Statement.....	39

SECTION E: RECOMMENDATION OF THE PRACTITIONER.....	40
REFERENCES.....	42

LIST OF FIGURES

Figure 1: Solar photovoltaic electricity generation process

Figure 2: Land capability classification

LIST OF TABLES

Table 1: General site information

Table 2: General layout information

APPENDICES

APPENDIX A: SITE PLAN(S)

- Figure 1: Locality Map
- Figure 2: Regional Map
- Figure 3: Sol Plaatje SDF (2009)

APPENDIX B: PHOTOGRAPHS

APPENDIX C: FACILITY ILLUSTRATION(S)

APPENDIX D: SPECIALIST REPORTS

- Appendix D1: Geotechnical Report
- Appendix D2: Heritage Impact Assessment
- Appendix D3: Ecological Fauna and Flora Habitat Survey
- Appendix D4: Visual Impact Assessment

APPENDIX E: COMMENTS AND RESPONSE REPORT

APPENDIX F: ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

APPENDIX G: OTHER INFORMATION

- Appendix G1: Press Advertisement
- Appendix G2: Site Notice
- Appendix G3: Proof of Correspondence
- Appendix G4: Assessment methodology
- Appendix G5: Project Compliance to the Equator Principles
- Appendix G6: Title Deed
- Appendix G7: CV of EAP

GLOSSARY OF TERMS AND ACRONYMS

BA	Basic Assessment
BAR	Basic Assessment Report
DEA	Department of Environmental Affairs
DoE	Department of Energy
DWA	Department of Water Affairs
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EP	Equator Principles
EPFI	Equator Principles Financial Institutions
Environmental impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects.
GNR	Government Notice Regulation.
GWh/yr	Gigawatt hours per year
I&AP	Interested and affected party.
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
kV	Kilo Volt
Mitigate	Activities designed to compensate for unavoidable environmental damage.
MW	Megawatt
MWp	Megawatt power
NEMA	National Environmental Management Act No.
NERSA	National Energy Regulator of South Africa
NWA	National Water Act no 36 of 1998.
PPP	Public Participation Process
PV	Photovoltaic
REFIT	Renewable Energy Feed-In Tariff
SAHRA	South African Heritage Resources Act
SDF	Spatial Development Framework
Wp	Watt power

CONTEXT FOR THE PROPOSED PROJECT

According to Eskom, the demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand, fueled by increasing economic growth and social development within Southern Africa, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmental responsible development, the impacts of climate change and the need for sustainable development. The use of renewable energy technologies, as one of a mix of technologies needed to meet future energy consumption requirements is being investigated as part of Eskom's long-term strategic planning and research process.

The primary rationale for the proposed photovoltaic solar facility is to add new generation capacity from renewable energy to the national electricity mix and to aid in achieving the goal of 42% share of all new installed generating capacity being derived from renewable energy forms, as targeted by the Department of Energy (DoE) (Integrated Resource Plan 2010-2030). In terms of the Integrated Resource Plan (IRP), approximately 8.4GW of the renewable energy mix is planned to be the new installed capacity generated from solar photovoltaic (PV) technologies over the next thirty years.

To contribute towards this target and to stimulate the renewable energy industry in South Africa, the need to establish an appropriate market mechanism was identified, and Feed-in Tariffs (FIT) for renewable energy was set. FITs are, in essence, guaranteed prices for electricity supply rather than conventional consumer tariffs. The basic economic principle underpinning the FITs is the establishment of a tariff (price) that covers the cost of generation plus a "reasonable profit" to induce developers to invest. The establishment of the Renewable Energy Feed-in Tariff (REFIT) in South Africa provides the opportunity for an increased contribution towards the sustained growth of the renewable energy sector in the country, the region and internationally, and promote competitiveness for renewable energy with conventional energies in the medium- and long-term (NERSA, 2009).

In response to the above, Subsolar Energy (Pty) Ltd. is proposing the development of a photovoltaic solar facility and associated infrastructure for the purpose of commercial electricity generation on a portion of Portion 24 of the farm Zoutpansfontein 34, Northern Cape Province (refer to Appendix A, figure 1 for the locality map). From a regional site selection perspective, this region is preferred for solar energy development due to amongst other reasons its annual direct irradiation values.

EXECUTIVE SUMMARY

The Sol Plaatje Local Municipality's (SPM) Integrated Development Plan (IDP, 2011) emphasizes the development of bulk infrastructure to unlock development for economic growth and ensure job creation. Objectives of the IDP include the sustainable delivery in respect of amongst others electricity to all residents of the SPM and to initiate a process for the use of alternative/renewable energy in the municipality (SPLM IDP, 2011). In response Subsolar Energy intends to develop a 19.5MW photovoltaic solar facility and associated infrastructure on a portion of Portion 24 of the farm Zoutpansfontein 34, situated within the Sol Plaatje Local Municipality area of jurisdiction. The proposed development is located approximately 30 kilometers north of Kimberley along the N12 to Warrenton, on the turn off to Boshoff (refer to figure 1 in Appendix A). The total footprint of the project will be less than 20 hectares (including supporting infrastructure on site). The site was identified as being highly desirable due to its suitable climatic conditions, topography (i.e. in terms of slope), environmental conditions (i.e. agricultural potential, geology and archaeology), proximity to a grid connection point (i.e. for the purpose of electricity evacuation), as well as site access (i.e. to facilitate the movement of machinery, equipment, infrastructure and people during the construction phase).

The Environmental Impact Assessment (EIA) Regulations, 2010 (GNR. 543) determine that an environmental authorisation is required for certain listed activities, which might have detrimental effects on the environment. The following activities have been identified with special reference to the proposed development and are listed in the EIA Regulations, Listing Notice 1 (GN. R. 544):

- Activity 1: *“The construction of facilities or infrastructure for the generation of electricity where: (i) the electricity output is more than 10 megawatts but less than 20 megawatts.”*
- Activity 10: *“The construction of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.”*
- Activity 23: *“The transformation of undeveloped, vacant or derelict land to (i) residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 hectares or more, but less than 20 hectares, or (ii) residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares.”*

Being listed under Listing Notice 1 (GNR. 544) implies that the development is considered as potentially having an impact on the environment, and therefore requires a Basic Assessment to be conducted as described in Regulations 21-25. Environamics has been appointed as independent consultant to undertake the EIA on Subsolar Energy's behalf.

Regulation 22 of the EIA Regulations requires that a basic assessment report must include a description and assessment of the significance of key environmental impacts. An impact assessment was conducted to ascertain the level of each identified impact, as well as mitigation measures which may be required. The potential positive and negative impacts associated with the proposed development have been evaluated and rated accordingly. The results of the evaluation have indicated that no fatal flaws exist as a result of the proposed solar facility and its associated infrastructure. The potentially most significant environmental impacts associated with the development are briefly summarised below:

Impacts during the construction phase:

During the construction phase minor negative impacts are foreseen over the short term. The latter refers to a period of months. The potentially most significant impact relates to the direct positive impact through the provision of temporary employment and other economic benefits for the duration of the construction phase.

Impacts during the operational phase:

During the operational phase the study area will serve as an electricity generation facility and the negative impacts are generally associated with the potential increase in storm water runoff, the increased consumption of water, potential for leakage of hazardous materials, and security risks. The operational phase will have direct positive impacts through the provision of employment opportunities for its duration, the generation of additional electricity and the generation of income to the local municipality.

Impacts during the decommissioning phase:

The physical environment will benefit from the closure of the solar facility since the site will be restored to its natural state. However, the decommissioning phase will result in the loss of employment and the generation of waste that will require management measures.

To address the above mentioned impacts, mitigation and management measures for the pre-construction/site preparation, construction, operation and decommissioning phases are included in the environmental management programme (EMPr) attached as Appendix F to the report. The assessment suggests that all of the identified impacts can be effectively mitigated. It is the opinion of the independent environmental assessment practitioner that none of the identified impacts could be regarded as significant enough to jeopardise the proposed development and it is recommended that the proposed project be allowed to proceed provided that the mitigation measures are implemented.

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:

Any specialist reports must be contained in Appendix D.

1. ACTIVITY DESCRIPTION

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

PROJECT LOCATION AND DESCRIPTION

The activity entails the development of a photovoltaic solar facility and associated infrastructure on a portion of Portion 24 of the farm Zoutpansfontein 34, Registration Division RD, situated within the Sol Plaatje Local Municipality area of jurisdiction. The proposed development is located approximately 30 kilometers north of Kimberley along national N12 road to Warrenton – the location of the site is illustrated in Appendix A, Figure 1.

The site is surrounded by agricultural land uses (grazing) – refer to Appendix B for photographs of the development area. The topography of the site is gentle with a slope of less than two percent. The site consists of land suitable for grazing.

The project entails the generation of approximately 19.5MW electrical power through photovoltaic (PV) panels. The total footprint of the project will be less than 20 hectares (including supporting infrastructure on site) – refer to table 1 for general site information. The property on which the facility is to be constructed will be leased by Subsolar Energy (Pty) Ltd. from the property owner, Mr. J.W. Weenink, for the life span of the project (minimum of 20 years).

Table 1: General site information

Description of affected farm portion	Portion 24 of the farm Zoutpansfontein 34, Registration Division RD, Northern Cape Province
21 Digit Surveyor General code	C0370000000003400024
Title Deed	T229/1987 – refer to Appendix G7
Photographs of the site	Refer to Appendix B
Type of technology	Photovoltaic solar facility with crystalline silicon panels
Structure Height	Approximately 3 meters
Surface area to be covered	19.9 hectares
Structure orientation	The PV panels will be tilted at a fixed northern angle in order to capture the most sun
Laydown area dimensions	Less than 19.9 hectares
Generation capacity	19.5MW
Expected production	24,5 GWh/yr

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.

PHOTOVOLTAIC TECHNOLOGY

The term photovoltaic describes a solid-state electronic cell that produces direct current electrical energy from the radiant energy of the sun through a process known as the Photovoltaic affect. This refers to light energy placing electrons into a higher state of energy to create electricity. Each PV cell is made of silicon (i.e. semiconductors) which is positively and negatively charged on either side, with electrical conductors attached to both sides to form a circuit. This circuit captures the released electrons in the form of an electric current (direct current).

The key components of the proposed project are described below:

- PV Panel Array - To produce 19.5MW, the proposed facility will require numerous linked cells placed behind a protective glass sheet to form a panel. Multiple panels will be required to form the solar PV arrays which will comprise the PV facility. The PV panels will be tilted at a fixed northern angle in order to capture the most sun.
- Wiring to Central Inverters - Sections of the PV array will be wired to central inverters which have a rated power of 500kW each. The inverter is a pulse width mode inverter that converts DC electricity to alternating current (AC) electricity at grid frequency.
- Connection to the grid – Connecting the array to the electrical grid requires transformation of the voltage from 480V to 132,000V. A new substation will be required in order to transform the voltage level from trafo inverter output (22kV) up to the required Eskom level (132kV). The power will therefore be evacuated via an on-site substation, where after it will connect to the existing 132kV overhead power line east of the site (refer to figure 1 in the basic assessment report for an illustration of the solar photovoltaic electricity generation process). The electricity generated from the solar panels will be transmitted via 132kV overhead lines from the on-site substation to the existing 132kV power line. Eskom will be the owner of the new overhead power line. The power line will not traverse any additional properties (refer to Appendix C for the facility illustrations).

