

**ENVIRONMENTAL IMPACT ASSESSMENT PROCESS  
DRAFT BASIC ASSESSMENT REPORT**

**PROPOSED PHOTOVOLTAIC FACILITY ON A SITE  
WEST OF KAKAMAS, NORTHERN CAPE**

**(DEA REF No: 12/12/20/2179)**

**DRAFT BASIC ASSESSMENT REPORT**

**29 August - 27 September 2011**

**Prepared for:**

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## environmental affairs

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REPUBLIC OF SOUTH AFRICA

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**File Reference Number:**

**Application Number:**

**Date Received:**


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

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**Kindly note that:**

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

## PROJECT DETAILS

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<b>DEA Reference No.</b>	:	12/12/20/2179
<b>Title</b>	:	Environmental Assessment Process Draft Basic Assessment for a proposed Photovoltaic Facility on a site west of Kakamas, Northern Cape Province
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<b>Report Status</b>	:	Draft Basic Assessment Report for Public Review
<b>Review Period</b>	:	29 August 2011 – 27 September 2011

**When used as a reference this report should be cited as:** Savannah Environmental (2011) Draft Basic Assessment Report: Proposed Photovoltaic Facility on a site west of Kakamas, Northern Cape Province.

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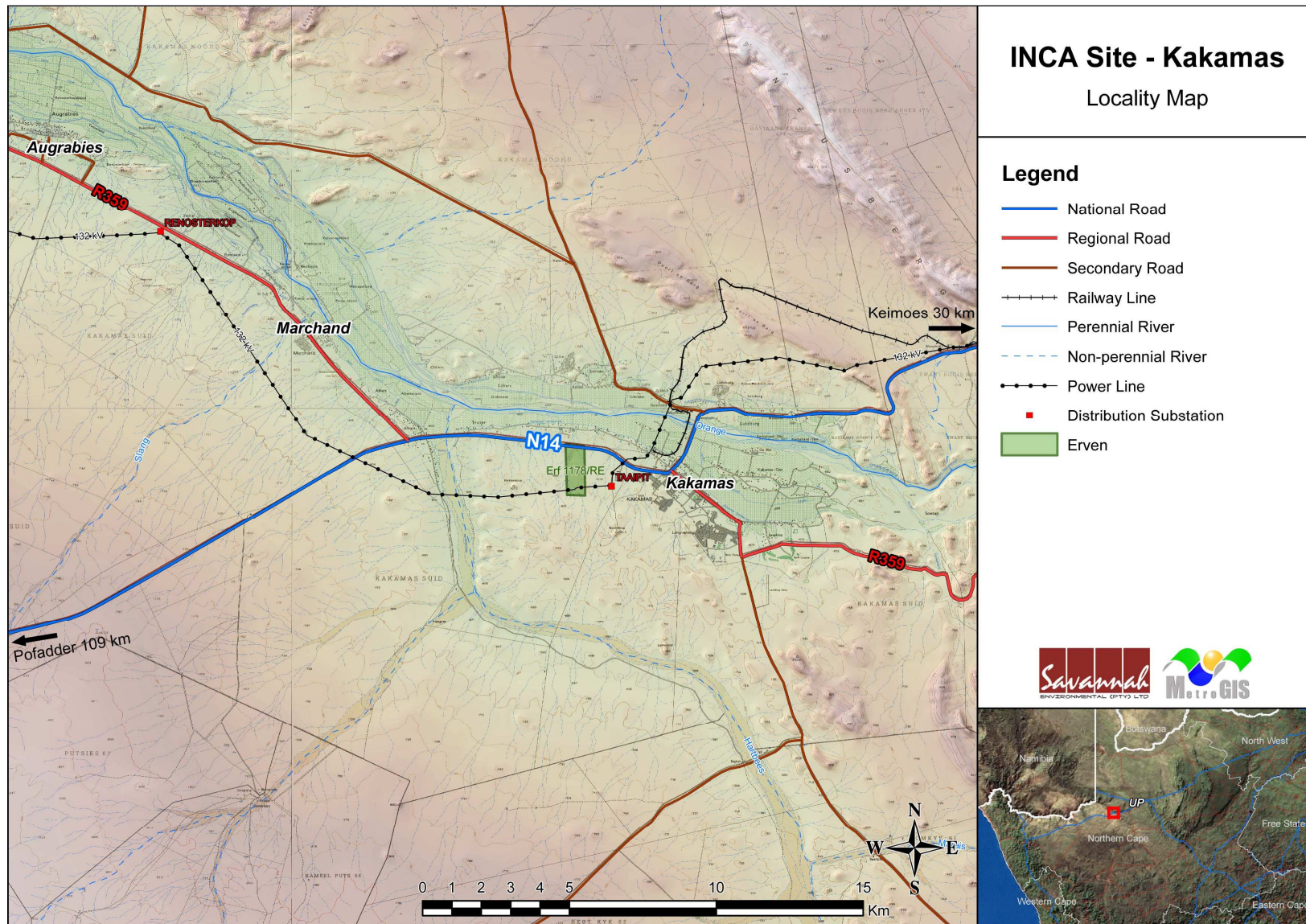
## SUMMARY AND OVERVIEW OF THE PROPOSED PROJECT

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The need to expand electricity generation capacity in South Africa is based on **national policy** and is informed by on-going strategic planning undertaken by the Department of Energy (DoE). In response to the National Energy Policy's objective relating to affordable energy services, the DoE commissioned a National Integrated Resource Plan (IRP) in order to provide a long-term, cost-effective resource plan for meeting electricity demand, which is consistent with reliable electricity supply and environmental, social, and economic policies. The planning horizon for the study was from 2010 to 2030. The objective of the IRP is to determine the least-cost supply option for the country, provide information on the opportunities for investment into new power generating projects, and evaluate the security of supply. The long-term electricity planning goal is to ensure sustainable development considering technical constraints, economic constraints, social constraints, and externalities.

In order to meet the long-term goal of a sustainable renewable energy industry, a goal of 17,8 GW of renewables by 2030 has been set by the DoE within the Integrated Resource Plan (IRP) 2010, to be produced mainly from wind, solar, biomass and small-scale hydro (with wind and solar comprising the bulk of the power generation capacity). This amounts to approximately 42% of the total estimated electricity generation capacity by 2030 being from renewables. This translates to approximately 9% of the power generated being produced by renewable energy. This is however dependent on the assumed learning rates and associated cost reductions for renewable options.

