PROPOSED KLEINBEGIN PHOTOVOLTAIC SOLAR ENERGY FACILITY SITE WEST OF GROBLERSHOOP, NORTHERN CAPE PROVINCE

FINAL SOCIAL IMPACT ASSESSMENT

Submitted to:

Savannah Environmental (Pty) Ltd
PO Box 148
Sunninghill
2157
Tel: 011-234 6621

Submitted by:

Batho Earth
PO Box 35130
MENLO PARK
0102
Cell: +27 082 779 2750
Fax: 088 012 361 1623
E-Mail: ingrid@bathoearth.co.za

Batho Earth
Social and Environmental Consultants

7 October 2011

TABLE OF CONTENTS

GLOSSARY OF ABBREVIATIONS

DEA:	Department of Environmental Affairs
EMP:	Environmental Management Programme
EPC:	Engineering, Procurement, Construction
GDP:	Gross Domestic Product
HDSA:	Historically Disadvantaged South African
IDP:	Integrated Development Plan
I&AP:	Interested and Affected Party
LED:	Local Economic Development
LM:	Local Municipality
PV:	Photovoltaic
SIA:	Social Impact Assessment
SDF:	Strategic Development Framework
StatsSA:	Statistics South Africa
SMME:	Small to Medium Size Enterprise

1. INTRODUCTION

1.1 Background to the proposed project

Savannah Environmental (Pty) Ltd, as Environmental Assessment Practitioners (EAP), has been appointed by Vanguard Solar (Pty) Ltd. to conduct an Environmental Impact Assessment (EIA) for the proposed Kleinbegin Photovoltaic Energy Facility, near Groblershoop and Upington in the Northern Cape Province.

Before a project of this nature can proceed an EIA needs to be undertaken. As part of the EIA process, a Social Impact Assessment (SIA) is required to be undertaken. The EIA process consists of two phases, namely the Scoping Phase and a detailed EIA Phase. This Report, together with other specialist studies, forms part of the detailed EIA phase.

Vanguard Solar (Pty) Ltd. is proposing the establishment of a renewable energy facility consisting of a Photovoltaic (PV) solar energy component as well as associated infrastructure on Portion 2 of the farm Kleinbegin 115. This property is also referred to as Witdam and is 6.900 ha in extent (Mr. G. van Zyl, 2011). The footprint of the facility would be approximately 163 ha (Vanguard Solar, 2011).

1.2 Site Location

The proposed site is situated approximately 22 km west of Groblershoop and approximately 45 km south-east of Upington in the Northern Cape Province. The Kleinbegin station and settlement is just on the border of the farm Kleinbegin 115 (Witdam) and the farm Kleinbegin 115/RE which is the neighbouring property to the south of the project. The Upington-De Aar railway line traverses the eastern side of the site and an existing power line runs in a north-south direction on the western section of the property. An existing access road from the north also traverses the northern section of the farm Kleinbegin 115 (Witdam). Refer to Figure 1 for a map of the site locality.

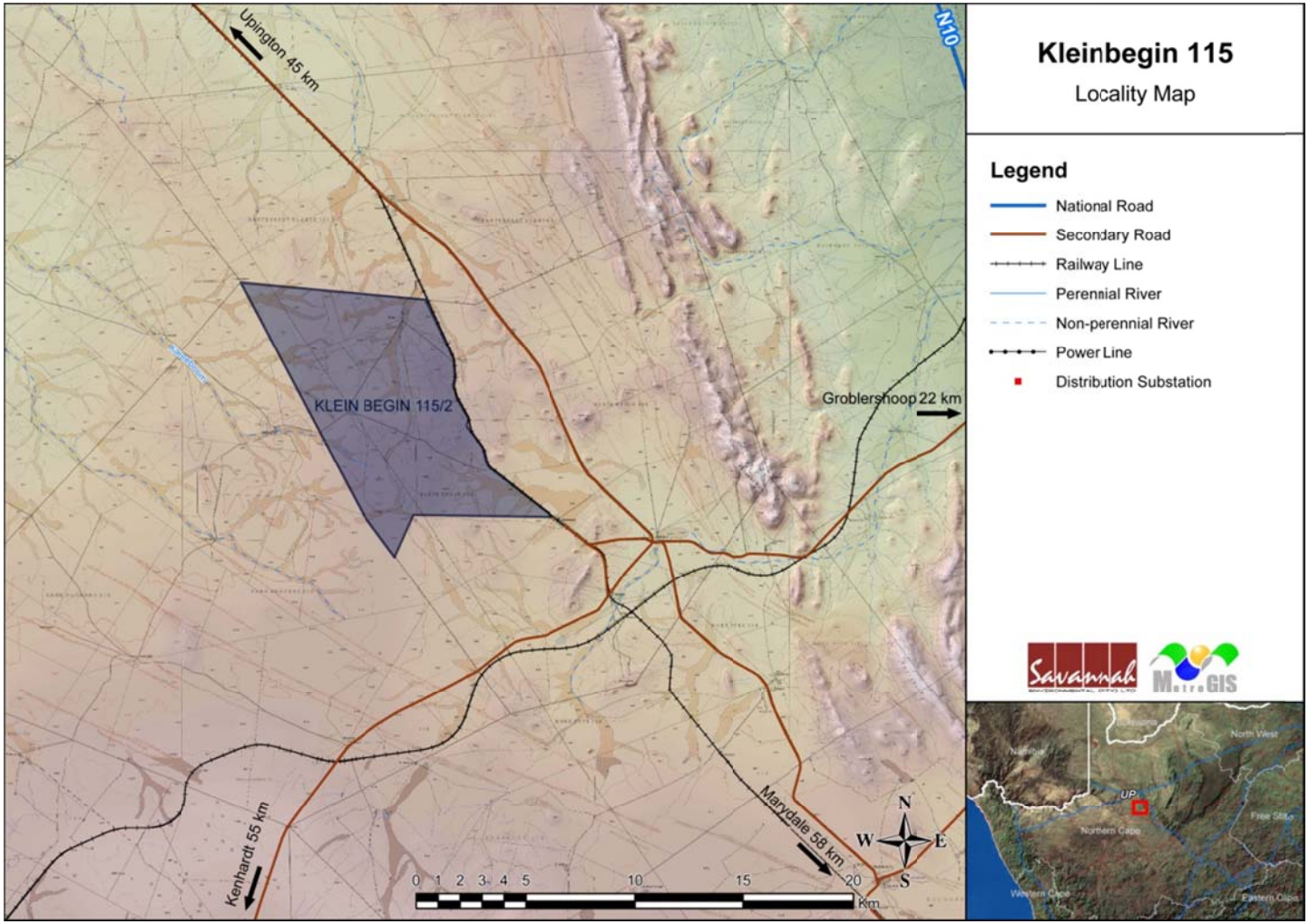

Figure 1.: Map of the site locality

1.3 Proposed development

The proposed PV Solar Energy Facility would be established in Portion 2 of the Farm Kleinbegin 115 (Witdam) and has road access from the N10 and other secondary roads such as the Kleinbegin gravel road. The larger site covers an area of approximately 6.900 hectares which is larger than the development footprint required, which is, at this stage roughly estimates at 30 hectares for each block of 10MW. Approximately 163 hectares would thus be required for the PV panels.

The proposed project would make use of photovoltaic (PV) technology with a maximum total generation capacity of 50MW. The facility would comprise the following infrastructure:

- An array of PV panels and associated foundations;
- Underground cabling between the PV panels;
- Invertors and substation;
- Power line linking to the Eskom electricity grid;
- Internal access roads; and
- Workshop area for maintenance and storage and administration building.

The purpose of the facility is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operational and maintenance costs, as well as social and environmental impacts.

1.4 Purpose of the Social Impact Assessment Report

The aim of the Social Impact Assessment Report is to:

- Determine the current socio-economic status of the area and the social characteristics of the receiving environment;
- Indicate the anticipated core impact categories and impact areas (possible hot spots);
- Identify anticipated positive socio-economic impacts of the proposed project, including positive impacts and provide management measures for these impacts;
- Identify and highlight negative socio-economic impacts (social hot spots) of the proposed project and indicate mitigation measures to deal with these impacts;
- Present the findings, recommendations, and conclusions of the social study.

2. DEFINITION OF A SOCIAL IMPACT ASSESSMENT

Burdge (1995) describes a Social Impact Assessment as the "…systematic analysis in advance of the likely impacts a development event (or project) will have on the day-to-day life (environmental) of persons and communities." A SIA therefore attempts to predict the probable impact of a development (before the development actually takes place) on people's way of life (how they live, work, play and interact with one another on a daily basis), their culture (their shared beliefs, customs and values) and their community (its cohesion, stability, character, services and facilities), by:

- Appraising the social impacts resulting from the proposed project;
- Relating the assessed social impacts of the project to future changes in the socio-economic environments that are not associated with it. This would serve to place the impacts of the project into context;
- Using the measurements (rating) to determine whether the impacts would be negative, neutral or positive;
- Determining the significance of the impacts; and
- Proposing mitigation measurements.

An SIA is thus concerned with the human dimensions of the environment, as it aims to balance social, economic and environmental objectives and seeks to predict, anticipate and understand the potential impacts of development.

The usefulness of an SIA as a planning tool is immediately clear, in that it can assist the project proponent to conceptualise and implement a project in a manner which would see the identified negative social impacts addressed through avoidance or mitigation and the positive impacts realised and optimised. It would also allow the community to anticipate, plan for and deal with the social changes once they come into effect. In this sense then, the SIA is an indispensable part of the EIA, the Environmental Management Plan (EMP) and any participative activity (e.g. community involvement in mitigation and monitoring during planning and implementation).

3. METHODOLOGY

The broad steps followed as part of the Social Impact Assessment are discussed below.

3.1 Scope of the Assessment

Based on information received from the client and Savannah Environmental, the scope of the assessment was determined.

3.2 Literature Review, Analysis and Desktop Studies

The literature review and desktop studies assisted the consultants in establishing the social setting and characteristics of the study area, as well as the key economic activities.

Primary data assisted the consultants in establishing the social setting and characteristics of the study area, as well as the key economic activities. Secondary data, which was not originally generated for the specific purpose of the study, were gathered and analysed for the purposes of the study. Such data included the census data, project maps, local histories, planning documentation such as the draft Integrated Development Plan (IDP) and Strategic Development Framework (SDF) of the !Kheis Local Municipality and Siyanda District Municipality.

3.3 Consultation Sessions and Fieldwork

During the EIA Phase additional primary data would also be gathered by means of consultation with the stakeholders and affected parties, and linkages with the public participation process.

3.4 Profiling

Profiling serves to build on information generated during the Scoping phase. It involves a description of the social characteristics and history of the area being assessed, an analysis of demographic data, changes in the local population, and the land-use pattern in the study area, as well as any other significant developments in the area and thus social character over time. The profiling process is a combination of secondary and primary research, site visits, and consultation. This could include information on:

- Historical background;
- Social characteristics;
- Culture, attitudes and socio-psychological conditions;
- Population characteristics;

- Community and institutional structures;
- Community resources; and
- Broad economic impacts.

The broad profiling will typically include descriptions regarding the following:

- The social trends and current conditions;
- The land-use in the area;
- The demographical profile and social characteristics of the host community;
- Other potential developments in the area;
- The local and regional economy; and
- Potential economic links between the proposed project and its environs.

3.5 Projection and Estimation of effects

A baseline assessment indicates the current reality in the social and related aspects of the affected environment. A baseline assessment is necessary to enable a logical and theoretically sound analysis of social impacts. It forms part of the process of identifying important cause-and-effect relationships and a comparative framework for anticipated changes and impacts.

The output of this phase is the impact matrix and mitigation measures.

3.6 Variables

The following variables are typically assessed (Burdge, 1995) as part of the Social Impact Assessment:

- Population impacts;
- Community/institutional arrangements;
- Conflicts between local residents and newcomers;
- Individual and Family level impacts;
- Community infrastructure needs; and
- Intrusion impacts.

For assessing the impacts associated with the proposed project, the above variables were adapted to allow the assessment of the full range of social impacts relevant to the specific project. These variables would relate to the construction and operational phases of the proposed project.

3.7 Significance Criteria

During the Environmental Impact Assessment Phase, the anticipated social impacts were rated according to a rating approach used and specified by Savannah Environmental. This rating approach is described below:

CATEGORY	DESCRIPTION
Nature	A description of what causes the effect, what will be affected, and how it will be affected.
Extent	Whether the impact will be local (limited to the immediate area or site of development) or regional. A value between 1 and 5 will be assigned as appropriate (1 = low and 5 = high).
Duration	Where it will be indicated whether: • The lifetime of the impact will be of a very short duration of 0 – 1 years: Assigned a score of 1 • The lifetime of the impact will be of a short duration of 2 – 5 years: Assigned a score of 2 • Medium term of 5 – 15 years: Assigned a score of 3 • Long term (> 15 years): Assigned a score of 4 • Permanent: Assigned a score of 5
Magnitude	This is quantified on a scale of 0-10, where • 0 is *small* and will have no effect on the environment; • 2 is *minor* and will not result in an impact on processes; • 4 is *low* and will cause a slight impact on processes; • 6 is *moderate* and will result in processes continuing but in a modified way; • 8 is *high* where processes are altered to the extent that they temporarily cease; and • 10 is *very high* and results in complete destruction of patterns and permanent cessation of processes.
Probability	The probability of occurrence describes the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1-5, where: • 1 is *very improbable* (probably will not happen)

CATEGORY	DESCRIPTION
	• 2 is *improbable* (some possibility, but low likelihood) • 3 is *probable* (distinct possibility) • 4 is *highly probable* (most likely) • 5 is *definite* (impact will occur regardless of any prevention measures)
Significance	The significance shall be determined through a synthesis of the characteristics described above and can be assessed as *low, medium or high*. The significance weightings for each potential impact are as follows: • Below 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area) • 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated) • Above 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area) The significance is calculated by combining the criteria in the following formula: S = (E+D+M)P S= Significance weighting E= Extent D= Duration M= Magnitude P= Probability
Status	The Status will be described as *positive, negative, or neutral*.
Reversibility	The degree to which the impact can be reversed.
Irreplaceable loss of resources?	The degree to which the impact may cause irreplaceable loss of resources.
Can impacts be mitigated?	The degree to which the impact can be mitigated.
Mitigation	Description of mitigation measures.

CATEGORY	DESCRIPTION
Cumulative impacts	Impacts that result from the incremental impacts of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.
Residual impacts	Identification of residual (remaining) impacts after mitigation.

