



solairdirect

Basic Assessment for a Photovoltaic (PV) Solar Facility
Proposed by SolairDirect at Knapdaar Farm (No. 14)
near Springfontein, Free State Province

FINAL BASIC ASSESSMENT REPORT (AMENDED)

DEA Reference No.: 14/12/16/3/3/1/456

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July 2012

FINAL BASIC ASSESSMENT REPORT (AMENDED)



CSIR Report Number:
CSIR/CAS/EMS/ER/2012/0005/B

CSIR

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Opportunity for review:

This amended Final Basic Assessment Report (dated July 2012) is released to all stakeholders for a 21 day review period, as required by Regulations 56(3) and 56(6) of GN R543. Review comments are to be submitted to the DEA Case Officer and copied to the CSIR project manager by 17 August 2012 at the contact details below:

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SUMMARY

SolaireDirect Southern Africa (Pty) Ltd. proposes to establish a Photovoltaic (PV) Solar Facility of 10MW on the Remainder of Knapdaar Farm (No.14), located approximately 6 km south-east of Springfontein, in the Free State province.

The following potential negative impacts were identified (with the relevant project phase and post-mitigation significance ratings shown in brackets):

▪ **Direct Impacts**

- Loss of vegetation (construction phase: low)
- Alien plant invasion (operational phase: low)
- Soil erosion (construction and operational phases: low)
- Soil compaction and disturbance (construction phase: very low)
- Soil compaction, disturbance and clearing of vegetation for the placement of foundations (construction phase: low)
- Potential soil and groundwater/surface water contamination due to placement of foundations (construction phase: low)
- Soil contamination (construction phase and operational phases: low)
- Redistribution of sunlight, temperature and rainwater by solar panels and hard surfaces (operational phase: low (positive) - post mitigation)
- Potential impacts associated with the construction/presence of access roads (construction, operational and decommissioning phases: low)
- Uncontrolled access to the site camp and security concerns (construction phase: low)
- Presence and operation of construction vehicles on-site (construction phase: low)
- Negligence by construction workers (construction phase: low)
- Temporary decrease in air quality from dust (construction phase: low)
- Loss of habitat for fauna and livestock (construction phase: medium; operational phase: low)
- Loss of grazing land, agricultural land and change in land-use (construction and operation phases: low)
- Disruption of landscape connectivity for fauna (construction and operational phases: low)
- Negative impacts on avifauna (birds) (construction and operational phases: low)
- Temporary noise disturbance during construction (construction phase: low)
- Visual impact (construction phase: low; operational phase: medium-high)
- Increased water consumption (construction phase: medium; operational phase: low)
- Generation of grey water and sewage (construction and operational phases: low)
- Generation of solid waste (construction and operational phases: low; decommissioning phase: medium)
- Disturbance/degradation of drainage channels as a result of access by vehicles and/or personnel (construction phase: low)

- Erosion of drainage channels as a result of concentration of runoff into channels (construction phase: medium; operational phase: low)
- Changes in runoff quality and quantity, affecting habitat quality in dams and drainage lines (construction and operational phases: low)
- Potential disturbance and damage to heritage and archaeological artefacts (construction phase: low)
- Potential disturbance and damage to palaeontological features (construction and operational phases: low)
- Traffic impacts (construction and decommissioning phases: low-medium; operational phase: low)
- Potential impacts on family structures and social networks associated with the presence of construction workers (construction phase: low for community; moderate-high for individuals adversely affected individuals).
- Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of veld fires (construction phase: low)
- Potential loss of livestock and damage to farm infrastructure associated with the presence of construction workers on site (construction phase: low)
- Potential impact of the solar thermal plant on local tourism (operational phase: low (negative or positive))
- Disturbance or use of no-go areas (decommissioning phase: low)
- Termination of employment (decommissioning phase: low)
- **Indirect impacts:**
 - Change in the sense of place (construction phase: medium; operational phase: high)
 - Potential disturbance and damage to freshwater features (planning and design phase: low)
 - Visual impact (planning and design phase: medium-high)
- **Cumulative impacts:**
 - Additional water consumption in the Springfontein area (construction phase: medium; operational phase: low)
 - Cumulative visual impacts (construction and operational phases: high)
 - Cumulative impacts on biodiversity and ecology (construction and operational phases: low)
 - Cumulative impacts on heritage and archaeological features (construction and operational phases: none)
 - Cumulative impacts on palaeontological features (construction and operational phases: none)
 - Cumulative impacts on freshwater resources/features (construction and operational phases: medium)
 - Cumulative soil/land and agricultural potential impacts (construction and operational phases: none)
 - Cumulative impacts on family structures and social networks associated with the presence of construction workers (construction phase: low for community, medium-high for adversely affected individuals)
 - Cumulative traffic impacts (construction phase: low)
 - Cumulative impacts resulting from the loss of farmlands (construction phase: low-medium)

The following potential positive impacts were identified (with the relevant project phase and post-mitigation significance ratings shown in brackets):

- **Direct Impacts**
 - Permanent Employment and other economic benefits/business creation opportunities (operational phase: medium)
 - Temporary Employment and other economic benefits/business creation opportunities (construction phase: medium)
 - Generation of “green” power and increased surety of power supply (operational phase: medium)
 - Potential palaeontological impacts (construction phase: low, if features preserved)
 - Potential impact of the solar thermal plant on local tourism (operational phase: low (negative or positive))
 - Establishment of a community trust funded by revenue generated from the sale of energy (operational phase: high)
 - Promotion of clean, renewable energy (operational phase: medium)

- **Cumulative impacts:**
 - Increase in power supply in the Free state (operational phase: low)
 - Increase in electrical infrastructure in Kopanong Municipality (operational phase: medium)
 - Cumulative impacts on employment and business creation opportunities (construction phase: low; operational phase: low-medium)
 - Cumulative impacts of the solar thermal plant on local tourism (operational phase: low (negative or positive))
 - Cumulative impacts of the establishment of a community trust funded by revenue generated from the sale of energy (operational phase: high)
 - Cumulative impacts of the promotion of clean, renewable energy (operational phase: medium)

The only negative impacts of high significance (with mitigation) that have been identified relate to the cumulative visual impact of the project and the visual impact on the sense of place in the immediate vicinity of the PV facility. Given the limited height of the solar facility (installed panels are less than 4 m high above ground) and that there are no other solar PV facilities identified within 50km of the site that would contribute to a cumulative impact, these negative impacts are not considered to present “fatal flaws” to the project. Furthermore, there is a degree of subjectivity in assessing the visual impact of a solar PV project such as this, as the visual impact could be perceived as positive by stakeholders in that project presents the promotion of renewable energy with zero carbon emissions during operations. The promotion of renewable energy is an important strategic priority for South Africa, which is currently more than 90% dependent on coal-based power generation with associated CO₂ emissions and implications for global warming.

Based on the findings of this Basic Assessment process, it is therefore the opinion of the Environmental Assessment Practitioner, that there are no negative impacts that should be considered as “fatal flaws” from an environmental perspective, and thereby necessitate substantial re-design or termination of the project. Based on the findings of this Basic Assessment, and given national and

provincial strategic requirements for renewable energy, it is the opinion of the Environmental Assessment Practitioner that the project benefits outweigh the negative environmental impacts, and that the project will make a positive contribution towards steering South Africa on a pathway to sustainable development.

In order to avoid and/or manage the potential negative impacts, and enhance the benefits, an Environmental Management Programme (EMPr) has been compiled. The EMPr is a dynamic document that should be updated regularly and provides clear and implementable measures for the establishment and operation of the solar facility. All the mitigation recommendations from the specialist inputs (Appendix D) have been incorporated into the EMPr and accepted by the project proponent.

Provided that the specified mitigation measures are applied effectively, it is proposed that the project receive environmental authorization in terms of the EIA Regulations promulgated under the National Environmental Management Act (NEMA).



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

(For official use only)

File Reference Number:

Application Number:

Date Received:

12/12/2133

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

Kindly note that:

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

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:

Introduction and Background

SolaireDirect proposes to establish a 10 MW Photovoltaic (PV) Solar Facility on the Remainder of Knapdaar Farm (No.14), located approximately 6km south east of Springfontein in the Free State province with a farm boundary extent covering an area of approximately 2353 hectares. SolaireDirect has commissioned the CSIR to undertake the Basic Assessment (BA) process required for the project. The 21 digit Surveyor General code for the property is F0020000000001400000. The project proponent had also proposed to construct a 75MW Solar PV Facility on the same property, for which an Environmental Impact Assessment (EIA) process was initiated in November 2011. The BA and EIA processes will be run in parallel, and considering that specialist studies conducted for purposes of the EIA assess all features that fall within the property bounds, the information is largely applicable to the site location of the 10 MW solar facility, and will therefore be used as input into the BA Report (See Specialist Declaration of Interest Forms in Appendix G).

A draft BA report was compiled and made available to Interested and Affected Parties (I&APs) in March 2012. A review and comment period of 40 days was allocated for the review of the report. All comments received on the draft report are addressed in Section C, point 5 -7 of this report and the comment and response table as well as copies of the correspondence are included in Appendix E.

SolaireDirect is a solar photovoltaic (PV) developer, contractor and operator founded in 2006 and based in Paris & Aix-en-Provence (France). It is a vertically integrated power producer providing a turnkey solar power generation service. The company's current South-African interest is a solar panel manufacturing facility in Cape Town that was commissioned in early 2009, and currently has a number of solar photovoltaic projects under development. SolaireDirect has made significant private investment into the local renewable energy manufacturing industry in the past five years, with more than R50million invested in not only the photovoltaic module manufacturing facility in Cape Town, but also in solar farm development projects .

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.

This project is proposed as part of the Integrated Resource Plan (IRP) for South Africa (2010). The IRP proposes to develop 17 800 MW of renewable energy capacity by 2030. Early in 2011, the Department of Energy (DoE) made the decision to abandon the renewable energy feed-in tariffs, or REFIT, in favour of a competitive bidding process or “REBID”; also known as the Independent Power Procurement Program (IPPP). The REBID commits the government to the purchase of 1 450 MWp of generation capacity from PV solar farms over 5 individual bid submission dates, starting November 2011 and occurring approximately every 6 months until the end of 2013. If a bid is found to be ‘compliant’, the bid is then evaluated against certain stipulated evaluation criteria. The selection criteria include price, economic development, technical feasibility and grid connectivity, environmental acceptability, black economic empowerment, community development, and local economic and manufacturing propositions. The bidders whose responses rank the highest according to these criteria will be appointed Preferred Bidders by DoE. Preferred Bidders would then need to enter into an implementation agreement with the DoE and a power purchase agreement with a “buyer”, which will most probably be Eskom. Regular reporting to demonstrate compliance during the life of the project is a strict requirement, and non-compliance will result in progressive demerits, and may eventually result in cancellation of the PPA and other agreements. This project forms part of a pipeline of projects by potential developers to submit proposals for the financing, construction, operation and maintenance of any onshore wind, solar thermal, solar photovoltaic, biomass, biogas, landfill gas, or small hydro technologies.

Despite the small scale nature of the proposed solar energy facility, the electricity generated by this facility would feed into the national grid and assist in South Africa’s aim to procure 3 725 MW capacity of renewable energy by 2016 (the first round of procurement). This 3 725 MW is broadly in accordance with the capacity allocated to renewable energy generation in IRP 2010. The IRP 2010 allows for an additional 14 749 MW of renewable energy in the electricity blend in South Africa by 2030. In addition, ESKOM also recently indicated a capacity of 4 149 MW for power generated by independent power producers to the National Grid by 2012.

Project Description

The project involves the construction of a solar facility wherein solar panels will be erected on support structures. The electricity generated by the panels will then be transferred to inverters where it will be converted from direct current into alternating current. Once converted, the electricity will be transferred via overhead power lines to a nearby ESKOM substation and consequently feed into the electricity grid.

The project involves the construction of a solar facility wherein solar panels will be erected on support structures. For the proposed Valleydora solar facility, SolaireDirect will utilise Photovoltaic (PV) technology to generate electricity. PV power generation employs solar panels composed of a number of solar cells containing a photovoltaic material (in this case, crystalline silicon). PV technology utilises the principals of semiconductor technology and converts solar radiation into DC. This in turn is connected to inverters that convert DC to alternating current AC. The exact number of PV arrays and more detailed design specifications will follow as proposed Valleydora solar facility development progresses. PV technology consists of the following components:

- **PV cell** - A basic photovoltaic device, which generates electricity when exposed to solar radiation. All photovoltaic cells produce direct current.
- **PV module or panel** - The smallest complete assembly of interconnected photovoltaic cells. In the case of crystalline silicon cells - following testing and sorting to match the current and voltage, the cells are interconnected and encapsulated between a transparent front (usually glass) and a backing material. The module is then typically mounted in an aluminium frame.
- **Photovoltaic array** - A mechanically integrated assembly of modules and panels together with support structure to form a direct current power producing unit. The proposed solar energy facility would consist of antireflective modules arranged in numerous arrays.

The PV module dimensions that will be used for the proposed Valleydora solar facility:

Length	1 660 mm
Width	990 mm
Height	45 mm
Weight	19 kg

The actual construction and establishment of the facility will entail the following:

1. Site Clearing and Preparation

The site will need to be cleared of vegetation and debris, and topsoil removed and stockpiled on site for later use. Foundation and platform areas will be levelled and compacted in preparation for the casting of foundations.

2. Civil Works

The main civil works are:

- **Terrain levelling** - Levelling will be minimal as the potential sites chosen are relatively flat.
- **Access and inside roads/paths** - existing roads/paths will be used where possible. A safety firebreak band and roadway will be constructed around the perimeter of the site. On the same principle, road design will be determined within detailed engineering in accordance with SABS standards and South African road regulation requirements (e.g. compacted road layer works and crushed stone surfacing).
- **Trenching** - cabling sleeves shall be installed underground as part of the civil works. All DC and AC cabling will be installed at a minimum of 800mm below finished ground level and have a 200mm cover of sifted bedding soil. Three strips of warning tape will be placed on top of the layer of sifted bedding sand on either side and in the middle of trenches prior to trenches being filled in with unsifted bedding soil.

3. Transportation and Installation of PV Panels into an Array

The erection of solar module arrays on support structures in the form of strategically positioned steel or aluminium frameworks will be followed by the fixation of these structures into the ground either through deep seated anchor screws or concrete

foundations. Once these frames have been installed, the panels will be transported to site for erection.

It is anticipated that the following number of trips would be required:

- Delivery of panels: 42 loads consisting of 18.9 tons each on 12 m long trailers.
- Delivery of electrical equipment and components: four loads of 20 tons each.
- Delivery of frames: three loads of 20 tons each.
- Earthworks: 200 loads (potentially) of 10 m³ each to the identified Local Authority Landfill Site.

4. Connection to Array Enclosures

The electricity generated from the solar modules will be transferred to array enclosures which are positioned underneath the solar module mounting structures, an area of approximately 1m². These enclosures function to combine the power transmitted by numerous solar modules and enable its transmission via two Direct Current (DC) cables to inverter/transformer enclosures.

5. Wiring to Central Inverters/Transformers

Array enclosures are wired to central inverters/transformer enclosures which can have a rated power of 630Kw each at peak operation. A typical 630kw central inverter/transformer has an approximate width of 2.5-3m and a breadth of 2.7-3.3m. A total of up to sixteen central inverters/transformers will be installed for purposes of the Valleydora solar facility. Solar panels create direct current (DC). However, this needs to be converted into alternating current (AC) in order to feed into the grid. The central inverters/transformers function to convert DC current to AC current at grid frequency. They also contain step-up transformers that subsequently transform low voltage AC (350kW) to medium voltage AC (22KW) for distribution to the grid connection substation. Additional transformer bays may be required at the substations. However, the need for this will be established when the final designs are complete.

6. Connection to the Grid

The grid connection substation is a building, similar to a central inverter/transformer in appearance, and contains metal-clad circuit breakers that serve to combine the power generated by each inverter/transformer enclosure. The required protection equipment, such as circuit breakers, will be installed in the substation building to Eskom specifications. Electricity generated from the solar park will be transmitted via 22kV overhead cables to the Valleydora Substation, located approximately 800m south west of the centre point of the site over the railway line, and connected by a single monopole wooden or concrete structure, intended to be 10 m, 12m or 13m in height. The length of the power line connection from the PV facility to Valleydora Substation is dependent on which of the two alternative sites the facility will be located upon.

7. Auxiliary Electrical Infrastructure

Apart from the essential components of a solar power facility required for effective power generation, the installation of numerous other auxiliary electrical infrastructure is integral in ensuring optimal operation of the plant. In the case of the proposed Valleydora solar facility, these include diesel generator sets that will supply power to security and monitoring systems in the event of a grid failure, a security system

including fencing and access control, a fire detection system and weather monitoring equipment, plant monitoring equipment, and associated telecommunication links. In addition, air-conditioning equipment will be installed inside inverter/transformer enclosures to regulate their operating temperatures.

8. Supporting Infrastructure

A control facility/substation containing electrical infrastructure and protection circuitry would be constructed at the site and would have an approximate footprint of 400m². Other supporting infrastructure would include fire breaks, access roads, site perimeter fire breaks and site perimeter fencing (electrical palisade fencing of approximately 2.8m in height), access gates and a guardhouse (approximately 4m x 6m x 3m) situated at the site entrance to accommodate full time security on site during and after the construction phase of the project. Project maintenance would consist mainly of panel replacement, panel cleaning and other minor mechanical and electrical infrastructure repairs.

2. FEASIBLE AND REASONABLE ALTERNATIVES

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

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

Describe alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in 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.

Preferred Technology: Photovoltaic Solar Facility

Given the high irradiation values and restricted (and variable) water supplies within the vicinity of the Springfontein area, one of the best technologies for this region for the generation of electricity using renewable sources is photovoltaic solar systems.

Alternative Technology: There will be no alternative technologies considered

A common alternative to solar Photovoltaic power is Concentrated Solar Power (CSP). This technology requires high volumes of water thus presenting a major constraint for the utilisation of this technology type. While the irradiation values are high enough to generate sufficient solar

power, the water constraints render this alternative unfeasible. Other renewable energy technologies for example, wind power is also unsuitable due to a lack of requisite wind speeds in the Free State area.

An alternative technology was initially considered for the project, that being dual axis tracking. This technology makes use of an electric motor, mechanical parts, and solar irradiation sensors to track the movement of the sun ensuring that light coming into contact with the PV panels is optimised.

Tracking PV systems are mounted on a single pole-type structure on a concrete foundation. The spacing of the mountings must be undertaken to ensure minimum inter-shading between structures. Because of the movement of the structure, however, the distance between structures are much greater than with fixed structures, as the maximum height of a tracking structure could be up to 8m, depending on the exact model chosen. The implication of this is that less power can be installed on the same size of land when compared to fixed structures. Furthermore, the solar tracking motors consume power in order to move the solar PV modules. The consumed power will have to be deducted from the total generated power. Visual impact of the structures is high due to the overall height.

In calculations that were performed, a solar tracking-based system generated 7% less power per installed kW (peak) than a comparative fixed structure installation. This is mainly due to the power consumption of the tracking structures themselves.

The total cost of a solar tracking structure is roughly double the cost of a fixed structure. The fixed structure requires virtually no maintenance, but a tracking structure will require maintenance seeing as it is a moving structure. If these units are mounted in a sandy environment, maintenance requirements will increase.

Following detailed investigation and analysis, it was found that tracking technology is a feasible alternative but not preferred as it produces less power and costs more than fixed structures, for the land area under consideration.

Therefore, these alternatives will not be considered further in this report.

Property Alternatives

No other properties have been legally secured by SolaireDirect in the Springfontein area to potentially establish solar facilities. The current property satisfies the requirements for establishing a solar facility in terms of the terrain and the proximity to electrical transmission and distribution infrastructure (i.e. Valleydora Substation). Therefore no property alternatives will be considered in this report.

Site Alternatives

Two potential sites have been identified on Knapdaar Farm (No.14). The sites are located approximately 70-75m apart (refer to Appendix A1: Locality Map) and have similar site characteristics. Their differences, although slight, relate to the potential environmental impacts that will result from developing each of these areas, and their respective distances from existing power lines and the substation. At the draft report stage, Site 1 was indicated as being the preferred site. However, subsequently, Site 2 has now become the preferred alternative as it was recognized that locating the development on this piece of land will result in the occurrence of slightly less significant ecological, freshwater ecosystem and visual impacts. Therefore Site 2 is now the preferred location and Site 1 is the alternative. The relevant sensitivity maps and specialist reports are included in Appendix D (Section F). Given that the location options are very similar in nature, one environmental baseline description is provided and it represents both location options as shown in Appendix A (Section F). The differences in

Site Option 1(the alternative site)” and Site Option 2, or the “preferred site”, are highlighted in greater detail in Section D of this report under sub-sections 2 and 3.

Design and Layout Alternatives

1) Foundation for the mounting of solar panels

The one design option being considered at this stage relates to the structures on which solar panels will be mounted. These structures could either be based on a concrete foundation or a deep seated anchor screw. See Section D of this Final BAR for an assessment of the impacts associated with each of these alternative foundation types. A generic site layout has been prepared (Appendix C, Section F).

2) Site access routes

There are two potential site access routes that can be considered. Access Road Option 1 (approximately 300m in length) is the ‘preferred’ route and Access Road Option 2 (approximately 460m in length) is the ‘alternative’ route. Access Road Option 1 is the ‘preferred’ access route as the environmental impacts associated with the construction of this road are of a slightly lower significance than those associated with the construction of Access Road Option 2. This is due to Access Road Option 1’s shorter length, with most of the road forming part of an already existing road. The potential environmental impacts of each are very similar, and the development of either of these access road options is feasible. The associated impacts are discussed in Section D of this Final BAR. The location of these access routes can be seen in the Locality Plan, in Appendix C, Section F of this Final BAR.