INCA Kakamas Solar (Pty) Ltd (a subsidiary of INCA Energy) is proposing the establishment of a PV facility for the purpose of commercial electricity generation on an identified site located approximately 2.5 km west of Kakamas in the Northern Cape Province (refer to Figure 1.1). The proposed project will have maximum generating capacity of **10 MW** which will be evacuated into the national electricity grid as part of a power purchase agreement with Eskom and the South African Treasury.



**Figure 1.1:** Locality map showing the proposed development site in relation to the town of Kakamas in the Northern Cape Province

From a regional site selection perspective, this region is preferred for solar energy development by virtue of its annual direct solar irradiation values. From a local perspective, the site is preferred due to its suitable topography (i.e. in terms of slope), proximity to a grid connection point (i.e. for the purpose of electricity evacuation), site access (i.e. to facilitate the movement of machinery during the construction phase), and by virtue of the extent of the site (i.e. a broader area of approximately 109 ha is being considered within which the facility can be developed).

The nature and extent of the proposed facility, and the potential environmental impacts associated with the construction, operation and decommissioning phases are explored in more detail in this Basic Assessment Report. This report has been compiled in accordance with the requirements of the EIA Regulations and includes details of the activity description; the site, area and property description; the public participation process; the impact assessment; and the recommendations of the Environmental Assessment Practitioner.

### **1.1. Summary of the Proposed Development**

INCA Kakamas Solar (Pty) Ltd (a subsidiary of INCA Energy) is proposing to establish a commercial photovoltaic solar energy facility as well as associated infrastructure on a site located approximately 2.5 km west of Kakamas in the Northern Cape province. Based on a pre-feasibility analysis and site identification processes undertaken by INCA Kakamas Solar, a favourable area has been identified for consideration and evaluation through a Basic Assessment.

The project is proposed on portions of the Remainder of farm 1178 (Kakamas Suid Nedersetting). The site proposed for the facility falls within the Kai Garib Local Municipality. A broader area of approximately 109 ha is being considered within which the facility is proposed to be constructed.

By undertaking a technical feasibility study which considered favourable climatic conditions (solar renewable energy facilities are directly reliant on average solar radiation values for a particular area), land availability, access to and capacity of the electricity grid, accessibility of the study site, and local site topography, a feasible site has been identified for the establishment of the proposed renewable energy facility.

The solar energy facility is proposed to accommodate an array of photovoltaic (PV) panels with a generating capacity of up to 10 MW. An area of less than 20ha will be required for this proposed facility. Other infrastructure associated with the facility will include:

- » An on-site generator transformer and a small substation to facilitate the connection between the renewable energy facility and the Eskom electricity grid;



- » A hole with concrete to support the PV panels;
- » Cabling between the project components, to be laid underground where practical;
- » An overhead power line (22kV) of ~100 m in length feeding into the Eskom electricity network at the existing Taaiput Substation;
- » Internal access roads; and
- » Workshop area for maintenance and storage.

The overall aim of the design and layout of the facility is to maximise electricity production through exposure to the solar radiation, while minimising infrastructure, operation and maintenance costs, and social and environmental impacts. The use of solar energy for power generation can be described as a non-consumptive use of natural resources which emits zero greenhouse gas emissions. The generation of renewable energy contributes to South Africa's electricity generating market which has been dominated by coal-based power generation.

## 1.2. Requirement for an Environmental Impact Assessment Process

In terms of the Environmental Impact Assessment Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA, Act No. 107 of 1998), authorisation is required from the National Department of Environmental Affairs (DEA), in consultation with the Northern Cape Department of Environment and Nature Conservation (DENC), for the establishment of the proposed facility. This project has been registered with National DEA under reference number **12/12/20/2179**. In terms of sections 24 and 24D of NEMA, as read with the Environmental Impact Assessment Regulations of GNR543; GNR544; GNR545; and GNR546, a Basic Assessment process is required to be undertaken for the construction of the proposed facility. The following listed activities are applicable:

Notice No.	Activity	Description	Project Components
544, 18 June 2010	1	The construction of facilities or infrastructure for the generation of electricity where: » The output is 10 MW or less but the total extent of the facility covers an area in excess of 1 ha.	» PV Panels » Substation » Power line
GN 544, 18 June 2010	11	The construction of: Infrastructure or structures covering 50 m <sup>2</sup> or more where such construction occurs within a watercourse or within 32 m of a watercourse, measured from the edge	» PV Panels » Substation

Notice No.	Activity	Description	Project Components
		of a watercourse, excluding where such construction will occur behind the development setback line.	
544, 18 June 2010	23	The transformation of undeveloped, vacant or derelict land to: » Residential, retails, commercial, recreational, industrial, or institutional use, outside an urban area, and where the total area to be transformed is bigger than 1 ha but less than 20 ha.	» PV Panels » Substation » Power line » Ancillary infrastructure

An EIA is an effective planning and decision-making tool for the project developer as it provides the opportunity for the developer to be forewarned of potential environmental issues and to assess if potential environmental impacts can be avoided, minimised or mitigated to acceptable levels. The EIA process forms part of the feasibility studies for a proposed project and informs the final design process. Comprehensive, independent environmental studies are required in accordance with the EIA Regulations to provide the competent authority with sufficient information in order to make an informed decision.

### 1.3. Details of Environmental Assessment Practitioner and Expertise to conduct the Scoping and EIA

Savannah Environmental has been appointed as the independent environmental consultant, to undertake the Environmental Basic Assessment to identify and assess the potential environmental impacts associated with the proposed facility. Neither Savannah Environmental nor any of its specialist sub-consultants on this project are subsidiaries of or are affiliated to INCA Kakamas Solar. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

Savannah Environmental is a specialist environmental consulting company providing holistic environmental management services, including environmental impact assessments and planning to ensure compliance and evaluate the risk of development; and the development and implementation of environmental management tools. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team.

The Savannah Environmental team has considerable experience in environmental impact assessments and environmental management, and have been actively involved in

undertaking environmental studies, for a wide variety of projects throughout South Africa, including those associated with electricity generation.