The distribution substation will approximately be 90m x 120m in size and will ideally be located in close proximity to the existing power lines. The substation will be a transmission substation and will include transformer bays which will contain transformer oils. Bunds will be constructed to ensure that any oil spills are suitable attenuated and not released into the environment. The substation will be securely fenced.

- Supporting Infrastructure - A control facility with basic services such as water and electricity will be constructed on the site and will have an approximate footprint 400m² or less. Other supporting infrastructure includes voltage and current regulators and protection circuitry. In terms of project maintenance, approximately 450m³ of water would be required per annum for the site.

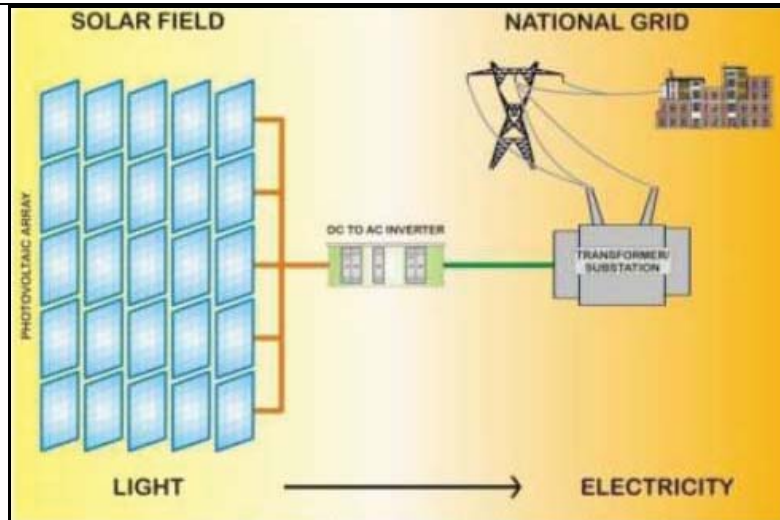


Figure 1: Solar photovoltaic electricity generation process

- **Roads** – Access to the site will either be from the N12 towards Warrenton or the dirt road towards Boshoff, off the N12. An internal site road network to provide access to the solar field and associated infrastructure will be required. Existing farm roads will be used where possible. All site roads will require a width of approximately 4m. Drainage trenches along the side of the internal road network will be installed.
- **Fencing** - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm.

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—

- the property on which or location where it is proposed to undertake the activity;
- the type of activity to be undertaken;
- the design or layout of the activity;
- the technology to be used in the activity;
- the operational aspects of the activity; and
- 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 the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

2.1 Site alternatives

No other properties have at this stage been legally secured by Subsolar in the area to potentially establish solar facilities. From a local perspective, Portion 24 of the farm Zoutpansfontein 34, is preferred due to its suitable climatic conditions, topography (i.e. in terms of slope), environmental conditions (i.e. agricultural potential, geology and archaeology), proximity to a grid connection point (i.e. for the purpose of electricity evacuation), as well as site access (i.e. to facilitate the movement of machinery, equipment, infrastructure and people during the construction phase). Therefore no further property alternatives will be considered in this report. The technical, logistical and environmental characteristics of the site are described in more detail below:

- **Climatic conditions:** The economic viability of a photovoltaic facility is directly dependent on the annual direct solar irradiation values. A study of available radiation data shows that the proposed site is uniformly irradiated by the sun. In addition the site also experiences temperatures which are suitable for PV technology. The site is located in a region with seasonal, summer and autumn rainfall with an annual precipitation of about 250-300mm. Summer temperatures are high and frequent frost occur in the winter.
- **Topography:** The topography of the area proposed for the PV facility is predominantly flat, and therefore no shading will be caused by the surrounding topography or vegetation on and around the site.
- **Geotechnical conditions:** The site is regarded as suitable for the proposed establishment of a solar power facility in terms of the geotechnical conditions (refer to Appendix D1 for geotechnical report). The following conditions prevail:
 - *Geology:* The area of investigation is located on calcrete deposits containing fragments of both sandstone and dolerite. Bedrock material was not encountered on the site.
 - *Soil Profiles:* The soil profiles encountered consisted of a surface colluvial cover, underlain by hardpan calcrete, presumably hosted in sandstone or dolerite. Soil profiles were limited to a depth of 500mm.
 - *Groundwater:* In general terms, it is expected that seasonal perched water will not be present on site. Permanent groundwater is expected to be present at depths exceeding 20m.
 - *Founding Conditions:* Safe bearing capacities exceeding 100kPa are present from depths exceeding 600mm. Conditions of heave do not prevail on site. Slight settlement of structures may take place.
 - *Excavation Potential:* Colluvial soils may be considered excavatable by backhoe, but the effort required will be dictated by the moisture state of the material. Hardpan calcrete makes for conditions of difficult excavation, inducing refusal of excavation at depths of 500mm. DPSH probes encountered refusal at depths between 900mm and 1200mm.
 - *Materials Utilisation:* It is expected that the calcrete will be suitable to be used for the construction of earthworks.
 - *Historic Monuments:* There are no historic monuments on the site.
 - *Cemetery Sites:* There are no cemeteries or graves on the site. The property is not regarded as suitable for cemetery site development.
 - *Dolomite Stability:* The site is not subject to instabilities due to the presence of dolomite.
 - *Undermining:* The area is not subject to undermining or surface gravel procurement.
 - *Seismicity:* The annual probability for an earthquake with intensity of 4,5 on the Modified Mercalli Scale to occur in the area is less than 10^{-0,9}; and with an intensity of 7,5 to occur the probability is 10⁻⁴. The annual probability for an earthquake with an acceleration of 10-

1,9g to occur in the area is less than 10-1,0; and with an acceleration of 10-1,0g to occur in the area is less than 10-3,6. A 10% probability exists that an earthquake with Peak Ground Acceleration exceeding of 0,12g may take place once in 50 years.

- **Agricultural potential:** The National Department of Agriculture (2006) classified land capability into two broad categories, namely land suited to cultivation (Classes I – IV) and land with limited use, generally not suited to cultivation (Classes V – VIII). Figure 2 illustrates that the site falls within Class V, indicated by the light green shade covering the majority of the area. The agricultural potential of the site is therefore limited and the change in land use will not impact on agricultural production.

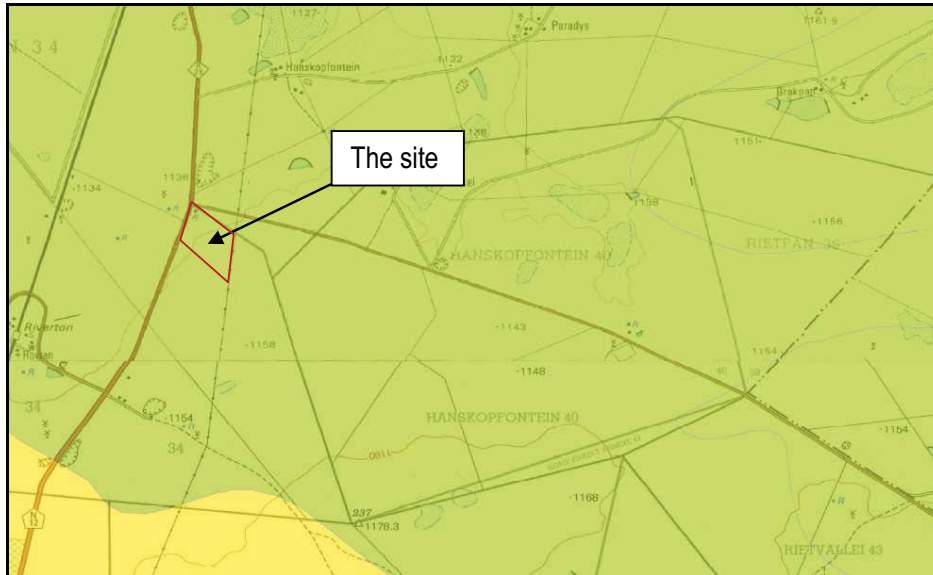


Figure 2: Land capability classification (The National Department of Agriculture, 2006)

- **Ecological sensitivity:** The development of the proposed PV facility will be constructed within an area less than 20 hectares. The proposed development falls within an area used for grazing and the site is therefore considered to have limited environmental sensitivity as a result. The ecological fauna and flora habitat survey concluded that:
 - The site is part of the Kimberley Thornveld vegetation type which listed as Least Threatened and therefore is not a threatened ecosystem (Mucina & Rutherford 2006).
 - No rocky ridges, rocky hills, caves or wetlands are present at the footprint allocated for development so that the microhabitat diversity is relatively low.
 - A diversity of indigenous plant species and animal species are present at the site proposed for development. However, ecologically the site proposed for the developments appear to be degraded and overgrazed. This is confirmed by the conspicuous presence of plant species such as *Pentzia globosa*, *Chrysocoma ciliata* and increaser 2 grass species such as *Aristida congesta* (tassel three-awn), *Eragrostis lehmanniana* (Lehmann's love grass) and *Tragus racemosus*.
 - Bush encroachment by *Acacia mellifera* takes place at certain patches at the site.
 - Some infestation of the site by the declared invasive tree, *Prosopis glandulosa* (mequite) is of concern and it is compulsory to eradicate this species at the site.
 - No loss of sensitive habitat of particular conservation importance is anticipated if the site is developed.
 - No loss of corridors or connectivity of ecosystems is anticipated if the sites are developed.

- There appears to be no threat to any protected tree species at the site (National Forests Act No. 84 of 1998).
 - It is unlikely that there will be a loss of any plant species of particular high conservation priority, i.e. threatened or near threatened species, if the site is developed.
 - It is highly unlikely that there would be a threat to any threatened animal species or any other animal species of particular conservation concern.
 - There is no distinct reason why these relatively small footprint sites allocated for the development, in the vast countryside of the Northern Cape is of particular conservation concern for any threatened vertebrate species, including those that roam large areas and which may occasionally or coincidentally visit the site.
 - If the development is approved, an opportunity to enhance the management of the ecological condition of the veld at the site, presents itself.
 - Given the low probability of resident threatened species occurring at the footprint site, the low probability of any significant conservation corridor or buffer zone at the footprint site, the high frequency of a number of pioneer plant species which indicate lesser veld condition, the absence of any wetland or rocky ridge habitats of particular conservation concern at the footprint site, the site proposed for development could be viewed as less sensitive in the region. In the larger area there appears to be no distinct reason why these sites proposed for development could not be considered some of the less sensitive patches (refer to Appendix D3 for the ecological fauna and flora habitat survey).
- Cultural sensitivity: The Heritage Impact Assessment confirmed that no sites, features or objects of cultural significance were found in the study area (refer to Appendix D2 for heritage impact assessment).
 - Visual sensitivity: In view of the moderately low visual value of this landscape, the small numbers of sensitive receptors, and the strategic importance of developing sustainable energy alternatives, the significance of the overall visual impact of this development can be regarded as low (refer to Appendix D3 for visual impact assessment).
 - Power transmission considerations: The power will be evacuated via an on-site substation, where after it will connect to the existing 132kV overhead power line east of the site (refer to figure 1 in the report for an illustration of the solar photovoltaic electricity generation process).

2.2 Activity alternatives

Photovoltaic solar facility - Subsolar Energy (Pty) Ltd. is a South African project development company that is focused on developing renewable energy power projects that will produce electricity from clean renewable energy sources, whilst advancing environmental, social and economic upliftment. Subsolar Energy (Pty) Ltd. is of the opinion that solar PV technology is perfectly suited to the site, given the high irradiation values for the area. The technology furthermore entails low visual impacts, have low water requirements, is a simple and reliable type of technology and all of the components can be recycled.