4. KEY DEMOGRAPHIC INFORMATION

4.1 Municipal Background

4.1.1 *Siyanda District Municipality*

The Siyanda District Municipality covers an area of 102,661.349km^2 in the Northern Cape Province and lies on the great African plateau. Towns are scattered through the area, with vast open spaces between. The district is thus scarcely populated (Environomics, 2008). The Siyanda District Municipality comprises six Local Municipalities namely:

- Mier Local Municipality;
- !Kai Local Municipality;
- !Gariep Local Municipality;
- //Khara Hais Local Municipality;
- Tsantsabane Local Municipality;
- !Kheis Local Municipality; and
- Kgatelopele Local Municipality.

Upington is the district municipal capital where the municipal government is located (Siyanda IDP, 2009).

4.1.2 *!Kheis Municipality*

The study area falls within the jurisdiction of the !Kheis Municipality. This municipality was established in 2000 from the former Groblershoop Municipality, and includes the following settlements:

- Boegoeberg;

- Gariep;
- Groblershoop (main town);
- Grootdrink;
- Kleinbegin;
- Opwag;
- Topline; and
- Wegdraai.

The !Kheis Municipal area was initially inhabited by the Khoi-San people, and many of their descendants still live in the area. The name of the !Kheis Municipality is thus an acknowledgment of the native people who first migrated to this area (!Kheis Municipality IDP, 2005).

4.2 Population Dynamics

4.2.1 *Population Figures*

The Siyanda District Municipality has a population of approximately 200 000 people and has a very low population density, which is typical of most of the areas within the Northern Cape Province (Siyanda District Municipality IDP, 2009). Statistics also show that the area experienced some decrease in the district population between 1996 and 2001 (Environomics, 2008).

The total population within the !Kheis Municipal area totalled 16 027 in 2001. Even though there has been an increase in the population from 1996 it is still an area with a very low population profile and makes up approximately 8% of Siyanda District Municipality's population. Due to seasonal workers employed mainly in the grape industry, the population figures could differ throughout the year. Most of these workers come from Keimoes, Olifantshoek and Griekwastad (!Kheis Municipality IDP, 2005).

4.2.2 *Age Groups and Gender*

The population of Siyanda District is young, with 59% of persons younger than 30 years old and 73% of persons younger than 40 years old. Less than 8% of persons are older than 60 years old, which indicates a low life expectancy for the region (Environomics, 2008).

Within the !Kheis Municipality, more than half of the population falls within the 5 to 34 year age category (!Kheis Municipality IDP, 2005).

4.3 Education levels

The Siyanda District has a high illiteracy rate as more than 21 105 persons (over the age of 20 have never been to school. According to information from Census 2001 only 16% obtained Grade 12, while 5% obtained a higher education (Environomics, 2008).

It is concerning that only a limited number of individuals within the !Kheis Municipality attended any tertiary education centres according to the 2001 Census information. Most of the individuals falling within the school going age groups, however, seemed to be attending school, although most of those only completed some form of secondary levels and not necessarily grade 12 (!Kheis Municipality IDP, 2005).

4.4 Employment Status

Information from 2001 indicates that the majority of income earning persons in the Siyanda District earned less than R800 per month. High incomes (above R50 0000 per month) were then also limited to less than 200 people (0.1%). The income per capita in the district is lower than the provincial level in each of the economic sectors. Not only the local area, but the district area thus suffers from the impacts of the extreme poverty of the largest section of the population (Environomics, 2008).

In the !Kheis Municipality 21% of the total labour force was unemployed in 2001. It is anticipated that this trend continued and that the unemployment rate remained the same. Agriculture, forestry and fishing is the main source of employment in the !Kheis Municipality, followed by the private households sector and then by the wholesale and retail sector. Unfortunately most of the employment opportunities associated with the irrigation agriculture provide only seasonal work (!Kheis Municipality IDP, 2005).

Most individuals thus fulfil elementary positions which indicates the lack of skills development and capacity within the !Kheis Municipality. As this has a direct impact on the income levels and individuals' ability to pay for services, it is critical that this aspect receives the attention it deserves (!Kheis Municipality IDP, 2005).

Poverty levels in the area are expected to be high as the majority of persons within the labour force earned less than R800 per month according to the statistics of 2001 (!Kheis Municipality IDP, 2005).

4.5 Basic Services

4.5.1 *Housing*

Although there was an increase in the number of formal houses since 1996 until 2001, a large number of households still only have informal type of housing facilities (!Kheis Municipality

IDP, 2005). A priority issue for the !Kheis Municipality is to provide approximately 800 sites and houses to communities within the municipal jurisdiction (Siyanda IDP, 2009).

4.5.2 *Water and Waste Services*

There has been an improvement in the provision of water to dwellings and on-sites, as well as community stands. Water networks were installed since 1996 and residents are mainly serviced with pre-paid water on-site. Through the development and implementation of the Water Management Programme, the !Kheis Municipality proposes to address the needs of individual households for easy access to good quality drinking water (!Kheis Municipality IDP, 2005).

The Boegoeberg Dam is in close proximity to the town of Groblershoop. From this dam water is diverted through canals for irrigation purposes and to various settlements (Siyanda IDP, 2009).

The majority of those living in the !Kheis Municipality make use of their own waste dump, followed by a large number of households receiving waste collection once a week (!Kheis Municipality IDP, 2005).

4.5.3 *Sanitation Services*

Within the Siyanda District, there has been a significant increase in the number of the households receiving sanitary services as more than 60% of households now have flush toilets. Chemical toilets, septic tanks, and VIP toilets have also been implemented, whereas there is a major effort to eradicate the bucket latrine systems (Environomics, 2008).

Due to the above efforts of the Siyanda District Municipality, there has also been a significant decrease in those making use of the bucket latrine system within the !Kheis Municipal area.

4.5.4 *Electricity Provision*

There has been an increase in the electricity provision to almost 600 households from 1996 until 2001. Electricity provision, however, still needs to be upgraded as some households in newly developed areas still struggle without electricity (!Kheis Municipality IDP, 2005).

4.5.5 *Health and Safety Services*

Health services in the !Kheis Municipality are of a poor standard. Community clinics are found within Groblershoop, Wegdraai, Toplink, Grootdrink and Boegoeberg. However, the nursing sister has to rotate between the different clinics and if she is not on duty, no services are available and the clinics are closed on those specific days. The nearest hospital is in Upington (!Kheis Municipality IDP, 2005).

Only two ambulance drivers and one ambulance are available. The ambulance drivers work each day. If one takes leave, the other one has to work alone (!Kheis Municipality IDP, 2005).

4.5.6 *Roads and modes of transport*

The majority of people within the !Kheis Municipality walk to their destinations or make use of public transport which is again an indication of the poverty levels of those residing within the municipal area (!Kheis Municipality IDP, 2005).

The main road from Upington to Groblershoop, is the N10. Groblershoop is also connected by the N8 to Griekwastad and by the N10 to Marydale. The rest of the connecting roads in the !Kheis area consists of gravel roads, which are often in a unsatisfactory condition (!Kheis Municipality IDP, 2005).

4.6 Resources and Land-Use

The Siyanda District Municipality has rich mineral deposits and mining has thus been the key activity of the district economy. Mining occupies approximately 7% of the entire district's land use. Due to the Gariep River (Orange River) various towns and settlements developed along the river. Irrigated agriculture is therefore also one of the key sectors within the local economy (Environomics, 2008).

The !Kheis Municipal area is characterised by stock-farming (sheep). Emerging farmers in the area farm with sheep and goats. Irrigation also takes place on a wide scale due to the Orange River stretching through the municipal area. Table grapes produced locally are exported to Europe and most employment opportunities in the municipal area are related to this seasonal industry. Cotton, corn, wheat, tomatoes, peanuts, melons and pumpkins are also produced under irrigation from the Orange River. The economic development of these settlements and the various types of products are thus dependent on the river (!Kheis Municipality IDP, 2005).

4.7 Tourism and Leisure

The Siyanda District has a unique landscape that has the potential to contribute to a range of local and international tourist activities and destinations. Scenic routes could thus be further developed to exploit this opportunity (Environomics, 2008).

The tourism industry of the !Kheis municipality could be further developed. Areas of potential relate to 4 x 4 routes and related activities as well as the development of water related tourism. The natural appearance of the area furthermore supports agricultural tourism. Currently the Boegoeberg Dam and Resort is the main tourist attraction providing fishing and water sport activities in the local area (!Kheis Municipality IDP, 2005).

Nearby tourist establishments include Thuru Lodge Private Game Reserve approximately 12 km south west from Wegdraai and almost 17 km south east of the proposed PV facility site (www.thurulodge.co.za).

4.8 Economy

Agriculture forms one of the bases of the Northern Cape provincial economy contributing 7.3% to the GGP in 2002. The Siyanda District economy, which is dominated by mining and agriculture, is responsible for approximately 30% of the Northern Cape economy. Tourism has proved that it is a fast growing sector with great potential (Environomics, 2008).

The exploitation of the climate of the area for the generation of solar energy has been identified as one of the local economic drivers (Environomics, 2008).

The main economic centre in the !Kheis Municipality is Groblershoop which has a large abattoir that services all livestock from the larger area. Kleinbegin also has an abattoir. The environment is conducive to stock farming (mainly sheep for the meat market) and the cultivation of table grapes. Grootdrink and Groblershoop also have two wine cellars which produce quality table wine and grape juice. Furthermore, the SAD Vine Fruit (Pty) Ltd based in Upington has an intake point at Groblershoop (Siyanda Integrated Economic Development Plan, 2006).

5. POTENTIAL IMPACTS ASSOCIATED WITH THE CONSTRUCTION PHASE OF THE PROJECT

The following sections provide more information on the construction process required and the anticipated social impacts expected to occur during the construction phase of the project.

5.1 Background to the Construction Phase

The overall period for the construction of a 50 MW facility is estimated to be between nine (9) to ten (10) months and is divided into the following phases:

- Ground levelling and earth moving works (three to four weeks);
- Insertion of poles into the ground (approximately 2,5 months);
- Assembling of structures once pole insertion is half-way (approximately 2,5 to 3 months and thus overlaps with the previous phase);
- Mounting and final assembling of panels and cabling (approximately 1,5 months); and
- Tests, fine tuning of connections and cables (one month).

Access to the site for construction purposes and for the delivery of the components and equipment required for construction will be done by means of national and provincial roads and proposed internal access roads although an option to use the existing railway track from Upington is currently being assessed by EPC Contractor ABB, in order to deliver material at a distance of less than 5 km from the plant. It is anticipated that the N10 from Upington via Wegdraai and Groblershoop will be used. From there the secondary gravel road will be used to access the site from a southerly direction. This local access from the south across the farm Kleinbegin 115/RE to the farm Kleinbegin 115/2 (Witdam) will be required and sections of this road would have to be upgraded to accommodate some of the heavy vehicles transporting the individual facility components for construction purposes, in particular in the final parts of the chosen route. Internal access roads within the site would also have to be upgraded.

Site preparation activities will include partial clearance of vegetation at the footprint of each support structure. These activities will require the stripping of topsoil, which will need to be stockpiled, backfilled and/or spread on site. If the land is undulating, then the land would have to be levelled and rocks may also be removed as well as some plant material that may be seen as obstacles. However, ground levelling at this site would mainly only require a bulldozer to level the top few centimetres of the soil. During this phase the holes for future water tanks will also be made in the ground. The depth and width would depend on the shape of the 3 000 litre water tanks to be purchased.

In addition to the PV cells, lay down and storage areas will be required for the storage of typical construction equipment which will be required on site.

It is estimated that approximately 40 inverter blocks and a small substation will be installed to facilitate the connection between the solar energy facility and the Eskom electricity grid. The construction of the substation would require a survey of the area, site clearing and levelling and construction of access road(s), construction of a level terrace and foundations, assembly, erection, installation and connection of equipment, as well as rehabilitation of any disturbed areas and protection of erosion sensitive areas.

Ancillary infrastructure includes a short turn-in overhead 132kV power line feeding into the Eskom electricity network via the existing Gordonia – Kleinbegin no 1 x 132kV power line which runs through the site, a workshop and storage area, as well as temporary contractor's equipment yard and substation.

Once construction is completed and once all construction equipment is removed, the site will be rehabilitated where practical and reasonable. On full commissioning of the facility, any access points to the site which are not required during the operational period will be closed and rehabilitated.

5.2 Population Impacts

5.2.1 *Inflow of workforce*

This variable refers to the inflow of temporary workers from outside the local community and the potential for conflict between locals and these “outsiders”.

The construction phase is expected to last between nine (9) to ten (10) months and could result in the employment of a temporary outside workforce. At this stage, the exact number of construction workers that could be employed from the local communities cannot be determined, although it is likely that approximately 50% of the workforce could consist of local labour as the process is labour intensive as indicated under section 5.3.1.

Even though it is highly probable that a large section of the construction workforce could consist of local labour, the inflow of the workforce during the construction phase is expected to have severe negative impacts on the nearby landowners.

The construction workforce could interfere in the daily living and movement patterns of landowners, thereby interfering with the existing social networks. The rural area and surrounds have low crime levels, although theft of livestock is commonplace. The increase in the population size concentrated at the construction site and unauthorised movement on the larger section of the farm, and possibly on neighbouring farms, is of grave concern to the neighbouring landowners. Any increase in any type of criminal activity would thus be attributed to the construction of the proposed facility.

Possible environmental pollution due to the localised increase in the population figures should be attended to through sound environmental management of the construction site.

Even though the proposed site is located within a remote location, conflict between outsiders and the local communities should not be excluded especially in an area where jobs are scarce.

Safety and security impacts associated with the inflow of a workforce are sensitive issues which should be thoroughly addressed to limit any possible negative impacts on the surrounding landowners.

NATURE: Temporary inflow of a workforce during the construction phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (3)
Duration	Very short duration (1)
Magnitude	Moderate (6)
Probability	Highly Probable (4)
Significance	**Medium (40)**
Status (positive or negative)	Negative
	WITH MITIGATION
Extent	Local (3)
Duration	Very short duration (1)
Magnitude	Moderate (6)
Probability	Probable (3)
Significance	**Medium (30)**
Status (positive or negative)	Negative
Reversibility	Yes
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Yes

Mitigation:

- The use of local labour will help to avoid many of the negative impacts and conflict that might occur due to friction between a local and 'outside' labour force.
- Local labourers should remain at their existing residences and no workers can be allowed on site during night time. No workers will thus be accommodated on site at night except for the security personnel.
- Outside members of the construction team must be accommodated in suitable existing housing facilities within the area.
- Construction workers should wear uniforms and identity tags.
- Working hours should remain at normal working hours (e.g. 7 am to 5 pm during weekdays).
- The construction area will be properly fenced and security personnel should be on site on a permanent basis.
- Security cameras will be placed at all entrances to the site and any identified strategic locations
- Trespassing of workers on adjacent privately owned farms will be strictly banned. Construction workers shall remain at the construction site.
- A labour desk could be set up and the procedures to apply for work should be distributed or communicated to the local communities.
- The public participation process and communication efforts as part of the EIA for this project should continue. A communication process should thus be maintained

NATURE: Temporary inflow of a workforce during the construction phase of the Kleinbegin solar energy facility and associated infrastructure
by Vanguard Solar to ensure transparent communication between Vanguard Solar and the directly affected property owners. Property owners should be kept informed of the size of the workforce and timeframes for construction and completion. • Sufficient water and sanitation facilities should be provided for the workers on site during the construction period. • The construction site should be properly managed to avoid any environmental pollution (due to inadequate water and waste infrastructure and services) and littering. • If any type of informal vending stations develop on or near the construction site it should be strictly managed. • An Environmental Control Officer (ECO) should be appointed prior to the construction phase. The contact details of the ECO should be made available to all affected property owners in the case where they would like to lodge a formal complaint or would like to require more information regarding the construction process.
Cumulative impacts: • None anticipated.
Residual impacts: • Possibility of outside workers remaining in the area after construction has ceased.