Jo-Anne Thomas, the principle Environmental Assessment practitioner (EAP) for this project, is a registered Professional Natural Scientist and holds a Master of Science degree. She has 13 year's experience consulting in the environmental field. Her key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. She is currently involved in undertaking siting processes as well as EIAs for several renewable energy projects across the country.

John von Mayer holds a BSc Honours degree and has over three years experience consulting in the environmental field. He has been involved in numerous projects within the energy sector with a strong focus on renewable energy.

In order to adequately identify and assess potential environmental impacts associated with the proposed project, Savannah Environmental has appointed the following specialist sub-consultants to conduct specialist impact assessments:

- » Ecology – David Hoare Consulting
- » Geology, soils, erosion and agricultural potential – Terra Soils
- » Heritage resources – Tim Hart of the University of Cape Town
- » Visual – MetroGIS
- » Social – Tony Barbour Environmental Consulting and Research
- » Public Participation Consultant – Sustainable Futures ZA

## SECTION A: ACTIVITY INFORMATION

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

**NO** ✓

If YES, please complete the form entitled "Details of specialist and declaration of interest for appointment of a specialist for each specialist thus appointed:  
Any specialist reports must be contained in Appendix D.

### 1. ACTIVITY DESCRIPTION

Describe the activity, which is being applied for, in detail<sup>1</sup>:

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

## **PROJECT LOCATION**

The proposed development site is located approximately 2.5 km west of Kakamas, within the Kai Garib Local Municipality on the remaining portion of Farm 1178 (Kakamas Suid Nedersetting) (refer to Appendix C). The site covers an extent of approximately 109 ha and is zoned agricultural but is currently fallow / vacant<sup>2</sup>. The N14 national road traverses the study area from east to west, while the R359 arterial road extends to the north west and south east. A number of secondary roads are also present in the area. Urban and built up areas in the vicinity of the development site include *Marchland, Augrabies, Kakamas, Langverwag Lutzburg, Cillie and Taaiput*.

## **PHOTOVOLTAIC TECHNOLOGY AND THE GENERATION OF ELECTRICITY**

Photovoltaic (PV) technologies use the energy from the sun to generate electricity through a process known as the *Photovoltaic Effect*. Simply speaking, this refers to light energy knocking electrons into a higher state of energy to create electricity. Each PV cell is made of silicone (i.e. semiconductors) which is positively and negatively charged on either side, with electrical conductors attached to both sides to form a circuit. This circuit captures the released electrons in the form of an electric current (direct current). An inverter (located in an inverter cabin) is required to convert the direct current (DC) into alternating current (AC) which can be evacuated into the National Eskom grid.

A single cell is sufficient to power a small device such as an emergency telephone. However, to produce 10 MW, the proposed facility will require numerous linked cells placed behind a protective glass sheet to form a panel. Multiple panels will be required to form the solar array. The PV panels will be fixed to a support structure set at an angle so to receive the maximum amount of solar radiation while withstanding the buffeting effects of the wind. The angle of the panel is dependent on the latitude and may be adjusted to optimise for summer or winter solar radiation characteristics and for daily movement of the sun from east to west. The transformer installed inside the substation will step up the power prior to the evacuation into a 22 kV power line of approximately 100 m long which will be constructed from the on-site substation to the existing Taaiput Substation. It has been determined through preliminary discussions with Eskom that this substation has capacity to receive the power from the proposed facility.

## **ACTIVITIES TO BE UNDERTAKEN DURING THE CONSTRUCTION PHASE**

A facility consisting of several PV arrays with a generating capacity of 10 MW could take approximately 6 months to construct and commission, and would require the expertise of skilled, semi-skilled and low skilled staff. In order to construct the proposed facility and its associated infrastructure, a series of activities will need to be undertaken which is discussed in more detail below.

### ***Conduct Surveys***

Prior to initiating construction, a number of surveys will be required including, but not limited to:

<sup>2</sup> This is supported by the lack of surface water and farm houses / dwellings present on the site.

- » *Geotechnical survey* – the geology identified in the specialist studies undertaken as part of this Basic Assessment Process will be confirmed. The geotechnical study will look at flood potential, foundation conditions, potential for excavations, and the availability of natural construction materials. This study will serve to inform the type of foundations required to be built (i.e. for the substation), and the extent of earthworks and compaction required in the establishment of the internal access roads. The geotechnical examination will include surface and subsurface exploration, soil sampling, and laboratory analysis.
- » *Site survey* - in order to finalise the design layout of the solar arrays, the substation, and other associated infrastructure. The micro-siting footprint will consider any environmental sensitivity identified during the Basic Assessment Process and will need to be confirmed in line with the Environmental Authorisation issued for the facility.

#### ***Transport Components and Construction Equipment to Site***

The equipment will be transported to the site using appropriate national, provincial, and local roads. Some of the substation components *may* be defined as abnormal loads in terms of the Road Traffic Act (Act No. 29 of 1989)<sup>3</sup> by virtue of the dimensional limitations (i.e. the transformer). In some instances, these dimensional characteristics may require alterations to the existing road infrastructure (e.g. widening on corners), and protection of road-related structures (i.e. bridges, culverts, etc) because of abnormal loading.

The typical civil engineering construction equipment will need to be brought to the site (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.) as well as components required for the establishment of the substation and power line.

#### ***Establishment of Internal Access Roads***

The N14 national road traverses the study area from east to west, while the R359 arterial road extends to the north west and south east. A number of secondary roads are also present in the area. Access to the site already exists via a tar road located south of the site. Supplementary internal gravel access road of approximately three metres wide will be constructed around the site for maintenance purposes.

Access track construction would normally comprise of compacted rock-fill with a layer of higher quality surfacing stone on top. The strength and durability properties of the rock strata at the proposed site are not known at this stage. This will need to be assessed via the geotechnical study to be conducted. It has not yet been determined whether these proposed internal access roads will be comprised of gravel tracks or whether access track construction would comprise of compacted rock-fill with a layer of higher quality surfacing stone on top. Should the latter be required, the strength and durability properties of the rock strata at the proposed site would need to be assessed during the geotechnical surveys. Depending on the results of these studies, it may be possible, in some areas, to strip off the existing vegetation and level the exposed ground surface to form an access track surface.