Wind energy facility - Due to the local climatic conditions a wind energy facility is not considered suitable as the area does not have the required wind resource. Furthermore the applicant has opted for the generation of electricity via solar power rather than the use of wind turbines. This alternative is therefore regarded as not feasible and will not be evaluated further in this report.

Concentrated Solar Power (CSP) technology - CSP technology requires large volumes of water and this is a major constraint for this type of technology in the proposed project area. While the irradiation

values are high enough to generate sufficient solar power, the water constraints render this alternative not feasible. Therefore, this alternative will not be considered further in this report.

2.3 Technology alternatives

There are several types of semiconductor technologies currently available and in use for PV solar panels. Two, however, have become the most widely adopted, namely crystalline silicon and thin film. These technologies are discussed in more detail below:

Crystalline (high efficiency technology at higher cost):

Crystalline silicon panels are constructed by first putting a single slice of silicon through a series of processing steps, creating one solar cell. These cells are then assembled together in multiples to make a solar panel. Crystalline silicon, also called wafer silicon, is the oldest and the most widely used material in commercial solar panels. Crystalline silicon modules represent 85-90% of the global annual market today. There are two main types of crystalline silicon panels that can be considered for the solar facility:



- Monocrystalline Silicon - Monocrystalline (also called single crystal) panels use solar cells that are cut from a piece of silicon grown from a single, uniform crystal. Monocrystalline panels are among the most efficient yet most expensive on the market. They require the highest purity silicon and have the most involved manufacturing process.



- Multicrystalline Silicon - Multicrystalline (also called polycrystalline) panels use solar cells that are cut from multifaceted silicon crystals. They are less uniform in appearance than monocrystalline cells, resembling pieces of shattered glass. These are the most common solar panels on the market, being less expensive than monocrystalline silicon. They are also less efficient, though the performance gap has begun to close in recent years (First Solar, 2011).

Thin film (low-cost technology with lower efficiency):

Thin film solar panels are made by placing thin layers of semiconductor material onto various surfaces, usually on glass. The term *thin film* refers to the amount of semiconductor material used. It is applied in a thin film to a surface structure, such as a sheet of glass. Contrary to popular belief, most thin film panels are not flexible. Overall, thin film solar panels offer the lowest manufacturing costs, and are becoming more prevalent in the industry. Thin films currently account for 10-15% of global PV module sales. There are three main types of thin film used:



- Cadmium Telluride (CdTe) - CdTe is a semiconductor compound formed from cadmium and tellurium. CdTe solar panels are manufactured on glass. They are the most common type of thin film solar panel on the market and the most cost-effective to manufacture. CdTe panels perform significantly better in high temperatures and in low-light conditions.



- Amorphous Silicon - Amorphous silicon is the non-crystalline form of silicon and was the first thin film material to yield a commercial product, first used in consumer items such as calculators. It can be deposited in thin layers onto a variety of surfaces and offers lower costs than traditional crystalline silicon, though it is less efficient at converting sunlight into electricity.



- Copper, Indium, Gallium, Selenide (CIGS) - CIGS is a compound semiconductor that can be deposited onto many different materials. CIGS has only recently become available for small commercial applications, and is considered a developing PV technology (First Solar, 2011).

The technology that proved most feasible and reasonable with respect to the proposed solar facility is crystalline silicon panels. Although it is more expensive than thin films it is approximately 10 times more efficient, is non-reflective and has a higher durability than thin-film systems. The active material in thin films tends to be less stable than crystalline causing degradation over time and the lower cost to manufacture some of the module technologies is partially offset by the higher area-related system costs (costs for mounting and the land required) due to their lower conversion efficiency. Furthermore thin film modules have higher visibility and reflections.

2.4 Design and layout alternatives

At this stage of the planning process, a generic site layout has been prepared (refer to Appendix C for the facility illustrations). The layout follows the limitations of the site and aspects such as roads, fencing and servitudes are considered. The total surface area proposed for layout options include the PV panel arrays spaced to avoid shadowing, access and maintenance roads and associated infrastructure (buildings, power inverters, transmission lines and perimeter fences) - refer to table 2 below.

Table 2: General layout information

PROJECT	
Site area	19.49ha
PV area	18.01ha
Row to row clearance	3m
Module tilt	20°
Number of modules	52.320
Installed capacity	13.08MWp
Number of arrays	1.090
Array type	4 x 12
Power / array	12Wp
TECHNOLOGY	
Module	BYD
Module power	250Wp
Module dimensions	1640mm x 992mm
Inverter	19 x AEG PV630

2.5 The no-go alternative

The site is currently zoned for agricultural land uses. Should the proposed development not proceed, the site will remain unchanged (refer to Appendix B for photographs of the site). The local SDF (Sol Plaatje Municipality SDF, 2009) indicates that the area is located within a rural area aimed at contributing to agriculture (extensive and intensive farming), tourism and recreational opportunities (hunting and animal conservation) and protecting ecological and archaeological heritage (refer to Figure 3 – Appendix A). However the land is classified by the Department of Agriculture (NDA, 2006) as having limited irrigation potential, generally not suited to cultivation, and therefore has low agricultural potential. If the no-go alternative prevails the land will continue to be used for low density cattle grazing. This alternative is included as a baseline in this report.

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

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.

Alternative:

- Alternative S1² (preferred or only site alternative)
- Alternative S2 (if any)
- Alternative S3 (if any)

Latitude (S):		Longitude (E):	
28°	29'24.46"	24°	47'52.28"
0	'	0	'
0	'	0	'

In the case of linear activities:

Alternative:

- Alternative S1 (preferred or only route alternative)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

0	'	0	'
0	'	0	'
0	'	0	'

- Alternative S2 (if any)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

0	'	0	'
0	'	0	'
0	'	0	'

- Alternative S3 (if any)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

0	'	0	'
0	'	0	'
0	'	0	'

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

² "Alternative S.." refer to site alternatives.

4. PHYSICAL SIZE OF THE ACTIVITY

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

Alternative:

Alternative A1³ (preferred activity alternative)

Alternative A2 (if any)

Alternative A3 (if any)

or, for linear activities:

Size of the activity:

199 000m ²

Length of the activity:

Alternative:

Alternative A1 (preferred activity alternative)

Alternative A2 (if any)

Alternative A3 (if any)

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

Size of the site/servitude:

Alternative:

Alternative A1 (preferred activity alternative)

Alternative A2 (if any)

Alternative A3 (if any)

5. SITE ACCESS

Does ready access to the site exist?

YES	NO
-----	----

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

--

Describe the type of access road planned:

An access road will be required from either from the N12 towards Warrenton or the dirt road towards Boshoff, off the national route N12. An internal site road network to provide access to the solar field and associated infrastructure will be required. The location of the access road will be detailed based on the geotechnical information during the detail design phase of the PV facility.

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.

6. SITE OR ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

- 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;

³ "Alternative A." refer to activity, process, technology or other alternatives.

- 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.

A locality and a regional map have been included in Appendix A.

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.

Photographs have been taken of all key features of the site and has been included in Appendix 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.

Refer to Appendix C for the facility illustrations.

9. ACTIVITY MOTIVATION

9(a) Socio-economic value of the activity

- What is the expected capital value of the activity on completion?
- What is the expected yearly income that will be generated by or as a result of the activity?
- Will the activity contribute to service infrastructure?
- Is the activity a public amenity?
- How many new employment opportunities will be created in the construction phase of the activity?
- What is the expected value of the employment opportunities during the construction phase?

	R350 million
	R60 million
	YES NO
	YES NO
	60
	R6 million

What percentage of this will accrue to previously disadvantaged individuals?	58%
How many permanent new employment opportunities will be created during the operational phase of the activity?	8
What is the expected current value of the employment opportunities during the first 10 years?	R8 million
What percentage of this will accrue to previously disadvantaged individuals?	60%

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	NO
2.	Does the proposed land use fall within the relevant provincial planning framework?	YES	NO
3.	<p>If the answer to questions 1 and / or 2 was NO, please provide further motivation / explanation:</p> <p>Given that renewable energy projects are being supported at a national level (in terms of the REFIT initiative) it can be inferred that such projects will also be supported by provincial development units.</p> <p>The rezoning for renewable energy facilities is relatively new in South Africa and current planning frameworks do not make provision for a renewable energy zone as such. A rezoning application process is currently being undertaken. The new proposed land use designation will be “special zone”.</p>		
DESIRABILITY:			
1.	Does the proposed land use / development fit the surrounding area?	YES	NO
2.	Does the proposed land use / development conform to the relevant structure plans, SDF and planning visions for the area?	YES	NO
3.	Will the benefits of the proposed land use / development outweigh the negative impacts of it?	YES	NO
4.	<p>If the answer to any of the questions 1-3 was NO, please provide further motivation / explanation:</p> <p>Although the surrounding land use is predominantly agriculture, a number of power lines and a cell phone mast are also located on or in close proximity to the site. Therefore, the proposed land use is not in conflict with the surrounding land use.</p> <p>The local Spatial Development Framework (SDF) indicates that the area is located within a rural area aimed at contributing to agriculture, tourism and recreational opportunities and protecting ecological and archaeological heritage. However, the land is classified as having limited agricultural potential in terms of the National Department of Agriculture’s land capability database (NDA, 2006), has limited environmental sensitivity, and no sites, features or objects of cultural significance.</p> <p>The Sol Plaatje IDP (2011) emphasizes the provision of bulk infrastructure development to unlock development for economic growth to ensure job creation. Objectives of the IDP include the sustainable delivery in respect of amongst others electricity to all residents of the SPM and to initiate a process for the use of alternative/renewable energy in the municipality (SPLM IDP, 2011). This project will significantly contribute to achieving this</p>		

	objective.		
5.	Will the proposed land use / development impact on the sense of place?	YES	NO
6.	Will the proposed land use / development set a precedent?	YES	NO
7.	Will any person's rights be affected by the proposed land use / development?	YES	NO
8.	Will the proposed land use / development compromise the "urban edge"?	YES	NO
9.	<p>If the answer to any of the question 5-8 was YES, please provide further motivation / explanation.</p> <p>The site is characterized by open fields that are used for grazing. The proposed development will change the character of the site, but given that a number of power lines already exist in close proximity to the site, the overall sense of place will not be significantly altered.</p> <p>The project will also be one of the first solar power projects in the province thereby setting precedents for future projects.</p>		

BENEFITS:			
1.	Will the land use / development have any benefits for society in general?	YES	NO
2.	<p>Explain:</p> <p>The development of the solar facility will have several benefits for society in general, some of which are discussed below:</p> <ul style="list-style-type: none"> • <u>Security of power supply</u> - The project has the potential of "securing" economic activity by assisting in removing supply constraints if Eskom generation activities result in a supply shortfall. When supply is constrained it represents a limitation to economic growth. When a supply reserve is available, it represents an opportunity for economic growth. • <u>Local employment</u> - The proposed project will contribute to local economic growth by supporting industry development in line with provincial and regional goals and ensuring advanced skills are drawn to the Northern Cape Province. The project will likely encounter widespread support from government, civil society and businesses, all of whom see potential opportunities for revenues, employment and business opportunities locally. The promotion and development of photovoltaic solar facilities, which will in turn lead to growth in tax revenues and sales of carbon credits, will result in increased foreign direct investment. • <u>Reduced air pollution, carbon dioxide emissions and water consumption</u> - The additional power supplied through solar energy will reduce the reliance on the combustion of fossil fuels to produce power. The reduction of GHG emissions as a result of the project implementation will be achieved due to reduction of CO2 emissions from combustion of fossil fuel at the existing grid-connected power plants and plants which would likely be built in the absence of the project activity. Coal power also requires high volumes of water, in areas of South Africa where water supply is already over-stretched and water availability is highly variable. 		