5.2.2 *Influx of jobseekers*

Construction projects have the potential to attract high numbers of jobseekers, placing numerous negative impacts on the social and bio-physical environments of the study area. Poor control over the employment process could, amongst others, result in:

- Localised pollution at the area where the jobseekers gather;
- Conflict between locals and newcomers, especially if newcomers are perceived to 'take' the job opportunities and compete for resources;
- Impacts on the local Municipality in terms of infrastructure (housing) and service delivery (water, sanitation, health, social, etc.) and a potential increase in the unemployment base if newcomers remain in the area post construction; and
- Safety and security issues.

Even though the high unemployment rate of the region could make an influx of jobseekers likely, it should be noted that the site is situated in a remote area removed from the local settlements. The inflow of jobseekers to the site is therefore considered to be possible, but of a low likelihood.

Control and prevention of jobseekers remain difficult as the extent cannot be easily determined prior to a project. The recruitment strategy should therefore be communicated to the communities in a clear and transparent manner to ensure that unrealistic expectations are not created and to limit the number of jobseekers coming to the site in search of employment. The input of the Municipality, Ward Councillor, any other community structures and an existing skills database of an available workforce would assist in this regard.

NATURE: Impact of an influx of jobseekers during the construction phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (2)
Duration	Very short (1)
Magnitude	Moderate (6)
Probability	Probable (3)
Significance	**Low (27)**
Status (positive or negative)	Negative
	WITH MITIGATION
Extent	Local (2)
Duration	Very short duration (1)
Magnitude	Moderate (6)
Probability	Improbable (2)
Significance	**Low (18)**
Status (positive or negative)	Negative
Reversibility	Yes

NATURE: Impact of an influx of jobseekers during the construction phase of the Kleinbegin solar energy facility and associated infrastructure	
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Yes to a certain extent
Mitigation: • Establish a labour desk that deals with job seekers and to discourage the gathering of people at unsuitable localities. The contractor and labour desk should clearly communicate the extent of the work and number of workers required to the affected Municipalities and job seekers to avoid unnecessary expectations regarding employment opportunities. • The contractor should be contractually obliged to give preference to a local labour force, as far as possible. • Co-ordinate and work through the !Kheis Municipality and relevant community organisations to source individuals with the relevant skills and those in need of employment.	
Cumulative impacts: • Added pressure on service delivery and the existing infrastructure with resultant additional socio-economic burdens for the !Kheis Municipality and surrounding property owners	
Residual impacts: • Possible impact on resources and infrastructure such as water, housing, social and health services should unsuccessful jobseekers remain in the area. • An increase in the unemployment base and an inability of the local economy to provide employment should unsuccessful jobseekers remain in the area.	

5.3 Community and Institutional Arrangements

5.3.1 *Employment opportunities*

The majority of the construction activities to be undertaken are workforce intensive, although specialist tasks would also be required. A main contractor would be used who would be responsible for the recruitment of the workforce required. Depending on the various construction phases, between 250 and 400 workers (unskilled, semi-skilled and higher skilled) will be on site at any given time. The peak construction period would be when the structures are being mounted (two to three months) which is a labour intensive phase. For this timeframe the workforce would thus reach its maximum.

In order to save costs and to contribute to employment and revenue creation locally, it is estimated that at least half of the temporary employees required for construction would be sourced locally. On average an estimated 125 to 200 local opportunities could thus be created. However, high illiteracy rates in the district and the low skills and education levels indicate that the higher skilled positions would most probably have to be 'imported' from other areas and provinces. As many are employed within the agricultural sector where technical skills have been acquired, basic skills among members of the local communities are anticipated to be available to fill some of the semi-skilled and most of the unskilled positions.

A situation whereby employed farm workers would be applying for temporary positions during the construction phase of the project due to the possibility of acquiring higher incomes, was raised as a concern. Such a situation would result in negative impacts for the employer (farmer) due to the loss of skilled labour, but also for the farmworker involved as changing their permanent employment for temporary employment with the hope of acquiring more money would have long term negative social impacts.

To ensure that a local labour force and local SMME's are included from the start of the process, a labour desk should be developed with the involvement of the !Kheis Municipality to ensure that local labour from Wegdraai, Grootdrink and Groblershoop be sourced. If required, recruitment can also focus on individuals from Upington, Leerkrans, Dagbreek, Ntsikelelo and so forth, although it would be preferred that workers be sourced from the !Kheis Municipality area of jurisdiction to ensure that the benefits accrue to the host communities.

NATURE: Temporary employment opportunities during the construction phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT ENHANCEMENT
Extent	Local (2)
Duration	Very short duration (1)
Magnitude	Moderate (6)
Probability	Probable (3)
Significance	**Low (27) (+)**
Status (positive or negative)	Positive

NATURE: Temporary employment opportunities during the construction phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITH ENHANCEMENT
Extent	Local (3)
Duration	Very short duration (1)
Magnitude	High (8)
Probability	Probable (3)
Significance	**Medium (36) (+)**
Status (positive or negative)	Positive
Reversibility	Yes
Irreplaceable loss of resources?	No
Can impacts be enhanced?	Yes

Mitigation:

- Make maximum use of local employment and set up a labour desk that undertakes a skills audit of the available workforce within the closest communities.
- Make use of any existing databases of available workers and include the local councillor and other representative community structures in the process.
- Project contracts between Vanguard Solar and the main contractor should stipulate the use of local labour for unskilled and semi-skilled positions and tasks
- Enhance on a capacity building and skills development strategy to lessen any possible skills disparity between the local skills available and the requirements of the project.
- Reserve a percentage of the workforce for women and the disabled (if possible).
- Recruitment adverts could be placed at strategic public localities in the local towns (e.g. Groblershoop, Wegdraai, Grootdrink and even Upington).
- Project requirements should be discussed with community representatives so avoid unrealistic expectations among local community members
- Remuneration packages should take cognisance of existing remuneration provided to local labourers
- Farm workers should be informed of the possible negative impacts of discarding

NATURE: Temporary employment opportunities during the construction phase of the Kleinbegin solar energy facility and associated infrastructure
their long term employment positions as farm workers for short term positions that could possibly have some short term financial benefits, without long term guarantees.
Cumulative impacts: • Possible shortage of applicable local labour should all the PV facility projects in the area be successful in terms of their applications and should the construction processes overlap
Residual impacts: • Skills would be obtained that can be used to secure related work once this contract has expired.

5.3.2 *Accommodation of workforce*

The aim would be to maximise the use of a local labour force to limit the housing requirements of some sections of the outside workforce as it is assumed that the locals would have existing housing. Accommodation of the workforce within established accommodation facilities could, on the other hand, result in positive impacts on the local hospitality industry. This impact is likely to be concentrated on the Groblershoop area, but could even culminate as far as Upington due to the large number of individuals requiring accommodation (approximately half of the construction team – 200 individuals - for certain periods during the total duration of the construction period which is expected to last 10 months). This impact would contribute to local revenue during the construction period.

In the event that accommodation requirements are not pro-actively and responsibly addressed, informal settlements could develop or sub-letting to construction workers could occur during the construction phase. Such as situation would then have devastating long-term socio-economic consequences for the communities, the overall area and the !Kheis Municipality.

As no workers would be accommodated on site, they would have to be transported to and from the site and to their places of residence on a daily basis. This impact on the landowners in proximity to the site is discussed under section 5.4.1.

NATURE: Accommodation of workforce during the construction of the Kleinbegin solar energy facility and associated infrastructure

NATURE: Accommodation of workforce during the construction of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (2)
Duration	Very short duration (1)
Magnitude	Moderate (6)
Probability	Highly probable (4)
Significance	**Medium (36) (-)**
Status (positive or negative)	Negative
	WITH MITIGATION
Extent	Local (2)
Duration	Very short duration (1)
Magnitude	Moderate (6)
Probability	Probable (3)
Significance	**Low (27) (+)**
Status (positive or negative)	Potentially positive
Reversibility	Yes
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Yes

Mitigation:

- The use of local labour would eliminate additional pressure on the existing housing shortages.
- No workers to be housed on site, except for security personnel. This issue should be included as a condition in the contract between Vanguard Solar and the main contractor.
- Transportation of workers by bus on a daily basis to and from their places of

NATURE: Accommodation of workforce during the construction of the Kleinbegin solar energy facility and associated infrastructure
residence will be undertaken. • Existing accommodation facilities in close proximity to the site should receive priority. • The number of individuals requiring housing and the type of facilities required must be identified during the planning phases as far as possible. These requirements should be discussed with the business and hospitality fraternity as well as with the !Kheis Municipality. • Peak construction periods with possible peak housing requirements should also be highlighted as part of the above mentioned planning process
Cumulative impacts: • Possible shortage of housing facilities should all the PV facility projects in the area be successful in their applications and should the construction processes overlap.
Residual impacts: • In worst case scenario possible negative impacts as a result of the development of informal settlements and/or sub-letting and thus additional pressure on the provision of infrastructure and services.

5.3.3 *Impact on local economy and regional benefits*

The favourable climate for the generation of solar energy has been identified as one of the local economic drivers for the Northern Cape Province. It could be expected that employment creation and an increase in incomes, albeit temporary, the influx of contractors and skills development and training would be beneficial and have economic spin-offs for local general dealers, merchandisers and overnight establishments over the short and medium term.

Construction of the proposed Kleinbegin solar energy facility will provide between 125 and 200 local employment opportunities, thereby increasing spending power over the short term (nine to ten months). In addition, skills development and training would increase the likelihood that workers would be able to secure employment at similar developments when their contracts for the Kleinbegin facility have expired.

The majority (60%) of construction material (i.e. panels and invertors) would be manufactured abroad, as the local South African manufacturer(s) do not have spare capacity for the next few years, even though it is believed that the so-called trackers (panel supporting structures should be assembled in South Africa). The towns in and around the study area supports farming communities and lacks large industries and, apart from the basic

hardware merchandise, it would be highly unlikely that construction goods would be sourced locally. However, it is the intent of the developer to reach between 35% and 40% of the overall project value for the benefit of South African contractors and suppliers. At this stage the total cost of the project is expected to be R1.5 billion, and it is therefore expected that at least R525 million would be allocated to South African contractors and suppliers. Economic benefits during the construction phase would therefore rather be for the benefit of the broader region and country than for the local region.

NATURE: Impacts on local economy and regional benefits during the construction phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT ENHANCEMENT
Extent	Regional (3)
Duration	Very short duration (1)
Magnitude	Low (4)
Probability	Probable (3)
Significance	**Low (24) (+)**
Status (positive or negative)	Positive
	WITH ENHANCEMENT
Extent	Regional (3)
Duration	Very short duration (1)
Magnitude	Moderate (6)
Probability	Probable (3)
Significance	**Medium (30) (+)**
Status (positive or negative)	Positive
Reversibility	Yes
Irreplaceable loss of resources?	No
Can impacts be	Yes

NATURE: Impacts on local economy and regional benefits during the construction phase of the Kleinbegin solar energy facility and associated infrastructure	
enhanced?	
Enhancement: • Maximise the use of local labour, suppliers and SMMEs during the construction process. • Procure local goods and services from local suppliers wherever possible. • Tender documentation should contain guidelines for the involvement of local labour, entrepreneurs, businesses and SMMEs from the local sector • House an outside workforce in existing overnight establishments, such as guesthouses and B&B's.	
Cumulative impacts: • Economic advantages for contractors and suppliers due to the possibility that various solar energy facilities be implemented within the region.	
Residual impacts: • Stimulation of local and regional economic growth	

5.3.4 *Land Acquisition and Rezoning*

The land under discussion is currently zoned as "agricultural" and the development footprint area thus has to be rezoned. Concerns with regards to the rezoning of the land refer to the perception that the change in land use would be an intrusion on the existing land-uses in the area which mainly include livestock and some game farming.

Not all the neighbouring property owners reside on their properties. This low population density in the area and limited presence of people movement is thus of concern as it could create various opportunities for criminal activities to occur on the Farm Kleinbegin 115/2. Due to the additional concerns with regards to safety and security, and the control of predators, it is critical for property owners that the existing farming activities continue on the land not affected by the development footprint.

At this stage indications have been given that the remainder of the property will still be used for farming practices. An agreement is thus being finalised with the current property owner to continue with the existing farming activities on the remaining portion of land. Alternatively, property owners indicated that they should be given preference to enter into a similar type of agreement with Vanguard Solar. Should either of the options be possible, the

impacts in this regard could be mitigated as there would be no significant disturbances felt by the surrounding property owners with regards to the change in land-use.

It is therefore imperative that the land should not be left fallow to create an opportunity for criminals to undertake any criminal activities on the property, to access neighbouring farms from this section of the property and so forth.

NATURE: Land acquisition and rezoning prior and during the construction phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Moderate (6)
Probability	Probable (3)
Significance	**Medium (36)**
Status (positive or negative)	Negative
	WITH MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Low (4)
Probability	Probable (3)
Significance	**Medium (30)**
Status (positive or negative)	Negative
Reversibility	Yes
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Yes

NATURE: Land acquisition and rezoning prior and during the construction phase of the Kleinbegin solar energy facility and associated infrastructure
Mitigation: • Rezoning and selling of the land should have the minimum disturbances with regards to the existing and adjoining land-uses • Similar farming activities should continue on the section of the property not used for the PV facility and ancillary infrastructure. • Vanguard Solar should provide written guarantees with regards to the future activities that would be allowed on the site and remaining section of the property
Cumulative impacts: • None anticipated
Residual impacts: • Presence of PV facility.

5.4 Individual and Family Level Impacts

5.4.1 *Impact on daily living and movement patterns*

This impact would refer to possible impacts on the road network and infrastructure, inconveniences and road safety hazards due to construction vehicles and an increase in traffic and possible changes in land use that could affect landowners and other affected parties negatively or positively.