The No-Go Alternative

If the project does not proceed, there will still be a need for alternative energy projects to supplement the current power requirements of the country. The site will remain unchanged and there will be no opportunities for temporary and permanent employment created through this project. This alternative is included as a baseline in this report, against which the project impacts are assessed.

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:	Latitude (S):		Longitude (E):	
Alternative S1 ² (preferred or only site alternative)	30 °	16.017'	25 °	45.000'
Alternative S2 (if any)	30 °	16.867'	25 °	45.567'
Alternative S3 (if any)				

² “Alternative S..” refer to site alternatives.

In the case of linear activities:

Alternative:

Latitude (S):

Longitude (E):

Alternative S1 (preferred or only route alternative)

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

30°	16.665'	25°	45.043'
30°	16.728'	25°	45.116'
30°	16.779'	25°	45.178'

Alternative S2 (if any)

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

30°	16.665'	25°	45.043'
30°	16.798'	25°	45.021'
30°	16.925'	25°	45.018'

Alternative S3 (if any)

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

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.

4. PHYSICAL SIZE OF THE ACTIVITY

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

Alternative:

Size of the activity:

Alternative A1³ (preferred activity alternative)

19.9 ha

Alternative A2 (if any)

Alternative A3 (if any)

or, for linear activities:

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):

Alternative:

Size of the site/servitude:

Alternative A1 (preferred activity alternative)

Alternative A2 (if any)

--

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

Alternative A3 (if any) [REDACTED]

5. SITE ACCESS

Does ready access to the site exist? (Yes, the site is accessible from the R30)
If NO, what is the distance over which a new access road will be built

YES [REDACTED]

Describe the type of access road planned:

The proposed Valleydora solar field will utilise the N1 national freeway and the auxiliary R715 for access to the site and no new access roads will be required. Dual access is envisaged for both security and for emergency purposes. In addition, a site internal road network will be developed to provide access to the solar park, and other infrastructure (i.e. substation and buildings). Access will be needed primarily for light service vehicles entering the site for maintenance, inspection and panel cleaning purposes. Two possible access routes are considered, referred to as Access Option 1 ('preferred' access) and Access Option 2 ('alternative' access). Furthermore, a safety firebreak band will be constructed around the perimeter of the site in order to prevent the spread of external fires entering the park. Existing farm roads will be used where possible.

The site road network will include turning circles for large trucks and passing points where necessary. All internal road infrastructure will fall outside of a 100 m buffer zone for wetlands/watercourses and ecologically sensitive areas will be avoided. All internal roads will require a width of approximately 6 m. Drainage trenches along the side of the internal road network will be installed. In addition, silt traps at the outfall of the drainage trenches to existing watercourses will be installed. A setback line of 95m along main and divisional roads as measured from the centre line of the applicable road reserve will be factored in.

Within the site itself, access will be required from the existing road to the individual facility components for construction purposes (and later limited access for maintenance). The access road between panels will consist of gravel.

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 (in Section F)** to this document.

The site or route plans must indicate the following:

- 6.1 the scale of the plan which must be at least a scale of 1:500;
- 6.2 the property boundaries and numbers of all the properties within 50 metres of the site;
- 6.3 the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
- 6.4 the exact position of each element of the application as well as any other structures on the site;

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

7. SITE PHOTOGRAPHS

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

8. FACILITY ILLUSTRATION

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

9. ACTIVITY MOTIVATION

9(a) Socio-economic value of the activity

What is the expected capital value of the activity on completion?

What is the expected yearly income that will be generated by or as a result of the activity?

Unknown at this stage – will depend on the tariff proposed to DOE.

R180 million	
R	
See adjacent explanation	
YES	
	NO

Will the activity contribute to service infrastructure?

Is the activity a public amenity?

<p>How many new employment opportunities will be created in the development phase of the activity?</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Site management: 22 Civil works: 27 Frames & foundations: 18 PV modules: 93 Electrical system & components: 44 employees Total: 204</p> </div>	<p>See adjacent explanation</p>
<p>What is the expected value of the employment opportunities during the development phase?</p>	<p>R18 million</p>
<p>What percentage of this will accrue to previously disadvantaged individuals?</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>The conditions of the contract between SolaireDirect and it's Subcontractors will include requirements for local Enterprise Development and Preferred Procurement.</p> </div>	<p>75% See adjacent explanation</p>
<p>How many permanent new employment opportunities will be created during the operational phase of the activity?</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>During the operation phase, the PV power facility is expected to create the following opportunities: General administration & maintenance: 8 employees Compliance related activities: 3 employees Performance monitoring of the PV power facility: 1 employee & Security: 12 employees. Total: 24</p> </div>	<p>See adjacent explanation</p>
<p>What is the expected current value of the employment opportunities during the first 10 years?</p>	<p>R 23.4 million</p>
<p>What percentage of this will accrue to previously disadvantaged individuals?</p>	<p>% See below explanation</p>

SolaireDirect intends to contribute a portion of their gross profit (before tax and depending on the project stage) to a local community trust that has been set up specifically for this project (SolaireDirect would be part of the board and have voting rights). The value of this contribution will be determined on finalisation of the tariff as part of the Power Purchase Agreement (PPA).

Note: The Project Company proposes to contribute approximately 1% of revenue towards Socio-Economic Development projects/initiatives in the province. It is envisaged that these funds will be directed into the account of a Local Community Trust and in turn will be administered in accordance with the Socio-Economic Development Strategy of the Local Municipality.

Mechanism

The shareholders of the proposed Valleydora Solar Project intend to set up a Local Community Trust (the "Trust") upon successful award of Preferred Bidder status. The Trust will be given a 2.5% shareholding in the Project Company.

The Trust will be administered by a Board of Trustees made up of key local stakeholders. The Trustees will include persons representing the following organisations:-

- The "Project Company"
- A local Accountant
- A local Lawyer
- 3 x NGO's

Funding of the Trust

The Trust will essentially benefit from two sources of revenue.

1. Dividends

As a 2.5% shareholder in the Project Company the Trust will receive dividends.

2. Socio-economic contribution payments

The Project Company has committed, as part of its bid response, to making a socio-economic contribution payment of 1% of Gross Revenue to the Trust.

This method of having the same entity as both a shareholder of the Project Company and the recipient of the socio-economic contributions from the Project Company implies that the Trust will have funds available from an early stage in the project life, rather than having to wait for what could be several years for dividend payments if it were only a shareholder.

Distribution of funds

The Trust will issue a request for socio-economic project proposals on an annual basis. The criteria for selection will be fully developed and detailed in the relevant documentation and interested parties will be invited to present their proposal in person to the Trustees.

Project proposals will be adjudicated and awarded by all Trustees in a fair and equitable manner, ensuring that the needs of the community are being met.

Based on the assessment of the Trustees, the Trust will then make a formal offer of financial assistance to the relevant project initiators, including the agreed contract terms and payment milestones.

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?		NO
2.	Does the proposed land use fall within the relevant provincial planning framework?		NO
3.	<p>If the answer to questions 1 and / or 2 was NO, please provide further motivation / explanation:</p> <p><u>Provincial Level Policy and Planning</u></p> <p>The Free State Provincial Growth and Development Strategy (FSPGDS) is a nine-year strategy (2004-2014) which aims to achieve the objectives of Vision 2014. As a provincial policy framework, it sets the tone and pace for shared growth and development in the Province. The FSPGDS identifies a number of key provincial priorities. The priorities that are relevant to the proposed PV solar energy facility include:</p> <ul style="list-style-type: none"> • Economic development, employment, and investment; • Human and social development. Economic growth is underpinned by a good socio-economic environment. <p>Furthermore, the following key objectives are set for economic development, employment and investment:</p> <ul style="list-style-type: none"> • To achieve an economic growth rate of 6%-7% per annum; • To reduce unemployment from 30% to 15%; • To reduce the number of households living in poverty by 5% per annum; • To provide adequate infrastructure for economic growth and development. <p>The installation and operation of a PV solar energy facility in the Free State will provide infrastructure that will serve to reduce unemployment levels by creating a number of job opportunities for local communities and in so doing promote economic growth and development.</p> <p><u>District Level Policy and Planning</u></p> <p>The Xhariep District Municipality IDP 2010/11 states that one of its key opportunities is, “diversifying production of energy from renewable sources such as biomass and rivers and solar to ensure both the price competitiveness of agriculture and help meet South Africa’s CO² reduction targets.” The proposed solar PV project will contribute directly towards this imperative.</p> <p>In addition, the Free State Development Corporation (FDC) has identified and fully appreciates the potential for solar energy projects in the larger Xhariep District Municipality DM (including the Kopanong Local Municipality) due to the excellent solar radiation rate in southern Xhariep District Municipality (only surpassed by that of Upington) and the availability of land for such developments.</p>		

Local Level Policy and Planning

The most recent Kopanong Local Municipality Integrated Development Plan (IDP) appears to have been approved for the financial year 2010/2011.

The developmental policy contained in the Kopanong Local Municipality Integrated Development Plan (IDP) is underpinned by the national Strategic Plan for Local Government 2006-2011, the Free State Provincial Growth and Development Strategy (FSGDS), the national Accelerate and Shared Growth Initiative – South Africa (2006-2014) (ASGISA), and the 2009 national Local Government Turn Around Strategy (re. service delivery challenges and financially sustainable local government).

The Key Priority Areas (KPA) as given in the Kopanong Local Municipality IDP which are of specific relevance to the proposed photovoltaic solar energy facility include:

- KPA 2: Improved Basic Service Delivery And Infrastructure Investment
- KPA 3: Local Economic Development

KPA 2: Improved Basic Service Delivery And Infrastructure Investment

How the proposed development will contribute towards achievement of this priority goal:

In terms of the Kopanong Municipality IDP (2010/2011), to address the urgent need for improved basic service delivery and encourage investment in infrastructure, the municipality aims to “ensure the provision of adequate and sustainable electricity services to all consumers” by extending and upgrading the existing network and infrastructure. In addition, the establishment of a fully functional power generating facility will effectively increase investment in infrastructure on a local scale.

KPA 3: Local Economic Development

How the proposed development will contribute towards achievement of this priority goal:

A key objective in terms of Kopanong Local Municipality’s IDP is, “to create an environment that is conducive for investors to invest in both urban and rural areas, including the availability of suitable land for a variety of uses, e.g. business, commercial and industrial.” The construction and operation of the proposed 10MW solar facility will assist in attracting further investment into rural areas which have, in the past, been avoided by investors. However, realization of the suitability of such areas for the construction of solar parks has augmented the inflow of both national and international investments into the country. This ultimately gives rise to a number of benefits; one of the most significant being economic growth and development. Furthermore, the employment opportunities generated throughout the project life cycle of the proposed PV plant will provide numerous job opportunities for residents and assist in alleviating poverty levels.

The Kopanong Local Municipality IDP (2010/11) notes that the municipality has a high level of illiteracy especially in the rural areas due to a lack of facilities and adequate resources. The lack of quality education in rural areas has exacerbated rural depopulation and increased urban in-migration which in turn has contributed to social

	<p>problems brought about by unemployment. Of the 3 Local Municipalities that make up the Xhariep District Municipality, the Kopanong Local Municipality has the highest number of employed people in the District estimated at over 35 961 (2006) people in the formal and informal employment market. However, according to the Kopanong Local Municipality IDP (2010/11), approximately 40.2% of people in the Municipality are living in poverty. Considering this, the proposed solar facility will act to uplift communities within the municipality by increasing employment opportunities, decreasing the number of households living in poverty by providing a monthly income to employees, and thereby boosting local economic development.</p>
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DESIRABILITY:			
1.	Does the proposed land use / development fit the surrounding area?	YES	
2.	Does the proposed land use / development conform to the relevant structure plans, SDF and planning visions for the area?	YES	
3.	Will the benefits of the proposed land use / development outweigh the negative impacts of it?	YES	
4.	If the answer to any of the questions 1-3 was NO, please provide further motivation / explanation:		
5.	Will the proposed land use / development impact on the sense of place?		NO
6.	Will the proposed land use / development set a precedent?	YES	
7.	Will any person's rights be affected by the proposed land use / development?		NO
8.	Will the proposed land use / development compromise the "urban edge"?		NO
9.	<p>If the answer to any of the question 5-8 was YES, please provide further motivation / explanation.</p> <p>According to the Kopanong Local Municipality 2010/2011 IDP document, electricity demand in the local area is growing, especially in rural areas It is a key focus of the Municipality's infrastructural analysis to ensure that its residents benefit from improved access to electricity. To attain this, the municipality can use alternative energy supplies to improve electricity supply.</p> <p>To this end, solar energy is an alternative energy source that can be fed into the existing electricity grid. This will contribute to a reduction in the use of fossil fuels (i.e. coal) to generate electricity.</p> <p>The use of alternate energy sources is often listed as a goal in various planning documents. If unlisted, their utilisation will however facilitate the achievement of several other goals specified in provincial, regional or local plans. This project will, if approved, and properly executed show how alternative energy sources can be successfully integrated into mainstream power supply and aid in the meeting of infrastructural goals for the region.</p>		

BENEFITS:		
1.	Will the land use / development have any benefits for society in general?	YES <input checked="" type="checkbox"/>
2.	<p>Explain:</p> <p>The development of solar facilities will have several benefits for society in general, five of which are discussed below:</p> <ul style="list-style-type: none"> <p>• Reduced Air Pollution, Carbon Dioxide Emissions and Water Consumption</p> <p>Solar energy facilities have a much smaller carbon footprint than coal power stations as they make use of solar energy, a renewable resource, to produce electricity. The impact on the natural landscape is thus also of a lower significance as there is no need for coal mines that result in more severe and longer term impacts. The additional power supplied through solar energy will reduce the reliance on combustion of fossil fuels to produce power. This has a direct impact on the volume of pollution produced as a result of fossil fuel combustion i.e. the volumes of carbon dioxide and other air pollutants will also decrease. In addition, coal power requires high volumes of water, in areas of South Africa where water supply is already over-stretched and water availability is highly variable.</p> <p>• Lower costs of Alternative Energy</p> <p>The greater the number of solar facilities being commissioned, the lower the costs of power generation through PV technology will be. This will contribute to the country's objectives of utilising more renewable energy and less fossil fuel based power sources.</p> <p>• Increased Surety of Supply and Increased Quantity of Available Power</p> <p>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, and even exceeded without increasing pollution in relation to the use of fossil fuels.</p> <p>• Improved Living Standards for Rural Populations</p> <p>An increase in power supply means that rural electrification can be more easily achieved. Electrification brings about opportunities for development of institutions such as clinics, hospitals and schools. There is the possibility of access to the internet, radio and television, as well as development of water treatment facilities and sanitation. By introducing these improvements, there may be a reduced need for rural –urban migration.</p> <p>• Economic Development and Employment Opportunities</p> <p>By supplying power to an area, there exists the potential to develop industries and businesses.</p> 	
3.	Will the land use / development have any benefits for the local communities where it will be located?	YES <input checked="" type="checkbox"/>
4.	Explain:	

<p><u>Creation of Employment Opportunities and Poverty Reduction</u> The main benefit of the proposed project operating near the Springfontein area is that local companies or contractors could be hired during the construction period (8-10 months). This will create temporary employment opportunities for locals. Additionally during the operational phase, 8-10 security guards are likely to be employed on a full time basis and 4-6 operation and maintenance labourers to clean the panels will also be required on a permanent basis. The labour contract between the developer and contractors who are appointed to provide services for the developer during the construction phase of the development should, inter alia, specify local labour employment criteria, e.g. percentage of total workforce. This will provide a number of households with a source of income and concomitantly reduce the poverty levels of communities.</p> <p><u>Economic Growth and Development</u> The additional power supply will likely result in more reliable power supply to the town and consequent opportunities for business expansion. This could add to the economic output of the town.</p>

10. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

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

Title of legislation, policy or guideline	Administering authority	Date
<p>Government Gazette 33306 GN R 544: Activities 1 and 23:</p> <p>1. The construction of facilities or infrastructure for the generation of electricity where: ii) the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare.</p> <p>23. The transformation of undeveloped, vacant or derelict land to – (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.</p>	National Department of Environmental Affairs	2010
<p>Government Gazette 33306 GN R 546 Listing Notice 3, Activity 14</p> <p>14. The clearance of an area of 5 hectare or more of vegetation where 75% or more of the</p>	National Department of Environmental Affairs	2010

coverage constitutes indigenous vegetation – (a) i. All areas outside urban areas.		
National Environmental Management Act (Act 107 of 1998)	National Department of Environmental Affairs	1998
National Environmental Management: Air Quality Act (Act 39 of 2004)	National Department of Environmental Affairs	2004
National Environmental Management: Waste Act (Act 59 of 2008)	National Department of Environmental Affairs	2008
National Environmental Management: Protected Areas Act (Act 57 of 2003)	National Department of Environmental Affairs	2003
National Veld and Forest Fire Act (Act 101 of 1998)	National Department of Environmental Affairs	1998
Water Services Act (Act 108 of 1997)	National Department of Environmental Affairs	1997
Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act 36 of 1947)	National Department of Environmental Affairs	1947
Hazardous Substances Act (Act 15 of 1973)	National Department of Environmental Affairs	1973
Agricultural Pests Act (Act 36 of 1983)	National Department of Environmental Affairs	1983
Environmental Conservation Act (ECA) (No 73 of 1989 Amendment Notice No.1183 of 1997)	National Department of Environmental Affairs	1997
National Environmental Management: Biodiversity Act (NEMBA) (Act 10 of 2004)	National Department of Environmental Affairs	2004
National Forests Act (No. 84 of 1998)	National Department of Environmental Affairs	1998

Conservation of Agricultural Resources Act (Act 43 of 1983)	National Department of Environmental Affairs	1983
National Heritage Resources Act (NHRA) (25 of 1999)	National Department of Environmental Affairs	1999
National Water Act (NWA) (Act 36 of 1998)	National Department of Environmental Affairs	1998
The National Energy Act (2008)	National Department of Environmental Affairs	2008
The White Paper on the Energy Policy of the Republic of South Africa (December 1998)	National Department of Environmental Affairs	1998
The White Paper on Renewable Energy (November 2003)	National Department of Environmental Affairs	2003
Integrated Resource Plan (IRP) for South Africa (2010-2030)	National Department of Environmental Affairs	2010-2030
Integrated Environmental Management (IEM) guideline series published by DEA (various documents dated from 2002 to present)	National Department of Environmental Affairs	2002 onwards
Local Government Turn Around Strategy	National Department of Environmental Affairs	2009
Accelerate and Shared Growth Initiative – South Africa (2006-2014)	National Department of Environmental Affairs	2006-2014
Free State Nature Conservation Ordinance 8 of 1969	Provincial Department of Environmental Affairs	1969
Free State Provincial Growth and Development Strategy (2004-2014)	Provincial Department of Environmental Affairs	2004-2014
Xhariep District Municipality IDP 2010/11	Xhariep District Municipality	2010-2011
Kopanong Local Municipality Integrated Development Plan (2010-2011)	Kopanong Local Municipality	2010-2011

*** N.B. The application for environmental authorisation for listed activities 11(x), (xi) and 18 (i) are withdrawn. The positioning of the project on site has now been determined and we confirm that it will not fall within 32 meters of a watercourse. Soil will furthermore not be moved or removed from a watercourse, or deposited into a watercourse. The listed activities related to watercourses that were initially applied for are therefore no longer applicable with respect to the project.**

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	<input type="checkbox"/>
-----	--------------------------

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

222 m ³

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

Construction waste will most likely consist of concrete (if concrete foundations are utilised to support mounting structures) mixed with scrap metal. It is recommended that all concrete mixing be undertaken on impermeable plastic lining to prevent contamination of the soils and surrounding areas. Construction solid waste will be managed via a Construction Environmental Management Plan (EMP) and will incorporate reduction, recycling and re-use principles. The contractor shall remove refuse collected from the working areas at the site at least once a week. Furthermore, all builders' rubble generated during the construction phase shall be removed from the site regularly to a licensed landfill site.

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

All construction wastes will be collected and temporarily stored in skips on site. The skips will be emptied into trucks and waste taken to the nearest registered landfill. Any scrap metal will be sent for recycling.

Will the activity produce solid waste during its operational phase?

YES	<input type="checkbox"/>
-----	--------------------------

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

0.2 m ³

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

Waste in the form of general waste will be produced by on-site labourers. A contracting party will be responsible for the disposal of general wastes in accordance with municipal guidelines and policies.

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

General wastes will temporarily be stored in skips on-site. A contracting party will be responsible for the periodic emptying of skips, and the transportation and subsequent disposal of all wastes.

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?

<input type="checkbox"/>	NO
--------------------------	----

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

Is the activity that is being applied for a solid waste handling or treatment facility? YES 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?

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:

E-mail:

Cell:

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?

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:

During the construction phase, dust will be generated from the clearing of vegetation and movement of vehicles accessing the site. Given that the site has pre-existing areas of open sand and tracks (from previous power line construction), the dust generated during construction is not expected to be significantly more than is currently experienced at the site on any given day.

Trucks will bring in water for the cleaning of panels and more frequently for refuse removal once per annum. However, the generation of dust and vehicle emissions is likely to be negligible. The settling of dust on solar panels affects the overall efficiency of power generation. It is therefore in the proponent's best interests to minimise the dust from the site. Approved soil stabilizing agents may need to be used to minimise dust. No emissions would be generated from the actual functioning of the facility during the operational phase as solar energy facilities operate by converting solar energy to electricity. The proposed facility would in fact assist in reducing South Africa's carbon emissions in the long term by contributing to Government's renewable energy target.

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?

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, noise will be generated by the construction activities, workers and vehicle on the site. The levels of noise are not expected to be very high and furthermore any potential receptors are likely to be the farm workers that tend the sheep. However, the sheep farming activities are not routinely undertaken in the area or the surrounds. The site is at least 6km from the edge of Springfontein residential areas. Therefore construction noise is not expected to influence these nearest residential areas.