#### ***Undertake Site Preparation***

Site preparation activities will include clearance of vegetation at the footprint of the PV panels, and ancillary infrastructure, establishment of laydown areas and internal access roads, and

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<sup>3</sup> A permit will be required for the transportation of these abnormal loads on public roads.

excavations for foundations (i.e. substation and workshop area). These activities will require the stripping of topsoil, which will need to be stockpiled, backfilled and/or spread on site.

Site preparation will be undertaken in a systematic manner to reduce the risk of open ground to erosion. In addition, site preparation will include search and rescue of floral species of concern (where required), as well as identification and excavation of any sites of cultural/heritage value (where required).

#### ***Establishment of Laydown Areas on Site***

Once the required equipment has been transported to site, a dedicated equipment construction camp and laydown area will need to be established adjacent to the workshop area. The equipment construction camp serves to confine activities and storage of equipment to one designated area to limit the potential ecological impacts associated with this phase of the project. The laydown area will be used for the assembly of the PV panels and the general placement/storage of construction equipment.

The storage of fuel for the on-site construction vehicles and equipment will need to be secured in a temporary bunded facility with the construction camp to prevent leakages and soil contamination.

#### ***Establishment of PV Panels***

The PV panels will be sited a certain distance away from each other to avoid shading. The support structures will be comprised of galvanised steel tubing and will be buried into the ground to a depth of approximately 1500 mm. An aluminium tube approximately 1000 mm high and approximately 20 mm in diameter will be fixed to the grounded stake, to which the PV panel will be affixed.

The PV panels will be constructed in individual 'strings' each with its own dedicated inverter. The rationale behind this layout is that if one 'string' should require maintenance or should it break down, then the generation capabilities of the whole facility will not be compromised. Each 'string' will be sited a certain distance away from each other to prevent shadows falling in an easterly direction from shading adjacent panels (i.e. to the west).

#### ***Construct On-Site Substation***

The on-site substation required to facilitate the connection between the PV facility and the Eskom Grid would be constructed in the following simplified sequence:

- » *Step 1* - survey of the site;
- » *Step 2* - site clearing and levelling and construction of access road to substation site;
- » *Step 3* - construction of terrace and substation foundation;
- » *Step 4* - assembly and installation of equipment (i.e. including the transformer);
- » *Step 5* - connection of conductors to equipment; and
- » *Step 6* - rehabilitation of disturbed areas and protection of erosion sensitive areas.

#### ***Connect the Substation to the Power Grid***

The overhead power line will connect / feed into the Eskom grid at the existing Taaiput Substation which is located in close proximity east of the site. The servitude cleared for the power line will be used for erecting the poles, where after the stringing process of the cabling

between the on-site substation and the evacuation point can be carried out.

### ***Undertake Site Remediation***

Areas requiring rehabilitation will include those areas disturbed during the construction phase and those that are not required for operation and maintenance operations. Rehabilitation should be undertaken in an area as soon as possible after the completion of construction activities within that area. Where relevant, disturbed areas must be rehabilitated/re-vegetated with appropriate natural vegetation and/or local seed mix. Re-vegetated areas may have to be protected from wind erosion and maintained until an acceptable plant cover has been achieved. All temporary facilities, equipment, and waste materials will be removed from site. Erosion control measures (i.e. drainage works and anti-erosion measures) should be used in sensitive areas (i.e. steep slopes, hills, and drainage lines), to minimise loss of topsoil and control erosion. Any access points and/or access roads which are not required during the operational phase must be closed as part of the post-construction rehabilitation.

### **ACTIVITIES TO BE UNDERTAKEN DURING THE OPERATIONAL PHASE**

The photovoltaic panels are designed to operate continuously, unattended and with low maintenance for approximately 20 years. The electricity that is generated from the PV panels will be converted from DC to AC by the inverters and stepped up by the transformer at the on-site substation. Thereafter the power will be evacuated via the short power line linking into the Taaiput Substation.

It is anticipated that a full-time security, maintenance, and control room staff will be required on-site. Each component within the PV facility will be operational except under circumstances of mechanical breakdown, unfavourable weather conditions, or maintenance activities (i.e. cutting of grass on the site, cleaning the PV panels etc). The panels will be cleaned by compressed air and where needed, by water twice a year. As this is a small amount of water and the requirement is for distilled water, this water will be transported to site.

### **ACTIVITIES TO BE UNDERTAKEN DURING THE DECOMMISSIONING PHASE**

The PV facility is expected to have a lifespan of approximately 20 years (i.e. the power purchase agreement will be issued for a period of 20 years). If economically feasible/desirable the decommissioning activities would comprise the disassembly and replacement of the individual components with more appropriate technology/ infrastructure available at that time. However, if not deemed so, then the facility would be completely decommissioned which would include the following decommissioning activities.

#### ***Site Preparation***

Site preparation activities will include confirming the integrity of the access to the site to accommodate the required equipment (e.g. lay down areas) and the mobilisation of decommissioning equipment.

#### ***Disassemble and Replace Existing Components***

The components would be disassembled, and reused and recycled (where possible), or disposed of in accordance with regulatory requirements.

## 2. FEASIBLE AND REASONABLE ALTERNATIVES

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

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

Describe alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both are appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.



No feasible alternatives have been identified for this proposed project and therefore none have been assessed within this report. The following describes the reasons as to why alternatives were not assessed.

***The property on which or location where it is proposed to undertake the activity:***

No site alternatives were proposed for this project as the placement of a solar facility is strongly dependent on several factors including climatic conditions, relief and orography, grid connection, the extent of the site, as well as availability of the site. This site has been identified by INCA Energy as being highly desirable for the establishment of a photovoltaic plant as per the following technical, logistical and environmental characteristics.

- 1) Climatic conditions: The economic viability of a photovoltaic plant is directly dependent on the annual direct solar irradiation values. A study of available radiation data shows that the proposed site is uniformly irradiated by the sun. In addition the site experiences temperatures which are suitable for PV technology.
- 2) Topography: A level surface area is preferred for the installation of PV panels. This reduces the need for extensive earthworks associated with the levelling of a site, thereby minimising environmental impacts. The topography of the area proposed for the PV facility is relatively flat. Due to the relatively flat nature of the site no horizon shading (shading caused by the surrounding topography and vegetation) is present around this site (shading affects output detrimentally).
- 3) Power transmission considerations: Eskom's Taaiput substation is located adjacent to the site and therefore only a short power line of approximately 500 m to 700 m will be required for evacuating the power directly to the substation. It has been determined through preliminary discussions with Eskom that this substation has capacity to receive the 10MW of power to be generated by the proposed facility. No reactive compensation will be required because of the short distance between the PV facility and the Taaiput substation .
- 4) Environmentally suitable: The site was previously used for agricultural purposes and has therefore been largely transformed. The degraded nature of much of the site is indicated by the presence of numerous weeds and alien invasive species. Therefore, from an ecological perspective, the establishment of a solar facility especially of the transformed sections of the site is not considered to pose a major impact. Any impacts can be effectively avoided through the consideration of layout alternatives within the site.