As indicated above the N10 between Upington towards Groblershoop would be used for the transportation of material and equipment (unless the rail option is feasible and adopted). From Wegdraai the gravel access road to the Kleinbegin Station would be used. During construction, an impact on the daily living and movement patters of local road users could be expected as civil engineering construction equipment such as excavators, trucks, graders and compaction equipment as well as components required for the establishment of the PV facility, will be brought to the site. Workers will be transported by bus (possible ten busses in the morning and ten busses in the evening) to and from the site. Some of the components, e.g. the transformer, may be defined as an abnormal load by virtue of its dimensional limitations (i.e. weight) and a permit will be obtained for the transportation of these abnormal loads on public roads.

The Wegdraai gravel road south-east of the plant will provide access to the property from the south and no trespassing on private properties would be required. Neighbours to the south

and east of the site would also be using this access road. Before any of the above material and equipment can be transported, the local gravel access road to the site would have to be upgraded.

Even though the construction phase is temporary, possible increase in dust and noise pollution, damage to local roads (worsened by the existing road conditions) and the increase in traffic could amount to frustration and animosity amongst the local community and road users if not mitigated adequately. Vanguard Solar should also guarantee the right of access to the property owners currently making use of this road.

The total size of the site is approximately 7000 hectares and only the 163 hectare footprint required for the plant would be rezoned. The current land use of grazing and game farming would continue on the remaining area and the agreement with the existing farmer could thus be continued during the construction phase. (Also refer to discussion under section 5.3.4).

Additional potential negative impacts that are usually associated with a construction site could include:

- Safety and security issues (trespassing, stock theft, increased fire hazards, etc.);
- Intrusion impacts (noise and movement of workers);
- Localised pollution (inappropriate waste and water management, littering); and
- Health issues (insufficient ablution facilities that are not cleaned regularly, flies, rodents and other pests, prostitution and inappropriate social activities that could lead to the spread of HIV/Aids and other STD's).

Stock theft, littering, as well as dust and noise pollution could thus have localised negative impacts and would remain of concern of the surrounding property owners. The spread of HIV/Aids, however, could have far reaching negative long term impacts on the local community members.

NATURE: Impacts on daily living and movement patterns during the construction phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (2)
Duration	Very short duration (1)
Magnitude	Moderate (6)
Probability	Highly Probable (4)

NATURE: Impacts on daily living and movement patterns during the construction phase of the Kleinbegin solar energy facility and associated infrastructure	
Significance	**Medium (36)**
Status (positive or negative)	Negative
	WITH MITIGATION
Extent	Local (2)
Duration	Very short duration (1)
Magnitude	Moderate (6)
Probability	Probable (3)
Significance	**Low (27)**
Status (positive or negative)	Negative
Reversibility	Yes
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Yes

Mitigation:

- Inspect construction vehicles on a regular basis to ensure their road safety worthiness.
- Limit movement of heavy vehicles on the local roads after hours.
- Ensure that heavy vehicles comply with speed limits and other traffic rules. Display a contact telephone number on the vehicles whereby other motorists could lodge complaints.
- Install penalties for drivers disobeying traffic rules.
- Ensure a safe turn-off from secondary roads to the access route.
- Rehabilitation of local roads should be undertaken if damaged by construction vehicles.

NATURE: Impacts on daily living and movement patterns during the construction phase of the Kleinbegin solar energy facility and associated infrastructure
• The contractor should be responsible for regular upgrading of the local gravel access road (grading) and the internal access roads. • The entrance to the site should be clearly indicated. Should any road upgrading at the entrance be required, it should be undertaken in consultation with the Northern Cape Department of Transport, Roads and Public Works. • Fence off the construction area and restrict unauthorised access. • Prohibit any movement of workers outside the designated footprint area and implement measures to prevent stock theft and poaching (e.g. surveillance cameras at strategic locations). • Security personnel should be permanently on-site once construction starts. • Security cameras should be installed at the entrance to the site. • Construction activities should not occur after-hours (e.g. after 5 pm), on weekends and/or public holidays. • Working hours should be kept to normal working hours (e.g. 7 am until 5 pm) during the construction and operational phases. • Before construction commences, representatives from the !Kheis Municipality, community leaders, community-based organisations and the surrounding property owners, should be informed of the details of the contractors, size of the workforce and construction schedules. • Construction workers and permanent employees should be easily identifiable by wearing uniforms and even identity tags. • The construction site should be properly managed to avoid any environmental pollution (due to inadequate water and waste infrastructure and services) and littering. • Informal vending stations on or near the construction site should be managed. • Information distributed as part of the existing HIV/Aids awareness campaigns should again be focused on and communicated to the local workforce.
Cumulative impacts: • Possible increase in criminal activities due to increase in localised population figures

NATURE: Impacts on daily living and movement patterns during the construction phase of the Kleinbegin solar energy facility and associated infrastructure
Residual impacts: • Change in landscape character.

5.4.2 *Safety and Security Risks*

Construction activities and projects are often associated with an increase in criminal activities and this impact, whether real or perceived, should be addressed and mitigated. Numerous concerns were expressed in this regard and it was indicated that any activities related to the PV facility construction that would increase the safety and security risk for nearby landowners would be unacceptable. Landowners indicated that the parent company, Medenergy, would be held responsible for any criminal incidences and legal action would be taken against said company.

Sheep farming is one of the primary agricultural activities in the area that could be threatened by livestock theft due to an increase of workers in the area with subsequent negative financial losses. Improper management of the larger farm and farming practices, could also, according to the nearby property owners, increase the difficulty associated with the control of predators. The impact on game farming also remains worrying.

Possible safety impacts would relate to construction related accidents, the increased risk of veld fires and vehicle accidents. The Health and Safety Plan developed according to SHE best practices would have to include and address management procedures for veld fire management as well as for the prevention of lightning impacts. A fire prevention and fighting procedure is already being prepared by Vanguard Solar and ABB South Africa and will include, in particular, the supply of a 4x4 pick-up truck equipped with a mobile water tank and associated pump, in order to contribute to the fight against any veld fire. The site will also be equipped with fire extinguishers. The plant will include a lightning protection pole.

NATURE: Safety and security impacts during the construction phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (2)
Duration	Very short duration (1)
Magnitude	Moderate (6)

NATURE: Safety and security impacts during the construction phase of the Kleinbegin solar energy facility and associated infrastructure	
Probability	Highly probable (4)
Significance	**Medium (36)**
Status (positive or negative)	Negative
	WITH MITIGATION
Extent	Local (2)
Duration	Very short duration (1)
Magnitude	Moderate (6)
Probability	Probable (3)
Significance	**Low (27)**
Status (positive or negative)	Negative
Reversibility	Yes
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Yes

Mitigation:

- Workers must not be allowed to overnight on the premises and have to be brought in and taken to their places of residence by bus on a daily basis.
- Workers must not be allowed to leave the designated construction areas.
- The access road south-east of the site (which is the only access road planned) must be fitted with security cameras and equipped with a controlled barrier (or equivalent), and will only be accessible to authorised neighbours.
- The two other access points to the farm are not to be used by construction vehicles and could be fitted with video surveillance for the duration of the construction period.
- The PV facility must be fenced (partially by electrical fencing).
- The PV facility should be equipped with surveillance around its perimeter.
- The proponent (parent company) could be held liable for stock or game theft during

NATURE: Safety and security impacts during the construction phase of the Kleinbegin solar energy facility and associated infrastructure
construction. • A Health and Safety Plan should be implemented and it must be ensured that all team leaders are qualified in First Aid and other relevant safety courses. • Workers should wear identifiable clothes and should not be allowed to leave the construction site or trespass on private properties. • Apart from security personnel and other authorised workers, no one is allowed to enter the construction site without permission. • Vanguard Solar could assist neighbouring property owners with regular inspections of the fence around the entire farm. • Implement safety measures at the plant to limit fire hazards, such as maintain short grass, implement fire breaks around the facility and install a lightning pole. • Safety monitoring on the access road should be implemented • Vanguard Solar should, in conjunction with the property owners, develop management and implement emergency procedures for veld fire management and for lightning.
Cumulative impacts: • Possible increase in overall crime levels
Residual impacts: • Same as above.

5.4.3 *Health Risks*

Poor management of the construction site could result in localised pollution that could have a negative impact on the health of workers and surrounding landowners (mainly water pollution). Unhygienic sanitation facilities and poor quality drinking water could contribute to poor health and diseases spreading among the workers and would result in a high staff turnover and unnecessary medical expenses for the developer. Facilities should be cleaned and maintained on a regular basis and household waste disposed of in an environmentally acceptable way to discourage the occurrence of flies, cockroaches, rodents and other pests.

Promiscuous social activities (prostitution activities, etc.) and sexual relationships with local women are often associated with an influx of males at construction sites. This contributes to unwanted pregnancies, the spreading of HIV/Aids and other sexually transmitted diseases. This would then place additional pressure on a Health Care system that is already under severe strain. The contractors should recognise their responsibility towards awareness and education of their workers and should address issues and myths associated with the spreading of HIV/Aids and other diseases.

NATURE: Health impacts during the construction phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (2)
Duration	Very short duration (1)
Magnitude	Moderate (6)
Probability	Probable (3)
Significance	**Low (27)**
Status (positive or negative)	Negative
	WITH MITIGATION
Extent	Local (2)
Duration	Very short duration (1)
Magnitude	Low (4)
Probability	Probable (3)
Significance	**Low (21)**
Status (positive or negative)	Negative
Reversibility	Yes
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Yes

Mitigation:

- Make the contact details of the Health and Safety Officer of the contractor's team available to the local community and communicate procedures to lodge complaints to the Municipality and community representatives.
- Provide adequate drinking water and appropriate sanitation facilities to the workers. Sanitation facilities to be cleaned and serviced on a regular basis.

NATURE: Health impacts during the construction phase of the Kleinbegin solar energy facility and associated infrastructure
• Dispose of rubble and other household waste appropriately and on a regular basis. • Implement a social responsibility strategy and embark on a HIV/Aids awareness campaign amongst the workers. • Appointment of a local labour force will reduce the possibility of promiscuous social practices usually associated with construction sites.
Cumulative impacts: • Existing prevalence of HIV/Aids resulting in cumulative impacts even if local labour is employed.
Residual impacts: • An unhealthy workforce that could result in a high staff turnover, with possible negative impacts on the financial resources for the proponent. • A possible increase in HIV/Aids occurrences and other STD's, subsequently placing additional pressure on public health resources.

5.5 Community Infrastructure Requirements

5.5.1 *Impact on infrastructure and services*

No significant impact on infrastructure and services during the construction phase is anticipated. In order for the PV panels to reach the site in good condition a review of the quality of the access road south-east of the plant will be carried out and appropriate road levelling would be done in advance where necessary. This road will be maintained and restored to the appropriate condition after the completion of the construction activities. It is not anticipated that any of the tarmac roads will require upgrading either prior to or after construction.

Water tanks will be brought on site with a truck to cover for water consumption for workers and for the construction process. Thus no municipal water or borehole water would be needed. Low water consuming chemical toilets will be provided for the workers on site.

NATURE: Impacts on infrastructure and services during the construction phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (2)
Duration	Very short duration (1)

NATURE: Impacts on infrastructure and services during the construction phase of the Kleinbegin solar energy facility and associated infrastructure	
Magnitude	Low (4)
Probability	Improbable (2)
Significance	**Low (14)**
Status (positive or negative)	Negative
	WITH MITIGATION
Extent	Local (2)
Duration	Very short duration (1)
Magnitude	Minor (2)
Probability	Improbable (2)
Significance	**Low (10)**
Status (positive or negative)	Negative to Neutral
Reversibility	Yes
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Yes
Mitigation: • Inform the local authority or any other affected party in advance should services have to be interrupted.	
Cumulative impacts: • None anticipated	
Residual impacts: • None anticipated	

5.5.2 *Impact on Local Municipality*

Vanguard Solar, as the project applicant, is responsible for funding of the Kleinbegin PV Facility project. Although the project falls within the jurisdiction of the !Kheis Municipality, the municipality will not contribute (financially or with regards to the provision of infrastructure) to the project. Infrastructure on site would be the responsibility of the applicant, although the infrastructure put in place would have to be linked to the municipal infrastructure off-site. It is thus not anticipated that the proposed project would have any financial bearing on the municipality, although services to the facility would have to be implemented such as the removal of general domestic waste.

NATURE: Impacts on Local Municipality during the construction phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (2)
Duration	Very short duration (1)
Magnitude	Moderate (6)
Probability	Improbable (2)
Significance	**Low (18)**
Status (positive or negative)	Negative to Neutral
	WITH MITIGATION
Extent	Local (2)
Duration	Very short duration (1)
Magnitude	Low (4)
Probability	Improbable (2)
Significance	**Low (14)**
Status (positive or negative)	Neutral
Reversibility	Yes
Irreplaceable loss of resources?	No

NATURE: Impacts on Local Municipality during the construction phase of the Kleinbegin solar energy facility and associated infrastructure	
Can impacts be mitigated?	Yes
Mitigation: • Inform the local authority or any other affected party in advance should services have to be interrupted. • Vanguard Solar should discuss the development of infrastructure on site and the link with the existing infrastructure with the !Kheis Municipality.	
Cumulative impacts: • None anticipated	
Residual impacts: • None anticipated	

6. POTENTIAL IMPACTS ASSOCIATED WITH THE OPERATIONAL PHASE OF THE PROJECT

The following sections provide more information on the operational phase of the proposed PV facility and the anticipated social impacts expected to occur during this phase of the project.

6.1 Background to the Operational Phase

The solar energy facility is expected to have a lifespan of more than 20 years (including maintenance), and the power plant infrastructure would only be decommissioned once it has reached the end of its economic life.

The electricity that is generated from the PV panels will be stepped up through the on-site inverters and transformers at the on-site substation. Thereafter the power will be evacuated from the on-site substation to the Eskom existing overhead power line to feed into the grid.

Full-time security, maintenance and control-room staff is required at the site. Each component within the solar energy facility will be operational unless under severe mechanical breakdown, unfavourable weather conditions or maintenance activities. Maintenance activities will include cutting of grass, cleaning the panels at least twice per year, verification of the state of the fence around the plant and so forth.

If economically feasible / desirable the decommissioning activities would comprise the disassembly and replacement of the individual components with more appropriate technology

available at that time. However, if not deemed so, the facility would completely be decommissioned and the components would be disassembled, reused and recycled (where possible) or disposed of in accordance with regulatory requirements.

6.2 Population Impacts

6.2.1 *Inflow of workforce*

A limited number of workers would be employed during the operational phase. For a 50 MW facility it is, at this stage, foreseen that there would be a requirement for six (6) technicians, twelve (12) assistants and approximately three (3) security personnel. This total of about twenty two employees would probably not be on site simultaneously due to the operating hours of the facility. It is expected that the workers would work in shifts though only security staff will stay on site at night. Intrusion impacts on surrounding property owners due to the inflow of workers would thus be restricted and of a low significance.