During the operational phase there will be no noise generated.

Noise generation would be limited to the construction phase and is thus considered to be short-term and of low significance.

12. WATER USE

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

	Other (see explanation below)	
--	-------------------------------	--

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:

N/A

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

YES

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 project developer will apply to the Department of Water Affairs for a Water Use Licence. The Department of Water Affairs will give preference to the assessment of Water Use Licence Applications submitted by “preferred bidders”. Hence, should the proponent be appointed as a “preferred bidder”, the process to apply for a Water Use Licence will be followed and the required application forms will be submitted accordingly.

The water source has not yet been determined; however should the landowner contain a lawful water licence, arrangements will be made with him for water use, on consent from the Department of Water Affairs.

The most significant quantities of water will be used in the construction phase of the development to facilitate construction-related activities, such as concrete-mixing (if concrete foundations are opted for as anchorage for mounting structures) and dust control. A total of approximately 5.4 million litres of water would be required for the construction phase of the project, of which an amount of 575,586 litres would be required for concrete-mixing, and a quantity of 4,800,000 litres for dust control and consumption purposes.

During the operational phase of the project, the main activities usually requiring water use include the maintenance or “up-keep” of solar panels and meeting the domestic needs of security and operational staff on site. In the case of this particular project, solar panels would be cleaned manually with a window washer type device covered with a specialized cloth material, such as a squeegee, a soft brush or cloth, on an annual basis. Hence, no water will be required for cleaning purposes. Water will only be required for consumption by on-site labourers.

13. ENERGY EFFICIENCY

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

The design takes the position of the optimum solar radiation into account in order to efficiently capture solar energy. The proposed solar energy facility would generate electricity from a renewable source, i.e. solar energy, and thereby promote the use of more energy efficient technologies for power production.

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

Not applicable

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	
-----	--

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:

- Remainder of Knapdaar Farm (No. 14)

The property is located adjacent to the N1 road on the right side travelling toward Trompsburg. The farm lies approximately 6km south-east of Springfontein.

(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:

The proposed sites are currently used as grazing camps for small livestock farming and agricultural purposes.

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	
-----	--

Must a building plan be submitted to the local authority?

YES	
-----	--

- 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)

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat

Alternative S2 (if any):

Flat

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: site option 1	Alternative: site option 2
Shallow water table (less than 1.5m deep)	NO	NO
Dolomite, sinkhole or doline areas	NO	NO
Seasonally wet soils (often close to water bodies)	NO	NO
Unstable rocky slopes or steep slopes with loose soil	NO	NO
Dispersive soils (soils that dissolve in water)	NO	NO
Soils with high clay content (clay fraction can exceed 40%)	YES	YES
Any other unstable soil or geological feature	NO	NO
An area sensitive to erosion	YES	YES

Note: Site options 1 and 2 are located on Swartland type soils characterised by a clay content that may exceed 40% and a high sensitivity to erosion (site options are shown on maps contained in Appendix A, Section F). However, the implementation of mitigation measures will decrease the negative impacts associated with erosion (see Appendix F: EMPr). A specialist study was undertaken for the property and is included in Appendix D4 (Section F).

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 with scattered aliens ^E

Note: The overall level of alien infestation can be considered low to negligible. Also, the veld condition is relatively poor with signs of overgrazing present.

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 (i.e. Xhariep Karroid Grassland and Besemkaree Koppies Shrubland species dominates the sites)

- 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)

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

The proposed project will not in any way impact upon the railway line. Likewise, there will be no impacts on the proposed activity resulting from the existing railway line.

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

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. N/A

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?

NO

See discussion below.

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:

A discussion on the findings of archaeological and palaeontological studies conducted are presented below:

Heritage and archaeological studies:

A Heritage Impact Assessment (HIA) was conducted to locate and evaluate the significance of cultural heritage sites, archaeological material, manmade structures older than 60 years, sites associated with oral histories and graves that might be affected by the proposed development. The study likewise aimed to assess the potential impact on archaeological and historical material and to recommend specific mitigation measures to avoid the risk of any damage or destruction of the finds during the construction and operation of the proposed developments. The HIA was done in terms of the National Heritage Resources Act (NHRA), (25 of 1999) and under the Environmental Conservation Act, (73 of 1989).

The study indicated the Free State province is closely associated with Iron Age archaeology, and that stone tools are likely to occur on flat Karoo vegetation areas and along the foothills of mountains or against koppies and hills characterising the property of interest. Furthermore, in a series of Environmental Impact Assessments (EIA) previously done in the Springfontein region, we have learnt that Anglo-Boer War remnants could be found in the vicinity of Springfontein. Some of the most possible finds could include fired cartridge shells and metal food containers displaying heavily soldered seams.

On the site visit conducted on the 06 of February 2012, a single piece of a soldered tin canned milk container dating from the Anglo-Boer War (1899-1902) was found on the surface opposite the N1 and adjacent to the Kuilfontein farm stall. Furthermore, it was discovered that over time the present farm house at Knapdaar had been renovated and extended into a modern dwelling. It is alleged that the original farm house was used as a hospital by the British Military Forces during the Anglo-Boer War (1899-1902). Judging by the large size of the trees on the farm yard it is clear that the farm could be very old. In addition, gates which appears to be hand made by a smithy protects the railway crossings on the farm. These features which bear witness of expert workmanship are of special interest, and should be protected and preserved in some way.

The Anglo-Boer War finds are not considered to be of significant heritage importance. Furthermore, no other cultural and historical material or graves were found during the investigation, nor were there any stone tool material visible. The HIA also revealed that the implementation of mitigation measures is not required for the specified area of development. It was further recommended that the planning of the proposed the PV Solar installation on the farm Knapdaar, No. 14 outside Springfontein may proceed.

Palaeontological studies:

The palaeontological significance of the affected area was evaluated through a desktop study and carried out on the basis of existing field data, database information and published literature.

The affected area is underlain by Late Permian Beaufort Group sediments of the lower Adelaide (Pa). These sediments form the base on which younger, weakly developed superficial deposits of Late Cenozoic age have been deposited and include pedocretes, colluvial slope deposits, sheet wash and alluvium. There are no objections to the proposed development on palaeontological grounds provided that access by a specialist should be facilitated at the appropriate stage during the construction phase of the development. Also, newly uncovered objects of palaeontological significance, found during the course of excavation activities must be reported to the appropriate heritage authorities. It must be noted that such finds may require a Phase 2 rescue operation at the cost of the developer.

The Draft and Final Basic Assessment Reports were sent to the Provincial Heritage Resources Authority of the Free State, as well as SAHRA for their review and comments.

NOTE: A response to the project announcement was received from SAHRA (letter dated 29 February 2012 in Appendix G). This response indicated that they acknowledge the proposed project. They also stated that the developer must ensure that an accredited heritage specialist provides an archaeological and palaeontological impact assessment report (Phase 1 of a Heritage Impact Assessment), and that appropriate mitigation measures must be implemented if applicable. These archaeology and palaeontology studies undertaken have provided an assessment of potential impacts and have also indicated whether a Phase 2 assessment would be required. These specialist studies are included in Appendix D of this Final BAR and all mitigation measures recommended are included in Appendix F of the Final BAR.

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

Note from CSIR:

The approach to the public participation (including authorities) for this BA process is presented below in sub-section 7 of Section C, as well as in Appendix E (Stakeholder Engagement) in Section F (Appendices).

1. ADVERTISEMENT

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

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

- (e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to—
 - (i) illiteracy;
 - (ii) disability; or
 - (iii) any other disadvantage.

2. CONTENT OF ADVERTISEMENTS AND NOTICES

A notice board, advertisement or notices must:

- (a) indicate the details of the application which is subjected to public participation; and
- (b) state—
 - (i) that the application has been submitted to the competent authority in terms of these Regulations, as the case may be;
 - (ii) whether basic assessment or scoping procedures are being applied to the application, in the case of an application for environmental authorisation;
 - (iii) the nature and location of the activity to which the application relates;
 - (iv) where further information on the application or activity can be obtained; and
 - (v) the manner in which and the person to whom representations in respect of the application may be made.

3. PLACEMENT OF ADVERTISEMENTS AND NOTICES

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

Advertisements and notices must make provision for all alternatives.

4. DETERMINATION OF APPROPRIATE MEASURES

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

5. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments and respond to each comment of the public before the application is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to this application. The comments and response report must be attached under Appendix E.

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.

Note: list of I&APs, authorities and contact details in Appendix E, Section F

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:

National authorities:

- Department of Agriculture, Forestry and Fisheries
- Department of Environmental Affairs
- Department of Water Affairs
- Department of Mineral Resources
- Department of Energy

Provincial authorities:

- Department of Agriculture
- Department of Water Affairs
- Department of Economic Development, Tourism and Environmental Affairs
- Department of Sport, Arts, Culture and Recreation (Free State Heritage Resources Authority)
- Free State Tourism Authority

Local authority:

- Kopanong Local Municipality

Other key authorities:

- South African Heritage Resources Agency (SAHRA)
- Civil Aviation Authority (CAA)
- South African National Roads Agency Limited (SANRAL)
- National Energy Regulator of South Africa (NERSA)
- Wildlife and Environment Society of South Africa (WESSA)

List of authorities from whom comments have been received:

National authorities:

Department of Environmental Affairs (DEA)

- Dated: 01 March 2012
- *via*: facsimile and post

Provincial authorities:

Department of Agriculture and Rural Development (DARD)

- Representative: Ms. Nosisa Ndumo (Engineering Control Technician - Provincial Department of Agriculture)
- Date: 21 February 2012
- *via*: Key Stakeholder Meeting

Department of Water Affairs (DWA)

- Representative: Mr. Carlo Schrader (Technician)
- Dated: 21 February 2012
- *via*: Key Stakeholder Meeting

Department of Economic Development, Tourism and Environmental Affairs (DETEA)

- Representatives: Ikhraam Osman (HOD - Provincial Department of Economic Development, Tourism and Environmental Affairs), Thabo Makweya (Head of Strategic Projects - Provincial Department of Economic Development, Tourism and Environmental Affairs), Mr Coenie Erasmus (Environmental Manager - Provincial Department of Economic Development, Tourism and Environmental Affairs)
- Dated: 21 February 2012
- *via*: Key Stakeholder Meeting

Department of Sport, Arts, Culture and Recreation - Free State Heritage Resources Authority (FSHRA)

- Representative: Ms. Loudine Philip (Member: Heritage Free State: Permit Committee)
- Dated: 06 March 2012
- *via*: e-mail

Other key authorities:

South African Heritage Resources Agency (SAHRA)

- Mr. Andrew Salomon (Member: Archaeology, Palaeontology and Meteorite Unit)
- Dated: 29 February 2012
- *via*: postage

Civil Aviation Authority (CAA)

- Representative: Mr. Christopher Isherwood (Obstacle Specialist)
- Dated: 16 February 2012
- *via*: e-mail

Free State Heritage Authority (FSHA)

- Representative: Ms. Ntando Mbatha
- Dated: 13 April 2012
- *via*: email

Ward Councillor: Kopanong Municipality

- Representative: Mr. S.A. Sola
- Dated: 03 April 2012
- *via*: email

Note: See Appendix G for the above-mentioned e-mail and letter correspondence. Below we have listed the key stakeholder meetings with authorities together with a brief summary of the discussions that took place.

Key Stakeholder meeting with the Provincial Department of Agriculture

(Representative: Ms. Nosisa Ndumo)

Date: 21 February 2012

Time: 11:30 a.m. – 12:30 p.m.

Individuals present: Nosisa Ndumo (Engineering Control Technician - Provincial Department of Agriculture) Reggie Niemand (SolaireDirect), Ismail Banoo (CSIR), Samantha Naidoo (CSIR)

Outline of discussion:

Nosisa Ndumo: Will arable lands be utilised for the development?

Reggie Niemand: No, arable land will not be used for the proposed development. The facility will be constructed on land categorised as having low agricultural potential, and which is currently being used for the grazing of livestock.

Nosisa Ndumo: For how long is the lease on the land valid?

Reggie Niemand: The lease covers a period of 25 years, with the option to renew or decommission the project thereafter.

Nosisa Ndumo: Did SolaireDirect obtain approval of the project from the Department of Energy and ESKOM?

Reggie Niemand: SolaireDirect will submit all pertinent information to the Department of Energy and Eskom for project approval once the Record of Decision (ROD) from the Department of Environmental Affairs is obtained.

Nosisa Ndumo: Will SolaireDirect provide the Department of Agricultural Affairs with information indicating approval of the project from the Department of Energy and Eskom?

Reggie Niemand: The Department of Agriculture will be greatly involved in the project during conduction of the Basic Assessment process. However, SolaireDirect will most definitely provide the Department of Agriculture with all requested information. The CSIR will also facilitate the active involvement of the Department of Agriculture in the public participation process for the Basic Assessment being conducted for this project.

Nosisa Ndumo: SolaireDirect must indicate the land on which the proposed solar facility will be located so that the provincial department can provide this information to the Department of Agriculture offices in Pretoria for application of lease agreement and change of landuse.

Reggie Niemand: SolaireDirect will provide this information as soon as a ROD is obtained from the Department of Environmental Affairs.

Nosisa Ndumo: What if such projects act to change the attitude and perspective of farmers towards agriculture?

Reggie Niemand: Such projects are unlikely to cause significant changes in the attitude of farmers as they will only be constructed on farms where substation capacity in the area supports them. Hence, agriculture will remain the major source of income for the majority of farmers in the Glen and Springfontein areas.

Reggie Niemand: Will the land portion utilised for construction of the solar facility require a special zone in terms of rezoning?

Nosisa Ndumo: Yes, a special zoning will be required. However, the portion of land will still remain zoned for agriculture.

Nosisa Ndumo: Will water be used for cleaning of the solar panels?

Reggie Niemand: No, a window-washer type device will be used for cleaning purposes. Water will only be used during the construction phase of the project.

Nosisa Ndumo: Will the project generate employment opportunities for local communities?

Reggie Niemand: Yes. Between 35 and 40 employment opportunities will be created during the operational phase of the project, 16 of which are permanent. SolaireDirect will also initiate a Trust, comprising of local authority representatives, a community representative as selected by the community and members of the SolaireDirect company. The Trust will operate such that a percentage of the income generated from operation of the solar facility will be utilised to fund community projects in line with the local municipality's Integrated Development Plan (IDP).

Nosisa Ndumo: Why are the proposed solar projects near Bloemfontein and Springfontein (the 75MW and 10MW projects) split?

Reggie Niemand: Given the shorter period required for the completion of a Basic Assessment process in comparison to full Environmental Impact Assessment process, SolaireDirect intends to use the 10MW solar facility to bid in Round Three of the bidding process.

Nosisa Ndumo: How long has SolaireDirect been operating in South Africa?

Reggie Niemand: Since the year 2009. SolaireDirect has made significant investment in the local energy market since then.

Reggie Niemand: Will it be possible for you to distribute all information pertinent to all proposed projects to the relevant persons within the Department?

Nosisa Ndumo: Yes I will.

Nosisa Ndumo: I am happy that the project proposes to benefit the local community in a number of ways. Thank you for proposing projects that have a core focus on community upliftment.

**Key Stakeholder meeting with the Provincial Department of Water Affairs
(Representative: Mr. Carlo Schrader)**

Date: 21 February 2012

Time: 13:30 p.m. – 14:15 p.m.

Individuals present: Carlo Schrader (Industrial Technician - Provincial Department of Water Affairs) Reggie Niemand (SolaireDirect), Ismail Banoo (CSIR), Samantha Naidoo (CSIR)

Outline of discussion:

Carlo Schrader: Where will water be sourced from for use in the proposed project? Will arrangements be made with the landowner or will water be extracted from a natural water source?

Reggie Niemand: SolaireDirect intends on making arrangements with the land owner to use his/her existing water use licence, on consent from the Department of Water Affairs.

Reggie Niemand: However, which of these will be the best option?

Carlo Schrader: I recommend using the property owner's water use licence. In this case, the registered water use will have to be changed from agricultural use to industrial use.

Reggie Niemand: Will SolaireDirect be required to fill in any forms regarding water use?

Carlo Schrader: Yes. SolaireDirect will have to fill in a form to register their water use and indicate that a change in land use activities, from agricultural to industrial, will occur.

Ismail Banoo: If 100m buffers (as accepted by the provincial Department of Water Affairs) are added to all existing water features, and sensitive areas are thereby avoided, will developing on the property be acceptable?

Carlo Schrader: Yes.

Ismail Banoo: Should section 21 (a) be applied for in this projects?

Carlo Schrader: At this stage, section 21 (f) is applicable to the projects.

Carlo Schrader: The Department of Water Affairs needs to determine whether the landowner's water use is lawful.

Reggie Niemand: If the owner's water use is found to be unlawful, will this prevent SolaireDirect from applying for water use?

Carlo Schrader: No, SolaireDirect can still apply for water use.

Carlo Schrader: Is the intended water source covered in the lease agreement between SolaireDirect and the landowner?

Reggie Niemand: Yes it is. However, should SolaireDirect opt to use the deep-seated anchor screw option instead of concrete foundations on their mounting structures then water use may not be required.

Ismail Banoo: Will it be possible for the Provincial Department of Water Affairs to provide the CSIR with a letter indicating that the Department is aware of the proposed projects and that Water Use Licence Application processes may have to be followed should these projects be accepted in the next Round of bids?

Carlo Schrader: Yes, the Department will supply such a letter. If water volumes to be used are found to be very low, then water use registration may not be required.

Key Stakeholder meeting with the Provincial Department of Economic Development, Tourism and Environmental Affairs (Representatives: Mr. Ikhraam Osman, Mr. Thabo Makweya and Mr. Coenie Erasmus)

Date: 21 February 2012

Time: 14:30 p.m. – 15:30 p.m.

Individuals present: Ikhraam Osman (HOD - Provincial Department of Economic Development, Tourism and Environmental Affairs), Thabo Makweya (Head of Strategic Projects - Provincial Department of Economic Development, Tourism and Environmental Affairs), Mr Coenie Erasmus (Environmental Manager - Provincial Department of Economic Development, Tourism and Environmental Affairs), Reggie Niemand (SolaireDirect), Ismail Banoo (CSIR), Samantha Naidoo (CSIR)

Reggie Niemand: These sites were selected based on proximity to substations that were found to have sufficient capacity to support the project.

Coenie Erasmus: What will be the cumulative impact of the development of solar facilities at a broader scale?

Ismail Banoo: The cumulative impact will be much smaller than that of power being generated via the conventional coal-based method. They do not result in the release of pollutants into the atmosphere that act to reduce air quality and deteriorate the health and well-being of communities. Solar facilities produce a number of positive impacts which benefit people immensely and support the need for a switch over to 'greener' methods of power production in South Africa.

Ikhraam Osman: Will a relaxation on any environmental laws applicable to the project be applied for? Are there any project-related activities or associated tasks that complicate the normal procedure to be followed regarding application for environmental authorisation?

Ismail Banoo: No.

Ikhraam Osman: Given this, the procedure should run smoothly.

Reggie Niemand: Are there any steps that SolaireDirect or the CSIR can take to ensure that the procedure is not delayed?

Coenie Erasmus: If all the relevant information is supplied to the Department, then there should be no delays.

Site visit by DEA case officer, 5 June 2012

A site visit was conducted with Linda Poll-Jonker (DEA case officer), Reggie Niemand (SolaireDirect) and Samantha Naidoo (Environmental Assessment practitioner, CSIR) on 5 June 2012.

7. CONSULTATION WITH OTHER STAKEHOLDERS

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

Proof of any such agreement must be provided, where applicable.

Has any comment been received from stakeholders?

YES

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

The following summarises the issues raised by I&APs, copies of the comments received are included in Appendix E.

1. Environmental impacts associated with the presence of solar panels on the property

Are solar panels harmful to the environment?

2. Request to review specialist studies (Heritage and Visual)

The request was noted and the heritage, archaeology and visual studies were sent to the Free State Heritage Resources Authority for comment. At that stage, only an archaeology study was conducted. Thereafter a palaeontology study was undertaken, as requested (see number 2 below). Furthermore, a visual study was conducted at the draft report stage which reflected the scope of the study. Therefore, a visual study reflecting more clearly the significance ratings of potential impacts was completed and is included in the final report (Section F, Appendix D5).

3. Requirement of a Palaeontology Study to be conducted

It was noted that a palaeontology study was not undertaken at the commencement of the project. A palaeontology study must be conducted by an accredited local palaeontologist to determine if sensitive areas occur on the proposed development site. This is important as the Free State is known for its abundance of palaeontological features. Free State Heritage Resources Authority also requests that the Visual Impact Assessment conducted be provided for review.

4. Comment on the Draft Basic Assessment Report from the Free State Heritage Resources Authority (FSHRA)

The Draft Basic Assessment Report was discussed by the FSHRA Committee members on Tuesday the 10th of April 2012. It was stated that Committee members are happy with both the Glen Thorne and Valleydora Draft Basic Assessment Reports and have suggested that the recommendations on the report be adhered to. They further stated that the reports are well written and there is nothing the Committee feels necessary to add on.