	<ul style="list-style-type: none"> • <u>Lower costs of alternative energy</u> - An increase in the number of solar facilities commissioned will eventually reduce the cost of the power generated through solar facilities. This will contribute to the country's objective of utilising more renewable energy and less fossil fuel based power sources. It will also assist in achieving the goal to generate 10 000 GWh of electricity from renewable energy by 2013 and the reduction of South Africa's GHG emissions by approximately 34% below the current emissions baseline by 2020 (DME, 2003). • <u>Increased surety of supply and increased quantity of available power</u> - By diversifying the sources of power in the country, the surety of supply will increase. Additionally, the power demands of South Africa are ever increasing and by adding solar power this demand can be met, even exceeded without increasing pollution in relation to the use of fossil fuels.
3.	Will the land use / development have any benefits for the local communities where it will be located? YES NO
4.	Explain: The main benefit of the proposed development operating in the area is that local companies or contractors will be hired for the duration of the construction period (12-14 months). The operational phase will provide permanent job opportunities to the local communities since security guards and general labourers will be required on a full time basis. The additional power supply will also likely result in more reliable power supply and consequently opportunities for business expansion. This will add to the economic output of the local municipality. In addition to the provision of job opportunities, it is required that the applicant donate approximately R700 000 per annum on local socio economic development, and approximately R250 000 per annum on local enterprise development. This will be for the full length of the project (minimum of 20 years). Therefore the local community may be granted the opportunity to improve their social and economic situation.

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:

The Environmental Impact Assessment was undertaken in accordance with the Environmental Impact Assessment Regulations (2010) published in GNR 543, in terms of Section 24(5), 24(M) and 44 of the National Environmental Management Act, 1998 (Act No 107 of 1998) as amended; the World Bank EHS Guidelines, the IFC Performance Standards, the Equator Principles and all relevant National legislation and guidelines. Although this report is not written in terms of the Equator Principles (EPs), it fully acknowledges that the EPs will need to be complied with should funding for the project be required.

Title of legislation, policy or guideline:	Administering authority:	Date:
The Constitution of South Africa (108 of 1996)	National Government	1996
The National Environmental Management Act (Act No. 107 of 1998)	National and Provincial Department of Environmental Affairs	1998

The National Water Act (Act No. 36 of 1998)	Department of Water Affairs (DWA)	1998
The National Heritage Resources Act (Act No. 25 of 1999)	South African Heritage Resources Agency (SAHRA)	1999
The National Environmental Management: Waste Act (Act No. 59 of 2008)	Department of Environmental Affairs (DEA)	2008
Conservation of Agricultural Resources Act (Act No. 85 of 1983)	National and Provincial Government	1983
Guideline 3 – General guide to the Environmental Impact Assessment Regulations	Department of Environmental Affairs (DEA)	2006
Guideline 4 – Public participation in support of the Environmental Impact Assessment Regulations	Department of Environmental Affairs (DEA)	2006
Guideline 5 – Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations	Department of Environmental Affairs (DEA)	2006
Guideline 5 – Draft companion to the NEMA Environmental Impact Assessment (EIA) Regulations of 2010	Department of Environmental Affairs (DEA)	2010
Sol Plaatje Local Municipality Integrated Development Plan (IDP)	Sol Plaatje Municipality	2011
Sol Plaatje Spatial Development Framework (SDF)	Sol Plaatje Municipality	2009
Sol Plaatje Town Planning Scheme	Sol Plaatje Local Municipality	-
Sol Plaatje Local Municipality Bylaws	Sol Plaatje Local Municipality	-
Equator principles	Voluntary	2006
World Bank Group Environmental, Health and Safety General Guidelines (EHS Guidelines)	Voluntary	2007
Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution	Voluntary	2007
International Finance Corporation's Policy on Environmental and Social Sustainability	Voluntary	2012

11. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

11(a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	YES	NO
If yes, what estimated quantity will be produced per month?	15m ³	

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

Construction waste will most likely consist of concrete, scrap metal and general waste. The waste will be collected and stored in suitable receptacles. The waste will then be transported to the nearest registered landfill. If possible and feasible, all waste generated on site during the construction phase must be separated into glass, plastic, paper, metal and wood to be recycled.

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

The waste will be disposed of at the Kimberley registered municipal landfill by approved contractors.

Will the activity produce solid waste during its operational phase?

YES **NO**

If yes, what estimated quantity will be produced per month?

Approximately
200kg per month

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

Sources of general waste will be waste food, packaging, paper, etc. General waste will be stored on the site and removed on a weekly basis. The waste will be taken to a registered landfill by a contractor employed by the applicant, as the site is located outside of the waste collection route. If possible and feasible, all waste generated on site during the operational phase must be separated into glass, plastic, paper, metal and wood to be recycled.

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

The waste will be disposed of at the Kimberley registered municipal landfill.

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 **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 **NO**

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

11(b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?

YES **NO**

If yes, what estimated quantity will be produced per month?

m³

Will the activity produce any effluent that will be treated and/or disposed of on site?

Yes **NO**

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

Will the activity produce effluent that will be treated and/or disposed of at another facility?

YES **NO**

If yes, provide the particulars of the facility:

Facility name:			
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 **NO**

If yes, is it controlled by any legislation of any sphere of government?

YES **NO**

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

If no, describe the emissions in terms of type and concentration:

The source of minor emissions will be the construction vehicles accessing and traversing the site, and possibly a diesel generator during construction. PV facilities are characterized by non-consumptive use of natural resources and consume no fuel for its continuing operation. The operational phase of the solar facility will not produce carbon dioxide, sulphur dioxide, mercury, particulates, or any other type of air pollution.

11(d) Generation of noise

Will the activity generate noise?

YES	NO
-----	----

If yes, is it controlled by any legislation of any sphere of government?

YES	NO
-----	----

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

If no, describe the noise in terms of type and level:

During the construction phase, a considerable amount of noise will be generated by ramming the poles of the photovoltaic structure into the soil. During the operational phase there will be no noise generated.

12. WATER USE

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

municipal	water board	groundwater	river, stream, dam or lake	other	the activity will not use water
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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:

450m ³ per annum

Does the activity require a water use permit from the Department of Water Affairs?

YES	NO
-----	----

If yes, please submit the necessary application to the Department of Water Affairs and attach proof thereof to this application if it has been submitted.

The estimated maximum amount of water required during construction is 50m³ per month during the 12 - 14 months of construction. The estimated maximum amount of water required during the facility's 20 years of production is 450m³ per annum. The majority of this usage is for the cleaning of the solar panels. Each panel requires approximately 2 liters of water for cleaning. Therefore the facility will require approximately 90,000 liter per wash. It is estimated that the panels may only need to be washed twice per annum, but provision is made for quaternary cleaning (March, May, July, and September). This totals approximately 360,000 liters per annum for washing, and allows 90,000 liters per annum (or 246 liter per day) for toilet use; drinking water, etc.

A specialist has been consulted with regards to obtaining the necessary approvals for the water use. It was confirmed that due to the limited amount of water required, the applicant will only need to obtain an approval (letter) from the local municipality to use the water for industrial related uses.

Water saving devices and technologies such as the use of dual flush toilets and low-flow taps, the management of storm water, the capture and use of rainwater from gutters and roofs would be considered by the developer. Furthermore locally indigenous vegetation will be used during landscaping and the staff will be trained to implement good housekeeping techniques.

13. ENERGY EFFICIENCY

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

Electricity use will be limited, and will primarily be related to the lighting of the facility and domestic use like lighting for offices and the control room. Design measures such as the use of energy saving light bulbs would be considered by the developer. Furthermore the design of the PV Arrays takes the position of the optimum solar radiation into account in order to efficiently capture the solar energy.

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

The project itself is an alternative energy source.

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.

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

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

3. Has a specialist been consulted to assist with the completion of this section?

YES	NO
-----	----

If YES, please complete the form entitled "Details of specialist and declaration of interest"

for each specialist thus appointed:

All specialist reports must be contained in Appendix D.

Property description/physical address:

Portion 24 of the farm Zoutpansfontein 34, Registration Division RD, situated within the Sol Plaatje Local Municipality area of jurisdiction.

(Farm name, portion etc.) 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:

Portion 24 of the farm Zoutpansfontein 34, Registration Division RD, is currently zoned for "Agricultural" land uses.

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

Is a change of land-use or a consent use application required?	YES	NO
Must a building plan be submitted to the local authority?	YES	NO

Locality map:

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.) The map must indicate the following:

- an 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)

The locality map is included as Appendix A – figure 1.

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

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

Alternative S2 (if any):

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

Alternative S3 (if any):

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

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

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

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

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

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
- 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 site

5.42 Other land uses (describe): Power lines

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/A" are ticked, how will this impact / be impacted upon by the proposed activity?

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If YES, specify and explain:

If YES, specify:

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:

If YES, specify:

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	NO
	No.	

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.

Briefly explain the findings of the specialist:

The Heritage Impact Assessment (refer to Appendix D2) did not find any sites, features or objects of cultural significance in the study area. There would therefore be no impact on cultural or historical features as a result of the proposed development. From a heritage point of view it is recommended that the proposed development be allowed to continue, subject to the following condition:

- Should any new evidence of archaeological sites or artefacts, paleontological fossils, graves or other heritage resources are found during the development, work must cease and SAHRA or an archaeologist must be alerted immediately.

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

If yes, please 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.

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.

- A2 site notices were placed on the western and northern boundaries of the site.
 - Written notices were sent to organs of state, the property owner, the local municipality, the ward councillor and other relevant stakeholders via registered post.
 - Written notices and reply forms were sent via e-mail or registered post to the surrounding land owners and occupiers.
 - A notice was placed in the Noord Kaap on 4 April 2012 to advertise the basic assessment process.
- A copy of the advertisement, photos of the site notice and proof of the letters that were sent are included as part of Appendix G.

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

- (iv) the manner in which and the person to whom representations in respect of the application may be made.

The content of the advertisement and site notice is included as part of Appendix G.

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.

The proposed development is unlikely to result in any impacts that extend beyond the municipal area where it is located. Therefore it was only deemed necessary to advertise in a local newspaper. The advertisement placed detailed the Basic Assessment process, the nature, the location, where further information can be obtained and the manner in which representations could be made.

A copy of the advertisement and a photo of the site notice is included as part of Appendix G.

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.

The following three categories of variables were taken into account when deciding the required level of public participation:

- The scale of anticipated impacts;
- The sensitivity of the affected environment and the degree of controversy of the project; and
- The characteristics of the potentially affected parties.

Since the scale of anticipated impacts is low and the fact that no conflict were foreseen between potentially affected parties no additional public participation mechanisms were considered.

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.

All comments received to date, as well as responses provided are captured and recorded within the comments and response report attached as Appendix E.