***The type of activity to be undertaken:***

No activity alternatives were assessed. INCA Kakamas intend to develop renewable energy projects in response to the government's goal in this regard, as well as in response to the proposed REFIT strategy for IPPs. Due to the local climatic conditions, the site is considered most suitable for the development of a solar energy facility, and not a wind energy facility. Due to the grid constraints resulting in a limited development, as well as water considerations, it is not considered feasible to develop a concentrating solar plant (CSP) facility on this site. A PV facility is therefore considered to be the only feasible activity alternative.

***The design or layout of the activity***

Design and Layout alternatives were not assessed during the compilation of the DBAR. The preliminary layout will be revised in order to consider environmental sensitivities and the

recommendations from the environmental studies conducted as part of the Basic Assessment process.

No power line layout alternatives were assessed as the proposed route of the power line is only about 500 m to 700 m in length. No feasible and reasonable alternatives were therefore identified for assessment.

***The technology to be used in the activity***

Very few technological options exist in as far as PV technologies are concerned. The choice of technology does not affect the environmental impact of the proposed development. The construction, operation and decommissioning of the facility will be the same irrespective of the technology chosen.

***The operational aspects of the activity***

No operational alternatives were assessed as no feasible and reasonable operational alternatives were identified.

***The option of not implementing the activity***

This option is assessed as the “no go alternative” in this Basic Assessment Report.

In conclusion no other feasible alternatives exist and none are being assessed in this basic assessment report. The site, activity, design and technology being assessed are the only ones considered suitable for this project.

**3. ACTIVITY POSITION**

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

List alternative sites, if applicable.

**Alternative:**

Alternative S1<sup>4</sup>

Alternative S2 (if any)

Alternative S3 (if any)

**Latitude (S):**

**Longitude (E):**

29°	5.738'	26°	17.386'
°	'	°	'
°	'	°	'

**In the case of linear activities:**

**Alternative:**

Alternative S1 (preferred or only route alternative)

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

**Latitude (S):**

**Longitude (E):**


<sup>4</sup> “Alternative S.” refers to site alternatives

- End point of the activity

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Alternative S2 (if any)

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


Alternative S3 (if any)

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


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

#### 4. PHYSICAL SIZE OF THE ACTIVITY

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

**Alternative:**

Alternative A1<sup>5</sup>

Alternative A2 (if any)

Alternative A3 (if any)

**Size of the activity:**

200 000 m <sup>2</sup>
m <sup>2</sup>
m <sup>2</sup>

Or, for linear activities:

Alternative:

Alternative A1

Alternative A2 (if any)

Alternative A3 (if any)

m
m
m

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

**Alternative:**

Alternative A1

Alternative A2 (if any)

Alternative A3 (if any)

**Size of the site/servitude:**

m <sup>2</sup>
m <sup>2</sup>
m <sup>2</sup>

#### 5. SITE ACCESS

Does ready access to the site exist?

**YES ✓**

<sup>5</sup> "Alternative A." refers to activity, process, technology or other alternatives.

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

Describe the type of access road planned:

Access to the site already exists via an unnamed tar road located south of the site. Existing gravel access roads exist from this road to the site. Supplementary internal gravel access roads of approximately 3m wide will, however, need to be constructed within the site for maintenance purposes.

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

## 6. SITE OR ROUTE PLAN

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

The site or route plans must indicate the following:

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

A detailed site plan has been included as part of this report as **Appendix A**.

## 7. SITE PHOTOGRAPHS

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

Colour photographs taken from the centre of the site in the eight major compass directions with a description of each photograph are attached within **Appendix B**.

## 8. FACILITY ILLUSTRATION

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

The facility illustration is attached within **Appendix C**.

## 9. ACTIVITY MOTIVATION

### 9(a) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	~ R300 million
What is the expected yearly income that will be generated by or as a result of the activity?	R 54 million
Will the activity contribute to service infrastructure?	<b>YES</b> ✓
Is the activity a public amenity?	<b>NO</b> ✓
How many new employment opportunities will be created in the development phase of the activity?	~40
What is the expected value of the employment opportunities during the development phase?	~ R120 000 000
What percentage of this will accrue to previously disadvantaged individuals?	80%
How many permanent new employment opportunities will be created during the operational phase of the activity?	25 10 – Security Gaurds 10 – Maintenance workers (grass cutting and cleaning) 4 – Basic electrical maintenance 1- Site Manager
What is the expected current value of the employment opportunities during the first 10 years?	R2.5 million year
What percentage of this will accrue to previously disadvantaged individuals?	80 %

**9(b) Need and desirability of the activity**

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

<b>NEED:</b>		
1.	Was the relevant provincial planning department involved in the application?	<b>YES</b> ✓
2.	Does the proposed land use fall within the relevant provincial planning framework?	<b>YES</b> ✓
3.	If the answer to questions 1 and / or 2 was NO, please provide further motivation / explanation:	

<b>DESIRABILITY:</b>		
1.	Does the proposed land use / development fit the surrounding area?	<b>YES</b> ✓
2.	Does the proposed land use / development conform to the relevant structure plans, SDF, and planning visions for the area?	<b>YES</b> ✓
3.	Will the benefits of the proposed land use / development outweigh the negative impacts of it?	<b>YES</b> ✓
4.	If the answer to any of the questions 1 - 3 was NO, please provide further motivation / explanation:	
5.	Will the proposed land use / development impact on the sense of place?	<b>YES</b> ✓
6.	Will the proposed land use / development set a precedent?	<b>NO</b> ✓
7.	Will any person's rights be affected by the proposed land use / development?	<b>NO</b> ✓
8.	Will the proposed land use / development compromise the "urban edge"?	<b>NO</b> ✓
	If the answer to any of the question 5 - 8 was YES, please provide further motivation / explanation.	
9.	The construction and operation of the Proposed Kakamas PV Solar Energy Facility and its associated infrastructure will have a visual impact on the natural scenic resources and rural character of the study area, particularly within 2,5km of the proposed facility. The anticipated visual impacts are not considered to be fatal flaws from a visual perspective, considering the relatively contained area of potential visual exposure and the low occurrence of visual receptors.	