APPROACH TO THE PUBLIC PARTICIPATION PROCESS

1) PROJECT INITIATION AND LAUNCH PHASE

- Submission of project application forms (24/01/12)
- Acknowledgement and acceptance of applications by the DEA (14/02/12)
- Notifying I&APs of Basic Assessment processes
 1. Placement of adverts serving as Notification of Basic Assessment processes in 2 local newspapers – 1 in English and 1 in Afrikaans
 - Express: 22/02/12
 - Volksblad: 21/02/12
 2. Distribution of letters and BIDs *via post* (10/02/12)

30 DAY COMMENTS AND I&AP REGISTRATION PERIOD

- Site visit: 20/02/12 – 21/02/12

2) REPORTING PHASE

- Completion of Draft Basic Assessment Reports and release into the public domain (16/03/12)
- Notifying key stakeholders and I&APs of the release of Draft Basic Assessment Reports by the distribution of letters *via post* (16/03/12)

40 DAY I&AP AND AUTHORITY COMMENT PERIOD

- Consider all comments received, provide responses and include in the Final Basic Assessment Report.
- Completion of Final Basic Assessment Reports and release into the public domain (08/05/12)
- Notifying key stakeholders and I&APs of the release of Final Basic Assessment Reports by the distribution of letters *via post* (08/05/12)

21 DAY I&AP COMMENT PERIOD

3) AUTHORITY DECISION-MAKING PHASE

- Department to acknowledge receipt of Final BARs in 14 days
- Department to accept/refuse the Final BAR
- Department to inform EAP and applicant of its decision
- Placement of adverts serving as Notification of Record of Decision in 2 local newspapers + notifying key stakeholders and I&APs by the distribution of letters *via post*

N.B: Refer to Appendix E for copies of all letters sent to I&APs, and Appendix G for other correspondence with I&APs and key stakeholders.

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:

1. Environmental impacts associated with the presence of solar panels on the property.
2. Request to review specialist studies (Heritage and Visual)
3. Requirement of a Paleontology Study to be conducted.

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 Annexure E):

- 1. Environmental impacts associated with the presence of solar panels on the property**
English: Solar panels act to absorb, not reflect, solar radiation. Solar panels utilise solar energy to generate electricity and are thus not as significant a threat to the environment as conventional coal-burning methods of electricity production. In fact, the use of solar facilities for power generation will reduce air pollution and other significant environmental impacts associated with coal-burning technologies.
Afrikaans: Sonpanele reflekteer nie sonstraling nie, dit absorbeer dit. Sonpanele gebruik sonkrag om elektrisiteit op te wek en is dus nie so 'n beduidende bedreiging vir die omgewing as konvensionele steenkoolverbranding metodes vir die opwekking van elektrisiteit nie. Trouens, die gebruik van sonkrag fasiliteite vir kragopwekking verminder lugbesoedeling en ander belangrike omgewingsimpakte wat verband hou met steenkoolverbranding tegnologie.
 - 2. Request to review specialist studies (Heritage and Visual)**
The Free State Heritage Resources Authority requested to review any heritage (archaeology and palaeontology) and visual studies. At that stage, only an archaeology study was conducted. The Free State Heritage Resources Authority thereafter requested that a palaeontology study be conducted (see number 2 below). Furthermore, a visual study was undertaken at the draft report stage which reflected the scope of the study. Therefore, a visual study reflecting the significance ratings of potential impacts was completed and is included in the final report (Section F, Appendix D5).
 - 3. Requirement of a Palaeontology Study to be conducted**
An accredited palaeontologist, based in the Free State, was appointed to carry out the required palaeontology study subsequent to Free State Heritage Resources Authority's request (See Appendix D for copy of the report). The information attained was included in the Draft BA Report. A copy is also included in this Final report. Palaeontological baseline data for the area and the significance of potential impacts on palaeontological features are highlighted in Sections B and D of this report.
 - 4. Comment on the Draft Basic Assessment Report from the FSHRA**
Comments noted.
- N.B:** Full responses are provided in the Comments and Response Report in Appendix E6.

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.

APPROACH TO THE BASIC ASSESSMENT

1) METHODOLOGY OF IMPACT ASSESSMENT

According to the DEA IEM Series guideline on "Impact significance" (2002), there are a number of quantitative and qualitative methods that can be used to identify the significance of impacts resulting from a development. The CSIR's approach to determining significance is generally as follows:

- i. Use of expert opinion by the specialists ("professional judgement"), based on their experience, a site visit and analysis, and use of existing guidelines and strategic planning documents and conservation mapping (e.g. SANBI biodiversity databases),
- ii. Review of specialist assessment by all stakeholders including authorities such as nature conservation officials, as part of the report review process (i.e. if a nature conservation official disagreed with the significance rating, then the rating could be discussed with the specialist),
- iii. A qualitative approach, based on professional judgement, available standards and guidelines, and review by all stakeholders.

Typically, an impact is ascribed 'high' significance when:

"High" significant impacts are definite factors informing the decision-making in the EIA/BA process. Often no mitigation is possible for "high" significance impacts & therefore requires re-design of the project in order to avoid the impact.

2) SPECIALIST CRITERIA FOR IMPACT ASSESSMENT

The following methodology has been provided by CSIR to all specialists, for incorporation into specialist EIA/BA assessments:

Assessment of potential impacts

The assessment of impact significance should be based on the following conventions:

Nature of impact - this reviews the type of effect that a proposed activity will have on the environment and should include "what will be affected and how?"

Spatial Extent - this should indicate whether the impact will be:

- Site specific;
- Local (<2 km from site);

- Regional (within 30 km of site);
- National.

Duration - The timeframe during which (lifetime of) the impact will be experienced:

- Temporary (less than 1 year);
- Short term (1 to 6 years);
- Medium term (6 to 15 years);
- Long term (the impact will cease after the operational life of the activity);
- Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient).

Intensity - here it should be established whether the impact is destructive or innocuous and should be described as either:

- High (severe alteration of natural systems, patterns or processes such that they temporarily or permanently cease);
- Medium (notable alteration of natural systems, patterns or processes; where the environment continues to function but in a modified manner);
- Low (negligible or no alteration of natural systems, patterns or processes); be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);

Probability - this considers the likelihood of the impact occurring and should be described as:

- Improbable (little or no chance of occurring);
- Probable (<50% chance of occurring);
- Highly probable (50 – 90% chance of occurring);
- Definite (>90% chance of occurring).

Reversibility - this considers the degree to which the adverse environmental impacts are reversible or irreversible. For example, an impact will be described as low should the impact have little chance of being rectified to correct environmental impacts. On the other hand, an impact such as the nuisance factor caused by noise impacts from wind turbines can be considered to be highly reversible at the end of the project lifespan. The assessment of the reversibility of potential impacts will be based on the following terms:

- High reversibility of impacts (this is the most favourable assessment for the environment.)
- Moderate reversibility of impacts
- Low reversibility of impacts
- Irreversibility of impacts (this is the least favourable assessment for the environment: the impact is permanent)

Irreplaceability - this reviews the extent to which an environmental resource is replaceable or irreplaceable. For example, if the proposed project will be undertaken on land that is already transformed and degraded, this will yield a low irreplaceability score; however, should a proposed development destroy unique wetland systems for example, these may be considered irreplaceable and thus be described as high. The assessment of the degree to which the impact causes irreplaceable loss of resources will be based on the following terms:

- High irreplaceability of resources (this is the least favourable assessment for the environment.)
- Moderate irreplaceability of resources
- Low irreplaceability of resources
- Resources are replaceable (this is the most favourable assessment for the environment.)

The status of the impacts and degree of confidence with respect to the assessment of the significance must be stated as follows:

Status of the impact: A description as to whether the impact will be:

- Positive (environment overall benefits from impact),
- Negative (environment overall adversely affected), or
- Neutral (environment overall not affected).

Degree of confidence in predictions: The degree of confidence in the predictions, based on the availability of information and specialist knowledge. This should be assessed as:

- High,
- Medium, or
- Low.

Based on the above considerations, the specialist must provide an overall evaluation of the significance of the potential impact, which should be described as follows:

- **Low to very low:** The impact may result in minor alterations of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated.
- **Medium:** The impact will result in moderate alteration of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated).
- **High:** The impact could have a “no-go” implication for the project unless mitigation or re-design is practically achievable. This could result if:
 - impacts exceeds a legal standard (e.g. SANS noise limit exceeded);
 - impacts contravene specified priorities, e.g. if the project footprint intruded on areas mapped as Ecosystem Support Areas or Critical Biodiversity Area by SANBI and ground truthing by the specialist confirms this high-level mapping. (It must be noted that sometimes these high-level SANBI CBAs are not actual what exists on the ground, and needs to be checked by specialists); or
 - impacts lead to potential species extinction or national scale impacts.

Furthermore, the following is considered in the assessment process:

- Impacts should be described both before and after the proposed **mitigation** and management measures have been implemented.
- All impacts should be evaluated for both the construction, operations and decommissioning **phases** of the project, where relevant.
- The impact evaluation should take into consideration the **cumulative effects** associated with this and other facilities which are either developed or in the process of being developed in the region, if relevant.

Management actions:

Where negative impacts are identified, specialists must specify practical mitigation objectives (i.e. ways of avoiding or reducing negative impacts). Where no mitigation is feasible, this should be stated and the reasons given. Where positive impacts are identified, management actions to enhance the benefit must also be recommended. The specialists should set quantifiable standards for measuring the effectiveness of mitigation and enhancement.

Monitoring:

Specialists should recommend monitoring requirements to assess the effectiveness of mitigation actions, indicating what actions are required, by whom, and the timing and frequency thereof.

Management Actions and Monitoring of the Impacts (EMPr):

- Where negative impacts are identified, mitigatory measures will be identified to avoid or reduce negative impacts. Where no mitigatory measures are possible this will be stated.
- Where positive impacts are identified, augmentation measures will be identified to potentially enhance positive impacts.
- Quantifiable standards for measuring and monitoring mitigatory measures and enhancements will be set. This will include a programme for monitoring and reviewing the recommendations to ensure their ongoing effectiveness.

Cumulative Impact:

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

Mitigation:

The objective of mitigation is to firstly avoid and minimise impacts where possible and where these cannot be completely avoided, to compensate for the negative impacts of the development on vegetation and animal habitats and to maximise re-vegetation and rehabilitation of disturbed areas. For each impact identified, appropriate mitigation measures to reduce or otherwise avoid the potential impacts are suggested. All impacts are assessed without mitigation and with the mitigation measures as suggested appropriately implemented.

3) ASSESSMENT OF CUMULATIVE IMPACTS FROM THE ESTABLISHMENT OF SIMILAR PROJECTS IN THE LARGER AREA

According to investigations undertaken, there are no similar developments within a 50km radius of the project area. According to the IPP process, a 50km radius is used to define what should be classified as 'local'. Two Photovoltaic Solar Facilities proposed to be impacts of low to negligible significance with respect to freshwater ecology, soil, land and agricultural potential, heritage and archaeology, palaeontology and social aspects to be considered. In terms of visual impact, the close proximity of the Valleydora 10MW and 75MW project will result in a greater cumulative impact due to the concentration of impacts within a particular location. However, visual impacts resulting from the development of projects greater than 50km away from the project site are expected to be low. Given the distance of other similar projects from the proposed development and the nature of solar projects, the loss of habitat for species of conservation concern is also expected to be of low significance provided that the other developments do not encroach upon ecologically sensitive areas, and that all mitigation measures proposed to reduce their respective ecological impacts are effectively implemented.

Cumulative impacts arise from the combined presence of several similar developments within an area which affect ecological processes operating at broader scales or which each have a small impact which becomes significant when combined. According to investigations undertaken, there are no other known PV developments within a 50km radius of the project area. When considering the likely cumulative impacts of renewable energy developments, the broader situational context and environment in which they occur is a critical consideration. This is because potentially important cumulative impacts of PV facilities include habitat loss, habitat fragmentation and the loss of landscape connectivity and reduced ability of South Africa to meet its conservation targets and obligations, all of which are closely related to the landscape context of the facility. The site falls within the Xhariep Karroid Grassland vegetation type which forms a broad-scale mosaic with Besemkaree Koppies Shrubland. These vegetation types are relatively extensive units and have been little impacted by transformation with more than 96% of Xhariep Karroid Grassland and 97% of Besemkaree Koppies Shrubland still intact. Therefore the potential of the current developments at Valleydora to impact conservation targets for these vegetation units is very low, especially given that the site is nowhere near any National Protected Areas Expansion Strategy focus areas. The overwhelmingly intact nature of the affected vegetation types also implies that habitat loss and broad-scale disruption of landscape connectivity, even when considered in the light of other potential developments in the area is not likely to be significant. The development of the PV facilities at the Valleydora site may impact landscape connectivity at a local-level for some fauna. However, as the broader landscape is likely to remain intact, these local-level impacts are not likely to be of wider significance. In terms of impacts to specific species of conservation concern which are likely to occur in the area such as the Black-footed Cat and White tailed mouse, the impacts are also likely to be low. The Black-footed Cat occurs at a low density across a wide range throughout the semi-arid areas of Southern Africa. They may travel as much as 16 km while foraging in a single night, indicating that these species are highly mobile and would easily be able to avoid developed areas. Given the extensive range of the Black-footed Cat, habitat loss from the current and other developments in the area are very small in comparison and are not likely to significantly impact the population of this species. The site is on the very margin of the distribution of the White-tailed Mouse and there is little evidence to suggest that the site or the broad area is a particularly important area for this species. Being a nocturnal rodent that lives down burrows and cracks in the soil, this species is less vulnerable to

disturbance than the Black-footed Cat and there is little to suggest that it would not persist within many development types such as wind farms and provided that some ground cover remains may even persist within a solar PV development. Given the marginal location of the site and the general area relative to the extensive distribution range of the White-tailed mouse, it is not likely that cumulative impacts from the current developments at Valleydora or those planned in the broader area, would have a significant long-term impact on the overall population viability of this species. In general, given the relatively homogenous nature of the surrounding landscape, there is no evidence to suggest that the site or the Springfontein area in general lies within an important movement or migration corridor for fauna and flora and the relatively small scale of solar PV developments are not likely to pose a threat to such processes under the current circumstances.

Cumulative visual impacts may result from PV plants positioned within 5 – 20 km from each other. This depends on the size of each project (MW generated), the type of solar technology implemented, the footprint of the development and the location thereof in the proximity of sensitive receptor areas. In the case of Valleydora, no information of any projects that may constitute cumulative impacts was available. The projects proposed to be situated 73km and 80km away, are both further than 70 km from the Valleydora site and far beyond the visual catchment of the Valleydora development. Halfway between the two development areas (i.e. approximately 35 km from either site), none of the sites are likely to be visible to an observer. It is therefore highly unlikely that cumulative visual impacts in terms of the other two projects will result from the Valleydora development.

4) ASSUMPTIONS, UNCERTAINTIES AND GAPS IN INFORMATION/KNOWLEDGE

Limitations and assumptions of the specialist reports include:

a. Ecological Impact Assessment

The major potential limitation associated with the sampling approach is the narrow temporal window of sampling. Ideally, a site should be visited several times during different seasons to ensure that the full complement of plant and animal species present are captured. However, this is rarely possible due to time and cost constraints and therefore the representivity of the species sampled at the time of the site visit should be critically evaluated. It is however unlikely that a single site visit has had a significant impact on the results. The ecological patterns at the site were clear, and although additional plant species would be recorded at different times of the year, this is highly unlikely to alter the overall ecological patterns at the site which are related to physical soil properties, rather than season variation. There had been some rainfall in the period preceding the site visit and the vegetation at the time of sampling was such that the majority of shrubs were in a growing or flowering state and could be identified. It was early in the season for many grasses and grasses are likely to under-represented in the species list obtained for the site. However, as most grasses are widespread this would not significantly impact the results. Furthermore, a late summer or autumn visit would probably also yield a lot more geophytes which were uncommon at the time of the site visit. The precautionary principle is exercised in this regard by recommending preconstruction surveys for protect and localised species prior to construction. The lists of amphibians, reptiles and mammals for the site are based on those observed at the site as well as those likely to occur in the area based on their distribution and habitat preferences. Furthermore, impacts are assessed in terms of likely impacts on habitats rather than the presence of listed species which by their nature are often difficult to confirm. This represents a sufficiently conservative and cautious approach which takes account of the study limitations.

b. Freshwater Ecology Impact Assessment

This report reflects information obtained from a visual assessment of the Valleydora site, carried out in late summer. Although the area is a summer rainfall area, and generally receives most of its rainfall in late summer (March) (CSIR 2012), the drainage lines and small pans / dams on the site were dry at the time of the site visit, and no water quality or aquatic invertebrate samples were thus collected from any of them. Given the kinds of water bodies on the site, this limitation is not considered of crucial importance. The drainage lines on and associated with the area assessed in this study were, for the most part, too minor to be indicated on the 1:50 000 GIS rivers layer. The extent of those portions of drainage lines that were identified as passing through the core study area were delineated on site, using a hand-held GPS with data being superimposed onto GOOGLE imagery at a later date. Other drainage lines, which pass in the vicinity of the site, but which were not considered to be directly implicated in the proposed development, were mapped more coarsely off GOOGLE imagery. The extent of such drainage lines is thus unlikely to be strictly accurate. In addition, the nature of runoff in the broader area of the site is such that, for the most part, runoff from minor ephemeral drainage lines simply dissipates into the veld. However, aerial imagery indicates clear links between the discrete drainage routes visible as depressions in the landscape, and downstream areas, suggesting that during high flow periods, flows pass all the way along these drainage routes, and into downstream dams or more pronounced water courses. Efforts were made to map these broad flow corridors on the basis of aerial imagery – the accuracy of mapping is however questionable.

At the time of writing this EIA report, certain aspects of the proposed development were still unclear, and are likely to be developed only at detailed design phase. These included:

- Details of storm water design;
- Details of internal roads and routing of underground cables;
- Sourcing of water for washing of solar panels during the operational phase.

While such information would be useful, its absence at this phase is not considered critical, as mitigation measures have, where appropriate, simply provided design criteria to be incorporated into the detailed design of these aspects.

c. Soil and land Impact Assessment

None.

d. Heritage and Archaeology Impact Assessment

Heritage Impact Assessment may, depending on specific circumstances, include a wide variety of study areas. In this instance the following assumptions were made:

- Aspects of symbolic landscapes or landscapes to which special meanings are attached were not considered or investigated. The landscape does not suggest this nor was any other evidence forthcoming.
- Other study areas, e.g. visual impact assessment, would be undertaken by other specialists.
- Built heritage and objects of historical interest as defined by archaeologists.
- Primary interest areas are Access routes will remain the same.
- Declaration of the historical wrought iron gates as a Grade III heritage resource will be applied for.

e. Palaeontology Impact Assessment

None.

f. Social Impact Assessment

- *Strategic importance of the project and no-go option*
It is assumed that the strategic importance of promoting renewable energy, including solar energy, is supported by the national and provincial energy policies.
- *Technical suitability*
It is assumed that the proposed Valleydora site identified by Solairedirect represents a technically suitable site for the establishment of a PVSEF plant.
- *Fit with planning and policy requirements*
Legislation and policies reflect societal norms and values. The legislative and policy context therefore plays an important role in identifying and assessing the potential social impacts associated with a proposed development. In this regard a key component of the SIA process is to assess the proposed development in terms of its fit with key planning and policy documents. As such, if the findings of the study indicate that the proposed development in its current format does not conform to the spatial principles and guidelines contained in the relevant legislation and planning documents, and there are no significant or unique opportunities created by the development, the development cannot be supported. However, the study recognises the strategic importance of solar energy and the technical, spatial and land use constraints required for such facilities.

- *Generic issues relating to renewable energy*

A number of the key authorities in the other parts of South Africa, specifically the Northern Cape Province, have been interviewed as part of the SIAs for other solar energy projects. For the purpose of the Valleydora SIA it is assumed that the generic issues relating to renewable energy, and specifically solar energy, also apply to the proposed Valleydora PVSEF plant.

- *Demographic data*

The demographic data used in the study is largely based on the 2001 Census¹. While this data does provide useful information on the demographic profile of the affected area, the data are dated and should be treated with care. Where possible, reference is made to the latest demographic data contained in local Integrated Development Plans and other documents. In addition, there is no longer any access to Census 2001 data at Ward level via the Municipal Demarcation Board. However, for the purposes of this study it was possible to source ward level information from a previous study undertaken in the area.

g. Visual Impact Assessment Report

None.

Assumptions, uncertainties and gaps in compiling this Final BAR include:

- **Assumption:** apart from the proposed 10MW Solar PV Facility near Reddersburg and the proposed PV Facility located approximately 73km away from the project area, there are no other solar PV plants in the Kopanong Local Municipality.
- **Uncertainty:** the number of Solar PV/Renewable projects proposed by other developers in the area.
- **Gap:** some provincial legislation that were not presented in the application form are listed in Section A of this Final BAR.

Alternative (“preferred site” and “alternative site” unless otherwise stated in the content presented below)

Planning and Design Phase

Direct impacts:

There are no direct impacts. All planning and design activities are done off site.

Indirect impacts:

1. Potential disturbance and damage to freshwater features/ecosystems

Considering that an ephemeral drainage line was identified on-site, it is likely that the development will act to degrade the health of this system if precautionary measures are not put in place at the very outset of the project. Two dams, an artificial impoundment, and a number of drainage lines occur within the confines of the

development property. The occurring drainage lines run across the property in a north to south direction. The potential impacts resulting from development of the “preferred” and “alternative” sites differ due to the variation in abundance, sensitivity and proximity of inherent freshwater features to each of these sites. An elucidation of the potential impacts relevant to each alternative site is provided below:

“Preferred site”

Creation of erosion nick points/ nodes of disturbance and/or degradation of the central ephemeral drainage line as a result of electrical cable crossings:

Development of the “preferred site” would require underground cables to be connected to the substation in the east, potentially resulting in excavation of trenches beneath or across the central ephemeral drainage line. Physical disturbance to drainage line soils would be likely to reflect in medium- to long- term disturbance nodes, and potentially increased sensitivity of disturbed areas to erosion.