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:

The following authorities were informed of the Basic Assessment process:

- Northern Cape Department of Environment and Nature Conservation
- The Department of Energy
- The Department of Water Affairs
- The Northern Cape Department of Agriculture
- The National Department of Agriculture
- The South African Heritage Resources Agency (SAHRA)
- ESKOM
- National Energy Regulator of South Africa (NERSA)
- The Wildlife and Environment Society of South Africa (WESSA)
- The Frances Baard District Municipality
- The Sol Plaatje Local Municipality
- The Local Councilor
- The Civil Aviation Authority
- Kimberley Ratepayers Association

A copy of the draft basic assessment report was circulated to the following authorities:

- Northern Cape Department of Environment and Nature Conservation
- The Department of Water Affairs
- The National Department of Agriculture
- The Sol Plaatje Local Municipality

List of authorities from whom comments have been received:

The authorities who have responded and/or submitted comments to date include:

- Northern Cape Department of Environment and Nature Conservation
- The National Department of Agriculture
- The Frances Baard District Municipality
- SAHRA
- Eskom
- The Civil Aviation Authority
- WESSA
- SANRAL

All comments received to date, as well as responses provided, are captured and recorded within the comments and response report in Appendix E.

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.

YES	NO
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Has any comment been received from stakeholders?

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

- The NC DENC noted in a letter dated 26 June 2012 that the application will be located near the N12, national road, a visual assessment study needs to be undertaken to determine the visual impact for the N12 road users. They also raised their concern about waste types and quantities that will be generated during the construction phase and the quantities of hydrocarbons (diesel) that will be stored on site for the trucks during site clearance and the construction phase. The Department stated that emergency and spillage plans need to be developed and submitted to the relevant authorities for approval.
 - The Department of Agriculture confirmed receipt of the draft BAR in an e-mail dated 23 May 2012 and formally acknowledged receipt of the application in a letter dated 13 April 2012. The Department confirmed in a letter dated 30 May 2012 that the application is currently in process on Step 2 of the eight steps which have to be completed in order to finalize the application and asked for copy of the report together with the footprint of the proposed solar plant in order to assist in the processing of the application.
 - The District Municipality stated in a letter dated 7 May 2012 that the District Municipality is in support of the Development as it will provide alternative sources of energy and that the proposed development is on a farm therefore an application of special use should be lodged with the relevant authority in terms of the Northern Cape Planning and Development Act, 7 of 1998.
 - SAHRA stated in a letter dated 11 January 2012 that they have no objection to the development on condition that, if any new evidence of archaeological sites or artefacts, paleontological fossils, graves or other heritage resources are found during the development, work must cease and SAHRA or an archaeologist must be alerted immediately.
 - Eskom confirmed in an e-mail dated 14 June 2012 that they have no objection to the proposed development and that the relevant departments within Eskom will in due time provide the cost estimate letters.
 - The CAA confirmed that they have no objection to the proposed development with a maximum height restriction of 5m above ground level in a letter dated 21 May 2012.
 - Wessa confirmed in an e-mail dated 12 April 2012 that they will not be participating in the EIA process.
 - SANRAL asked to be registered as an Interested and Affected party as part of the Town Planning Process in an e-mail dated 31 May 2012 and requested the applicant to submit additional information.
- All comments received to date, as well as responses provided, are captured and recorded within the comments and response report in Appendix E.

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.

Mr. André Bodenstein from Transnet (a surrounding land owner) confirmed receipt of the notification in an e-mail dated 23 April 2012 and stated that Transnet has no objection to the proposed development. He noted that should any high voltage power lines cross the railway line, the local TFR Infrastructure office (Kimberley – Riaan Karriem 053 838 3008) should be contacted for way leave agreements between Transnet and the developer.

All comments received to date, as well as responses provided, are captured and recorded within the comments and response report in Appendix E.

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):

Mr. André Bodenstein from Transnet was informed on 28 June 2012 that his comments were incorporated into the final basic assessment report.

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

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.

NOTE - For the assessment methodology refer to Appendix G.

IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN PHASE

Alternative (preferred alternative)

No impacts are anticipated from the planning and design phase of the proposed development. However, potential impacts will be dealt with through the implementation of an EMPr included as Appendix F.

IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION PHASE

List the potential site alternative related impacts (as appropriate) that are likely to occur as a result of the construction phase:

Alternative S1 (preferred alternative)

Direct impacts: During the construction phase minor negative impacts are foreseen over the short term. The latter refers to a period of months. The installation of services will inevitably result in the removal of fauna, flora and top soil with a degree of dust being created in the process, the potential for soil erosion increasing and temporary noise disturbance. The disposal of waste during construction will additionally require certain management measures. It is obvious that the construction phase will also have a direct positive impact through the provision of employment opportunities for its duration. The abovementioned impacts are discussed in more detail below:

- Loss of vegetation - In terms of vegetation type the site falls within the Kimberley Thornveld vegetation type (Mucina and Rutherford, 2006). Kimberley Thornveld vegetation is widespread, covering areas of the North West, Free State and Northern Cape Provinces. The conservation status of this vegetation type is described by Mucina and Rutherford (2006) as 'least threatened'. The vegetation and landscape features are described as plains often slightly irregular with well-developed tree layer with amongst other *Acacia erioloba*. The ecological fauna and flora habitat survey confirmed that there are no *Acacia erioloba* located on the site – refer to Appendix D3.

Loss of vegetation	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Definite (4)	Definite (4)
Duration	Permanent (4)	Permanent (4)
Magnitude	Low (1)	Low (1)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Negligible cumulative impacts (1)	
Significance	Negative low (15)	Negative low (15)
Can impacts be mitigated?	Yes, re-vegetation and habitat rehabilitation are dealt with in the fauna and flora habitat survey and numerous sections of the EMPr.	

- Dust and soil erosion – Although the site will need to be cleared or graded to a limited extent, some amount of bare soil will still be exposed during construction, which may potentially result in a degree of dust being created, increased runoff and potentially soil erosion. The time that these areas are left bare will be limited to the construction phase, since vegetation will be allowed to grow back after construction. Therefore dust and soil erosion is unlikely to be a significant impact. However proper planning in terms of storm water management and erosion control will be required.

Dust and soil erosion	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative

Extent	Local/Regional (2)	Local/Regional (2)
Probability	Probable (3)	Unlikely (1)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Medium cumulative impact (3). Should these impacts occur, there will be a cumulative impact on the air and water resources in the study area in terms of pollution.	
Significance	Negative low (22)	Negative low (9)
Can impacts be mitigated?	Yes, it is therefore important that all mitigation measures included in the EMPr are implemented to ensure that these impacts do not occur.	

- Loss of habitat for fauna – The ecological fauna and flora habitat survey (refer to Appendix D3) concluded that given the low probability of resident threatened species occurring at the footprint site, the low probability of any significant conservation corridor or buffer zone at the footprint site, the high frequency of a number of pioneer plant species which indicate lesser veld condition, the absence of any wetland or rocky ridge habitats of particular conservation concern at the footprint site, the site proposed for development could be viewed as less sensitive in the region.

Loss of habitat for fauna	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Definite (4)	Definite (4)
Duration	Short term (1)	Short term (1)
Magnitude	Low (1)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Negligible cumulative impacts (1)	
Significance	Negative low (9)	Negative low (9)
Can impacts be mitigated?	Yes, the EMPr includes mitigation measures and management actions to ensure that any impacts on fauna are avoided or mitigated.	

- Generation of waste - general waste, construction waste, sewage and grey water - The workers on site are likely to generate general waste such as food wastes, packaging, bottles, etc. Construction waste is likely to consist of packaging, scrap metals, waste cement, etc. The applicant will need to ensure that general and construction waste is appropriately disposed of i.e. taken to the nearest registered landfill. Sufficient ablution facilities will have to be provided, in the form of portable/VIP toilets. No pit latrines, French drain systems or soak away systems shall be allowed.

Generation of waste	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)

Probability	Definite (4)	Definite (4)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Medium cumulative impact (3) - An additional demand for landfill space could result in significant cumulative impacts if services become unstable or unavailable, which in turn would impact on permanent residents.	
Significance	Negative low (26)	Negative low (13)
Can impacts be mitigated?	Yes, it is therefore important that all management actions and mitigation measures included in the EMP are implemented.	

- Temporary noise disturbance - Construction activities will result in the generation of noise over a period of months. Sources of noise are likely to include vehicles, the use of machinery such as drills and people working on the site. The noise impact is unlikely to be significant; but construction activities should be limited to normal working days and hours.

Temporary noise disturbance	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Probable (3)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
Significance	Negative low (20)	Negative low (9)
Can impacts be mitigated?	Yes, management actions related to noise pollution are included in the EMP.	

- Temporary employment and other economic benefits – A number of temporary job opportunities will be created to undertake the construction activities. It is likely that local construction companies with the necessary expertise to construct solar facilities will be partnered with. The construction period is estimated to take 12-14 months. During this period security personnel will also be required to work at the site particularly after working hours. It is also likely that some materials such as fencing, and other construction related consumables will be sourced locally.

Temporary employment and other economic benefits	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Positive	Positive
Extent	Province (3)	Province (3)
Probability	Definite (4)	Definite (4)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Medium (2)

Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	Medium cumulative impact (3) - The community would be uplifted through certain interventions, which means that they are more able to find employment and gain skills, which in turn could impact positively on the individual and families, concerned.	
Significance	Positive Medium (30)	Positive Medium (30)
Can impacts be mitigated?	No mitigation measures required.	

Indirect impacts: The nuisance aspects generally associated with the installation of infrastructure will also be applicable to this development, which relates primarily to the increase in construction vehicle traffic.

- Increase in construction vehicle traffic – Building materials will be transported to site on a daily basis and there will be an increase in construction vehicles on access roads. Mitigation measures are available to effectively manage the impacts.

Increase in construction vehicle traffic	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local/Regional (2)	Local/Regional (2)
Probability	Definite (4)	Definite (4)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
Significance	Negative low (20)	Negative low (10)
Can impacts be mitigated?	Yes, management actions related to the increase in construction vehicle traffic are included in the EMPr.	

Indicate mitigation measures that may eliminate or reduce the potential impacts listed above:

Alternative S1

All the construction impacts will be dealt with through the implementation of an EMPr included as Appendix F to the report.

IMPACTS THAT MAY RESULT FROM THE OPERATIONAL PHASE

List the potential site alternative related impacts (as appropriate) that are likely to occur as a result of the operational phase:

Alternative S1 (preferred alternative)

Direct impacts: During the operational phase the study area will serve as an electricity generation facility and the impacts are generally associated with the change of land use, increase in storm water runoff, increased consumption of water, visual intrusion, the generation of general waste, leakage of hazardous materials and security. The operational phase will also have a direct positive impact through the provision of permanent employment opportunities, the generation of additional electricity and the generation of income to the Local Municipality. The abovementioned impacts are discussed in more detail below:

- Change in land-use - The site is currently zoned for agricultural land uses. Should the site remain unchanged it will most likely continue to be used for grazing purposes. The National Department of Agriculture (2006) classified the site as land with limited use, generally not suited to cultivation (Class VI). The agricultural potential of the site is therefore low and the change in land use will not impact on agricultural production.

Change in land use	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Low (1)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Low cumulative impacts (2) - The presence of the PV facility can set an unintended precedent for land use change, which in future can lead to cumulative impacts.	
Significance	Negative low (13)	Negative low (13)
Can impacts be mitigated?	No mitigation measures required.	

- Increase in storm water runoff – The development will potentially result in an increase in storm water run-off that needs to be managed to prevent soil erosion, especially where vegetation will be cleared. Run-off from solar panels will be led into water furrows that traverse the site. Vegetation corridors should be maintained within the subject area.