<b>BENEFITS:</b>		
1.	Will the land use / development have any benefits for society in general?	<b>YES</b> ✓
	Explain:	

	The evacuation of additional electricity into the Eskom Grid will serve to both strengthen the grid itself and assist in the small scale alleviation of pressure of electricity generation from coal-fired power stations. Due to the small scale nature of the project, the significance of this positive impact is low. However, with the cumulative effect of numerous proposed renewable energy facilities across the country the long term impact will prove significant.	
2.	Will the land use / development have any benefits for the local communities where it will be located?	<b>YES</b> ✓
	Explain: Limited job opportunities may arise during the construction phase. However, the employment of individuals within the local community cannot be guaranteed.	

## 10. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

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

<b>Title of Legislation, Policy or Guideline</b>	<b>Administering Authority</b>	<b>Date</b>
Constitution of the Republic of South Africa (Act No 108 of 1996)	National Government	1996
National Environmental Management Act (Act No 107 of 1998)	National and Provincial Department of Environmental Affairs	1998
National Environmental Management: Waste Act (Act No 59 of 2008)	Department of Environmental Affairs	2008
Environment Conservation Act (Act No 73 of 1989)	National Department of Environmental Affairs	1989
National Water Act (Act No 36 of 1998)	Department of Water Affairs	1998
National Heritage Resources Act (Act No 25 of 1999)	South African Heritage Resources Agency	1999
National Environmental Management: Air Quality Act (Act No 39 of 2004)	Department of Environmental Affairs	2004
Conservation of Agricultural Resources Act (Act No 43 of 1983)	Department of Environmental Affairs	1983
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	Department of Environmental Affairs	2004
National Veld and Forest Fire Act (Act No. 101 of 1998)	The National Department of Agriculture, Forestry and Fisheries	1998
National Forests Act (Act no 84 of 1998)	The National Department of Agriculture, Forestry and Fisheries	1998

Title of Legislation, Policy or Guideline	Administering Authority	Date
Promotion of Access to Information Act (Act No 2 of 2000)	National Department of Environmental Affairs	2000
Northern Cape Nature Conservation Act, No. 9 of 2009	Northern Cape Department of Environment and Nature Conservation	2009

## 11. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

### 11(a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?

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

<b>YES</b> ✓	
Approximately 100 m <sup>3</sup> of solid construction waste consisting mainly of vegetation and spoil material from clearing activities.	

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

Construction solid waste will be disposed of at an appropriately licensed waste facility.

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

As above

Will the activity produce solid waste during its operational phase?

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

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

	<b>NO</b> ✓
m <sup>3</sup>	

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

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

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?

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

	<b>NO</b> ✓
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Is the activity that is being applied for a solid waste handling or treatment facility?

	<b>NO</b> ✓
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If yes, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

**11(b) Liquid effluent**

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

	<b>NO</b> ✓
--	----------------

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

	m <sup>3</sup>
--	----------------

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

	<b>NO</b> ✓
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If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

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

	<b>NO</b> ✓
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If yes, provide the particulars of the facility:

Facility name:			
Contact person:			
Postal address:			
Postal code:			
Telephone:		Cell:	
E-mail:		Fax:	

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

No waste water will be produced therefore this is not applicable.
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**11(c) Emissions into the atmosphere**

Will the activity release emissions into the atmosphere?

	<b>NO</b> ✓
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If yes, is it controlled by any legislation of any sphere of government?

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

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

PV facilities operate by converting solar energy into electricity. This is characterised as a non-consumptive use of a natural resource and consumes no fuel for its continuing operation. The operational phase of a solar facility does not produce carbon dioxide, sulphur dioxide, mercury, particulates, or any other type of air pollution.
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**11(d) Generation of noise**

Will the activity generate noise?

<b>NO</b> ✓
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If yes, is it controlled by any legislation of any sphere of government?

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

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

Limited noise will be generated during the construction phase of the development. The operation phase will not generate any noise.

**12. WATER USE**

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

Municipal	Water board	Groundwater	River, stream, dam or lake	Other	<p><b>The activity will not use water</b> ✓</p> <p>Panels will be cleaned with compressed air and distilled water (min. twice a year) that is purchased and transported to site.</p>
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If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:

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

<b>NO</b> ✓
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If yes, please submit the necessary application to the Department of Water Affairs and attach proof thereof to this application if it has been submitted.

**13. ENERGY EFFICIENCY**

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

N/A

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

The proposed facility will utilise a renewable/alternative energy technology therefore this is not applicable.

**SECTION B: SITE/AREA/PROPERTY DESCRIPTION**

Important notes:

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

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

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

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

	<b>NO</b> ✓
--	----------------

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed:

All specialist reports must be contained in **Appendix D**.

Property description/physical address: 

Property description/physical address:	The project is proposed on the Remainder of Farm 1178 (Kakamas and Suid Nedersetting).  (Farm name, portion etc.) Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application.
--	--

In instances where there is more than one town or district involved, please attach a list of towns or districts to this application.

Current land-use zoning: 

Current land-use zoning:	Agricultural, but has been left fallow and unused for at least five years.  In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to , to this application.
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Is a change of land-use or a consent use application required? 

<b>YES</b> ✓	
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Must a building plan be submitted to the local authority? 

<b>YES</b> ✓	
--------------	--

- Locality map: An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.) The map must indicate the following:
- An indication of the project site position as well as the positions of the alternative sites, if any;
  - Road access from all major roads in the area;
  - Road names or numbers of all major roads as well as the roads that provide access to the site(s);
  - All roads within a 1km radius of the site or alternative sites; and
  - A north arrow;
  - A legend; and
  - Locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection).