“Alternative site”

Creation of erosion nick points/ nodes of disturbance and/or degradation of the central ephemeral drainage line as a result of road crossings:

Development of the “alternative” site would require an access road, theoretically crossing the central drainage line. Examples of road crossings higher up in the system indicate their high potential to result in concentration of flows and initiate erosion nick-points, leading to down cutting and channelization, and resulting in general channel degradation;

Loss of wetland habitat:

A small dam located in the western portion of the proposed “alternative” site would potentially be infilled / disturbed by construction activities. This impact is considered of low significance, given the size of the affected system and its artificial nature. Its loss may however result in increased flows along the (natural) central ephemeral drainage line, as well as highly localised loss of seasonally inundated habitat for amphibians and other fauna.

Potential impacts relevant to both sites:

Degradation and habitat fragmentation/interruption of hydrological and ecological corridors along drainage lines by fencing and cables:

In fact, neither of the alternative layouts would actively cut through drainage corridors, and the impact of habitat fragmentation becomes essentially a terrestrial one, dealt with in Todd and Skowno (2012). The design / selection of fencing is however one that has potential impacts to freshwater ecosystems. Any fencing that impeded surface and shallow subsurface flows would potentially increase erosion and precipitate areas of localised scour and channelization during high flows.

It is therefore imperative that the planning and designing of the facility be informed by a set of preventative measures that will serve to minimise disturbance to these environments throughout the project life-cycle. Hence, a number of preventative

measures that can be effectively integrated into the project design are highlighted in the EMPr (Appendix F, Section F), of which includes the application of 100m buffers to all freshwater features on-site. Of the two alternatives, mitigation against layout and design phase impacts is considered far less problematic in the case of the “preferred” site.

2. Visual impacts

The establishment of a site camp and construction of the solar facility will change the nature of the site. The visual impact resulting from the presence of the solar facility on-site can be prevented by locating the development away from the N1 road; away from koppies present on-site, and as low as possible; and close to the existing powerlines and railway lines. The impacts can also be reduced by reducing the footprint of the solar facility.

Cumulative impacts:

There are no cumulative impacts.

Construction Phase

Potential impacts resulting from the construction of an access route to the site during the Construction Phase:

Construction of the access route will increase hard, impermeable surfaces on-site therefore increasing overland flow and soil erosion in rainy seasons and eroding water flow channels as a result of concentrated water flows; contribute to the loss of grazing and agricultural land, and a decrease in soil agricultural potential; the clearing of vegetation in the route area; movement of vehicles/traffic impacts in the operational and decommissioning phases; and result in the compaction and disturbance of soil due to the movement of construction vehicles and actual construction of the road. The former three impacts are expected to be medium- to long-term given that the use of access roads will extend through to the end of the project lifespan (Mitigation measures to be implemented to curtail each of these impacts are addressed in the EMPr). The latter two impacts, on the other hand, will be short-term, being limited to the construction phase of the project only (Mitigation measures to be implemented to curtail each of these impacts are addressed in the EMPr). These impacts can be mitigated by limiting the movement of construction vehicles on-site especially in wet conditions, managing soil erosion by implementing the infield rainwater harvesting method of erosion control; and minimising vegetation clearing such that it is only performed in areas required for construction of the road.

1) Access Road Option 1 ('preferred' route)

This access road option does not encroach upon any ecologically sensitive areas, and is an acceptable distance away from all sensitive or 'no-go' areas. It is also the shortest in length, as it joins an existing road a few metres distance away. This option is therefore the 'preferred', as it will create the least physical disturbance.

2) Access Road Option 2 ('alternative' route)

Similar to the above, this access road option also does not encroach upon any ecologically sensitive areas, and is an acceptable distance away from all sensitive or 'no-go' areas. This option is the 'alternative' option as it is longer in length, joining the existing

road a greater distance away from the solar facility layout area in comparison to the 'preferred' option. It will thus create a greater physical disturbance, and is therefore considered as an 'alternative' option.

Given that neither of the two abovementioned access road options disturbs identified ecologically sensitive areas, they are both feasible and will have similar impacts on the surrounding environment. These impacts are assessed in the impact tables provided in this section (Section D) of the Amended Final BAR.

Potential impacts resulting from the use of alternative foundation types during the Construction Phase:

1) Concrete foundation:

The placement of concrete foundations will result in the removal of vegetation in locations where these foundations will be placed. The soil may also be compacted in these designated areas as a result of construction vehicles transporting equipment, cement and water for the mixing and casting of foundations on-site; or the transport of pre-casted foundations to site. The applicant has indicated that all cement foundations will be pre-casted off-site and transported to site only at the time of foundation lay-down. If, however, the applicant decides to cast cement foundations on-site, mitigation measures must be implemented to ensure that soil and subsequent groundwater/surface water contamination does not occur as a result of cement mixing. This includes the placing of plastic lining on the ground of areas designated for the mixing and moulding of cement foundations. The 100m buffers applied to all freshwater features must also be kept in mind when choosing designated foundation mixing and moulding areas. These areas should also be located a considerable distance away from all identified no-go areas. It is also suggested that the extent of potential impacts be limited and that traffic be prevented on wet soil especially during rainy seasons (Refer to the EMPr in Appendix F).

2) Deep-seated anchor screw:

Utilisation of the deep-seated anchor screw as foundations for solar panels will result in the clearing of vegetation in areas in which these foundations will be located, and compaction of soil as a result of the movement of construction vehicles transporting equipment and anchor screws. These anchor screws will be inserted 1.5 m into the ground, resulting in further soil disturbance. Hence, in order to mitigate the potential soil compaction, disturbance and vegetation removal, it is suggested that the extent of potential impacts be limited and that traffic be prevented on wet soil especially during rainy seasons (Refer to the EMPr in Appendix F).

If cement foundations are pre-cast before transportation to site, then the two above-mentioned options will create similar impacts on the surrounds and are equally feasible.

Direct impacts:

1. Loss of Vegetation

In terms of the national vegetation map, the site falls within an area characterised by two vegetation types, namely Xhariep Karroid Grasslands and Besemkaree Koppies Shrubland, with the former being the most extensive. The grasslands at the potential development sites are fairly homogenous except where shallow or rocky soils occur which are dominated by a larger proportion of woody shrubs. Common species within this vegetation type include shrubs such as:

- *Chrysocoma ciliata*
- *Rosenia oppositifolia*
- *Asparagus capensis*.

It also includes grasses such as:

- *Eragrostis lehmanniana*
- *E.curvula, Cynodon incompletus*
- *Tragus koelerioides* with occasional low forbs and geophytes.

In general this plant community does not represent a highly sensitive environment and should form the focus of the development. Also, the vegetation on-site can be considered to be in a poor to average condition as although palatable grass species such as *Themeda triandra* are common within the run-on areas, unpalatable species such as *Chrysocoma ciliata* which increase as a result of overgrazing are dominant across large parts of the site.

A number of species protected under the provincial Nature Conservation Ordinance 8 of 1969, were observed at the site. This includes *Aloe broomii*, *Boophone disticha* and *Euphorbia clavarioides var. truncata* and *Gethylis transkarooica*. Other protected species with a high probability of occurring at the site include *Pachypodium succulentum*, *Ammocharis coranica* and *Brunsvigia radulosa*. In order to avoid negative impacts on protected species, a search and rescue operation should be conducted within the final development footprint prior to construction. The majority of protected species are succulents or geophytes and their prospects for successful transplant are high. Individuals of protected species within the development footprint should be translocated to a safe area on the property. A permit obtainable from DETEA's permit office in Bloemfontein is required before any protected species may be interfered with.

The area on which the facility will be constructed will need to be cleared of vegetation in order for vehicles to access the site as well as for the placement of panel structures and panels. In terms of national conservation status, species of the Xhariep Karroid Grassland vegetation type are classified as "Not Threatened".

The above information is broadly relevant to both the preferred and alternative sites. Hence, significance of the impacts of vegetation clearing on both the "preferred" and "alternative" sites is likely to be very similar.

2. Soil Erosion

Clearing of vegetation will likely result in more areas of loose soil that will be

susceptible to wind and water erosion. Furthermore, the existence of hard surfaces (roads and solar panels) will increase surface runoff and also lead to erosion. However, given that vast areas within the site and further afield are sensitive to erosion, the area to be cleared is not large enough to impact significantly on the area's overall erodability. In addition, sheetwash had occurred in some areas of the site and had resulted in the banding of vegetation which can readily be discerned on satellite imagery of the site. The erosion risk is higher within these areas and specific measures to reduce erosion potential will need to be implemented. Vegetation will be allowed to grow back after construction. If the deep seated screw method is used for the foundations of mounting structures, then less vegetation will be cleared. This will also assist the developer in reducing dust and therefore maximise efficiency of the PV facility.

“Preferred site”

Given the greater distance from the site to the grid connection point, a larger area is likely to be disturbed as a result of the need for additional trenching, excavations, and access road creation. However, this site falls largely within an area of the property classified as “medium” sensitivity, and is therefore not subject to significant erosion as a result of the development given its situation away from identified wash areas. The clearing of vegetation and the undertaking of construction activities in this area will increase the risk of soil erosion, and mitigation measures will need to be implemented to counteract the potential detrimental effects. The significance of impacts will subsequently decrease to reflect “low” significance.

“Alternative site”

The proximity of the site to the grid connection point implies that the area subject to trenching and excavations, and thus physical disturbance, will be limited. However, approximately 60% of this site falls within a “medium + erosion” sensitivity category, indicating that this area is more sensitive to sheetwash and soil erosion that will occur as a result of vegetation clearing and construction activities associated with the proposed development. Also, considering that the remaining portion falls within an area classified as “medium” sensitivity, and that mitigation measures to reduce soil erosion will be implemented, the impact significance is likely to reduce to a low – medium significance. Furthermore, if construction activities and the movement of heavy vehicles are restricted to the portion of the site that has “medium” sensitivity, then the significance of soil erosion can be further reduced.

Overall, it must be noted that the slope of both “preferred” and “alternative” sites is quite low, and therefore the probability that severe erosion problems would result from the development after suitable mitigation measures have been put in place is very low.

3. Soil compaction and disturbance

During the construction phase vehicle movement will compact the soil to some degree depending on the number of passes. It will also deteriorate vegetation even when driven over once or twice, demolish vegetation in tracks used frequently and remove vegetation where foundations are made for solar panels. Hence, the movement of heavy vehicles in and around the site, especially on wet soils, must be minimised.

“Preferred site”

Given the greater distance from the site to the grid connection point, a larger area is likely to be disturbed as a result of the need for additional trenching, excavations, the movement of vehicles, and access road creation. This site is most definitely subject to soil compaction and disturbance, as is the “alternative site”, but the significance is likely to be slightly lower given the reduced potential of soil erosion in this area and its positioning a more substantial distance away from wet and wash areas on-site. The implementation of mitigation measure is likely to reduce potential soil compaction and disturbance to “low” significance.

“Alternative site”

Given the higher potential for soil erosion on this site, it is likely that the movement of construction vehicles on the portion of the site identified as being of “medium + erosion” sensitivity will result in increased soil compaction and disturbance. However, the implementation of mitigation measures will reduce the significance of this potential impact to “low - medium” significance. Furthermore, given the proximity of the site to the grid connection point, the area subject to trenching, excavations, the movement of construction vehicles, and thus physical disturbance, will be limited. Furthermore, if construction activities and the movement of heavy vehicles are restricted to the portion of the site that has “medium” sensitivity, then the significance of soil compaction and disturbance can be further reduced.

Overall, the implementation of appropriate mitigation measures will reduce the significance of soil compaction and disturbance impacts on both the “preferred” and “alternative” sites.

4. Soil Contamination

There is the potential that during construction activities, accidental spillage of small amounts of cement and oil for machinery maintenance or from vehicles may contaminate the soil. Hence, it is important that plastic linings be used to prevent the direct contact of oils and cement with the ground.

5. Temporary Decrease in Air Quality

The movement of construction vehicles across cleared areas of the site will generate dust. This will lead to a temporary deterioration in air quality. This impact is not considered to be significant as other portions of the farm and the site have naturally occurring areas of bare soil. There are also no occupants of land within at least a 1km radius that will be impacted by windblown dust.

6. Uncontrolled access to the site camp and security concerns

Uncontrolled access to the site camp once established may result in disturbance or even irreversible damage to the site as a consequence of inappropriate and unlawful actions of trespassers, such as theft or damage to property. Therefore, once the site camp has been established, fencing will need to be erected and security guards employed to ensure that access to the construction site is controlled. Furthermore, all construction materials that are to remain on the site must be located within the site camp and locked in specialised containers if necessary.

7. Loss of Habitat for fauna and livestock

Approximately 55 terrestrial mammals and 5 bats potentially occur within the property. The limited extent and range of habitats available however implies that the actual number likely to be present is significantly less. Five species of conservation concern potentially occur on the farm. These are the White-tailed Mouse *Myodomys albicaudatus* (Endangered), Brown Hyaena *Hyaena brunnea* (Near Threatened), Leopard *Panthera pardus* (Near Threatened), Black-footed Cat *Felis nigripes* (Vulnerable) and Schreibers' Long-fingered Bat *Miniopterus schreibersii* (Near Threatened). Of these, the Leopard and Brown Hyaena are not likely to occur in the proposed development site, whilst there is a good probability that the White-tailed and Mouse Black-footed Cat occurs within the property as the habitat is broadly suitable. However, the development occupies a very small area relative to the extensive range of these species, and the impact of the development on habitat loss for these species would be minimal. Within the proposed development site itself there does not appear to be any specific habitats which are highly sensitive from a mammalian perspective.

The property lies in or near the distribution range of at least 40 reptile species, of which comprise 1 terrapin, 23 snakes, 14 lizards and skinks and 2 geckos. A single species of conservation concern may occur at the site, the Striped Harlequin Snake *Homoroselaps dorsalis* (Near Threatened). The rocky outcrops and drainage areas on the property are likely to represent the most important habitats for reptiles and have therefore been excluded during preliminary site assessments carried out to determine the most suitable location for the PV facility.

The property lies within or near the range of 12 amphibian species. Those that require permanent water are likely to be restricted to the vicinity of drainage areas, and two dams to the south of the railway line. As such these species are not likely to be directly impacted by the development. The only species of conservation concern which may occur in the property is the Giant Bullfrog *Pyxicephalus adspersus*. Within the boundaries of the proposed development site at least, there does not appear to be any suitable breeding habitat for this species and is probably not an important area for this species.

Loss of the proposed development area (less than 20 hectares) makes up less than 0.85% of the total farm area available for foraging and shelter of livestock. The extent of the farm is approximately 2353 hectares (Remainder of Farm Knapdaar) and is used for grazing livestock.

8. Disruption of landscape connectivity for fauna

Disruption of landscape connectivity for fauna could result if the site is fenced off in a manner which prevents the movement of larger and middle-sized mammals. Findings of the biodiversity and ecology study undertaken indicate that development of the "alternative" site will most likely impact on landscape connectivity and the movement of fauna more significantly than development of the "preferred" site. This potential outcome is as a result of the "alternative" site being located within an upland-lowland gradient, and occupying a large area between the mountain and the railway line, thus restricting faunal movement in the north-south and west-east directions. However, given that the study was conducted for purposes of a much larger-scale project (75MW solar facility), it can safely be said that the smaller footprint of this 10MW project will

induce an impact on faunal movement will be of a much lesser significance. The significance of the impact is thus likely to be “low”. Furthermore, fencing will be constructed in a manner which allows for the passage of small and medium sized mammals.

9. Negative impacts on Avifauna (birds)

Of the bird species that have been recorded in the area, 17 are listed species, suggesting that the potential for negative impacts on avifauna is relatively high. A number of these species were observed at the site and it is highly likely that a number of others occur there. Listed species observed at the site include Lesser Kestrel *Falco naumanni*, Ludwig's Bustard *Neotis ludwigii*, Blue Crane *Anthropoides paradiseus* and Black Harrier *Circus maurus*. According to the landowner, flamingos also frequent the dams to the south of the site. Bird flappers are present on the transmission lines near the substation, specifically to reduce flamingo collisions. The loss of habitat for birds is not significant given the overwhelmingly intact nature of the affected vegetation type and the scale of development in relation to the distribution of the affected species. The presence of additional transmission lines represents a much greater potential impact source. A large proportion of the listed species which occur at the site are particularly vulnerable to collisions or electrocution from transmission lines. Species such as flamingos, Bustards, and Blue Cranes are particularly susceptible to collisions with transmission lines, while the larger eagles and vultures being vulnerable to electrocution. In order to mitigate these potential impacts, the length of new transmission lines should be kept to a minimum and the design aspects of the transmission lines should be “bird-friendly”. This includes flappers to increase the visibility of the lines as well as insulating those sections of the lines where raptors are likely to perch.

10. Loss of grazing land, agricultural land and a Change in Land-use

Livestock farming is the current land use on Knapdaar Farm. However, given that the vegetation condition of the site is considered to be between poor and average and that it constitutes a large proportion of unpalatable plant species, the loss of vegetation resulting from construction activities will not have a significant negative impact on livestock within the property. It must also be noted that although installation of solar panels will cover an area of less than 20 ha, the above-ground height of panels allows for the grazing of livestock, and gates providing access into the actual solar park will be opened periodically for livestock grazing.

Potential agricultural land will also be lost. Considering however that these areas are categorised as low agricultural potential land, no significant agricultural loss will be incurred. Also, the significance of impacts is to some extent mitigated by the fact that farming activities on the site are confined to cattle farming as opposed to crops.

Furthermore, due to the extent of the farm portion (Remainder of Knapdaar Farm) being approximately 2353 ha and the proposed site being less than 0.85% of the total area, the loss of grazing and agricultural area are considered negligible. Additionally, the impact on farmland associated with the construction phase can be mitigated by minimising the footprint of the construction related activities and ensuring that disturbed areas are fully rehabilitated on completion of the construction phase.

11. Temporary Noise Disturbance

Construction activities will result in the generation of noise. However, once construction ends so too will the associated noise. Sources of noise are likely to include vehicles, the use of machinery such as drills and people working on the site. There are no residential areas within 1 km of the site and the farm workers tending the livestock are unlikely to be in the vicinity of the construction activities for extended periods of time.

12. Potential disturbance and damage to Heritage and Archaeological Artefacts

In the event that heritage artefacts are present, clearing activities may result in damage to these objects. However, observations during the site visit and the report compiled by the specialist did not indicate the presence of objects of heritage significance, or the presence of graves or historical buildings in the area.

13. Potential disturbance and damage to Palaeontological Features

The proposed development will impact on fossil-bearing Adelaide Subgroup strata especially during the construction phase, if excavations into bedrock are required. There are no objections to the proposed development on palaeontological grounds provided that access by a specialist should be facilitated at the appropriate stage during the construction phase of the development. Also, newly uncovered objects of palaeontological significance, found during the course of excavation activities must be reported to the appropriate heritage authorities. It must be noted that such finds may require a Phase 2 rescue operation at the cost of the developer.

14. Visual Impact

The construction phase of a project potentially causes the most disturbances within the receiving environment. During this time there will be a noticeable increase in heavy vehicles utilising the roads to the development site that may cause, at the very least, a visual nuisance to other road users and land owners in the area. The nature of related visual impacts is regarded as insignificant, due to the temporary nature of construction, which is normally accepted by observers as part of the development process. The number of receptors will be limited to residents in Springfontein and on farmsteads, visitors to the area and observers travelling along the R715 regional road, N1 national road and other nearby roads. If mitigation measures such as dust suppression and prevention of fire are not adhered to the visibility of the construction phase will increase, and so too will significance of the impact.

15. Increased Water consumption

In the event that the applicant opts to mix concrete on-site, water will be needed to complete the mixing of concrete. Water will also be required for purposes of dust control and human consumption given that local construction workers will be employed to work on-site. As previously mentioned, the applicant intends on setting up arrangements with the landowner regarding access to and usage of water, with consent from the Provincial Department of Water Affairs. On consultation with the Provincial Department of Water Affairs, this was deemed acceptable (refer to summaries of key stakeholder meetings in Section C).

16. Generation of Waste - General waste, Construction waste, Grey Water and

Sewage

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. Ablution facilities will be necessary at the construction site. With regards to the guardhouse, a composting toilet would be installed which makes use of an aerobic process to treat human waste material. The composting toilet requires no water and produces compost-like, odourless, de-hydrated material that could be either disposed of via municipal waste services or be used in the production of compost. It is proposed that the contracting company supplying the abluion facilities will also be responsible for the removal and treatment thereof. It is the responsibility of the applicant to ensure that the contractor hired is accredited and has the necessary permits to remove the sewage. The sewage will be treated in accordance with the municipal sewage works policies and guidelines. All wastes must be recycled/re-used as much as possible. It must also be ensured that all grey water generated as a result of construction activities is properly disposed to prevent the soil and subsequent water contamination.

17. Erosion of drainage lines as a result of concentration of runoff into channels

Drainage lines traverse the development site in a south to north direction, with flows arising from the south of the property. The risk exists of disturbing naturally occurring drainage lines and increasing runoff velocities that enter these systems as a result of construction activities. The outcome would be an increased vulnerability to erosion and overall degradation of wet areas. Hence, in order to mitigate these potential impacts, freshwater features on-site should be marked with temporary fencing, located 50m from the edge of the drainage line, and demarcated as no-go areas. Also, construction design should seek to minimise disturbance of natural ground levels and to maintain, as far as possible, existing ground cover by vegetation. In addition, increases in flow velocities as a result of removal of natural vegetation will give rise to concentrated, localised flow channels across the site during the wet season and potentially result in the passage of sediment-rich water into downstream dams and the ongoing degradation of existing, relatively undisturbed ephemeral drainage systems. Allowance should be made for rehabilitation of disturbed drainage lines during construction, to the specifications of a botanist and/or freshwater ecologist, as appropriate. Furthermore, a comprehensive set of mitigation measures have been recommended (See Section F, Appendix F: EMP_r) to ensure that potential damage to all natural freshwater features on-site is prevented, or otherwise minimised during construction.