Increase in storm water runoff	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Probable (3)	Unlikely (1)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative impact (3) - Should these impacts occur, there will be a cumulative impact on	

	the surface water in the study area. It is therefore critical that all mitigation measures are implemented to ensure that these impacts do not occur.
Significance	Negative medium (30) Negative low (13)
Can impacts be mitigated?	Yes. It is therefore important that all management actions and mitigation measures included in the EMPr are implemented to ensure that these impacts do not occur.

- Increased consumption of water - Approximately 450m³ of water will be required per annum for the operation of the solar facility. Cleaning will take place once every quarter. It is foreseen that water will be sourced from the existing boreholes on the farm. It needs to be determined whether the boreholes are registered and the necessary authorisation for the water use must be obtained from the local municipality.

Increased consumption of water	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Region (3)	Region (3)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Low (1)	Low (1)
Reversibility	Irreversible (4)	Partly reversible (3)
Irreplaceable loss of resources	Marginal loss of resources (2)	Marginal loss of resources (2)
Cumulative impact	Medium cumulative impacts (3) - An additional demand on water sources could result in medium cumulative impacts if water sources become unstable or unavailable.	
Significance	Negative medium (38) 	Negative medium (36)
Can impacts be mitigated?	Yes, management actions and mitigation measures related to the use of water are included in the EMPr.	

- Visual intrusion – The Visual Impact Assessment concluded that in view of the moderately low visual value of this landscape, the small numbers of sensitive receptors, and the strategic importance of developing sustainable energy alternatives, the significance of the overall visual impact of this development can be regarded as low (refer to Appendix D3 for). Although the site will be visible from the National Road (N12), the polycrystalline modules considered for this development are non-reflective. Furthermore the lighting of the facility will be restricted to low level, downward facing lights to reduce light spill. Therefore, the visual impact of a low-lying PV facility is not expected to be significant.

Visual intrusion	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)

Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resources (1)	No loss of resources (1)
Cumulative impact	Negligible cumulative impact (1)	
Significance	Negative low (24)	Negative low (12)
Can impacts be mitigated?	Yes, mitigation measures are included in the visual impact assessment study and the EMPr.	

- Generation of waste - Security guards will be stationed at the solar facility 24 hours a day and 7 days a week. Sources of general waste will be waste food, packaging, paper, etc. General waste will be stored on the site and removed on a weekly basis. Since the site is located outside of the waste collection route, the waste will be taken to a registered landfill by a contractor employed by the applicant.

Generation of waste	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Low (1)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Medium cumulative impact (3) - An additional demand for landfill space could result in significant cumulative impacts if services become unstable or unavailable, which in turn would impact on permanent residents.	
Significance	Negative low (15)	Negative low (15)
Can impacts be mitigated?	Yes, management actions related to waste management are included in the EMPr.	

- Leakage of hazardous materials - The proposed development will comprise of a distribution substation and will include transformer bays which will contain transformer oils. Leakage of these oils can contaminate water supplies and must be prevented by constructing oil bunds to ensure that any oil spills are suitably attenuated and not released into the environment.

Leakage of hazardous materials	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Unlikely (1)
Duration	Long term (3)	Long term (3)
Magnitude	High (3)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Marginal loss of	Marginal loss of

	resource (2)	resource (2)
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
Significance	Negative medium (36)	Negative low (22)
Can impacts be mitigated?	Yes. It is therefore important that all management actions and mitigation measures included in the EMPr are implemented to ensure that these impacts do not occur.	

- Security risk – The surrounding rural communities may have negative security impacts on the solar facility. This may potentially result in significant negative impacts and therefore the solar facility will need to be fenced with security personnel securing the site 24 hours every day of the week.

Security risk	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Probable (3)	Possible (2)
Duration	Long term (3)	Long term (3)
Magnitude	High (3)	High (3)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
Significance	Negative medium (33)	Negative medium (30)
Can impacts be mitigated?	Yes – refer to the EMPr, Appendix F.	

- Permanent employment - Security guards will be required for 24 hours every day of the week. It is envisaged that two security guards will be required per shift (each of 12 hours). This will assure work for at least four people on an ongoing basis. In addition general labourers will also be required for the cleaning of the panels.

Permanent employment	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Positive	Positive
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	Low cumulative impact (2) – Increased local spending.	
Significance	Negative Medium (30)	Negative Medium (30)
Can impacts be mitigated?	No mitigation measures required.	

- Generation of additional electricity - The photovoltaic effect of the panels will generate electricity that will be fed into the existing overhead 132kV power lines. The evacuation of generated electricity into the Eskom grid will strengthen and stabilize the grid (especially in the local area).

Generation of additional electricity	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Positive	Positive
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	Low cumulative impact (2) - The evacuation of generated electricity into the Eskom grid will strengthen and stabilize the grid (especially in the local area).	
Significance	Positive medium (30)	Positive medium (30)
Can impacts be mitigated?	No mitigation measure required.	

- Generation of income to the Local Municipality – As a result of the proposed development an amount of approximately R700 000 will be donated to the Local Municipality per annum for local socio economic development. In addition to this it is also required that the applicant donate approximately R250 000 per annum on local enterprise development. This will be for the full length of the project (minimum of 20 years). Therefore the local community may be granted the opportunity to improve their social and economic situation.

Generation of additional electricity	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Positive	Positive
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	Low cumulative impact (2) - The donations may improve the social and economic situation of the local community.	
Significance	Positive medium (30)	Positive medium (30)
Can impacts be mitigated?	No mitigation measure required.	

Indirect impacts: The operational phase will have an indirect negative impact through the change in the sense of place and an indirect positive impact through the provision of additional electrical infrastructure.

- Change in the sense of place – The site is characterized by open veldt with a rural agricultural sense of place. The surrounding area has already been subject to transformation in terms of

the power lines located in close proximity to the site. Since the number of sensitive receptors is also very low, the impact of a low-lying PV facility on the sense of place is expected to be insignificant.

Change in sense of place	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
Significance	Negative low (26)	Negative low (26)
Can impacts be mitigated?	Yes, mitigation measures relating to visual impacts are included in the EMPr.	

- Additional electrical infrastructure - The proposed solar facility will add to the existing electrical infrastructure in the immediate area and aid to lessen the reliance of electricity generation from coal-fired power stations. Due to the small scale of the project, the significance of this positive impact is low.

Additional Electrical Infrastructure	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Positive	Positive
Extent	Local (2)	Local (2)
Probability	Probable (2)	Probable (2)
Duration	Long term (3)	Long term (3)
Magnitude	Low (1)	Low (1)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	Medium cumulative impact (3)	
Significance	Positive low (14)	Positive low (14)
Can impacts be mitigated?	In order to maximise the benefits of the proposed project Subsolar Energy should use the project to promote and increase the contribution of renewable energy to the national energy supply.	

Indicate mitigation measures that may eliminate or reduce the potential impacts listed above:
 These measures are the same for each of the site alternatives and are given once only.

Alternative S1

All the operational impacts will be dealt with through the implementation of an EMPr included as Appendix F to the report.

5. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING AND CLOSURE PHASE

List the potential site alternative related impacts (as appropriate) that are likely to occur as a result of the decommissioning or closure phase:

Alternative S1 (preferred alternative)

Direct impacts: The physical environment will benefit from the closure of the solar facility since the site will be restored to its natural state. However, the decommissioning phase will result in the loss of employment and the generation of waste that will require management measures.

- Rehabilitation of the physical environment – The physical environment will benefit from the closure of the solar facility since the site will be restored to its natural state.

Rehabilitation of the physical environment	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Positive	Positive
Extent	Site (1)	Site (1)
Probability	Possible (2)	Probable (3)
Duration	Long term (3)	Long term (3)
Magnitude	Low (1)	Medium (2)
Reversibility	N/A	N/A
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
Significance	Negative low (7)	Negative low (16)
Can impacts be mitigated?	No mitigation measures required.	

- Generation of waste - The panels contain material that may be hazardous in nature if released into the environment. If the panels are intact, there will be no risk of exposure. The removal of the supporting infrastructure such as the concrete foundations, cabling, fencing and control rooms, etc. will generate waste. Some of the waste will where possible be recycled, for example steel support structures can be re-used elsewhere or melted down to form new products. The amount of waste will be limited and is not expected to significantly reduce the capacity of the local landfill. However, the project is estimated to last for 20-25 years and the current landfill site at Kimberley may at that stage (or sooner) reach its capacity. The applicant will need to assess the project lifespan and make suitable arrangements for waste disposal when the site is decommissioned.

Generation of waste	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Short term (1)	Short term (1)
Magnitude	High (3)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Medium cumulative impact (3) - An additional	

	demand on municipal services could result in significant cumulative impacts if services become unstable or unavailable.	
Significance	Negative medium (39)	Negative low (26)
Can impacts be mitigated?	Yes – refer to the EMPr, Appendix F.	

- Loss of employment - It is a general trend that over time there will be people leaving one job for another and so it is expected that there will periodically be staff turnover. At the stage where decommissioning becomes the next logical step, any staff employed at that time must be given adequate notice so that they may seek alternative employment.

Loss of employment	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Short term (1)	Short term (1)
Magnitude	High (3)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
Significance	Negative medium (33)	Negative medium (22)
Can impacts be mitigated?	Yes.	

Indirect impacts: No indirect impacts are anticipated from the decommissioning phase of the proposed development.

Indicate mitigation measures that may eliminate or reduce the potential impacts listed above:

Alternative S1

All the decommissioning impacts will be dealt with through the implementation of an EMPr included as Appendix F to the report.

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.

Global dependence on fossil fuels and the impacts of climate change is of global concern. South Africa’s energy is largely fossil fuel dependent and government therefore aims to incorporate more renewable energy into the energy mix and reduce carbon dioxide emission. The proposed solar facility is a step in this direction as this form of energy is considered to be a clean fuel which has not only local but also global benefits. The benefits of this proposed development with respect to social and economic factors outweigh the minor negative impacts.

The assessment suggests that all of the identified impacts can be effectively mitigated. It is the opinion

of the independent environmental assessment practitioner that none of the identified impacts could be regarded as significant enough to jeopardise the proposed development. Ultimately the mitigation and management of potential impacts needs to focus only on the most significant issues identified during the assessment. It can be concluded that the potentially most significant environmental impacts associated with the development relate to the following:

During the construction phase -

- Temporary employment and other economic benefits (positive medium)

During the operational phase -

- Increase in storm water runoff (negative low)
- Increase in consumption of water (negative medium)
- Leakage of hazardous materials (negative low)
- Security risks (negative medium)
- Permanent employment opportunities (positive medium)
- Generation of additional electricity (positive medium)
- Generation of income to the Local Municipality (positive medium)

During the decommissioning phase -

- Generation of waste (negative low)
- Loss of employment (negative medium)

To address these impacts, an environmental management programme (EMPr) is included under Appendix F. It is concluded that the overall negative impact of this development is low. For a detailed description of the assessment methodology and results refer to Appendix H.

SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?

YES	NO
-----	----

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

Not applicable.

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 Basic Assessment Report aimed at identifying significant environmental impacts and reasonable mitigation measures in order to facilitate sustainable and responsible development. It is the opinion of the independent environmental assessment practitioner that the proposed development will have a net positive impact for the area and will subsequently ensure the optimal utilisation of resources. All negative environmental impacts can further be effectively mitigated through the proposed mitigation measures. The following conclusions are made:

- The Basic Assessment Report complied with the specification set out in the EIA Regulations.
- The proposed mitigation measures will be sufficient to mitigate the identified impacts to an

acceptable level.

- No additional specialist studies are proposed on any environmental issue raised and thus, no terms of reference are provided for such studies.