NATURE: Inflow of a workforce during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Low (4)
Probability	Probable (3)
Significance	**Medium (30)**
Status (positive or negative)	Possibly Negative
	WITH MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Minor (2)
Probability	Improbable (2)
Significance	**Low (16)**

NATURE: Inflow of a workforce during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
Status (positive or negative)	Negative to Neutral
Reversibility	Yes
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Yes
Mitigation: • Local labourers should be employed where applicable and the employment of outsiders during the operational process should not be pursued.	
Cumulative impacts: • None anticipated.	
Residual impacts: • None anticipated.	

6.3 Community and Institutional Arrangements

6.3.1 *Employment opportunities*

The number of permanent employment opportunities created to operate and maintain a PV facility is not significant. The following personnel would be required:

- Security (three staff – it is anticipated that two security personnel will be on duty during the night); and
- Maintenance staff (six technicians, twelve helpers).

General maintenance work would include cutting of grass, repairing infrastructure, cleaning panels i.e. twice per year) and other general maintenance. Additional temporary employees could be contracted from time to time to do elementary work and upgrading of the gravel road when required. As far as possible staff would be hired locally, although the low literacy and skills levels of the district indicate that higher skilled positions, such as technicians, might have to be sourced from elsewhere.

Even though a limited number of jobs would be created during the operational phase, it should still be viewed as a significant positive impact due to the large section of the population that are unemployed and the associated poverty levels found in the area. Skills development and capacity building during the lifespan of the facility would further benefit the workers and could assist them in obtaining transferable skills.

Due to the limited number of employment opportunities to be created and the remote location of the facility, an influx of jobseekers during the operational phase is not anticipated.

NATURE: Employment opportunities during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Low (4)
Probability	Probable (3)
Significance	**Medium (30) (+)**
Status (positive or negative)	Positive
	WITH MITIGATION
Extent	Local (3)
Duration	Long term (4)
Magnitude	Moderate (6)
Probability	Probable (3)
Significance	**Medium (39) (+)**
Status (positive or negative)	Positive
Reversibility	Yes
Irreplaceable loss of resources?	No

NATURE: Employment opportunities during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
Can impacts be mitigated?	Yes
Mitigation: • Appoint as many local employees as would be feasible and possible. • Should locals with applicable skills not be available, Vanguard Solar should embark on a skills development process during the construction phase to allow locals to be employable for the operational phase • Implement training and capacity building programmes for the workers throughout the operational period of the PV facility.	
Cumulative impacts: • Possible shortage of applicable local labour should all the PV facility projects in the area be successful in terms of their applications and should the construction processes overlap	
Residual impacts: • Skills development and capacity building for workers to obtain transferable skills.	

6.3.2 *Impact on local economy and regional benefits*

During the operational phase, local procurement for general materials, goods and services (e.g. catering and security) could materialise possibly from Groblershoop, but also from the larger urban nodes in the area such as Upington. Although large scale procurement would not be undertaken, some positive regional benefits could occur.

On a national scale the project is anticipated to have positive environmental impact through the supply of "greener technology" that will be used. The proposed project would therefore assist in meeting the government target for renewable energy while contributing to sustainable development in the country (Savannah Environmental, 2011). The electricity generated as part of a 50 MW plant could supply electricity to approximately 16 000 houses.

NATURE: Impact of local and regional benefits during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT ENHANCEMENT
Extent	Regional (3)
Duration	Long term (4)

NATURE: Impact of local and regional benefits during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
Magnitude	Moderate (6)
Probability	Probable (3)
Significance	**Medium (39) (+)**
Status (positive or negative)	Positive
	WITH ENHANCEMENT
Extent	Regional and national (4)
Duration	Long term (4)
Magnitude	Moderate (6)
Probability	Probable (3)
Significance	**Medium (42) (+)**
Status (positive or negative)	Positive
Reversibility	Yes
Irreplaceable loss of resources?	No
Can impacts be enhanced?	Yes
Enhancement: • Local sourcing of materials, goods and services should be undertaken where possible to assist in providing more economic and employment opportunities for the local people	
Cumulative impacts: • None anticipated	
Residual impacts: • Positive environmental and social impacts on national scale by providing energy through renewable energy	

6.3.3 *Attitude formation and social mobilisation*

Although attitude formation is not an impact *per se*, it serves an important indication of community sentiments toward the project. Attitudes can be defined as lasting, general evaluations of people. Attitudes can be formed through own experience and/or reports in the media. It could provide important information regarding the feelings and potential actions of Interested and Affected Parties (I&APs) that could become evident during the appeal period of the Environmental Impact Assessment process, and/or during the construction and operational phases of the proposed project.

Attitude formation and social mobilization for or against the project would largely depend on the degree that potential negative impacts expected to occur locally have been mitigated and addressed.

Some form of interest group activity has already materialised as the Kleinbegin Agricultural Union has submitted an objection letter to the appointed Town Planners against the proposed rezoning of the land. Although it is possible that some property owners and other stakeholders are not against the development *per se*, from the results of the public participation process and particularly the comments received during the social consultation session, there is some definite attitude formation against the proposed development. These attitudes mainly pertain to the following issues:

- Safety and security concerns based on the inflow of a large workforce into the area and increase in stock theft with subsequent negative financial implications for the affected landowners due to theft, but also with regards to the costs implied to safeguard them against the negative safety impacts;
- Uncertainty with regards to project ownership and the fact that Vanguard Solar is seen as an outside agency which would make decisions that would negatively impact on the neighbouring landowners' quality of life;
- Uncertainty whether Vanguard Solar intents to sell the PV facility in future to some unknown and unfitting stakeholders (though this is highly unlikely due to the rules of the process put in place by the Department of Energy);
- Concerns that the disruption in or ending of the farming activities on the farm Kleinbegin 115/2 could culminate in negative impacts on the neighbouring farm owners such as no upkeep of fencing, lack of predator control, a section of fallow land creating opportunities for criminal activities, increased risks of fires starting on site and so forth. All of these would result in negative financial impacts for the property owners affected by such impacts;

- Change is the visual quality of area and subsequent impact on the sense of place;
- No benefits would accrue to the neighbouring landowners;
- Environmental impact of the facility on the micro climate of the area; and
- Possible devaluation of adjoining properties due to change in land-use with severe negative monetary consequences.

A transparent process and communication channel between Vanguard Solar, landowners and the !Kheis Municipality is therefore essential to address the above concerns. In addition, should Vanguard Solar indicate their commitment in terms of their social responsibility during the planning stages of the project, it could assist in limiting the opposition against the proposed project. Some indication should thus be given as to what they intend to be involved in and how local communities could benefit e.g. through their involvement with Local Economic Development Programmes (LED), and/or contributing towards projects identified as key priority areas in the !Kheis Municipality's Integrated Development Planning (IDP).

NATURE: Attitude formation and social mobilisation during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Moderate (6)
Probability	Highly Probable (4)
Significance	**Medium (48)**
Status (positive or negative)	Negative
	WITH MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Moderate (6)
Probability	Probable (3)
Significance	**Medium (36)**

NATURE: Attitude formation and social mobilisation during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
Status (positive or negative)	Negative
Reversibility	Yes
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Yes to some extent

Mitigation:

- Vanguard Solar should provide written guarantees with regards to the future activities that would be allowed on the site and remaining section of the property
- A transparent process and communication channel between Vanguard Solar, landowners and the !Kheis Municipality is therefore essential to address the above concerns
- Safety and security concerns and any possible negative impacts on the existing farming activities as a result of the proposed PV Facility should be successfully addressed
- Vanguard Solar's social responsibility commitments and planned involvement with Local Economic Development Programmes (LED), and/or contributing towards projects identified as key priority areas in the !Kheis Municipality's Integrated Development Planning (IDP) should be made known
- Appoint a community liaison officer and ensure thereby a future transparent process and communication between the Local Municipality, Vanguard Solar and landowners.
- Address concerns in a pro-active manner to avoid issues that can be resolved before becoming contentious.

Cumulative impacts:

- None anticipated

Residual impacts:

- Attitude formation, social mobilisation and interest group activity among landowners

6.4 Individual and Family Level Impacts

6.4.1 *Impact on daily living and movement patterns*

No significant impact on daily living and movement patterns are anticipated during the operational phase of the PV Facility, as only a small number of workers and maintenance vehicles will enter the site on a daily basis. The facility is also not expected to create noise or have any health related impacts on the neighbouring landowners. One access from the south-eastern corner of the property will be used and any other access during the construction period will be prevented. Safety and security concerns can thus be addressed to some extent in this regard.

The total size of the site is approximately 7000 hectares and only the 163 hectare footprint required for the PV facility would be rezoned. The footprint area of the PV facility would be maintained and the grass kept short. Apart from the portion where the facility will be established, no impact on the existing land use is thus anticipated. The current land use of grazing and game farming would continue on the remaining area and the agreement with the existing farmer could thus be continued during the operational phase of the project. To further mitigate against the uncertainty regarding the future ownership of and thus activities to be undertaken on the land, local resident farmers should be allowed to lease the property if the remaining farmland becomes available for renting, or in the event that the current property owner do not continue to rent the remaining section of the farm from Vanguard Solar.

NATURE: Impact on daily living and movement patterns during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Low (4)
Probability	Probable (3)
Significance	**Medium (30)**
Status (positive or negative)	Negative
	WITH MITIGATION

NATURE: Impact on daily living and movement patterns during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
Extent	Local (2)
Duration	Long term (4)
Magnitude	Low (4)
Probability	Improbable (2)
Significance	**Low (20)**
Status (positive or negative)	Negative
Reversibility	Yes
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Yes

Mitigation:

- Security personnel will be permanently on-site.
- Security cameras will be installed at the entrance to the site.
- Working hours should be kept to normal working hours (e.g. 7 am until 5 pm) during the construction and operational phases.
- Only workers that are on duty and security personnel will be allowed on site.
- The use of alcohol and illegal substances should not be allowed on site.
- Limit noise generating activities at the site.
- The entrance to the site should be clearly indicated. Should any road upgrading at the entrance be required, it should be undertaken in consultation with the Northern Cape Department of Transport, Roads and Public Works.

Cumulative impacts:

- None anticipated

Residual impacts:

- Visual impact and possible impact on sense of place

6.4.2 *Safety and security impacts*

Increased movement as a result of the proposed PV facility and access to this portion of land could give rise to an increase in criminal activities (general theft, stock theft, illegal game poaching) at the site as well as surrounding properties. This impact, however, is not very likely due to the limited movement of workers to and from the site during the operational phase.

Other safety concerns include the increased fire risks and general accidents and injuries that might occur during maintenance work. A fire prevention and fighting procedure is already being prepared by Vanguard Solar and ABB South Africa and will include, in particular, the supply of a 4x4 pick-up truck equipped with a mobile water tank and associated pump, in order to contribute to the fight against any veld fire. The site will also be equipped with fire extinguishers. The plant will include a lightning protection pole.

General safety and security measures must be implemented, but the implementation of an Occupational Health and Safety Plan is essential.

NATURE: Impact on safety and security during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Low (4)
Probability	Probable (3)
Significance	**Medium (30)**
Status (positive or negative)	Negative
	WITH MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Minor (2)
Probability	Probable (3)

NATURE: Impact on safety and security during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
Significance	**Low (24)**
Status (positive or negative)	Negative
Reversibility	Yes
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Yes
Mitigation: • Access to the site will be limited to only one controlled entrance. • Fencing that is partially electrocuted will be set-up around the PV facility. • Security personnel will remain on site overnight. • General workers will enter and leave the site at normal working hours. • Surveillance cameras along the facility's fence, access to the site and at other strategic localities will be set-up. • Control over the movement on the access road should be undertaken. • Apart from those travelling to the PV facility, only private property owners should be allowed to use the access road. • No workers will be allowed to leave the designated area and trespass on private properties. • Only workers that are on duty and security personnel would be allowed on site. • Implement an Occupational Health and Safety Plan and ensure that at least one person trained in First Aid is present on the site at all times.	
Cumulative impacts: • None anticipated	
Residual impacts: • None anticipated	

6.4.3 *Impact on Land Value*

The possible devaluation of the surrounding properties as a result of the change in the land use and negative visual impacts is of concern for adjacent landowners. As there is limited experience in South Africa of such facilities, the unfamiliarity of property owners with such a

project could create the perception that the land value could decrease. However, some argue that agricultural land value is market related and is seldom affected by the perceptions of sense of place.

From a social perspective, the presence of a PV facility could negatively influence the land value of the surrounding properties. This devaluation could only be for a short duration until the facility demonstrated its viability and limited social impact (if properly managed) once operational. Surrounding land values could then again increase or return to normal according to the property market fluctuations.

The visual impact of the facility, which could play a role with regards to land value, is not anticipated to be mitigated, although it should be noted that due to the location of the facility within the larger farm it is foreseen that the direct visual impacts on neighbouring land owners could be limited. It should also be noted that the limited number of employees, controlled movement to and from the site and safety and security measures to be implemented indicates that processes in the local area will continue unchanged (status quo will remain) and no major negative impacts on the neighbouring landowners activities and thus resource use are foreseen.

NATURE: Impact on land value during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Moderate (6)
Probability	Probable (3)
Significance	**Medium (36)**
Status (positive or negative)	Negative
	WITH MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Low (4)

NATURE: Impact on land value during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
Probability	Probable (3)
Significance	**Medium (30)**
Status (positive or negative)	Negative
Reversibility	Yes
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Yes
Mitigation: • All relevant safety and security measures as proposed must be implemented.	
Cumulative impacts: • None anticipated	
Residual impacts: • Impact on visual character of affected and surrounding properties	

6.4.4 *Health related impacts*

As the operations at the proposed PV facility would not result in any air pollution, the subsequent health impacts on communities and property owners in close proximity are deemed insignificant.

Concerns have been raised to the possible negative impact of invertors and connection line on human health. If not tackled, this can have negative effects on human health and people living in close proximity with prolonged exposure to these structures, i.e. immediately next to / inside the invertors itself. It is demonstrated that at more than 10 metres on each side of the line, these emissions disappear altogether. Therefore electromagnetic radiation from the line is not considered to have a significant effect of the PV facility during its operation and its effect on human health are not proven / conclusive (Kleinbegin PV Comments and responses report, May 2011). Installation of invertors inside an invertor cabin on the other hand, will suffice to completely annihilate electromagnetic impact of invertors.

NATURE: Health related impacts during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Low (4)
Probability	Improbable (2)
Significance	**Low (20)**
Status (positive or negative)	Negative
	WITH MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Minor (2)
Probability	Improbable (2)
Significance	**Low (16)**
Status (positive or negative)	Negative
Reversibility	Yes
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Yes
Mitigation: • The PV facility should be operated in compliance with all relevant environmental regulations. • Engineering aspects and the design of the facility should ensure that no environmental pollution occurs. Proper waste, water and sanitation infrastructure and facilities must thus be installed	
Cumulative impacts:	

NATURE: Health related impacts during the operational phase of the Kleinbegin solar energy facility and associated infrastructure
• None anticipated
Residual impacts: • None anticipated

6.4.5 *Impacts on sense of place*

The social impact associated with the impact on the sense of place relates to the change in the landscape character and visual impact of the proposed Kleinbegin PV facility. The permanent visual impact on property owners in the area was assessed as part of the Visual Impact Assessment. The following discussion should thus be read from a social perspective as the impact on the sense of place, but also in conjunction with the Visual Impact Assessment.