18. Disturbance / degradation of drainage channels as a result of access by vehicles and/or personnel

Disturbance to drainage lines as a result of uncontrolled passage of personnel or vehicles across the veld, and beyond the boundaries of either development alternative is another potential impact resulting from the development. Hence, the presence of construction vehicles and personnel on-site must be minimised and restricted to the undertaking of construction activities.

19. Changes in runoff quality and quantity, affecting habitat quality in dams and drainage lines

Considering the sensitivities involved in developing close to wet areas of this nature,

the risk of disturbance, water contamination and water flow inhibition exist due to the activities to be undertaken on-site. Sources of potential pollution would include any grey water discharges, and car park or road runoff. No wash water or water that is in any way contaminated by construction or other materials, such as cement, sands, and /or leakage or spillage of fuels and other contaminants should be passed into natural watercourses, and arrangements should be made for their proper disposal. It is thus imperative that water quality be monitored and water flows off-site be effectively managed to facilitate processes that determine the functioning of natural freshwater features. There is also a potential for the increased passage of sediment-rich water into downstream dams, resulting in short-term increases in turbidity and potential changes in habitat quality for frogs and other fauna.

20. Traffic impacts

During the construction phase, traffic impacts will be a little higher than normal (low – medium significance) as trucks will transport materials and equipment to the site. Infrastructure required for the proposed development, including support structures, PV modules, frames, as well as machinery will be transported to and from the site area from various locations in the region. Impacts associated with the higher traffic volumes can be accommodated by proper site management, e.g. controlling the size of orders that would be transported to the site at any given time, and by notifying the public through local and regional media centres when large freight-carrying vehicles will be on the roads. Furthermore, the movement of heavy construction vehicles during the construction phase has the potential to damage roads and create noise, dust, and safety impacts for other road users and local communities in the area. However, the findings of the social impact assessment indicate that the current road use frequency is low. The social impacts associated with the movement of construction related traffic are therefore likely to be low.

21. Potential impacts on family structures and social networks associated with the presence of construction workers

While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on the local community. In this regard the most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to the potential behaviour of male construction workers, including:

- An increase in alcohol and drug use
- An increase in crime levels
- The loss of girlfriends and or wives to construction workers
- An increase in teenage and unwanted pregnancies
- An increase in prostitution
- An increase in sexually transmitted diseases (STDs)

Given the relatively small labour force (175) during the construction phase, of which approximately 100-120 can be sourced from the local area, the potential risk to local family structures and social networks is regarded as low.

22. Potential loss of livestock and damage to farm infrastructure associated with the presence of construction workers on site

The presence of construction workers on the site increases the potential risk of stock theft. The movement of construction workers on and off the site also poses a potential threat to farm infrastructure, such as fences and gates, which may be damaged. Stock and game losses may also result from gates being left open and/or fences being damaged.

23. Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of veld fires

The presence of construction workers and construction-related activities on the site poses an increased risk of veld fires that in turn pose a threat to the livestock, wildlife, and farmsteads in the area. In the process, farm infrastructure may also be damaged or destroyed and human lives threatened. All of the landowners interviewed identified that veld fires were an issue of concern. In this regard all of the farms in the area are dependent on grazing and any loss of grazing due to a fire would therefore impact negatively on the livelihoods of the affected farmers. The potential risk of veld fires is likely to be higher during the dry, winter months. Hence it is suggested that the recommended mitigation measures be implemented (See Section F, Appendix F: EMPr).

24. Presence and operation of construction vehicles

Construction vehicles will create a physical impact as well as noise, pollution and other forms of disturbance at the site itself. Hence, it must be ensured that they are present on-site only when necessary.

25. Negligence by construction workers

It is imperative that all construction staff be forbidden to carry out any activity on-site that is likely to cause disturbance or damage to natural or relatively undisturbed areas. Staff training and awareness of environmental impacts should be provided in order to assist staff in gaining a better understanding of their surrounds and the potential results of careless behaviour on the environment.

26. Temporary Employment and other economic benefits/business creation opportunities

The project will require the appointment of workers 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 span over 8-10 months. During this period security personnel will also be required to work at the site particularly after working hours. The work associated with the construction phase will be undertaken by contractors and will include the establishment of the solar energy facility and the associated components, including, access roads, services and power line. Hence, good business opportunities may arise for local contractors and engineering companies in Springfontein.

The sector of the local economy that is most likely to benefit from the proposed development is the local service industry. The potential opportunities for the local service sector would be linked to accommodation, catering, cleaning, transport and security, etc. associated with the construction workers on the site. The majority of

construction workers are likely to be accommodated in Springfontein and Bethulie. This will create opportunities for local hotels, B&Bs, guest farms and people who want to rent out their houses. In addition, a proportion of the total wage bill earned by construction workers over the construction phase is also likely to be spent in the regional and local economy.

The hospitality industry in Springfontein, Trompsburg and Bethulie is also likely to benefit from the provision of accommodation and meals for professionals (engineers, quantity surveyors, project managers, product representatives etc.) and other (non-construction) personnel involved on the project.

Indirect impacts:

1. Change in the sense of place

The site is characterised by open veld with a rural agricultural sense of place. The establishment of a site camp, the presence of temporary construction equipment and structures on-site, and the associated activities will result in a change in sense of place. However, the site is not occupied by tenants or the landowners and neighbours are not situated within close viewing distance of the site. Additionally, there is a large-scale regional Eskom substation across the railway track with high-voltage power lines that traverse the farm as well. However, given the rural setting of the potential development site, the impact of a PV facility on the sense of place is expected to be significant, considering that the surrounding area has been subject to limited transformation.

Cumulative impacts:

1. Additional Water Consumption due to Multiple Developments in the Springfontein Area

The number of developments and the amount of water required for each project needs to be considered. In terms of this particular project, the most substantive amounts of water will be utilised for activities undertaken during the construction period of the development. Thereafter, a much smaller quantity of water will be required to meet the consumption needs of on-site workers on an ongoing basis.

2. Cumulative visual impacts

With the “preferred” site for 10MW solar power facility being developed, the PV panels will appear larger and more discernable. The open space of approximately 500 m between the 10MW and 75MW solar power facilities will not be visible, due to the flat surface of the topography and the height of the PV panels. Viewed from this location it will appear as one facility, thereby signifying a cumulative impact. This impact is expected to be of “high” significance.

3. Cumulative impacts on biodiversity and ecology

The sites considered for the BAR are nested within the recommended development sites for the Biodiversity and Ecology specialist study, and as such the impacts for the two proposed developments (the 10MW and 75MW solar power facilities) are very similar in nature and extent. Given the largely intact nature of the surrounding

landscape and the relatively limited extent of the solar developments, the potential for cumulative impacts is low.

4. Cumulative impacts on freshwater resources/features

The net impact to freshwater ecosystems would be substantially increased, since it is assumed that a doubling of infrastructure (roads, cable crossings) would occur, the extent of hardened surfaces would increase and the net impact of increased concentrations of flows into downstream areas would also increase.

5. Cumulative impacts on heritage and archaeological features

Cumulative impacts are not considered relevant in this field of study.

6. Cumulative impacts on palaeontological features

There are no cumulative impacts. Cumulative impacts will result if the recommendations for mitigation are not followed, i.e. monitoring by a specialist during the construction phase of the project.

7. Cumulative impacts on soil/land and agricultural potential

There are no cumulative impacts.

8. Cumulative impacts on employment and business creation opportunities

Opportunity to up-grade and improve skills levels in the area. However, due to relatively small number of local employment opportunities this benefit is likely to be limited.

9. Cumulative impacts on family structures and social networks associated with the presence of construction workers

Impacts on family and community relations that may, in some cases, persist for a long period of time. Also in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.

10. Cumulative traffic impacts

If damage to roads is not repaired then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were not responsible for the damage.

11. Cumulative impacts resulting from the loss of farmlands

Overall loss of farmland could affect the livelihoods of the affected farmers, their families, and the workers on the farms and their families. However, disturbed areas can be rehabilitated.

Operational Phase

Direct impacts:

1. Alien plant invasion

Apart from the loss of plant cover in cleared areas, the disturbance would also encourage the invasion of alien plant species. These species will increase in number subsequent to the clearing of vegetation. Hence, regular monitoring and the effective management of alien plants will be required to prevent their increased presence on-site.

2. Soil Erosion

Clearing of vegetation will likely result in more areas of loose soil that will be susceptible to wind and water erosion. Furthermore, the existence of hard surface (roads and solar panels) will also increase runoff and lead to erosion. However, vegetation will be allowed to grow back after construction, and if the deep seated screw method is used for the foundations of mounting structures, then less vegetation will be cleared. This will also assist the developer in reducing dust and therefore maximise efficiency of the PV facility.

“Preferred site”

The greater distance of the site from the grid connection point will increase the area disturbed by operational activities and thereby increase vulnerability to erosion. However, this site falls completely within an area of the property classified as “medium” sensitivity, and is therefore not subject to significant erosion as a result of the development, given its situation away from identified wash areas. The clearing of vegetation and the undertaking of operational activities in this area will increase the risk of soil erosion, and mitigation measures will need to be implemented to counteract the potential detrimental effects. The significance of impacts will subsequently decrease to reflect “low” significance.

“Alternative site”

60% of this site falls within a “medium + erosion” sensitivity category, indicating that this area is more sensitive to sheetwash and soil erosion. However, given that the remaining portion falls within an area classified as “medium” sensitivity, and that mitigation measures to reduce soil erosion will be implemented, the impact significance is likely to reduce to a “low –medium” significance. Furthermore, the movement of vehicles on-site will be significantly reduced from that in the construction phase. In addition, if the movement of vehicles is restricted to the site portion that has “medium” sensitivity, then the significance of soil disturbance and erosion can be further reduced. The closer proximity of the site to the grid connection point will also decrease the area disturbed by operational activities as a result of the development.

Overall, it must be noted that the slope of both “preferred” and “alternative” sites is quite low, and therefore the probability that severe erosion problems would result from the development after suitable mitigation measures have been put in place would be very low.

3. Soil Contamination

Only window washer type devices will be utilised for the cleaning of panels. Hence, the possibility of soil contamination as a result is extremely low.

4. Loss of habitat for fauna and livestock

Additional disturbance to the site will result from the increased presence of people in and around the area during the operational phase of the project. The possible outcomes include a reduction in suitable habitat areas for fauna on-site, increased incidences of fire, and the illegal hunting and poaching of inhabitant fauna. Hence it is imperative that unauthorised persons are prevented from entering the site and on-site labourers receive environmental education so as to ensure that no harm is inflicted on occupant faunal species. This will also imply a loss of available grazing land for livestock. However, loss of this area (less than 20 hectares) makes up less than 18% of the total farm area available for foraging and shelter. The extent of the farm is 111.218 hectares (Remainder of Farm Knapdaar) and is used for grazing livestock.

5. Redistribution of sunlight, temperature and rainwater by solar panels and hard surfaces

The solar panels reduce the direct sunlight and rain on vegetation. Direct sunlight can reach shaded areas during early morning and late afternoon. Indirect sunlight will play a role radiating on vegetation. The reduction in direct sunlight has two effects. Firstly it potentially reduces photosynthesis and vegetative growth. Secondly it reduces the temperature of the shaded area. Dry semi-arid regions of South Africa have excessive sunlight and reduction of midday heat may contribute more to vegetative production than what is lost by shading.

Also, rain water will be redistributed by the solar panels. The water falling on the panels will be accumulated in a line at the bottom of the panels. Swartland soils are sensitive, Glenrosa soils moderately sensitive, and Oakleaf and Mispah soils slightly sensitive to erosion.

Furthermore, the construction of roads will increase the hard, impermeable surfaces on-site, resulting in an increase in overland flow and consequential soil erosion, and increased flow in water flow channels.

In order to mitigate these impacts, horizontal ridges and adjacent basins will be constructed next to each row of solar panels, which will act to boost vegetation growth in and around basins and limit erosion.

6. Loss of grazing land, agricultural land and a Change in Land-use

Livestock farming is the current land use on Knapdaar Farm. However, given that the vegetation condition of the site is considered to be between poor and average and that it constitutes a large proportion of unpalatable plant species, the loss of vegetation resulting from construction activities will not have a significant negative impact on livestock within the property. It must also be noted that although installation of solar panels will cover an area of less than 20 ha, the above-ground height of panels allows for the grazing of livestock, and gates providing access into the actual solar park will be opened periodically for livestock grazing.

Potential agricultural land will also be lost. Considering however that these areas are categorised as low agricultural potential land, no significant agricultural loss will be incurred.

Furthermore, due to the extent of the farm portion (Remainder of Knapdaar Farm) being approximately 2353 ha and the proposed site being less than 0.85% of the total area, the loss of grazing and agricultural area are considered negligible.

7. Increased Consumption of Water

Water will be needed to wash the dust off of the panels on an annual basis. Water will be sourced from the landowner and will be trucked to the site. The applicant is currently liaising with Kopanong Local Municipality regarding the water use agreements. The water availability for non-human consumption purposes needs to be considered as the town is often affected by water shortages.

8. Generation of Waste Water

No water will be required for cleaning of the solar panels.

9. Visual Impact

Infrastructure in the study area consists of a network of roads, power lines, substations, railway lines, and communication towers on koppies. The N1 national road between Bloemfontein and Colesberg abuts the development area on its western boundary. An arterial road (the R715), a railway line and transmission line transect the development area from east to west.

Photovoltaic panels would primarily be exposed to areas west and east of the facility with intermittent exposure to the south. Visual exposure to the north is totally screened by the range of hills, of which Signal Hill is the highest.

The “preferred” site for the 10MW solar energy facility shows the lowest degree of visual exposure, compared to the “alternative” site. This is due to the lower elevation of the topography which increases the visual absorption capacity of the landscape around the “preferred” site.

Affected areas include the rural area surrounding the facility, and roads within close proximity (< 4 km). Stilfontein is not highly affected, with the eastern side of the town (facing the development site) screened from visual exposure by virtue of a low lying ridge east of the town.

The visual impact index for the 10MW solar facility indicates a core area of possible high visual impact from the immediate vicinity to distances of 3 km from the boundaries of the site in a western direction. Visual exposure becomes intermittent with varying degrees of exposure from 3 km and further. The “alternative” site shows a larger degree of visual exposure, especially to the west and east, whereas the “preferred” site has no visual exposure further than 2km towards the east. Affected areas in the core zone are limited to a couple of farmsteads in the south and a few locations on the R715 and the N1. Some areas in Springfontein may experience some level of

exposure, but it is anticipated that the occurrence of buildings (houses and other) will effectively screen any visibility of the facility.

The “preferred” site for the development shows the lowest degree of visual exposure, compared to the “alternative” site. This is due to the lower elevation of the topography which increases the Visual Absorption Capacity (VAC) of the landscape around the “preferred” site.

Establishment of the solar energy facility will also elicit secondary visual impacts caused by lighting. Light impacts are expected to occur from the security lighting during the night which may cause glare and sky glow. Although the area has a low population density, the light trespass and glare from the security and after-hours operational lighting will have some significance, especially with regard to the neighbouring farms. Glare is expected to result from unshielded high mast and other lighting sources, and may be experienced as a nuisance factor and sky glow will intensify with the increase in the amount of light sources. Although light pollution can be mitigated, the effects as described above, will still be noticeable.

It is expected that the area of potential visual exposure will lie within that of the primary infrastructure (i.e. specifically the PV panels). Therefore, the significance of potential visual impact of ancillary infrastructure is expected to be low. Overall, visual impact is expected to be of medium-high significance, depending on the level of exposure, distance from the facility, the orientation of the viewer (on the road, at home, in the veld, etc.) and the quality of the landscape around him/her.

10. Disruption of landscape connectivity for fauna

Although the restriction of faunal movement poses a greater concern in the “alternative” site, as expressed in the biodiversity and ecology impact assessment (conducted for purposes of a 75MW project), the smaller area occupied by this 10MW solar facility limits the degree to which faunal movement is disrupted. Disruption of landscape connectivity for fauna could result if the site is fenced off in a manner which prevents the movement of larger and middle-sized mammals. Furthermore, since most such mammals have home ranges which exceed the extent of the site, any mammals trapped within the site would probably not have sufficient resources present to be able to support themselves. However, fencing will be constructed in manner which allows for the passage of small and medium sized mammals. Also, access gates will be left open to facilitate easy movement of larger fauna between the site and adjacent farmlands.

11. Negative impacts on Avifauna (birds)

The loss of habitat for birds is not significant given the overwhelmingly intact nature of the affected vegetation type and the scale of development in relation to the distribution of the affected species. The presence of additional transmission lines represents a much greater potential impact source. A large proportion of the listed species which occur at the site are particularly vulnerable to collisions or electrocution from transmission lines. It must be ensured that any maintenance on the transmission infrastructure of the site retains the bird-friendly design features. Also, any electrocution and collision events that occur must be recorded so that further mitigation

and avoidance measures can be implemented.

12. Generation of Solid Waste, Grey Water and Sewage

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 weekly. The waste will be taken to the Kopanong Municipal landfill by a contractor employed by the applicant, as the site is located outside of the waste collection route. The applicant will need to arrange an agreement with the municipal landfill to accept the general waste from the site which will be disposed according to municipal guidelines and policies. With regards to the guardhouse, a composting toilet would be installed which makes use of an aerobic process to treat human waste material. The composting toilet requires no water and produces compost-like, odourless, de-hydrated material that could be either disposed of *via* municipal waste services or be used in the production of compost. It is proposed that the contracting company supplying the ablution facilities will also be responsible for the removal and treatment thereof. It is the responsibility of the applicant to ensure that the contractor hired is accredited and has the necessary permits to remove the sewage. The sewage will be treated in accordance with the municipal sewage works policies and guidelines. All wastes must be recycled/re-used as much as possible. It must also be ensured that all grey water generated as a result of operational activities is properly disposed to prevent the soil and subsequent water contamination.

13. Changes in runoff quality and quantity, affecting habitat quality in dams and drainage lines

Considering the sensitivities involved in developing close to wet areas of this nature, the risk of disturbance, water contamination and water flow inhibition exist due to the activities to be undertaken on-site. Sources of potential pollution would include any grey water discharges, and car park or road runoff, panel washing areas or other sources of potential foreign material passed untreated into downstream resources. Depending on the nature of pollutants, negative impacts to aquatic fauna including amphibians could be expected in downstream systems – that is, the dams south of the site. Hence, no wash water or water that is in any way contaminated should be passed into natural watercourses, and arrangements should be made for their proper disposal. Furthermore, changes in the characteristics of ephemeral drainage lines/dams, as a result of receipt of frequent flows of wash water from panel washing activities (if opted for) would be likely to result in an increase in weedy, disturbance tolerant species. It is thus imperative that water quality be monitored and water flows off-site be effectively managed to facilitate processes that determine the functioning of natural freshwater features.

14. Erosion of drainage channels as a result of concentration of runoff into channels

Runoff from the site may result in the passage of concentrated flows into drainage lines; result in bank or bed erosion in these systems; necessitate their being lined or otherwise artificially stabilised; and result in droughting of natural systems through diversion of flows into adjacent water courses. Hence, a stormwater management system must be designed, implemented and maintained. The stormwater plan should also address areas likely to generate high volumes of water during rainfall events, including car parks, roofs and the solar panels themselves.

15. Potential disturbance and damage to Palaeontological Features

The proposed development will impact on fossil-bearing Adelaide Subgroup strata if excavations into bedrock are required. There are no objections to the proposed development on palaeontological grounds provided that access by a specialist should be facilitated at the appropriate stage during the construction phase of the development. Also, newly uncovered objects of palaeontological significance, found during the course of excavation activities must be reported to the appropriate heritage authorities. It must be noted that such finds may require a Phase 2 rescue operation at the cost of the developer.

16. Traffic impacts

During the operational phase, traffic impacts will be less, with vehicles only required to transport infrastructure during routine maintenance and upgrading phases. Impacts associated with the higher traffic volumes can be accommodated by proper site management, e.g. controlling the size of orders that would be transported to the site at any given time, and by notifying the public through local and regional media centres when large freight-carrying vehicles will be on the roads.

17. Generation of additional electricity

The photovoltaic effect of the panels will generate electricity that will be fed directly into the 22kV power lines that lead toward the Valleydora Substation. The additional electricity generated will supplement the power supply in the area and will contribute to an increased surety of supply on a national level and is a clear benefit of the project.

18. Permanent Employment and other economic benefits/business creation opportunities

Security Guards will be required for 24 hours every day of the week. It is envisaged that 8-10 security guards and 4-6 maintenance workers will be required. This will assure work for at least 12 people on an ongoing basis and is a clear benefit of the project. Due to the low education and skills levels in the area the potential employment opportunities for members from the local Spingfontein, Trompsburg and Bethulie community are likely to be limited to the low and semi-skilled positions. However, it will be possible to increase the number of local employment opportunities through the implementation of a skills development and training programme linked to the operational phase. Such a programme would support the strategic goals of promoting local employment and skills development contained in the Kopanong Local Municipality IDP.

Given the location of the proposed facility the majority of permanent staff is likely to reside in Spingfontein, Trompsburg and or Bethulie. In terms of accommodation options, a percentage of the permanent employees may purchase houses in the town, while others may decide to rent. Both options would represent a positive economic benefit for the region. In addition, a percentage of the monthly wage bill earned by permanent staff would be spent in the regional and local economy, which will benefit local businesses in these towns. The benefits to the local economy will extend over the 20-year operational lifespan of the project.

The local hospitality industry in Spingfontein, Trompsburg and Bethulie is also likely to

benefit from the operational phase. These benefits are associated with site visits by company staff members and other professionals (engineers, technicians etc.) who are involved in the company and the project but who are not linked to the day-to-day operations.