The locality map has been included as **Appendix A:**

## 1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

### Alternative S1:

<b>Flat</b> ✓	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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## 2. LOCATION IN LANDSCAPE

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

- 2.1 Ridgeline
- 2.2 Plateau
- 2.3 Side slope of hill/mountain
- 2.4 Closed valley
- 2.5 Open valley

**2.6 Plain**

**2.7 Undulating plain / low hills**

2.8 Dune

2.9 Seafront

**3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE**

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

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

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

#### 4. GROUNDCOVER

Indicate the types of groundcover present on the site:

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

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

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

***Refer to the specialist ecology report included within Appendix D***

#### 5. LAND USE CHARACTER OF SURROUNDING AREA

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

##### 5.1 Natural area

- 5.2 Low density residential
- 5.3 Medium density residential
- 5.4 High density residential
- 5.5 Informal residential <sup>A</sup>
- 5.6 Retail commercial and warehousing
- 5.7 Light industrial
- 5.8 Medium industrial <sup>AN</sup>
- 5.9 Heavy industrial <sup>AN</sup>
- 5.10 Power station
- 5.11 Office/consulting room
- 5.12 Military or police base/station/compound
- 5.13 Spoil heap or slimes dam <sup>A</sup>
- 5.14 Quarry, sand, or borrow pit
- 5.15 Dam or reservoir
- 5.16 Hospital/medical centre
- 5.17 School
- 5.18 Tertiary education facility
- 5.19 Church
- 5.20 Old age home
- 5.21 Sewage treatment plant <sup>A</sup>
- 5.22 Train station or shunting yard <sup>N</sup>

- 5.23 Railway line <sup>N</sup>
- 5.24 Major road (4 lanes or more) <sup>N</sup>
- 5.25 Airport <sup>N</sup>
- 5.26 Harbour
- 5.27 Sport facilities
- 5.28 Golf course
- 5.29 Polo fields
- 5.30 Filling station <sup>H</sup>
- 5.31 Landfill or waste treatment site
- 5.32 Plantation

**5.33 Agriculture**

- 5.34 River, stream or wetland
- 5.35 Nature conservation area
- 5.36 Mountain, koppie or ridge
- 5.37 Museum
- 5.38 Historical building
- 5.39 Protected Area
- 5.40 Graveyard
- 5.41 Archaeological site
- 5.42 Other land uses (describe)

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

N/A
-----

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

If YES, specify and explain:

If YES, specify:

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

If YES, specify and explain:

If YES, specify:

**6. CULTURAL/HISTORICAL FEATURES**

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including

	<b>NO</b> ✓
<b>Archaeological or palaeontological sites, on or close (within 20m) to the site?</b>	<b>NO</b> ✓

Archaeological or palaeontological sites, on or close (within 20m) to the site?

If YES, explain:

--

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



Briefly explain the findings of the specialist:

--

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

**NO** ✓

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

**NO** ✓

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

***Refer to the specialist heritage report included within Appendix D.***

## **SECTION C: PUBLIC PARTICIPATION**

### **1. ADVERTISEMENTS AND NOTICES**

- » A2 site notices were placed on the access gates of on the remaining portion of Farm 1178 (Kakamas Suid Nedersetting) on 13 April 2011.
- » A stakeholder letter was distributed to the database of registered parties on 28 March 2011 which included key stakeholders and organs of state relevant to the proposed project. The stakeholder letters served to announce the proposed project and invite comment on the Draft Basic Assessment Report.
- » A notice was placed in Die Gemsbok on 30 March 2011 and in Die Volksblad on 25 March 2011 to advertise the Basic Assessment Process.

Refer to Appendix E for proof of placement of the advertisements, site notice, and letters to stakeholders.

### **2. CONTENT OF ADVERTISEMENTS AND NOTICES**

The contents of the notices and adverts were in accordance with the following requirements:

- (a) Indicate the details of the application which is subjected to public participation; and
- (b) State –
  - (i) That the application has been submitted to the competent authority in terms of these Regulations, as the case may be;
  - (ii) Whether basic assessment or scoping procedures are being applied to the application, in the case of an application for environmental Authorisation;
  - (iii) The nature and location of the activity to which the application relates;
  - (iv) Where further information on the application or activity can be obtained; and
  - (iv) The manner in which and the person to whom representations in respect of the application may be made.

### **3. PLACEMENT OF ADVERTISEMENTS AND NOTICES**

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

The proposed PV facility is unlikely to result in any impacts that extend beyond the municipal area where it is located. Therefore it was only deemed necessary to advertise in one local newspaper, i.e. Die Gembok. The advertisement placed detailed the Basic Assessment process, the DEA EIA Reference number, the nature, and location of the proposed project, where further information on the proposed activity could be obtained and the manner in which representations on the application could be made. Copies of advertisements and proof of placement are included within Appendix E.

#### 4. DETERMINATION OF APPROPRIATE MEASURES

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

Due to the small footprint and the localised nature of the proposed project the public participation process that was undertaken was deemed adequate.

*Meetings held:*

**Public Meeting:** All interested and affected parties were invited to attend a public feedback meeting held on 5 May 2011 at the Kakamas Library Hall, from 15:00 – 16:30.

**Focus Group Meetings:** Focus group meetings were held from 4 – 6 May 2011 with the following stakeholders: Khai Gariep Local Municipality, Department of Water Affairs and Department of Agriculture, Forestry and Fisheries in Upington as well as with the landowner for the project.

Minutes of these meetings are contained within Appendix E.

#### 5. COMMENTS AND RESPONSE REPORT

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

All comments received, as well as responses provided are captured and recorded within the Comments and Response Report attached in Appendix E.

## 6. AUTHORITY PARTICIPATION

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

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

Authorities were informed of the Basic Assessment process through the distribution of a stakeholder letter sent on several dates as stakeholder contact information was collated, these included, amongst others:

- » Northern Cape Department of Environment and Nature Conservation
- » Kai Garib Local Municipality
- » Siyanda District Municipality
- » South African Heritage Resources Agency
- » South African Roads Agency Limited - Northern Cape (Western Region)
- » Department of Transport, Roads and Public Works
- » Department of Water Affairs - Upington
- » Department of Energy
- » Department of Agriculture, Land Reform and Rural Development

List of authorities from whom comments have been received:

All comments received, as well as responses provided, are captured and recorded within the Comments and Response Report in Appendix E.

## 7. CONSULTATION WITH OTHER STAKEHOLDERS

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

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

Has any comment been received from stakeholders?