This impact would thus refer to the possible impact that the proposed development could have on or change the perception that the surrounding landowners' and communities' have of their living environment. Sense of place could be affected by intrusion impacts (noise and dust), safety and security issues, visual impacts, an increase in movement or traffic and so forth.

The study area is characterised by an open rural landscape with scattered hilltops. The fact that the area is sparsely populated is one of the main aspects contributing to the rural sense of place and peacefulness of the area. The proposed Kleinbegin PV facility would permanently change the landscape character of the area and would thus alter the sense of place as experienced by residents and visitors to the area.

The sense of place could furthermore be affected by the change in the sense of security experienced by property owners within close proximity to the site. The area is characterised by low levels of violent crimes, although livestock theft is common. This situation should thus not be worsened to allow the sense of place in this regard to remain unchanged.

However, having noted this, it should also be highlighted that the area is already disturbed by various infrastructure such as the Upington-De Aar railway line, an existing Gordonia-Kleinbegin 132 kV power line, a substation which is located on the farm Kleinbegin 115/RE and various gravel roads. The position of the PV facility on the larger section of the land, and the low density of the area could further limit the negative visual impacts on the surrounding property owners and at their homesteads. The height of the panels will also be reduced to 1.90 meters above ground which could act as mitigation measures.

An impact on the sense of place is thus likely although the intensity would depend on the direct impact on sensitive receptors, which would be determined by the Visual Impact Assessment study. The potential visual impacts of the facility and thus impact on the sense of place receive a moderate rating prior and after mitigation has been implemented as mitigation measures are not expected to successfully address the impact from a social perspective.

NATURE: Impacts on the sense of place during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Moderate (6)
Probability	Highly probable (4)
Significance	**Medium (48)**
Status (positive or negative)	Negative
	WITH MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Moderate (6)
Probability	Highly probable (4)
Significance	**Medium (48)**
Status (positive or negative)	Negative
Reversibility	No
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Only to a very limited extent

NATURE: Impacts on the sense of place during the operational phase of the Kleinbegin solar energy facility and associated infrastructure
Mitigation: • The design and specific positioning of the PV facility should aim to minimise the possible negative visual impact of the facility on the surrounding property owners. • The panel mounts should have the lowest height practically possible. • It should be ensured that there is no reflection from the panels. • The design of buildings should blend in with surrounding environment. • Lighting issues should receive the attention it deserves to avoid any light pollution at night (for instance using infrared technology as is already envisaged as part of the planning phase). • Mitigation measures as proposed as part of Section 6.4.2 would also be applicable. • The mitigation measures of the Visual Impact Assessment should be strictly implemented
Cumulative impacts: • None anticipated
Residual impacts: • Distinct change in character and quality of the area

6.4.6 *Impact on Tourism potential*

Due to its location, the permanent features of the PV facility would not be clearly visible from any major tourist routes or routes frequently used by visitors. Some property owners do receive visitors to their farms who partake in hunting activities and leisure activities such as guided horse trails, walks and so forth. These establishments are however not in close proximity to the proposed PV facility and the infrastructure would possible not be visible from these properties. Due to the limited visual exposure of visitors to the PV facility it is therefore unlikely that the facility will impact negatively on the experience of tourist visiting existing tourism activities in the immediate area.

Even though this is a new technology in South Africa, the possibility that the proposed PV facility will attract tourists to the area is low due to the remoteness of the facility to the larger urban nodes. Also, if similar facilities are developed in the area concentrated around Upington, the Kleinbegin facility would lose its uniqueness, which will then have no impact on the local tourism industry.

In future, however, the tourism marketing strategy of the !Kheis Municipality could note the presence of the Kleinbegin facility.

NATURE: Impact on tourism potential during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Low (4)
Probability	Improbable (2)
Significance	**Low (20)**
Status (positive or negative)	Potentially Negative
	WITH MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Low (4)
Probability	Very improbable (1)
Significance	**Low (10)**
Status (positive or negative)	Potentially Negative
Reversibility	Yes
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Yes
Mitigation: • Working hours should be kept to normal working hours (e.g. 7 am until 5 pm) during the operational phase. • The mitigation noted under section 6.4.5 would be applicable • The construction site should be properly managed to avoid any environmental	

NATURE: Impact on tourism potential during the operational phase of the Kleinbegin solar energy facility and associated infrastructure
pollution (due to inadequate water and waste infrastructure and services) and littering. • Vanguard Solar and representatives of the !Kheis Municipality, tourism operators and property owners involved in the tourism sector should jointly investigate the possible role which the PV facility could play with regards to the local tourism industry • The presence of the PV facility could be included in the marketing strategy of the !Kheis Municipality
Cumulative impacts: • Limited uniqueness of the facility due to the development of similar facilities nearer to urban nodes
Residual impacts: • None anticipated

6.5 Community Infrastructure Requirements

6.5.1 *Impacts on infrastructure and services*

The water that is required for cleaning of the panels will be obtained through a rainwater harvesting programme whereby rainwater from the panels will be channelled through gutters built at the bottom of the panels and stored in tanks. Low grassy vegetation will be maintained below the panels to maintain the network of underground plant roots, which will slow down any water run-offs.

Sanitation for workers will be provided through low water consuming chemical toilets. No negative impacts on water, electricity or sewerage infrastructure are therefore expected.

NATURE: Impact on infrastructure and services during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
	WITHOUT MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Low (4)

NATURE: Impact on infrastructure and services during the operational phase of the Kleinbegin solar energy facility and associated infrastructure	
Probability	Improbable (2)
Significance	**Low (20)**
Status (positive or negative)	Negative to Neutral
	WITH MITIGATION
Extent	Local (2)
Duration	Long term (4)
Magnitude	Minor (2)
Probability	Improbable (2)
Significance	**Low (16)**
Status (positive or negative)	Potentially neutral
Reversibility	Yes
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Yes
Mitigation: » Any possible infrastructure and services requirements from the local municipality should be discussed with the representatives of the !Kheis Municipality as a priority to ensure that the additional requirements are considered in the future planning of the municipality in this regard	
Cumulative impacts: » None anticipated	
Residual impacts: » None anticipated	

7. NO-GO ALTERNATIVE

Should the proposed project not proceed, no construction related impacts would realise which could, in some instances, be viewed as a positive aspect where severe negative impacts on the social environment is expected.

The project, however is aimed to provide increased energy security and an opportunity would be lost should it not be implemented. Benefits in terms of job creation and possible local procurement would thus not occur should the proposed project not continue.

As the project aims to strengthen the supply and improve the supply consistency to customers in South Africa, as well as to contribute to the provision of renewable energy as part of the energy generation mix (as required by the Department of Energy), from a social point of view, the no-go option should not be supported even though negative social impacts would occur as part of the implementation

8. DECOMMISSIONING

After the expected lifespan (20 years minimum) of the Kleinbegin PV Facility it is anticipated that the equipment will either be upgraded or the entire facility will be completely decommissioned. This would depend on the economic feasibility of the various options.

Decommissioning could thus include the dismantling of the infrastructure and/or replacement of the infrastructure with newer technology. Typical social impacts associated with decommissioning of the proposed facility or issues that should be investigated include the following:

- A repeat of construction related intrusion impacts due to the replacement of the infrastructure (though on a shorter period);
- Job-losses in the case of dismantling of infrastructure (even limited);
- The impact and implementation of a retrenchment or downscaling programme;
- The existence of other sectors that could replace the jobs lost;
- Temporary job creation in the case of the replacement of the infrastructure with newer technology;
- The change in community infrastructure;
- Disruptions and nuisance factors associated with the actual decommissioning or replacement of the infrastructure such as noise and visual impacts; and
- Safety factors associated with the decommissioning of the infrastructure.

As decommissioning or the replacement of the infrastructure is likely to only take place after approximately 20 years, it is recommended that a detailed Social Impact Assessment be undertaken then to determine the actual impacts on the changing social environment at that stage.

9. CONCLUSIONS AND RECOMMENDATIONS

9.1 Summary Table of Impacts

Table 1: Summary Table of Anticipated Impacts

IMPACTS ANTICIPATED DURING THE CONSTRUCTION PHASE		
Impact Category	**Significance without Mitigation / Enhancement**	**Significance with Mitigation / Enhancement**
Population Impacts		
Inflow of workers	Medium (40)	Medium (30)
Inflow of jobseekers	Low (27)	Low (18)
Community and Institutional Activities		
Employment opportunities	Low (27) (+)	Medium (36) (+)
Accommodation of workforce	Medium (36) (-)	Low (27) (+)
Impact on local economy and regional benefits	Low (24) (+)	Medium (30) (+)
Land acquisition and rezoning	Medium (36)	Medium (30)
Individual and Family Level Impacts		
Impact on daily living and movement patterns	Medium (36)	Low (27)
Safety and security risks	Medium (36)	Low (27)
Health risks	Low (27)	Low (21)
Community Infrastructure Needs		
Impact on infrastructure and services	Low (14)	Low (10)
Impact on Local Municipality	Low (18)	Low (14)

IMPACTS ANTICIPATED DURING THE OPERATIONAL PHASE		
Impact Category	**Significance without Mitigation / Enhancement**	**Significance with Mitigation / Enhancement**
Population Impacts		
Inflow of workers	Medium (30)	Low (16)
Community and Institutional Activities		
Employment opportunities	Medium (30) (+)	Medium (39) (+)
Impact on local economy and regional benefits	Medium (39) (+)	Medium (42) (+)
Attitude formation and social mobilisation	Medium (48)	Medium (36)
Individual and Family Level Impacts		
Impact on daily living and movement patterns	Medium (30)	Low (20)
Safety and security risks	Medium (30)	Low (24)
Impact on land value	Medium (36)	Medium (30)
Health related impacts	Low (20)	Low (16)
Impact on sense of place	Medium (48)	Medium (48)
Impact on tourism potential	Low (20)	Low (10)
Community Infrastructure Needs		
Impact on infrastructure and services	Low (20)	Low (16)

9.2 Construction Phase

- The majority of the impacts associated with the construction phase is temporary in nature, of medium significance prior to mitigation measures being implement. Most of these impacts can be successfully mitigated to achieve a low rating.

- The main concerns revolve around safety and security matters that could occur and should be addressed during the construction phase. A construction workforce of between 250 (on average) to 400 (during peak construction periods) would result in severe negative intrusions on the surrounding property owners. This sensitive issue should be thoroughly dealt with.
- The most significant positive impact during this phase of the development is the creation of 250 to 400 temporary employment opportunities. Although many of these opportunities would be semi-skilled it seems that at least 50% of the job opportunities could be allocated to local people to do elementary and basic construction work, such as site clearing, planting of poles, mounting of structures and so forth. The higher skilled positions would not necessarily be obtainable in or around the study area and outsiders would probably have to be sourced.
- Skills development and capacity building would enhance the benefits of the job creation, but would further enable the employees to secure work at similar developments in future.
- An effective recruitment strategy for employees and SMME's will address the potential impacts associated with the inflow of outsiders, as well as many of the safety and security issues often associated with construction projects of this nature.
- The accommodation of construction team members from outside the community should be responsibly handled to avoid any informal settlements from developing and to ensure that the local hospitality industry benefit in this regard. It should further be ensured that this aspect have the least negative impacts on the neighbouring landowners as possible. This negative impact could thus, if successfully handled be changed to become a positive impact.
- Economic benefits during the construction phase would rather be for focused on the broader region and country than on the local region.
- The land under discussion is currently zoned as "agricultural" and the development footprint area thus has to be rezoned. Concerns with regards to the rezoning of the land refer to the perception that the change in land use would be an intrusion on the existing land-uses in the area which mainly include livestock and some game farming. Existing farming activities should be allowed to continue on the property.
- The impact on the daily living and movement patterns of property owners and the host community refers to the changes or disruptions in their daily lives caused by noise and dust pollution, the presence of an outside workforce, transportation routes and/or the number of vehicular traffic resulting from the proposed project. Most of these aspects

would thus occur during the construction phase of the project and could be mitigated to limit negative impacts in this regard.

- No major impacts with regards to the infrastructure requirements and service provision on the local municipality is foreseen during the construction phase.

9.3 Operational Phase

- Once operational the project is not labour intensive and would employ three security staff, six technicians and twelve assistants. From time to time additional temporary workers might be contracted to do maintenance work such as for the access road and fixing of fences. The aim would be to employ as many local employees as possible.
- Local procurement for general materials, goods and services (e.g. catering and security) could materialise possibly from Groblershoop, but also from the larger urban nodes in the area such as Upington. Although large scale procurement would not be undertaken some positive regional benefits could occur. This aspect received a high rating mainly due to the regional extent and the long operational period.
- Routine maintenance work would include the cleaning of the panels (approximately twice per year) and the cutting of grass. Limited impacts on the neighbouring farming activities are thus foreseen.
- The plant's footprint is 163 hectares and would be fenced (partially electrified) and relevant security measures would be implemented. This would include security staff (including at night time), only one controlled access to the plant, surveillance cameras, control over the movement on the access road i.e. that only private property owners would be allowed to use this road and no workers would be allowed to trespass on private property. In addition to this the current animal control practice (lynx, jackal, etc.) would be maintained. Sufficient safety and security are thus planned, but the concerns of landowners in this regard should still be addressed and sensitively dealt with.
- No impact on infrastructure and services (water, sanitation and electricity) are expected. No water is required for cooling purposes and a rainwater harvesting programme will provide water for cleaning purposes.
- Attitude formation and possible social mobilisation against the proposed project is evident. This relates to various issues as discussed in the report. One of the key concerns however relate to Vanguard Solar perceived as an outside agency negatively impacting on local community networks, as well as to concerns with regards to the ownership of Vanguard Solar. Landowners are of the opinion that decisions could then

be made by this new “outside agency” which could impact on the surrounding landowners well–being and which could influence the successful implementation of their farming activities. Uncertainty with regards to the future management of the facility and the possibility of Vanguard Solar selling the facility to another group unknown to the landowners exists and should be addressed.