Based on the contents of the report it is proposed that an environmental authorisation be issued for consideration by the Department of Environmental Affairs, which states (amongst other general conditions) that the photovoltaic solar facility and associated infrastructure on a Portion of Portion 24 of the farm Zoutpansfontein 34, Registration Division RD be approved subject to the following conditions:

- Implementation of the proposed mitigation measures set out in the specialist studies and the EMPr.
- The proposed solar facility must comply with all relevant national environmental laws and regulations.
- The proposed solar facility must conform to all relevant International and national environmental guidelines and standards.

Is an EMPr attached?

YES NO

The EMPr must be attached as Appendix F.

REFERENCES

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

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SOILKRAFT. 2012. Reconnaissance report and desk top study on the geotechnical conditions encountered at five proposed sites for the conversion of sun energy to electricity.

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SOL PLAATJE IDP. 2011. Integrated Development Plan: Planning 2011/12 to 2013/14.

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WORLD BANK GROUP. 2006. The Equator Principles.

Appendix A

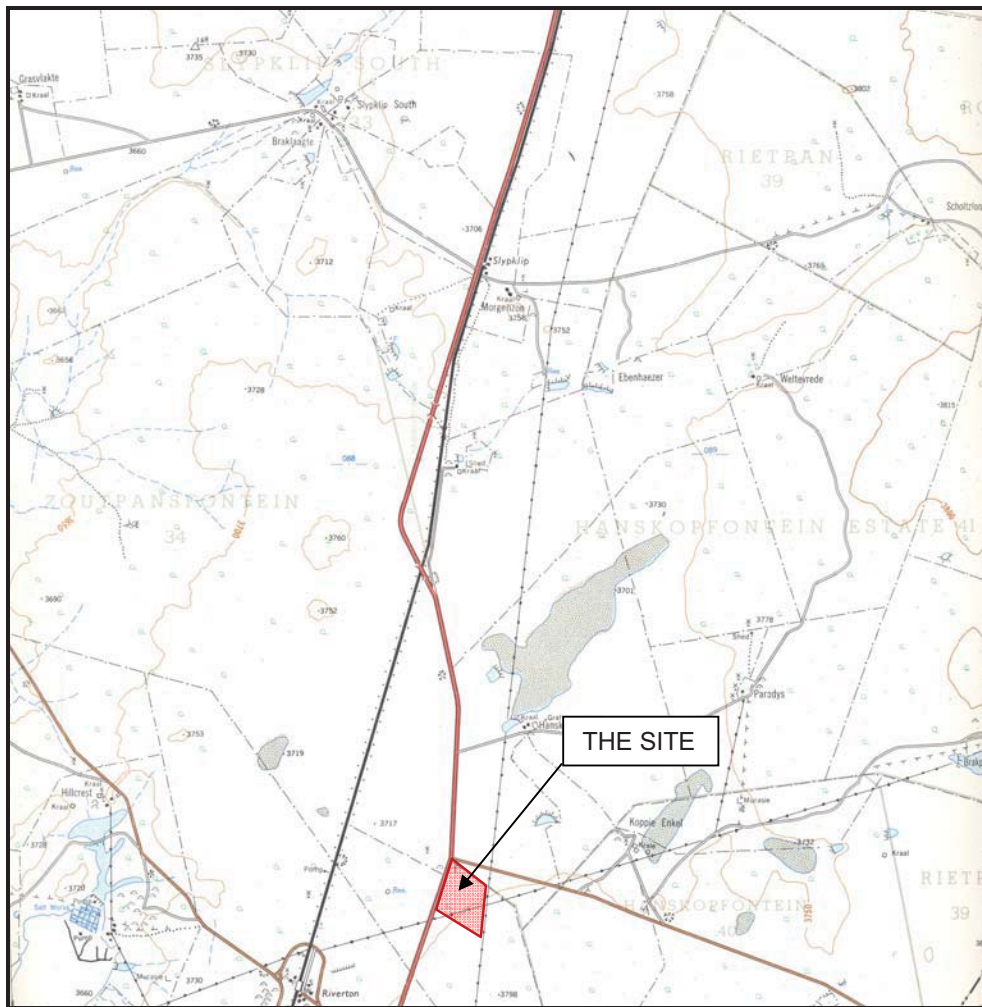
Site Plans

Figure 1 – Locality Map

Environamics
Environmental Consultants

**THE DEVELOPMENT OF A 19.5MW PHOTOVOLTAIC SOLAR PLANT AND ASSOCIATED
INFRASTRUCTURE ON A PORTION OF PORTION 24 OF THE FARM ZOUTPANSFOTEIN 34,
REGISTRATION DIVISION RD, SITUATED WITHIN THE SOL PLAATJE LOCAL MUNICIPALITY AREA
OF JURISDICTION**

1:50 000 Topographical Map – 2824BD Windsorton Road
GPS Coordinates: 28°29'24.46"S & 24°47'52.28"E



Environamics
Environmental Consultants

**THE DEVELOPMENT OF A 19.5MW PHOTOVOLTAIC SOLAR PLANT AND ASSOCIATED
INFRASTRUCTURE ON A PORTION OF PORTION 24 OF THE FARM ZOUTPANSFOTEIN 34,
REGISTRATION DIVISION RD, SITUATED WITHIN THE SOL PLAATJE LOCAL MUNICIPALITY AREA
OF JURISDICTION**

Google Earth Spot Image (2012)



Figure 2 – Regional Map

Environamics
Environmental Consultants

**THE CONSTRUCTION OF A 19.5MW PHOTOVOLTAIC SOLAR PLANT AND ASSOCIATED
INFRASTRUCTURE ON A PORTION OF PORTION 24 OF THE FARM ZOUTPANSFONTEIN 34,
SITUATED WITHIN THE SOL PLAATJE LOCAL MUNICIPALITY AREA OF JURISDICTION**

1:250 000 Topographical Map – 2824

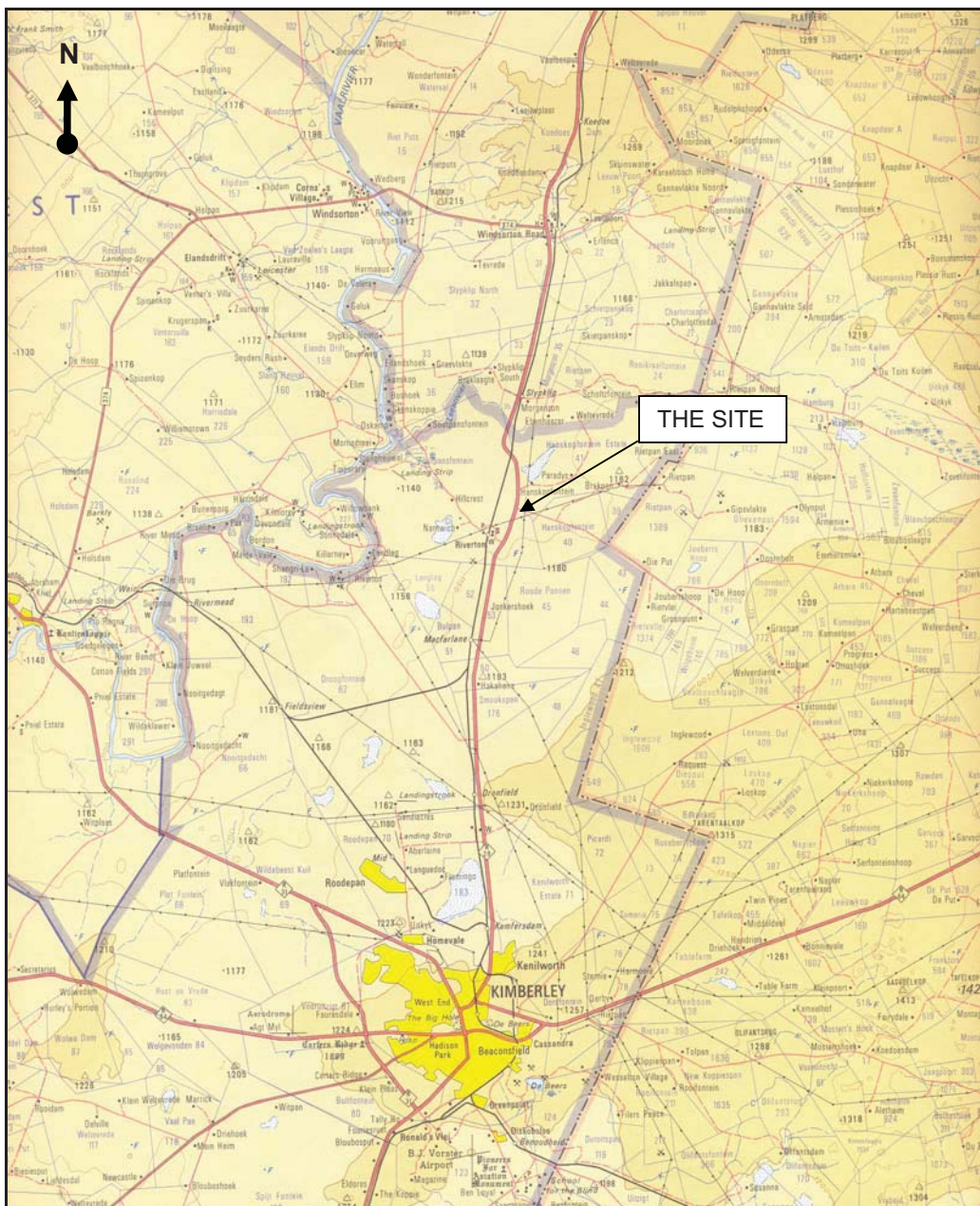
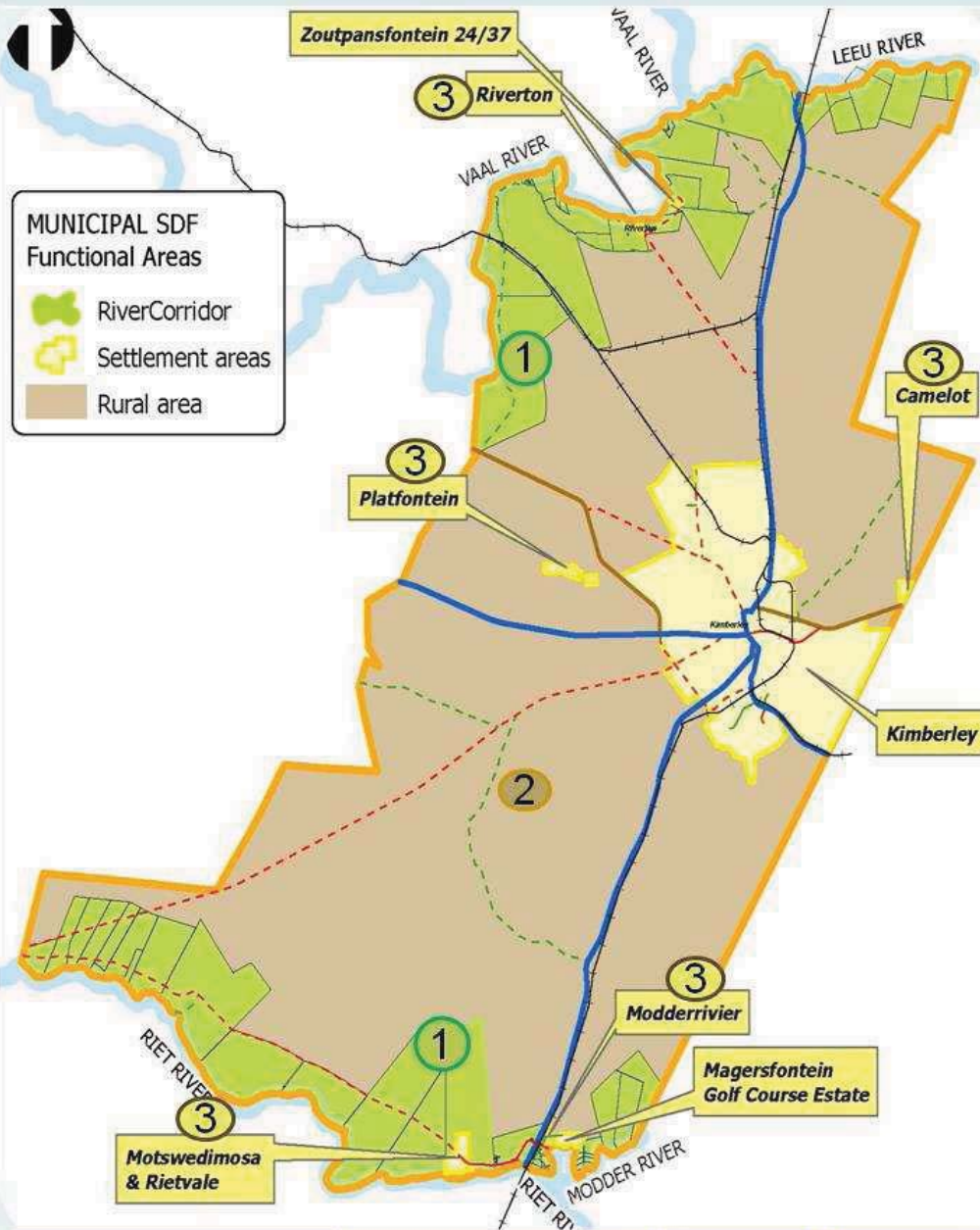