19. Potential impact of the solar thermal plant on local tourism

The focus appears to be on promoting tourism in the north east of the province. Despite this caution must be taken to ensure that the development of renewable energy projects, such as the proposed solar energy facility, do not affect the tourism potential of the Province. However, based on the findings of the site visit, the proposed facility is not likely to impact on the tourism sector in the area or the Province. This is due to the sites location and the existence of existing infrastructure in the site, including the railway line and the Valleydora substation and associated power lines. The significance of this issue is therefore rated as low negative. In some instances the plant may also attract tourists to the area. However, the significance of this potential benefit is also rated as low positive.

20. Establishment of a community trust funded by revenue generated from the sale of energy

In terms of the Request for Proposal document prepared by the Department of Energy all bidders for operating licences for renewable energy projects must demonstrate how the proposed development will benefit the local community. This can be achieved by establishing a Community Trust which is funded by revenue generated from the sale for energy. SolaireDirect has indicated that they are committed to establishment of a Community Trust. Community Trusts provide an opportunity to generate a steady revenue stream that is guaranteed for a 20 year period. This revenue can be used to fund development initiatives in the area and support the local community. The long term duration of the revenue stream also allows local municipalities and communities to undertake long term planning for the area.

21. Promotion of clean, renewable energy

South Africa currently relies on coal-powered energy to meet more than 90% of its energy needs. As a result South Africa is one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer of carbon emissions. The establishment of a clean, renewable energy facility will therefore reduce, albeit minimally, South Africa's reliance on coal-generated energy and the generation of carbon emissions into the atmosphere.

Indirect impacts:

1. Change in the sense of place

The site is characterised by open veld with a rural agricultural sense of place. The installation of solar panels and operation of the solar facility will result in a change in sense of place. However, the site is not occupied by tenants or the landowners and neighbours are not situated within close viewing distance of the site. Additionally, there is an Eskom substation across the railway line to the south of the potential sites with high-voltage power lines that traverse the farm. However,

given the rural setting of the potential development site, the impact of a PV facility on the sense of place is expected to be significant, considering that the surrounding area has been subject to limited transformation.

Cumulative impacts:

1. Increase in electrical infrastructure in the Springfontein area

The immediate surrounding area already has substantial electrical generation infrastructure with the power lines and substation. The addition of a solar facility to this area will result in a hub of electrical infrastructure in the area.

2. Cumulative visual impacts

Cumulative visual effects are the combined effects that arise through the interaction of two or more phase developments. It is evident that the combination of the 10MW solar power facility and the 75MW solar power facility in particular, may institute a cumulative impact in terms of visual exposure.

Potential visual exposure of both phases is highest within and immediately east of the development area. However, the effect of cumulative impact is more significant towards the west, where areas of high viewer incidence (the N1 and R715) are most likely to be affected.

Of the two site options for the Phase 1 development, the “preferred” site shows the lowest degree of cumulative impact, mainly because of the lower elevation of this site compared to the elevation of the “alternative” site (a difference of between 10 – 13 m is observed from the digital elevation model). However, the closer location of the “preferred” site to the N1 will result in the PV panels appearing more prominent than those in the background of the “alternative” site.

The cumulative impact of operation of the 10MW and 75MW developments is expected to be of “high” significance.

3. Cumulative impacts on biodiversity and ecology

The sites considered for the BAR are nested within the recommended development sites for the Biodiversity and Ecology specialist study, and as such the impacts for the two proposed developments (the 10MW and 75MW solar power facilities) are very similar in nature and extent. Given the largely intact nature of the surrounding landscape and the relatively limited extent of the solar developments, the potential for cumulative impacts is low.

4. Cumulative impacts on freshwater resources/features

The net impact to freshwater ecosystems would be substantially increased, since it is assumed that a doubling of infrastructure (roads, cable crossings) would occur, the extent of hardened surfaces would increase and the net impact of increased concentrations of flows into downstream areas would also increase.

- 5. Cumulative impacts on heritage and archaeological features**
Cumulative impacts are not considered relevant in this field of study.
- 6. Cumulative impacts on palaeontological features**
There are no cumulative impacts.
- 7. Cumulative impacts on soil/land and agricultural potential**
There are no cumulative impacts.
- 8. Cumulative impacts on employment and business creation opportunities**
Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area.
- 9. Cumulative impacts of the solar thermal plant on local tourism**
The establishment of both the 10MW and 75MW facilities are likely to bring about potential negative and/or positive impacts on tourism in the Kopanong Municipality Area.
- 10. Cumulative impacts of the establishment of a community trust funded by revenue generated from the sale of energy**
The cumulative impact of the establishment of the 10MW and 75MW solar energy facilities will ultimately be the promotion of social and economic development and improvement in the overall well-being of the community.
- 11. Cumulative impacts of the promotion of clean, renewable energy**
The construction and operation of both the proposed solar energy facilities will reduce carbon emissions *via* the use of renewable energy and elicit associated benefits in terms of global warming and climate change.

Closure and Decommissioning Phase

Direct impacts:

- 1. Generation of Solid Waste**
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 chosen landfill. However, the project is estimated to last for 20-25 years and the current landfill near Springfontein 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.
- 2. Disturbance or use of no-go areas**
Disassembled structures should be temporarily placed in areas identified to be least sensitive from an environmental perspective, and loaded onto trucks for transportation off-site as soon as possible. No-go areas should not be disturbed or used for the

stockpiling of disassembled structures or other materials.

3. Traffic impacts

During the decommissioning phase, traffic impacts will be a little higher than normal as trucks will transport disassembled structures and equipment to a landfill site. Infrastructure utilised for the proposed development, including support structures, PV modules, frames, as well as machinery will be transported to the landfill for disposal. Impacts associated with the higher traffic volumes can be accommodated by proper site management, e.g. controlling the quantity of materials that would be transported to the landfill, and by notifying the public through local and regional media centres when large waste-carrying vehicles will be on the roads.

4. Termination of Security Guard jobs

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 be periodic security 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.

Indirect impacts:

There are no indirect impacts.

Cumulative impacts:

There are no cumulative impacts

3. ENVIRONMENTAL IMPACT STATEMENT

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

Impact Assessment Methodology

The following section comprises a summary table of Environmental Issues identified during the environmental assessment process, i.e. how, where and when the proposed facility could interact and affect the environment, and summarises what mitigation measures may be taken to ameliorate the significance of the identified issues.

A qualitative rating of the significance of environmental issues has been included. The purpose of the significance rating is to highlight relevant and important issues, and to eliminate the insignificant issues from the investigation. Each category was divided into a number of different levels. These levels were then assigned various criteria. This is detailed in the table below.

Nature of the potential Impact		Description of the effect, and the affected aspect of the environment
Duration (time scale)	Short-term	Impact restricted to construction and early operation (e.g. 0-5 years)
	Medium-term	Impact restricted to operational phase (e.g. 5 years – closure)
	Long-term	Impact will cease after the operational life of the activity either by natural processes or by human intervention
	Permanent	Where mitigation either by natural processes or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.
Probability	Improbable	Possibility of the impact to materialise is very low, either because of design or historic experience
	Probable	There is a distinct possibility that the impact will occur
	Highly probable	Where it is most likely that the impact will occur
	Definite	Where the impact will occur regardless of any mitigation measures
Extent	Limited to site	Where impacts are limited to the proposed development site.
	Local	Where impacts are limited to the local area of the proposed development.
	Regional	Where impacts are limited to the regional area of the proposed development.
	Provincial	Where impacts are limited to the province in which the proposed development will be located.
	National	Where impacts are limited to the country in which the proposed development will be located.
Reversibility	Low	Where there is little chance of correcting adverse environmental impacts.
	Medium	Where there is a moderate chance of correcting adverse environmental impacts.

	High	Where there is a high chance of correcting adverse environmental impacts.
Irreplaceability	Low	Where the impact will degrade or destroy environmental resources or features that are insensitive or low in sensitivity.
	Medium	Where the impact will degrade or destroy environmental resources or features that are moderately sensitive.
	High	Where the impact will degrade or destroy environmental resources or features that are highly sensitive.
Overall Significance (Synthesis of the aspects produced in terms of their nature, duration, extent, probability, reversibility and irreplaceability)	Low	Where the impact will not have an influence on the decision
	Medium	Where it should have an impact on the decision unless it is mitigated
	High	Where it would influence the decision regardless of any possible mitigation

Evaluation of Potential Environmental Impacts Associated with the Proposed Solar Facility – PLANNING AND DESIGN PHASE

Type of Impact		Duration	Probability	Extent	Reversibility	Irreplaceability	Overall Significance
Potential disturbance and damage to freshwater features/ecosystems - Considering that a number an ephemeral drainage line was identified on-site, it is likely that the development will act to degrade the health of this system if precautionary measures are not put in place at the very outset of the project.	“Preferred site” 1. <i>Degradation and habitat fragmentation/ interruption of riverine corridors as a result of the installation of perimeter fencing and cables.</i>	Permanent	Probable	Local	High	Medium - High	Low (Negative)
	“Alternative site” 1. <i>Degradation and habitat fragmentation/ interruption of riverine corridors as a result of the installation of perimeter fencing and cables.</i>	Permanent	Probable	Local	High	Medium - High	Low (Negative)
	2. <i>Creation of erosion nick points/ nodes of disturbance and/or degradation of the central ephemeral drainage line as a result of road crossings.</i>	Permanent	Probable	Local	High	Medium - High	Low (Negative)

<p>Visual impact – The establishment of a site camp and construction of the solar facility will change the nature of the site. The visual impact resulting from the presence of the solar facility on-site can be prevented by locating the development:</p> <ul style="list-style-type: none"> - Away from the N1 road - Away from koppies present on-site, and as low as possible - Close to the existing powerlines <p>The impacts can also be reduced by reducing the footprint of the solar facility.</p>	Long Term	Highly Probable	Local	Medium	Medium - High	Medium - High (Negative)	

Evaluation of Potential Environmental Impacts Associated with the Proposed Solar Facility – CONSTRUCTION PHASE

Type of Impact		Duration	Probability	Extent	Reversibility	Irreplaceability	Overall Significance
Potential impacts associated with the construction/presence of access roads - will increase hard, impermeable surfaces on-site therefore increasing overland flow and soil erosion in rainy seasons and eroding water flow channels as a result of concentrated water flows; contribute to the loss of grazing and agricultural land, and a decrease in soil agricultural potential; the clearing of vegetation in the route area; movement of vehicles/traffic impacts and result in the compaction and disturbance of soil due to the movement of construction vehicles and actual construction of the road.	“Preferred access road”	Short Term	Highly Probable	Local	High	Low	Low (Negative)
	“Alternative access road”				Low	High	High (Negative)

<p>Soil compaction, disturbance and clearing of vegetation for the placement of foundations—the laying of foundations for the solar panels is likely to result in the compaction and disturbance of soil, and the clearing of vegetation in those areas. The significance of these impacts, however, can be reduced by limiting the extent of the impact, preventing construction vehicles from travelling on wet soil and by employing the infield rainwater harvesting method.</p>	<p>Cement foundation</p>	Short Term	Highly Probable	Limited to the site	High	Low, if managed properly and reduced by infield rainwater harvesting.	Low (negative)
	<p>Deep-seated anchor screw</p>						
<p>Potential soil and groundwater/surface water contamination due to placement of foundations - the mixing or moulding of cement foundations on-site may result in soil and subsequent groundwater/surface water contamination. Hence, all areas designated for the mixing and moulding</p>	<p>Cement foundation</p>	Short Term	Probable	Local	Low	High	Low (negative)
	<p>Deep-seated anchor screw</p>	N/A	N/A	N/A	N/A	N/A	N/A

of cement foundations must be lined with plastic to prevent contact with the soil.							
Decrease in agricultural suitability and loss of agricultural and grazing land as a result of placement of foundations – The placement of foundations will result in a decrease in agricultural suitability of the soil, and a decrease in agricultural and grazing land.	Cement foundation	Short Term if areas are rehabilitated	Highly probable	Local	Low – Medium	Low - Medium	Low (negative)
	Deep-seated anchor screw						
Loss of vegetation – Some vegetation will need to be cleared prior to construction. However, the vegetation will be allowed to grow back and will be kept trimmed. Therefore the extent of the loss of vegetation is not expected to be significant.		Short Term	Definite	Local	Low, rehabilitation costs are very high and success is low in arid environments.	Medium, natural vegetation will be lost but no unique ecological features impacted.	Low (negative)
Soil erosion - The removal of vegetative cover and an increase in hard surfaces (roads and panels) will not significantly increase the erodability of the site. Vegetation is expected to grow back and the site will	“Preferred site”	Long Term	Highly probable	Local	Low, rehabilitation costs are very high and success is low in arid environments	Moderate, natural drainage line ecology will be impacted	Low (negative)

revert to its current form. Furthermore, given the small area involved and the low slopes on site, the erosion danger is expected to be low.	“Alternative site”			Local	Low, rehabilitation costs are very high and success is low in arid environments	Moderate, natural drainage line ecology will be impacted	Low - Medium (negative)
Soil compaction and disturbance - vehicle movement will compact the soil in some degree depending on the number of passes.		Short Term	Highly probable	Limited to site	High	Low, if managed properly and erosion reduced by infield rainwater harvesting.	Very low (negative)
Decrease in air quality – there is the potential for construction activities such as site clearing and movement of construction vehicles to generate dust and temporarily deteriorate the local air quality.		Short Term	Probable	Local	Low	High	Low (negative)
Uncontrolled access to the site camp and security concerns - Uncontrolled access to the site camp once established may result in disturbance or even irreversible damage to the site as a consequence of inappropriate and unlawful actions of trespassers, such as theft or damage to property. Therefore, once the site camp has been established, fencing will need to be erected and security guards employed to ensure that access to the construction site is controlled. Furthermore, all construction materials that are to remain on the site must be located		Short Term	Probable	Local	High	Low - Medium	Low (negative)

within the site camp and locked in specialised containers if necessary.						
Loss of habitat – the clearing of vegetation and site disturbance will likely result in a loss of habitat. However the extent of the clearing will be limited to less than 20 ha. The total area of the farm portion is approximately 2353 ha. Therefore there will be adequate habitat of similar nature to accommodate fauna in other areas.	Long term	Highly probable	Local	High, after construction most fauna will return to site	Low, most fauna will move away from the area	Medium (negative)
Negative impacts on Avifauna (birds) - A large proportion of the listed species which occur at the site are particularly vulnerable to collisions or electrocution from transmission lines. In order to mitigate these potential impacts, the length of new transmission lines should be kept to a minimum and the design aspects of the transmission lines should be bird-friendly.	Short term	Highly probable	Local	High, after construction most avifauna will return to site	Low, most avifauna will move away from the area	Low (negative)
Disruption of landscape connectivity for fauna - Disruption of landscape connectivity for fauna could result if the site is fenced off in a manner which prevents the movement of larger and middle-sized mammals. Furthermore, since most such mammals have home ranges which exceed the extent of the site, any mammals trapped within the site would probably not have sufficient resources present to be able to support themselves.	Short Term	Highly probable	Local	High, removal of infrastructure	Low	Low (negative)
Loss of grazing areas, agricultural land and change in land use – The establishment of a	Short Term if areas are	Highly probable	Local	Low - Medium	Low - Medium	Low (negative)

<p>site camp will result in a change of land use and the consequent loss of grazing areas. However, the extent of the area to be transformed is less than 20 ha and there remain sufficient grazing land for the sheep on the farm.</p>	<p>rehabilitated</p>					
<p>Change in sense of place - The site is characterised by open veld with a rural agricultural sense of place. The establishment of a site camp, the presence of temporary construction equipment and structures on-site, and the associated activities will result in a change in sense of place. However, neighbours are not situated within viewing distance of the site. Additionally, there is an Eskom substation across the railway line to the south of the potential sites with high-voltage power lines that traverse the farm. However, given the rural setting of the potential development site, the impact of a PV facility on the sense of place is expected to be significant, considering that the surrounding area has been subject to limited transformation.</p>	<p>Short Term</p>	<p>Highly probable</p>	<p>Regional</p>	<p>Medium</p>	<p>Low</p>	<p>Medium (negative)</p>

<p>Presence and operation of construction vehicles - The movement of heavy construction vehicles during the construction phase has the potential to damage roads and create noise, dust, and safety impacts for other road users and local communities in the area. However, the findings of the SIA indicate that the current road use frequency is low. The social impacts associated with the movement of construction related traffic are therefore likely to be low. Furthermore, construction vehicles will also create a physical impact and other forms of disturbance at the site itself. Hence, it must be ensured that they are present on-site only when necessary.</p>	Short Term	Highly probable	Local	Medium	Low	Low (negative)
<p>Negligence by construction workers - It is imperative that all construction staff be forbidden to carry out any activity on-site that is likely to cause disturbance or damage to natural or relatively undisturbed areas.</p>	Short Term	Probable	Limited to the site	Low - Medium	Low - Medium	Low (negative)
<p>Temporary noise disturbance – there is the potential for noise to be generated by construction vehicles and construction workforce.</p>	Short Term	Probable	Local	Low	Low	Low (negative)
<p>Soil Contamination – there is the potential that during construction activities, accidental spillage of small amounts of cement and oil for machinery maintenance or from vehicles may contaminate the soil. Hence, it is important that plastic linings be used to prevent the direct contact of oils and</p>	Short term	Improbable	Local	Low	High	Low (negative)

cement with the ground.						
Visual impacts – The construction phase of a project potentially causes the most disturbances within the receiving environment. During this time there will be a noticeable increase in heavy vehicles utilising the roads to the development site that may cause, at the very least, a visual nuisance to other road users and land owners in the area. The nature of related visual impacts is regarded as insignificant, due to the temporary nature of construction, which is normally accepted by observers as part of the development process.	Short Term	Probable	Local	Medium	Low	Low (negative)
Increased water consumption – Water will be required for construction purposes and an agreement must be obtained from the local municipality stating that water will be supplied to the site.	Short Term	Definite	Local	Low	Medium – High	Medium (negative)
Generation of solid waste, grey water and sewage – All the above-mentioned waste will be produced as a result of construction activities and presence of workers on the site. The applicant will employ waste removal contractors to collect, remove and dispose of waste generated at the site. It will be necessary to ensure that the contractors have the necessary permits and that the waste is disposed of at a licensed waste disposal site. All waste must be recycled/re-used as much as possible. It must also be ensured that grey water produced is properly disposed to	Long Term	Definite	Local	Low	Low - Medium	Low (negative)

prevent soil and water contamination.						
Potential disturbance and damage to heritage and archaeological artefacts – In the event that archaeological and palaeontological features are discovered on the site, construction must stop and the heritage authorities must be informed. The features can then be protected and recorded. However, no graves or historical buildings occur on the site. Additionally, although two artefacts of Anglo-Boer War origin were found on the property, these are not considered to be of significant heritage importance. The project could have a positive impact on the palaeontological record if features are uncovered during excavations and properly documented.	Permanent	Improbable	Limited to the site	Low	High	Low (negative)
Potential disturbance and damage to palaeontological features - The proposed development will impact on fossil-bearing Adelaide Subgroup strata especially during the construction phase, if excavations into bedrock are required. There are no objections to the proposed development on palaeontological grounds provided that access by a specialist should be facilitated at the appropriate stage during the construction phase of the development. Also, newly uncovered objects of palaeontological significance, found during the course of excavation activities must be reported to the appropriate heritage authorities. It must be noted that such finds may require a Phase 2	Permanent	Probable	Local	Low, potential destruction of fossils is considered irreversible	High, fossils considered irreplaceable	Low (negative) Positive (low) - if palaeontological features are discovered and added to the heritage record.

rescue operation at the cost of the developer.						
Erosion of drainage lines as a result of concentration of runoff into channels - The risk exists of disturbing naturally occurring drainage lines and increasing runoff velocities that enter these systems as a result of construction activities. The outcome would be an increased vulnerability to erosion and overall degradation of wet areas. In addition, increases in flow velocities as a result of removal of natural vegetation will give rise to concentrated, localised flow channels across the site during the wet season and potentially result in the passage of sediment-rich water into downstream dams and the ongoing degradation of existing, relatively undisturbed ephemeral drainage systems.	Permanent	Probable	Local	Low	High	Medium (negative)
Disturbance / degradation of drainage channels as a result of access by vehicles and/or personnel - Disturbance to drainage lines as a result of uncontrolled passage of personnel or vehicles across the veld, and beyond the boundaries of either development alternative is another potential impact resulting from the development. Hence, the presence of construction vehicles and personnel on-site must be minimised and restricted to the undertaking of construction activities.	Short Term	Improbable	Local	Low	High	Low (negative)
Changes in runoff quality and quantity, affecting habitat quality in dams and drainage lines - Sources of potential pollution would	Short Term	Probable	Local	Low	High	Low (negative)

include any grey water discharges, and car park or road runoff. No wash water or water that is in any way contaminated by construction or other materials, such as cement, sands, and /or leakage or spillage of fuels and other contaminants should be passed into natural watercourses, and arrangements should be made for their proper disposal. There is also a potential for the increased passage of sediment-rich water into downstream dams, resulting in short- term increases in turbidity and potential changes in habitat quality for frogs and other fauna.						
Traffic impacts - During the construction phase, traffic impacts will be a little higher than normal as trucks will transport materials and equipment (PV panels, frames) to the site. Infrastructure required for the proposed development, including support structures, PV modules, frames, as well as machinery will be transported to and from the site area from various locations in the region. Impacts associated with the higher traffic volumes can be accommodated by proper site management, e.g. controlling the size of orders that would be transported to the site at any given time, and by notifying the public through local and regional media centres when large freight-carrying vehicles will be on the roads.	Short Term	Highly Probable	Local	High	Low	Low - Medium (Negative)
Additional water consumption due to multiple developments in the Springfontein area - The	Short Term	Definite	Local	Low	High	Medium (negative)

number of developments and the amount of water required for each project needs to be considered. In terms of this particular project, the most substantive amounts of water will be utilised for activities undertaken during the construction period of the development. Thereafter, a much smaller quantity of water will be required to meet the consumption needs of on-site workers on an ongoing basis.						
<p>Potential impacts on family structures and social networks associated with the presence of construction workers - While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on the local community. In this regard the most significant negative impact is associated with the disruption of existing family structures and social networks.</p> <p>Given the relatively small labour force (175) during the construction phase, of which approximately 100-120 can be sourced from the local area, the potential risk to local family structures and social networks is regarded as low.</p>	Short Term for the community	Probable	Local	Low	High, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods	Low (negative) for the community
	Long Term for adversely affected individuals		Local	Low	High, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods	Medium – High (negative) for adversely affected individuals
<p>Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of veld fires - The presence of construction workers and construction-related</p>	Short Term	Probable	Local	High, compensation paid for stock losses etc.	Low	Low (negative)

activities on the site poses an increased risk of veld fires that in turn pose a threat to the livestock, wildlife, and farmsteads in the area. In the process, farm infrastructure may also be damaged or destroyed and human lives threatened. All of the landowners interviewed identified that veld fires were an issue of concern. In this regard all of the farms in the area are dependent on grazing and any loss of grazing due to a fire would therefore impact negatively on the livelihoods of the affected farmers.						
Potential loss of livestock and damage to farm infrastructure associated with the presence of construction workers on site - The presence of construction workers on the site increases the potential risk of stock theft. The movement of construction workers on and off the site also poses a potential threat to farm infrastructure, such as fences and gates, which may be damaged. Stock and game losses may also result from gates being left open and/or fences being damaged.	Short Term	Probable	Local	High, compensation paid for stock losses etc.	Low	Low (negative)
Cumulative traffic impacts - If damage to roads is not repaired then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were no responsible for the damage.	Short Term	Probable	Local	High	Low	Low (negative)
Cumulative impacts resulting from the loss of	Short Term	Highly	Local	Low, in case	High, loss of	Low