- The impact on the visual character and sense of place would have lasting negative impacts on the area and it is not anticipated that these impacts can be successfully mitigated. As a result, the concerns with regards to the impact on the land value of neighbouring properties would remain until proven otherwise over a period of time.
- Negative impacts on the local tourism sector are foreseen to be unlikely. Even though this is a new technology in South Africa, the possibility that the proposed PV facility will attract tourists to the area is low due to the remoteness of the facility to the larger urban nodes. Also, if similar facilities are developed in the area concentrated around Upington, the Kleinbegin facility would lose its uniqueness, which will then have no impact on the local tourism industry.
- The project, once completed will provide a clean “greener technology” energy that would be sufficient for approximately 16 000 households.
- On a national scale the project would have positive environmental impacts (no fossil fuels, no noise, no emissions, etc.) and would therefore assist in meeting the government’s target for renewable energy while contributing to sustainable development in the country.
- The overall project value is in the order of R1.5 billion. Approximately 35% to 40% of this amount (R525 million to R600 million) would be allocated to local labour and services, as well as infrastructure equipment from the broader region and country. Economic benefits of the project would therefore be to the advantage of a wider area.

9.4 Recommendations

In addition to the recommendations and mitigation measures set out in this Social Impact Report, it is recommended that:

- From a social perspective it can be concluded that the proposed Kleinbegin PV facility would not result in permanent damaging social impacts, apart from the change in visual character which does not directly impact on community members’ health and overall quality of life. Even though there are little direct socio-economic benefits associated with the proposed project, it still outweighs the negative social impacts. No negative social impacts that could be classified as fatal have been identified and there

are also no impacts of such a high significance that they could prevent the project from continuing. The implementation of the proposed Kleinbegin PV facility could be implemented, provided that mitigation measures are strictly adhered to.

- The labour desk should work in close collaboration with the !Kheis Municipality to determine the best possible strategy to advertise and employ locals. Should the Municipality (or another community structure) have a database of available workers this should be used as a starting point in the recruitment process.
- All safety and security measures as proposed by the developer and set out in this Report be implemented to ensure that concerns raised by landowners are addressed and eliminated.
- It is recommended that a Community Liaison Officer be appointed and that the correct communication procedures be communicated to affected landowners and other interested parties during the construction and operational phases.
- Decisions made by the operator of the site should thus be responsive to the local needs and priorities. Should this not be adhered to, the impact of such decisions could then be a key source of dissatisfaction among the local landowners affecting existing social relationships.
- In addition, should Vanguard Solar's future social contributions be clearly communicated and should the benefits be felt by the wider community, negative perceptions, attitude formation and social mobilisation against the operators and project could be contained. Community benefits is a long process that should still be elaborated on and be maximised throughout the planning process (pre-construction and construction phase)and for life of project
- Future management and ownership of the property is of concern. The current directors of Vanguard Solar are foreigners with local partners. Some commitment in terms of the management plan and future of the facility should thus be provided to property owners.
- It has therefore also been recommended that the land not used for the footprint of the facility should remain agriculture and ideally be used for the farming of livestock and game. This would then assist the landowners in continuing with normal farming practices and would assist with predator control and preserving the sense of place of the area.

10. SOCIAL MANAGEMENT PLAN

From a social perspective the following objectives and measures should be included as part of the Social Management Plan which would be included as part of the Environmental Management Plan (EMP) developed for the construction and operation of the proposed PV facility.

10.1 Population Impacts

OBJECTIVE: **Limit negative social impacts associated with the inflow of outsiders to the area**

The impact of the inflow of outsiders to the area, especially during the construction phase would mainly be concentrated on the site. Due to the size of the overall site, the development footprint and the size of the workforce required, however, it is anticipated that it could result in intrusion impacts on the surrounding property owners especially if local labour is not used.

Jobseekers gathering at the project site are likely although it is difficult to mitigate against this impact from occurring.

An increase of people movement in an area also usually creates the perception that criminal activities increase. This perception could become a reality and should therefore be noted and addressed.

Project component/s	» Construction and establishment of activities associated with the establishment of the facility and associated infrastructure and the inflow of workers and jobseekers as a result of these activities.
Potential Impact	» Intrusion impacts on neighbouring property owners » Outsiders placing an additional burden on the provision of services and infrastructure » Possible negative social impacts due to jobseekers at the site and the impact on infrastructure and services should they remain in the area
Activities/risk sources	» EPC partner and/or contractor not employing local labour where possible. » The inflow of various specialists from outside the study area and even abroad » Sourcing of individuals outside the municipal area
Mitigation: Target/Objective	» The developer should aim to employ a maximum number of the low-skilled to semi-skilled workers from the local area where possible. This should also be stipulated in the tender documentation and contractors should adhere to this guideline. Inputs from the Kheis Municipality in this regard would be critical.

Mitigation: Action/control	Responsibility	Timeframe
The use of local labour will help to avoid many of the negative impacts and conflict that might occur due to friction between a local and 'outside' labour force.	Vanguard Solar, !Kheis Municipality, EPC Partner & Contractor	Pre-Construction and Construction
Local labourers should remain at their existing residences and no workers can be allowed on site during night time. No workers should thus be accommodated on site at night except for the security personnel.	Vanguard Solar, EPC Partner & Contractor	Construction
Establish a labour desk that deals with job seekers and to discourage the gathering of people at unsuitable localities. The contractor and labour desk should clearly communicate the extent of the work and number of workers required to the affected Municipalities and job seekers to avoid unnecessary expectations regarding employment opportunities.	Vanguard Solar, !Kheis Municipality, EPC Partner & Contractor	Pre-Construction and Construction
The contractor should be contractually obliged to give preference to a local labour force, as far as possible.	Vanguard Solar, EPC Partner & Contractor	Pre-Construction and Construction
Co-ordinate and work through the !Kheis Municipality and relevant community organisations to source individuals with the relevant skills and those in need of employment	Vanguard Solar, !Kheis Municipality, EPC Partner & Contractor	Pre-Construction and Construction and Operation
Outside members of the construction team must be accommodated in suitable existing housing facilities within the area.	Vanguard Solar, !Kheis Municipality, EPC Partner & Contractor	Construction
Construction workers should wear uniforms and identity tags.	Vanguard Solar, EPC Partner & Contractor	Construction
Working hours should remain at normal working hours (e.g. 7 am to 5 pm during	Vanguard Solar, EPC Partner & Contractor	Construction

Mitigation: Action / control	Responsibility	Timeframe
weekdays).		
The construction area should be properly fenced and security personnel should be on site on a permanent basis.	EPC Partner & Contractor	Construction
Security cameras should be places at all entrances to the site and any identified strategic locations	Vanguard Solar, EPC Partner & Contractor	Pre-Construction and Construction
Trespassing of workers on adjacent privately owned farms should be avoided at all costs. Construction workers should remain at the construction site.	EPC Partner & Contractor	Construction
The public participation process and communication efforts as part of the EIA for this project should continue. A communication process should thus be maintained by Vanguard Solar to ensure transparent communication between Vanguard Solar and the directly affected property owners. Property owners should be kept informed of the size of the workforce and timeframes for construction and completion.	Vanguard Solar, EPC Partner & Contractor	Pre-Construction and Construction
Sufficient water and sanitation facilities should be provided for the workers on site during the construction period.	Vanguard Solar, EPC Partner & Contractor	Construction
The construction site should be properly managed to avoid any environmental pollution (due to inadequate water and waste infrastructure and services) and littering.	Vanguard Solar, EPC Partner & Contractor	Construction
If any type of informal vending stations develop on or near the construction site it should be strictly managed.	Vanguard Solar, EPC Partner & Contractor	Construction
An Environmental Control Officer (ECO) should be appointed prior to the construction	Vanguard Solar, EPC Partner & Contractor	Pre-construction

Mitigation: Action/control	Responsibility	Timeframe
phase. The contact details of the ECO should be made available to all affected property owners in the case where they would like to lodge a formal complaint or would like to require more information regarding the construction process.		

Performance Indicator	» Job opportunities, especially of low to semi-skilled positions, are primarily awarded to members of local communities. » Locals and previously disadvantaged individuals (women) are taken into account during the hiring process. » SMME's are awarded with contracts during the construction and operational phase. » Labour, entrepreneurs, businesses, and SMME's from the local sector are awarded with jobs, based on requirements in the Tender Documentation. » The involvement of local labour is promoted. » Reports are not made from members of the local communities regarding unrealistic employment opportunities or that only outsiders were employed.
Monitoring	» Vanguard Solar, their EPC Partner and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

10.2 Community and Institutional Impacts

OBJECTIVE: Enhance employment opportunities and address economic inequities within the study area and invest in capacity building and skills training

Some local employment opportunities would be available during the construction phase. If it is aimed to employ half of the workforce from locals, an estimated hundred and twenty five (125) to two hundred (200) local opportunities could arise. The detailed number of locals to be employed, however, cannot be finalised at this stage. Local labour, however should be pursued as far possible.

Although it is expected that suitable local candidates would also be available for most of the low to semi-skilled positions it should be considered that locals with limited skills, employed as part of the construction phase, could with the support of training programmes, be considered for permanent employment. Skills training and capacity building would thus increase the positives with regards to employment. Local procurement of materials and

goods, especially during the operational phase, should be implemented to contribute to some economic development even if only of a limited scale.

For a temporary period the size and density of the local population would increase in and around the proposed site. Care should further be taken to ensure suitable housing for the outside workers to avoid negative impacts in this regard on the neighbouring landowners.

Local economic benefits of the proposed project could accrue although of a limited scale. Local procurement could enhance this possible impact.

Land acquisition and change of zoning status could negatively influence the land use in the area. Care should thus be taken that the existing farming activities continue on the remainder of the site.

Project component/s	» Employment creation and the availability of required skills in the local communities » Housing of workforce » Local economic benefits » Land acquisition and rezoning
Potential Impact	» The opportunities and benefits associated with the creation of local employment and business could be maximised » Temporary increase in housing requirements » Termination of existing farming activities result in negative impacts on the land use and activities undertaken by neighbouring farmers
Activity/risk source	» Unavailability of locals with the required skills resulting in locals not being employed and labour be sourced from outside the !Kheis Municipality area » Potential housing requirements that cannot be met by the existing facilities » Limited local economic benefits » Termination of existing farming activities
Mitigation: Target/Objective	» Vanguard Solar and their EPC partner, in cooperation with the !Kheis Municipality, should aim to employ a maximum number of the low-skilled workers from the local area where possible. Should the necessary skills not be readily available, skills training and capacity building should be undertaken. This would also limit the need for housing.

Mitigation: Action/control	Responsibility	Timeframe
Make maximum use of local employment and set up a labour desk that undertakes a skills audit of the available workforce	Vanguard Solar & EPC Partner	Pre-Construction & Construction Phase

Mitigation: Action / control	Responsibility	Timeframe
within the closest communities.		
Make use of any existing databases of available workers and include the local councillor and other representative community structures in the process.	Vanguard Solar & EPC Partner	Pre-Construction & Construction Phase
Project contracts between Vanguard Solar and the main contractor should stipulate the use of local labour for unskilled and semi-skilled positions and tasks	Vanguard Solar & EPC Partner	Pre-Construction Construction
Enhance on a capacity building and skills development strategy to lessen any possible skills disparity between the local skills available and the requirements of the project.	Vanguard Solar & EPC Partner	Pre-Construction Construction
Reserve a percentage of the workforce for women and the disabled (if possible).	Vanguard Solar & EPC Partner	Pre-Construction Construction
Recruitment adverts could be placed at strategic public localities in the local towns (e.g. Groblershoop, Wegdraai, Grootdrink and even Upington).	Vanguard Solar & EPC Partner	Pre-Construction & Construction Phase
Project requirements should be discussed with community representatives so avoid unrealistic expectations among local community members	Vanguard Solar & EPC Partner	Pre-Construction & Construction Phase
Remuneration packages should take cognisance of existing remuneration provided to local labourers	Vanguard Solar & EPC Partner	Construction
Farm workers should be informed of the possible negative impacts of discarding their long term employment positions as farm workers for short term positions	Vanguard Solar & EPC Partner	Construction

Mitigation: Action / control	Responsibility	Timeframe
that could possibly have some short term financial benefits, without long term guarantees		
Appoint as many local employees as would be feasible and possible.	Vanguard Solar	Operation
Should locals with applicable skills not be available, Vanguard Solar should embark on a skills development process during the construction phase to allow locals to be employable for the operational phase	Vanguard Solar	Construction and Operation
Implement training and capacity building programmes for the workers throughout the operational period of the PV facility	Vanguard Solar	Operation
The use of local labour would eliminate additional pressure on the existing housing shortages.	Vanguard Solar & EPC Partner	Construction Phase
No workers to be housed on site, except for security personnel. This issue should be included as a condition in the contract between Vanguard Solar and the main contractor.	Vanguard Solar & EPC Partner	Construction Phase & Operational phase
Transportation of workers by bus on a daily basis to and from their places of residence should be undertaken.	Vanguard Solar & EPC Partner	Construction Phase
Existing accommodation facilities in close proximity to the site should receive priority.	Vanguard Solar & EPC Partner	Pre-Construction Phase and Construction
The number of individuals requiring housing and the type of facilities required must be identified during the planning phases as far as possible. These requirements should be discussed with	Vanguard Solar, EPC Partner & !Kheis Municipality	Pre-Construction Phase

Mitigation: Action / control	Responsibility	Timeframe
the business and hospitality fraternity as well as with the !Kheis Municipality.		
Peak construction periods with possible peak housing requirements should also be highlighted as part of the above mentioned planning process	Vanguard Solar & EPC Partner	Pre-Construction Phase
Maximise the use of local labour, suppliers and SMMEs during the construction process.	Vanguard Solar & EPC Partner	Construction
Local sourcing of materials, goods and services should be undertaken where possible to assist in providing more economic and employment opportunities for the local people	Vanguard Solar & EPC Partner	Pre-Construction, Construction and Operation
Tender documentation should contain guidelines for the involvement of local labour, entrepreneurs, businesses and SMMEs from the local sector	Vanguard Solar & EPC Partner	Construction and Operation
House an outside workforce in existing overnight establishments, such as guesthouses and B&B's.	Vanguard Solar & EPC Partner	Construction
Rezoning and selling of the land should have the minimum disturbances with regards to the existing and adjoining land-uses	Vanguard Solar	Pre-Construction
Similar farming activities should continue on the section of the property not used for the PV facility and ancillary infrastructure.	Vanguard Solar	Construction and Operation
Vanguard Solar should provide written guarantees with regards to the future activities that would be allowed on the	Vanguard Solar	Construction and Operation

Mitigation: Action/control	Responsibility	Timeframe
site and remaining section of the property		

Performance Indicator	» Job opportunities, especially of lower skilled positions, are primarily awarded to members of local communities. » A skills development plan is developed » Skills training and capacity building initiatives are implemented according to the skills development plan » Local SMME's and/or entrepreneurs should be awarded the opportunity to become involved in the tender process. » Local procurement is implemented during operational phase » Locals are employed for the operation and management of the facility
Monitoring	» Vanguard Solar, community leaders and !Kheis Municipality must monitor indicators listed above to ensure that they have been implemented.