Figure 3 – Sol Plaatje Local Municipality SDF

MUNICIPAL SDF



1 River Corridor (Richie)	2 Rural Area	3 Settlement for Rural Support
<ul style="list-style-type: none"> To contribute to food security (small farms intensive agriculture) To contribute to tourism and recreational opportunities To protect ecological and archaeological heritage 	<ul style="list-style-type: none"> To contribute to food security (Extensive and Intensive Farming) To contribute to tourism and recreational opportunities (Hunting and animal conservation) To protect ecological and archaeological heritage 	<p><i>i.e.: Rietvale, Mottswedimosa, Modder River, Platfontein, Riverton and Camelot</i></p> <ul style="list-style-type: none"> Contain urban development Create sustainable communities Promote activities in support of rural area and river corridor

Appendix B

Photographs

**Key features of Portion 24 of the farm Zoutpansfontein 34, Registration Division RD,
Northern Cape Province**

Plate 1: The site from a north eastern direction



Plate 2: The site from an eastern direction



Plate 3: The site taken from a northern direction



Plate 4: The access off the N12 to Warrenton



Plate 5: The existing power lines east of the site
(taken from a northern direction)

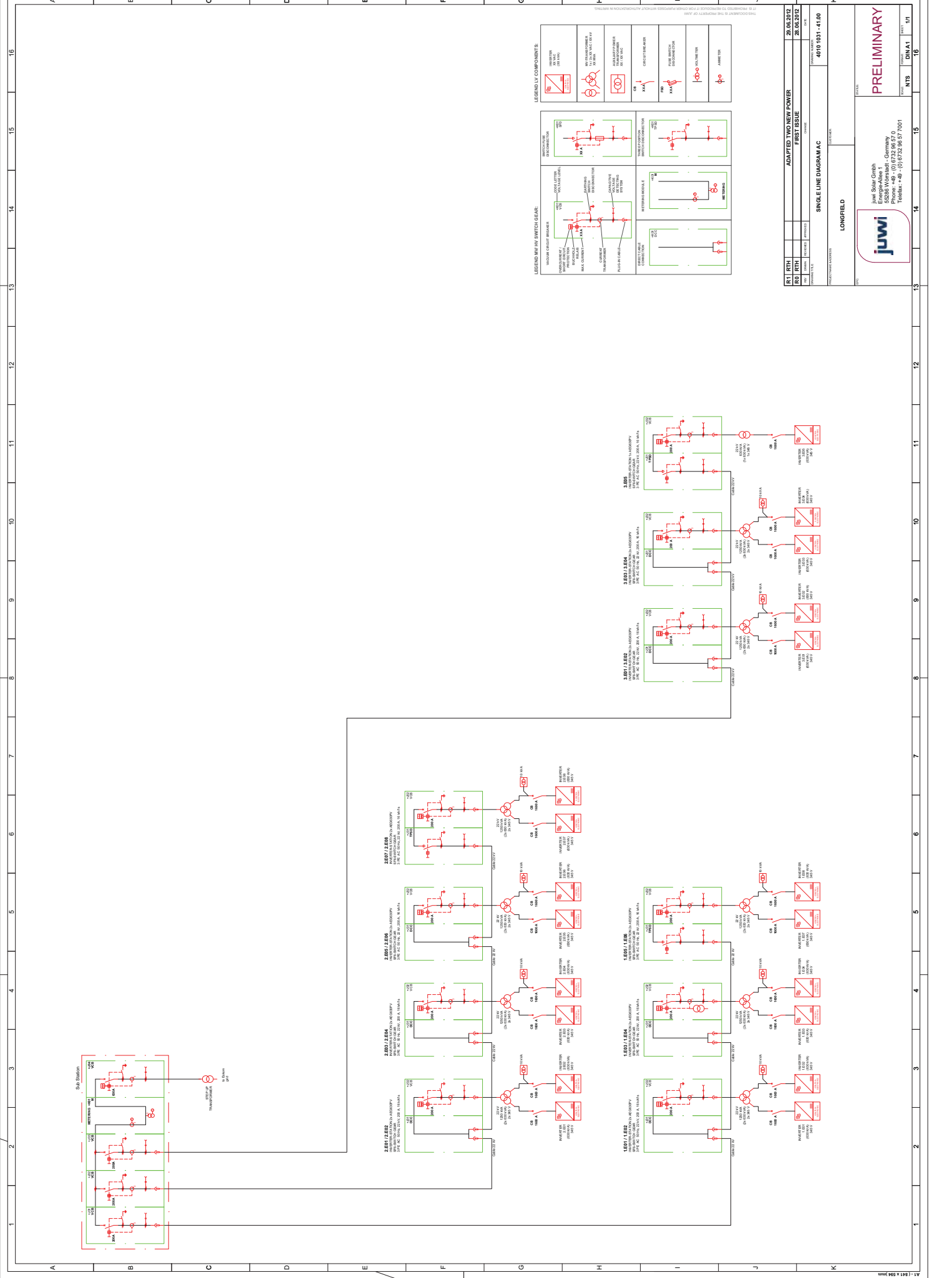


Appendix C

Facility Illustrations

A B C D E F G H I J K

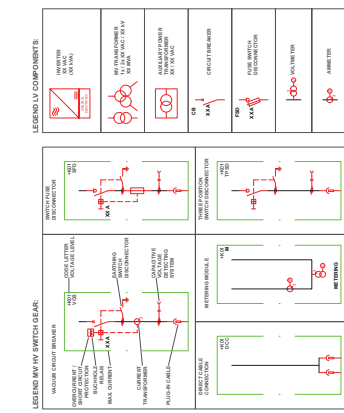
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16



LEGEND BY SWITCH GEAR



LEGEND BY COMPONENTS



RI	RTH	DATE	DESCRIPTION
20.08.2012	L. RTH		ADAPTED TWO NEW POWER
28.08.2012	G. RTH		FIRST ISSUE

LONGFIELD

juwi

Prof. Stefan Czuch
Energie-Akteur
55286 Wiesbaden - Germany
Tel.: +49 (0) 6322 98 52 7001
Telefax: +49 (0) 6322 98 52 7001

DATE: 20.08.2012
DRAWN: L. RTH
CHECKED: G. RTH

PROJECT: LONGFIELD

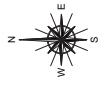
SCALE: 1:1

DINA 1

NTS

1/1

OVERALL MODULE LAYOUT
SCALE: 1:500



EXISTING WATERTANK
60.48m

DISTANCE TO THE BORDER
(= DISTANCE BETWEEN PV AREA AND FENCE) 8.0m

PV AREA : 18.01 ha
TOTAL AREA : 19.49 ha

EXTRN ROAD

8.00m

POWER LINE

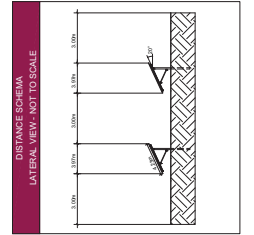
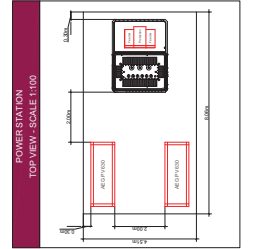
INTERNAL ROADS WIDTH : 3.50m

MAIN SUBSTATION

TO 132 kV
GRID CONNECTION

LEGEND	
	ARRAY
	POWER STATION (1USMA)
	POWER STATION (2USMA)
	FENCE
	PV AREA
	SITE BOUNDARY

PROJECT	
LATITUDE	28°29'27.72" S
SITE AREA	19.49 ha
PV AREA	18.01 ha
ROW TO ROW CLEARANCE	3.00 m
MODULE TILT	20°
NUMBER OF MODULES	52,320
INSTALLED CAPACITY	13.08 MWp
ARRAY TYPE	4x.12
TYPE OF ARRAY	FIXED
WAS CONNECTION	INAGE
TECHNOLOGY	BYD
MODULE	250 Wp
MODULE POWER	1640mm x 962mm
MODULE DIMENSIONS	18x AEG PV630
INVERTER	



REV	DATE	DESCRIPTION	BY	CHECKED
RT1	20.03.2012	TOTAL AREA REDUCED		
RO1	26.03.2012	FIRST ISSUE		

PROJECT DATA	
PROJECT NAME	LONGFIELD
PROJECT NO.	4010 1031 - 10.00
PROJECT DATE	

PRELIMINARY

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Tel: +49 (0) 6122 98 57 7000
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juwi

SCALE: 1:500

DINA1 1/1



juwi Solar Project

Longfield – South Africa

BYD 250 P6-30

juwi project no.: 4010 1031

juwi project manager: Luca Simonetti



Our proposed configuration Longfield with BYD 250 P6-30 13,08 MW_p

PV-area: 18,01 ha

- **Module:** 52.320 x BYD 250 P6-30 = 13,08 MW_p
that's 2.180 strings with 24 modules each

- **Array:** 1090 x 4H x 12
 - 4 rows with 12 modules each in portrait mounting
1 array = 2 electrical strings = 12,00 kW_p
 - 20° tilt angle
 - Array length approx. 20 m
 - Row to row clearance: 3 m

- **DC combiners:**
 - Appr. 70 x DCB (32 entrances) + fuses
 - Appr. 6 x DCB (16 entrances) + fuses

- **Power stations:**
 - 19 x AEG 630kVA
 - 6 x Nominal Power Ratio: 1,067 % (112 strings per inverter)
 - 13 x Nominal Power Ratio: 1,10 % (116 strings per inverter)

 - 9 x transformer LV/LV/MV 1.25 MVA
 - 1 x transformer LV/MV 630 kVA

- **Medium voltage cable type:**

Appendix D

Specialist Reports