<p>farmlands - Overall loss of farmland could affect the livelihoods of the affected farmers, their families, and the workers on the farms and their families. However, disturbed areas can be rehabilitated.</p>	<p>(if damaged areas are rehabilitated)</p>	<p>probable</p>		<p>of footprint associated with solar thermal plant</p>	<p>farmland. However, disturbed areas can be rehabilitated</p>	<p>(negative)</p>
<p>Cumulative impacts on family structures and social networks associated with the presence of construction workers - Impacts on family and community relations may, in some cases, persist for a long period of time. Also in cases where unplanned/unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.</p>	<p>Short Term for the community</p>	<p>Probable</p>	<p>Local</p>	<p>Low</p>	<p>High, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods</p>	<p>Low (negative) for the community</p>
	<p>Long Term for adversely affected individuals</p>		<p>Local</p>	<p>Low</p>	<p>High, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods</p>	<p>Medium – High (negative) for adversely affected individuals</p>
<p>Cumulative visual impacts - With the “preferred” site for 10MW solar power facility (Phase 1) being developed, the PV panels will appear larger and more discernable. The open space of approximately 500 m between Phase 1 and Phase 2 (75MW solar power facility) will not be visible, due to the flat surface of the topography and the height of the PV panels. Viewed from this location it will appear as one facility, thereby signifying a cumulative impact.</p>	<p>Short Term</p>	<p>Highly Probable</p>	<p>Local</p>	<p>Medium</p>	<p>Low</p>	<p>High (negative)</p>

<p>Cumulative impacts on biodiversity and ecology - The sites considered for the BAR are nested within the recommended development sites for the Biodiversity and Ecology specialist study, and as such the impacts for the two proposed developments (the 10MW and 75MW solar power facilities) are very similar in nature and extent. Given the largely intact nature of the surrounding landscape and the relatively limited extent of the solar developments, the potential for cumulative impacts is low.</p>	Short Term	Improbable	Local	Medium	High	Low (negative)
<p>Cumulative impacts on freshwater features/resources - The appointed specialist was specifically asked to assess the cumulative impacts that would accrue to freshwater ecosystems in the event that development of both a 10 MW and a 75 MW site occurred. In terms of this scenario, the net impact to freshwater ecosystems would be substantially increased, since it is assumed that a doubling of infrastructure (roads, cable crossings) would occur, the extent of hardened surfaces would increase and the net impact of increased concentrations of flows into downstream areas would also increase.</p>	Short Term	Highly probable	Local	Low	High	Medium (negative)
<p>Cumulative impacts on heritage and archaeological features - Cumulative impacts are not considered relevant in this field of study.</p>	N/A	N/A	N/A	N/A	N/A	N/A

<p>Cumulative impacts on palaeontological features - There are <u>no cumulative impacts</u>. Cumulative impacts will result if the recommendations for mitigation are not followed, i.e. monitoring by a specialist during the construction phase of the project.</p>	N/A	N/A	N/A	N/A	N/A	N/A
<p>Cumulative impacts on soil/land and agricultural potential - There are <u>no cumulative impacts</u>.</p>	N/A	N/A	N/A	N/A	N/A	N/A
<p>Cumulative impacts on employment and business creation opportunities - Opportunity to up-grade and improve skills levels in the area. However, due to relatively small number of local employment opportunities this benefit is likely to be limited.</p>	Short Term	Highly probable	Local	N/A	N/A	Medium (positive)
<p>Temporary employment and other economic benefits/ business creation opportunities - The project will require the appointment of workers 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 span over 8-10 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.</p>	Short Term	Highly probable	Local	N/A	N/A	Medium (positive)

Evaluation of Potential Environmental Impacts Associated with the Proposed Solar Facility – OPERATIONAL PHASE

Type of Impact		Duration	Probability	Extent	Reversibility	Irreplaceability	Overall Significance
<p>Potential impacts associated with the construction/presence of access roads - will increase hard, impermeable surfaces on-site therefore increasing overland flow and soil erosion in rainy seasons and eroding water flow channels as a result of concentrated water flows; contribute to the loss of grazing and agricultural land, and a decrease in soil agricultural potential; the clearing of vegetation in the route area; movement of vehicles/traffic impacts and result in the compaction and disturbance of soil due to the movement of heavy duty vehicles.</p>	“Preferred access road”	Short Term	Highly Probable	Local	High	Low	Low (Negative)
	“Alternative access road”				Low	High	High (Negative)
<p>Alien plant invasion – Apart from the loss of plant cover in cleared areas, the disturbance would also encourage the invasion of alien plant species in the post-construction phases of the project.</p>		Medium Term	Definite	Local	Low	Medium	Low (negative)

<p>Loss of grazing areas, agricultural land and change in land use – The establishment of a solar facility will result in a change of land use and the consequent loss of grazing areas. However, the extent of the area to be transformed is less than 20 ha and there remain sufficient grazing land for the sheep on the farm.</p>	Long Term	Highly probable	Local	Low - Medium	Low - Medium	Low (negative)	
<p>Soil erosion – The increase in hard surfaces (roads and panels) will not significantly increase the erodability of the site. Given the small area involved and the low slopes on site, the erosion danger is expected to be low.</p>	<p>“Preferred site”</p>	Medium Term	Probable	Local	Low	Medium	Low (Negative)
	<p>“Alternative site”</p>						Low - Medium (negative)
<p>Redistribution of sunlight, temperature and rainwater by solar panels and hard surfaces - The solar panels reduce the direct sunlight and rain on vegetation. Rain water will be redistributed by the solar panels. The water falling on the panels will be accumulated in a line at the bottom of the panels. Constructed access roads will also increase hard, impermeable surfaces, increase overland flow resulting in increased soil erosion and increased water flow in water flow channels.</p>	Permanent	Definite	Limited to the site	High	Low, if managed properly and reduced by infield rainwater harvesting	Low (positive)	
<p>Disruption of landscape connectivity for fauna - Disruption of landscape connectivity for fauna could result if the site is fenced off in a</p>	Long Term	Highly probable	Local	High, removal of infrastructure	Low	Low (negative)	

manner which prevents the movement of larger and middle-sized mammals. Furthermore, since most such mammals have home ranges which exceed the extent of the site, any mammals trapped within the site would probably not have sufficient resources present to be able to support themselves.						
Negative impacts on Avifauna (birds) - A large proportion of the listed species which occur at the site are particularly vulnerable to collisions or electrocution from transmission lines. It must be ensured that any maintenance on the transmission infrastructure of the site retains the bird-friendly design features. Also, any electrocution and collision events that occur must be recorded so that further mitigation and avoidance measures can be implemented.	Long term	Highly probable	Regional	High	Low	Low (negative)
Loss of habitat – the presence of a solar facility for approximately 20-25 years will likely result in a loss of habitat for current fauna utilising the site. However the extent of the clearing will be limited to less than 20 ha. The total area of the farm portion is approximately 2353 ha. Therefore there will be adequate habitat of similar nature to accommodate fauna in other areas.	Long term	Highly probable	Local	High	Low	Low (negative)
Soil contamination – only window washer type devices will be utilised for the cleaning of panels. Hence, the possibility of soil contamination as a result is extremely low.	Short term	Improbable	Local	Low	High	Low (negative)

<p>Visual impacts – The construction of the solar facility will change the nature of the site. However, there already exist power lines that run across the farm itself leading to the substation. Therefore the view of the area will not change substantially. Additionally the solar facility is partially blocked by koppies situated at the northern end of the property and the occurrence of bush, trees and buildings may act to conceal it from potential visual receptors. Establishment of the facility will also elicit lighting impacts which require the implementation of mitigation measures (Section F, Appendix F).</p>	Long Term	Highly probable	Local	Medium	Low	Medium - High (negative)
<p>Additional water consumption on a quarterly basis – Water will be required for human consumption (i.e. the security guards on site)> Therefore an agreement must be obtained from the local municipality stating that water will be supplied to the site.</p>	Short Term	Definite	Local	Low	High	Low (negative)
<p>Generation of solid waste, grey water and sewage – All the above-mentioned waste will be produced as a result of the presence of security personnel on the site. The anticipated volumes will be low and are not expected to have a significant impact. The applicant will employ waste removal contractors to collect, remove and dispose of waste generated at the site. It will be necessary to ensure that the contractors have the necessary permits and that the waste is disposed of at a licensed waste disposal site. All</p>	Long Term	Definite	Local	Low	Low - Medium	Low (negative)

<p>waste must be recycled/re-used as much as possible. It must also be ensured that grey water produced is properly disposed to prevent soil and water contamination.</p>						
<p>Changes in runoff quality and quantity, affecting habitat quality in dams and drainage lines - Sources of potential pollution would include any grey water discharges, and car park or road runoff, panel washing areas or other sources of potential foreign material passed untreated into downstream resources. Depending on the nature of pollutants, negative impacts to aquatic fauna including amphibians could be expected in downstream systems – that is, the dams south of the site. Hence, no wash water or water that is in any way contaminated should be passed into natural watercourses, and arrangements should be made for their proper disposal. Furthermore, changes in the characteristics of ephemeral drainage lines/dams, as a result of receipt of frequent flows of wash water from panel washing activities (if opted for) would be likely to result in an increase in weedy, disturbance tolerant species. It is thus imperative that water quality be monitored and water flows off-site be effectively managed to facilitate processes that determine the functioning of natural freshwater features.</p>	<p>Short Term</p>	<p>Probable</p>	<p>Local</p>	<p>Low</p>	<p>High</p>	<p>Low (negative)</p>

<p>Erosion of drainage channels as a result of concentration of runoff into channels - Runoff from the site may result in the passage of concentrated flows into drainage lines; result in bank or bed erosion in these systems; necessitate their being lined or otherwise artificially stabilised; and result in droughting of natural systems through diversion of flows into adjacent water courses. Hence, a stormwater management system must be designed, implemented and maintained. The stormwater plan should also address areas likely to generate high volumes of water during rainfall events, including car parks, roofs and the solar panels themselves.</p>	Permanent	Probable	Local	Low	High	Low (negative)
<p>Change in sense of place - The site is characterised by open veld with a rural agricultural sense of place. The installation of solar panels and operation of the solar facility will result in a change in sense of place. However, neighbours are not situated within viewing distance of the site. Additionally, there is an Eskom substation across the railway line to the south of the potential sites with high-voltage power lines that traverse the farm. However, given the rural setting of the potential development site, the impact of a PV facility on the sense of place is expected to be significant, considering that the surrounding area has been subject to limited transformation.</p>	Long Term	Highly probable	Regional	Medium	Low	High (negative)

<p>Traffic impacts - During the operational phase, traffic impacts will be less, with vehicles only required to transport infrastructure during routine maintenance and upgrading phases. Impacts associated with the higher traffic volumes can be accommodated by proper site management, e.g. controlling the size of orders that would be transported to the site at any given time, and by notifying the public through local and regional media centres when large freight-carrying vehicles will be on the roads.</p>	<p>Medium Term</p>	<p>Highly Probable</p>	<p>Local</p>	<p>High</p>	<p>Low</p>	<p>Low (negative)</p>
<p>Potential disturbance and damage to palaeontological features - The proposed development will impact on fossil-bearing Adelaide Subgroup strata if excavations into bedrock are required. There are no objections to the proposed development on palaeontological grounds provided that access by a specialist should be facilitated at the appropriate stage during the construction phase of the development. Also, newly uncovered objects of palaeontological significance, found during the course of excavation activities must be reported to the appropriate heritage authorities. It must be noted that such finds may require a Phase 2 rescue operation at the cost of the developer.</p>	<p>Permanent</p>	<p>Improbable</p>	<p>Local</p>	<p>High, since there will be no impacts on <i>in situ</i> fossils.</p>	<p>Low, since there will be no impacts on <i>in situ</i> fossils.</p>	<p>Low (negative)</p> <p>Positive (low) - if palaeontological features are discovered and added to the heritage record.</p>
<p>Potential impact of the solar thermal plant on local tourism - The focus appears to be on promoting tourism in the north east of the</p>	<p>Long Term</p>	<p>Probable</p>	<p>Local</p>	<p>High</p>	<p>Low</p>	<p>Low (either negative or positive)</p>

<p>province. Despite this caution must be taken to ensure that the development of renewable energy projects, such as the proposed solar energy facility, do not affect the tourism potential of the Province. However, based on the findings of the site visit, the proposed facility is not likely to impact on the tourism sector in the area or the Province. This is due to the sites location and the existence of existing infrastructure in the site, including the railway line and the Valleydora substation and associated power lines. The significance of this issue is therefore rated as low negative. In some instances the plant may also attract tourists to the area. However, the significance of this potential benefit is also rated as low positive.</p>						
<p>Establishment of a community trust funded by revenue generated from the sale of energy - SolaireDirect has indicated that they are committed to establishment of a Community Trust. Community Trusts provide an opportunity to generate a steady revenue stream that is guaranteed for a 20 year period. This revenue can be used to fund development initiatives in the area and support the local community. The long term duration of the revenue stream also allows local municipalities and communities to undertake long term planning for the area.</p>	Long Term	Definite	Local and regional	N/A	N/A	High (positive)
<p>Promotion of clean, renewable energy - South Africa currently relies on coal-powered energy to</p>	Long Term	Highly probable	Local, Regional	High	High, impact of climate change on	Medium (positive)

meet more than 90% of its energy needs. As a result South Africa is one of the highest per capita producers of carbon emissions in the world. The establishment of a clean, renewable energy facility will therefore reduce, albeit minimally, South Africa's reliance on coal-generated energy and the generation of carbon emissions into the atmosphere.			and National		ecosystems.	
Cumulative impacts of the solar thermal plant on local tourism - The establishment of both the 10MW and 75MW facilities are likely to bring about potential negative and/or positive impacts on tourism in the Kopanong Municipality Area.	Long Term	Probable	Local	High	Low	Low (either negative or positive)
Cumulative impacts of the establishment of a community trust funded by revenue generated from the sale of energy - The cumulative impact of the establishment of the 10MW and 75MW solar energy facilities will ultimately be the promotion of social and economic development and improvement in the overall well-being of the community.	Long Term	Definite	Local and regional	N/A	N/A	High (positive)
Cumulative impacts of the promotion of clean, renewable energy - The construction and operation of both the proposed solar energy facilities will reduce carbon emissions <i>via</i> the use of renewable energy and elicit associated benefits in terms of global warming and climate change.	Long Term	Highly probable	Local, Regional and National	High	High, impact of climate change on ecosystems.	Medium (positive)
Cumulative visual impacts - The combination	Long Term	Highly	Regional	Medium	Low	High

of the 10MW solar power facility (Phase 1) and the 75MW solar power facility (Phase 2), in particular, may institute a cumulative impact in terms of visual exposure.		Probable				(negative)
Cumulative impacts on biodiversity and ecology - The sites considered for the BAR are nested within the recommended development sites for the Biodiversity and Ecology specialist study, and as such the impacts for the two proposed developments (the 10MW and 75MW solar power facilities) are very similar in nature and extent. Given the largely intact nature of the surrounding landscape and the relatively limited extent of the solar developments, the potential for cumulative impacts is low.	Long Term	Improbable	Local and Regional	Medium	Low - Medium	Low (negative)
Cumulative impacts on freshwater features/resources - The appointed specialist was specifically asked to assess the cumulative impacts that would accrue to freshwater ecosystems in the event that development of both a 10 MW and a 75 MW site occurred. In terms of this scenario, the net impact to freshwater ecosystems would be substantially increased, since it is assumed that a doubling of infrastructure (roads, cable crossings) would occur, the extent of hardened surfaces would increase and the net impact of increased concentrations of flows into downstream areas would also increase.	Long Term	Highly probable	Local	Low	High	Medium (negative)

Cumulative impacts on heritage and archaeological features - Cumulative impacts are not considered relevant in this field of study.	N/A	N/A	N/A	N/A	N/A	N/A
Cumulative impacts on palaeontological features - There are <u>no cumulative impacts</u> .	N/A	N/A	N/A	N/A	N/A	N/A
Cumulative impacts on soil/land and agricultural potential - There are <u>no cumulative impacts</u> .	N/A	N/A	N/A	N/A	N/A	N/A
Cumulative impacts on employment and business creation opportunities Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area.	Long Term	Probable	Local and Regional	N/A	N/A	Low – Medium (Positive)
Generation of electricity – The additional electricity generated will <u>positively</u> contribute to the country’s drive toward sustainable energy generation.	Long Term	Definite	National	N/A	N/A	Medium (positive)
Increase in electrical infrastructure in Kopanong Municipality – The additional power may give rise to increased business opportunities in terms of industrial businesses that the power supply cannot currently accommodate.	Long Term	Probable	Local	Medium	Low - Medium	Medium (positive)
Permanent employment and other economic benefits/business creation opportunities - The solar facility will require round the clock security. Operational staff and at least four	Long Term	Probable	Local and Regional	N/A	N/A	Medium (positive)

security guards will be needed on a permanent basis.						
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Evaluation of Potential Environmental Impacts Associated with the Proposed Solar Facility – DECOMMISSIONING PHASE

Type of Impact		Duration	Probability	Extent	Reversibility	Irreplaceability	Overall Significance
Potential impacts associated with the construction/presence of access roads - movement of vehicles/traffic impacts and result in the compaction and disturbance of soil due to the movement of heavy duty vehicles.	“Preferred access road”	Short Term	Highly Probable	Local	High	Low	Low (Negative)
	“Alternative access road”				Low	High	High (Negative)
Generation of solid waste – The panels contain materials that may be hazardous in nature if released into the environment. If the panels are intact, there will be no risk of exposure. Therefore the panels need to be disposed of appropriately. Additionally, other structures from the solar facility will need to be removed and disposed of. The applicant must ensure that the final disposal site can accept the waste and the anticipated volumes thereof. Any hazardous waste must be disposed of at a hazardous waste disposal site. The disassembled structures and other wastes must be recycled/re-used as much as possible.		Long Term	Definite	Local	Low	Low - Medium	Medium (negative)

Disturbance or use of no-go areas - No-go areas should not be disturbed or used for the stockpiling of disassembled structures or other materials.	Short Term	Probable	Limited to the site	Low	High	Low (negative)
Traffic impacts - During the decommissioning phase, traffic impacts will be a little higher than normal as trucks will transport disassembled structures and equipment (PV panels, frames) to a landfill site. Infrastructure utilised for the proposed development, including support structures, PV modules, frames, as well as machinery will be transported to the landfill for disposal. Impacts associated with the higher traffic volumes can be accommodated by proper site management, e.g. controlling the quantity of materials that would be transported to the landfill, and by notifying the public through local and regional media centres when large waste-carrying vehicles will be on the roads.	Short Term	Probable	Local	High	Low	Low - Medium (negative)
Termination of employment – Once the facility has been decommissioned there will be no need for operational staff and security guards.	Short Term	Definite				Low (negative)

No-go alternative (compulsory)

The status quo will remain and there will be no generation of additional power from renewable energy sources and no investment in the local power generation infrastructure. The negative impacts described above associated with the project would not be experienced. The most significant negative impact to be avoided would be the visual impact of the project on the sense of place in the immediate vicinity of the site. However, this needs to be considered against the key benefits, such as the investment of the project for the local area and benefits for the local community from the proposed Community Trust that is a compulsory component of any renewable energy project that proceeds under the IPP Procurement Programme of the Dept of Energy.

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

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

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

An Environmental Management Plan Report (EMPr) has been compiled and is included in Appendix F. The mitigation measures necessary to ensure that the project is planned, constructed, operated and decommissioned in an environmentally responsible manner are listed in the EMPr.

Is an EMPr attached?

YES

The EMPr must be attached as Appendix F.

SECTION F: APPENDIXES

The following appendixes must be attached as appropriate:

- Appendix A: Site plans
- Appendix B: Photographs
- Appendix C: Facility illustrations
- Appendix D: Specialist reports
- Appendix E: Stakeholder Engagement
- Appendix F: Environmental Management Programme (EMPr)
- Appendix G: Other information