10.3 Individual and Family Level Impacts

OBJECTIVE: Limit possible negative impacts on the quality of life of the host communities and avoid negative impacts on the tourism industry

This aspect refers to the changes or disruptions in the daily living and working activities of residents caused by noise and dust pollution, transportation routes and/or the number of vehicular traffic resulting from the proposed project, as well as safety and security risks created as a result of the increase in the local population density. Most of these aspects would thus occur during the construction phase of the project.

Safety and security concerns have been raised on numerous occasions. The possible negative impacts in this regard should be attended to although the key mitigation measure in this regard refers to the employment of local community members.

The possible devaluation of the properties surrounding the PV facility as a result of the change in the land use and negative visual impacts could materialise. From a social perspective it is anticipated that if any devaluation occurs that it would only be for a short duration until the facility demonstrated its viability and limited social impact (if properly managed) once operational. Surrounding land values could then again increase or return to normal according to the property market fluctuations.

The visual impact of the facility, which could play a role with regards to land value, is however not anticipated to be mitigated.

Possible impacts on the local tourism establishments and ventures should be guarded against, although the main impact in this regard would relate to the visual impact of the facility and subsequent influence on the sense of place and possible negative impact on the property values.

Project component/s	» Changes or disruptions in the daily living and working activities of residents, possible safety and security risks as a result of the proposed project » Change in visual character of the area » Impact on land value » Impact on tourist establishments and activities
Potential Impact	» Possible increase in dust and noise » Traffic related impacts » Change in visual character » Possible increase in crime due to influx of people to the area » Possible impact on land value » Possible negative impacts on tourism activities and ventures undertaken in the area
Activity/risk source	» Increased risk of accidents due to increase in vehicle movement » Possible degradation of local roads » Change in visual character » Possible increase in crime due to influx of people to the area » Possible negative impacts on tourism activities and ventures undertaken in the area » Increased health risks during construction phase
Mitigation: Target/Objective	» Limit any negative impacts on the host communities' daily living and movement patterns

Mitigation: Action/control	Responsibility	Timeframe
Inspect construction vehicles on a regular basis to ensure their road safety worthiness.	Vanguard Solar, EPC Partner and Contractor	Construction and Operational Phases
Limit movement of heavy vehicles on the	Vanguard Solar, EPC	Construction

Mitigation: Action/control	Responsibility	Timeframe
local roads after hours.	Partner and Contractor	
Ensure that heavy vehicles comply with speed limits and other traffic rules. Display a contact telephone number on the vehicles whereby other motorists could lodge complaints.	Vanguard Solar, EPC Partner and Contractor	Construction
Install penalties for drivers disobeying traffic rules.	Vanguard Solar, EPC Partner and Contractor	Construction and Operational Phases
Ensure a safe turn-off from secondary roads to the access route.	Vanguard Solar, EPC Partner and Contractor	Construction and Operational Phases
Rehabilitation of local roads should be undertaken if damaged by construction vehicles.	Vanguard Solar, EPC Partner and Contractor	Construction
The contractor should be responsible for regular upgrading of the local gravel access road (grading) and the internal access roads.	Vanguard Solar, EPC Partner and Contractor	Construction
The entrance to the site should be clearly indicated. Should any road upgrading at the entrance be required, it should be undertaken in consultation with the Northern Cape Department of Transport, Roads and Public Works.	Vanguard Solar, EPC Partner and Contractor	Pre-Construction and Construction
Fence off the construction area and restrict unauthorised access.	Vanguard Solar, EPC Partner and Contractor	Construction
Prohibit any movement of workers outside the designated footprint area and implement measures to prevent stock theft and poaching (e.g. surveillance cameras at strategic locations).	Vanguard Solar, EPC Partner and Contractor	Construction
Security personnel should be	Vanguard Solar, EPC Partner and Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
permanently on-site once construction starts.		
Security cameras should be installed at the entrance to the site.	Vanguard Solar, EPC Partner and Contractor	Construction
Construction activities should not occur after-hours (e.g. after 5 pm), on weekends and/or public holidays.	Vanguard Solar, EPC Partner and Contractor	Construction
Working hours should be kept to normal working hours (e.g. 7 am until 5 pm) during the construction and operational phases.	Vanguard Solar, EPC Partner and Contractor	Construction and Operation
Before construction commences, representatives from the !Kheis Municipality, community leaders, community-based organisations and the surrounding property owners, should be informed of the details of the contractors, size of the workforce and construction schedules.	Vanguard Solar, EPC Partner and Contractor, !Kheis Municipality	Construction
Construction workers and permanent employees should be easily identifiable by wearing uniforms and even identity tags.	Vanguard Solar, EPC Partner and Contractor	Construction and Operational Phases
The construction site should be properly managed to avoid any environmental pollution (due to inadequate water and waste infrastructure and services) and littering.	Vanguard Solar, EPC Partner and Contractor	Construction
Informal vending stations on or near the construction site should be managed.	Vanguard Solar, EPC Partner and Contractor	Construction
Information distributed as part of the existing HIV/Aids awareness campaigns	Vanguard Solar, EPC Partner and Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
should again be focused on and communicated to the local workforce		
Only workers that are on duty and security personnel should be allowed on site.	Vanguard Solar, EPC Partner and Contractor	Construction
The use of alcohol and illegal substances should not be allowed on site.	Vanguard Solar, EPC Partner and Contractor	Construction
Limit noise generating activities at the site.	Vanguard Solar, EPC Partner and Contractor	Construction
Workers must not be allowed to overnight on the premises and have to be brought in and taken to their places of residence by bus on a daily basis.	Vanguard Solar, EPC Partner and Contractor	Construction
Workers must not be allowed to leave the designated construction areas.	Vanguard Solar, EPC Partner and Contractor	Construction
The access road south-east of the site (which is the only access road planned) must be fitted with security cameras and equipped with a controlled barrier (or equivalent), and will only be accessible to authorised neighbours.	Vanguard Solar, EPC Partner and Contractor	Construction and Operation
The two other access points to the farm are not to be used by construction vehicles and could be fitted with video surveillance for the duration of the construction period.	Vanguard Solar, EPC Partner and Contractor	Construction
The PV facility must be fenced (partially by electrical fencing).	Vanguard Solar, EPC Partner and Contractor	Construction and Operation
The PV facility should be equipped with surveillance around its perimeter.	Vanguard Solar	Operation
The proponent (parent company) could	Vanguard Solar, EPC	Construction and

Mitigation: Action / control	Responsibility	Timeframe
be held liable for stock or game theft during construction.	Partner and Contractor	Operation
A Health and Safety Plan should be implemented and it must be ensured that all team leaders are qualified in First Aid and other relevant safety courses.	Vanguard Solar, EPC Partner and Contractor	Construction and Operation
Workers should wear identifiable clothes and should not be allowed to leave the construction site or trespass on private properties.	Vanguard Solar, EPC Partner and Contractor	Construction and Operation
Apart from security personnel and other authorised workers, no one is allowed to enter the construction site without permission.	Vanguard Solar, EPC Partner and Contractor	Construction
Vanguard Solar could assist neighbouring property owners with regular inspections of the fence around the entire farm.	Vanguard Solar, EPC Partner and Contractor	Construction and Operation
Implement safety measures at the plant to limit fire hazards, such as maintain short grass, implement fire breaks around the facility and install a lightning pole.	Vanguard Solar, EPC Partner and Contractor	Construction and Operation
Safety monitoring on the access road should be implemented	Vanguard Solar	Operation
Vanguard Solar should, in conjunction with the property owners, develop management and implement emergency procedures for veld fire management and for lightning	Vanguard Solar, EPC Partner and Contractor	Construction and Operation
Make the contact details of the Health and Safety Officer of the contractor's team available to the local community	Vanguard Solar, EPC Partner and Contractor	Pre-Construction

Mitigation: Action / control	Responsibility	Timeframe
and communicate procedures to lodge complaints to the Municipality and community representatives.		
Provide adequate drinking water and appropriate sanitation facilities to the workers. Sanitation facilities to be cleaned and serviced on a regular basis.	Vanguard Solar, EPC Partner and Contractor	Construction and Operation
Dispose of rubble and other household waste appropriately and on a regular basis.	Vanguard Solar, EPC Partner and Contractor	Construction and Operation
Implement a social responsibility strategy and embark on a HIV/Aids awareness campaign amongst the workers.	Vanguard Solar, EPC Partner and Contractor	Construction and Operation
Appointment of a local labour force will reduce the possibility of promiscuous social practices usually associated with construction sites.	Vanguard Solar, EPC Partner and Contractor	Construction
The PV facility should be operated in compliance with all relevant environmental regulations.	Vanguard Solar	Operation
Engineering aspects and the design of the facility should ensure that no environmental pollution occurs. Proper waste, water and sanitation infrastructure and facilities must thus be installed	Vanguard Solar, EPC Partner and Contractor	Construction and Operation
The design and specific positioning of the PV facility should aim to minimise the possible negative visual impact of the facility on the surrounding property owners.	Vanguard Solar	Operation
The panel mounts should have the lowest	Vanguard Solar	Operation

Mitigation: Action/control	Responsibility	Timeframe
height practically possible.		
It should be ensured that there is no reflection from the panels.	Vanguard Solar	Operation
The design of buildings should blend in with surrounding environment.	Vanguard Solar	Operation
Lighting issues should receive the attention it deserves to avoid any light pollution at night.	Vanguard Solar	Operation
The mitigation measures of the Visual Impact Assessment should be strictly implemented	Vanguard Solar	Operation
Vanguard Solar and representatives of the !Kheis Municipality, tourism operators and property owners involved in the tourism sector should jointly investigate the possible role which the PV facility could play with regards to the local tourism industry	Vanguard Solar	Operation
The presence of the PV facility could be included in the marketing strategy of the !Kheis Municipality	Vanguard Solar, !Kheis Municipality	Operation

Performance Indicator	» No noise and dust pollution » Limited intrusions on host communities » Limited or no reports from property owners regarding problems with construction activities and workforce » No degradation of local roads » No increased accidents » No reports of fires and other emergencies » No security threats and no increase in criminal activities that could be attributed to individuals involved in the facility's construction and operation » Limited visual impact of facility

Monitoring	» Vanguard Solar, their EPC Partner, the !Kheis Municipality and appointed ECO must monitor indicators listed above to ensure that they have been implemented

10.4 Community Infrastructure Needs

OBJECTIVE: Limit the impact of infrastructure, ancillary infrastructure and need for the creation of additional infrastructure requirements

All infrastructure on site would be developed as part of the construction phase and would be funded by Vanguard Solar. The infrastructure however, should be connected to the municipal infrastructure off-site, such as water reticulation and sewage infrastructure. It is only envisaged at this stage, that it would have some impacts on planning and scheduling processes of the local municipality.

The electricity generated on site would be stepped up through the on-site inverters and transformers at the substation. Thereafter the power would be linked to the existing Eskom electricity grid via an overhead power line.

Project component/s	» Infrastructure requirements of the proposed project
Potential Impact	» Contribution of local municipality
Activities/risk sources	» Economic implications for !Kheis Municipality
Mitigation: Target/Objective	» Limited impact on contribution of !Kheis Municipality

Mitigation: Action/control	Responsibility	Timeframe
Inform the local authority or any other affected party in advance should services have to be interrupted	Vanguard Solar and !Kheis Municipality	Pre-Construction
Inform the local authority or any other affected party in advance should services have to be interrupted.	Vanguard Solar and !Kheis Municipality	Pre-Construction
Vanguard Solar should discuss the development of infrastructure (water and sanitation related) on site and the link with the existing infrastructure with the	Vanguard Solar and !Kheis Municipality	Pre-Construction

Mitigation: Action / control	Responsibility	Timeframe
!Kheis Municipality.		
Any possible infrastructure and services requirements from the local municipality should be discussed with the representatives of the !Kheis Municipality as a priority to ensure that the additional requirements are considered in the future planning of the municipality in this regard	Vanguard Solar and !Kheis Municipality	Pre-Construction, Construction and Operation

Performance Indicator	» No additional infrastructure requirements on !Kheis Municipality
Monitoring	» Vanguard Solar and landowners must monitor indicators listed above to ensure that they have been implemented

11. SOURCES CONSULTED

11.1 Documents

Becker, H.A. (1997). Social Impact Assessment: Method and experience in Europe, North America and the developing world. UCL Press: London

Becker, H.A. & Vanclay, F. (eds) (2003). The International Handbook of Social Impact Assessment: Conceptual and Methodological Advances. Edward Elgar: Cheltenham

Burdge, R.J. A community guide to Social Impact Assessment

Environomics. 2008. Siyanda Environmental Management Framework

!Kheis Municipality. 2005. Integrated Development Plan

Finsterbusch, K., Llewellyn, L.G. & Wolf, C.P. (eds) (1983). Social Impact Assessment Methods. Sage Publications: Beverly Hills

Savannah Environmental (2011) Final Scoping Report: Proposed Kleinbegin Photovoltaic Solar Energy facility on a site west of Groblershoop, Northern Cape Province

Siyanda District Municipality. (2009) Integrated Development Plan 2010/11- 2012.

Siyanda District Municipality. (2006) Siyanda Integrated Economic Development Plan.

11.2 Websites

www.demarcation.org.za

www.ewisa.co.za

www.greenkalahari.co.za

www.kheis.co.za

www.northerncape.gov.za

www.northerncape.org.za

www.siyanda-dm.co.za

www.stalle.vaalkloof.co.za

www.thurulodge.co.za

11.3 Consultation

The following individuals were consulted for the purpose of the Social Impact Assessment:

Mr. G. Kotze: Farm Kleinbegin 115/2 (Witdam)

Mr. K. Kotze (snr.): Farm Kleinbegin 115/RE

Mr. K. Kotze (jnr.): Farm Kleinbegin 115/RE

Mr. L. Kotze: Farm Kleinbegin 418

Mr. J. Schreuder: Farm Kleinbegin 115/3 (Vaalkloof)

Mr. A. van den Heever: Farm Hartebeestvlakte 111/1 (Josling)

Mr. D. Malan: Farm Zandruggens 116/3 (Weltevrede)

Mr. J. van Staden: Farm Zandruggens 116/9

Mrs. M. Venter: Farm Zandruggens 116/5 and 116/4

12. APPENDIX A: QUALIFICATIONS AND EXPERIENCE OF SPECIALIST

Ms. Ingrid Snyman holds a BA Honours degree in Anthropology. She has fourteen years' experience in the social field. Ms. Snyman has been involved in various Social Impact Assessments during her career as social scientist. These project themes consist of infrastructure development, waste management, road development, water and sanitation programmes, township and other residential type developments. She has also been involved in the designing and management of numerous public participation programmes and communication strategies, particularly on complex development projects that require various levels and approaches.

Ms. Snyman has no vested interest in the outcome of the project and hereby declares her independence with regard to the study undertaken for the above mentioned project