YES ✓

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

Potentially affected stakeholders have been identified and consulted regarding the proposed project, including, inter alia:

- » Northern Cape Department of Environment and Nature Conservation
- » Kai Garib Local Municipality
- » Siyanda District Municipality
- » South African Heritage Resources Agency
- » Department of Water Affairs - Upington
- » Department of Energy
- » Department of Agriculture, Land Reform and Rural Development
- » Surrounding landowners

Comments are listed below and included in Appendix E of this report.

A stakeholder database of is attached in Appendix E.



Has any comment been received from stakeholders?

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

There was no attendance at the public meeting and no comments have been received from the public to date on the project. Comments have been received from the following Organs of State:

The local municipality has requested the draft BA report be submitted to them before submitting any comment.

The Branch: Forestry within the Department of Agriculture, Forestry and Fisheries (DAFF) in the Northern Cape Province made the following comments on the proposed development:

1. Our main concern is the possible impact on protected tree species (National Forests Act, Act 84 of 1998 as amended) and other protected flora. Protected tree species such as *Acacia erioloba* and *Boscia albitrunca* are known to occur in the area. The developer must take note that protected trees may not be disturbed or removed without a Forest Act License. License application forms are available at the offices of the Department of Agriculture, Forestry and Fisheries (DAFF). Impacts on protected trees must be avoided and where it cannot be avoided, suitable mitigation are required.
2. The developer must consider all applicable and relevant legislation when assessing the potential impact on protected plants and animals. Legislation to consider in this regard should include the Northern Cape Nature Conservation Ordinances, the new Northern Cape Nature Conservation Act and the TOPS Regulations (National Environmental Management: Biodiversity Act, Act 10 of 2004). If protected species such as *Aloe dichotoma*, *Hoodia gordonii*, *Sutherlandia frutescens* & *Harpagophytum procumbens* occur on site, the necessary permits must be obtained from Nature Conservation to relocate it to a suitable site.
3. The Department of Forestry would like to get a copy of the specialist study that will be undertaken to identify and assess potential impact on the ecology, fauna and flora.

## **SECTION D: IMPACT ASSESSMENT**

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

### **1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES**

List the main issues raised by interested and affected parties.

No comments have been received to date.

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

All comments raised during the Basic Assessment Process are included, together with a response from the EAP, in the Comments and Response Report (Appendix E)

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

List the potential direct, indirect and cumulative property/activity/design/technology/operational alternative related impacts (as appropriate) that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed.

#### **2.1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN PHASE**

##### **Alternative (preferred alternative)**

No impacts are anticipated from the planning and design phase of the proposed development.

## 2.2. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION PHASE

### **Nature: Loss of habitat within indigenous natural vegetation**

Construction of infrastructure (i.e. PV panels, internal access roads, buildings and less so for the power line towers) will lead to direct loss of vegetation which will lead to localised or more extensive reduction in the overall extent of vegetation. There are factors that may aggravate this potential impact (i.e. where this vegetation has already been stressed due to degradation and transformation at a regional level, the loss may lead to increased vulnerability of the habitat and a change in the conservation status. Consequences of the potential impact of loss of indigenous natural vegetation occurring may include:

- » Negative change in conservation status of habitat (Driver et al. 2005).
- » Increased vulnerability of remaining portions to future disturbance.
- » General loss of habitat for sensitive species.
- » Loss in variation within sensitive habitats due to loss of portions of it.
- » General reduction in biodiversity.
- » Increased fragmentation (depending on location of impact).
- » Disturbance to processes maintaining biodiversity and ecosystem goods and services.
- » Loss of ecosystem goods and services.

The most widespread vegetation type on site is Bushmanland Arid Grassland, which is classified as Least Threatened. The site is within an area classified as a corridor area and is not necessarily in pristine condition, but remains important to maintain an ecologically functional state. It is therefore considered unlikely that development of the site will compromise ecological connectivity within this corridor area. Some loss of natural habitat will occur, but this will be insignificant in comparison to the total area of the vegetation type concerned or the width of the corridor area (10 km wide).

The following ratings are relevant to the PV panels, the internal access roads, the buildings, and to the proposed power line.

<b>PV panels, internal access roads, and buildings</b>		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	Small (1)	Small (1)
<b>Probability</b>	Highly probable (4)	Probable (3)
<b>Significance</b>	<b>Low (28)</b>	<b>Low (21)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Not reversible	Not reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	To some extent	
<b>Power line and associated towers</b>		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	local (1)	local (1)
<b>Duration</b>	Long-term (4)	Long-term (4)

<b>Magnitude</b>	small (1)	small (1)
<b>Probability</b>	Highly probable (4)	probable (3)
<b>Significance</b>	<b>low (24)</b>	<b>low (18)</b>
<b>Status (positive or negative)</b>	negative	negative
<b>Reversibility</b>	Not reversible	Not reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	To some extent	
<b>Mitigation measures:</b>		
<ul style="list-style-type: none"> <li>» Avoid unnecessary impacts on natural vegetation surrounding infrastructure.</li> <li>» Impacts should be contained, as much as possible, within the footprint of the infrastructure.</li> <li>» If possible, infrastructure should be placed within existing disturbed areas on site, or close to these.</li> </ul>		
<b>Cumulative impacts:</b>		
Soil erosion and alien invasions may lead to additional loss of habitat that will exacerbate this impact.		
<b>Residual impacts:</b>		
Some loss of this vegetation type will occur, but this is insignificant relative to the total extent of the vegetation type.		

**Nature: Destruction/permanent loss of individuals of threatened plant species**

Threatened species include those classified as critically endangered, endangered or vulnerable. For any other species a loss of individuals or localised populations is unlikely to lead to a change in the conservation status of the species. However, in the case of threatened plant species, loss of a population or individuals could lead to a direct change in the conservation status of the species, possibly extinction. This may arise if the proposed infrastructure is located where it will impact on such individuals or populations. Consequences of this may include:

- » Fragmentation of populations of affected species;
- » Reduction in area of occupancy of affected species; and
- » Loss of genetic variation within affected species.

It is definite that there could be impacts on populations of the Threatened species, *Aloe dichotoma* subsp. *dichotoma*. This is based on the fact that there are two individuals of this species occurring on site and the fact that the solar energy facility probably requires large areas of land. Natural vegetation will have to be cleared in order to build the facility and therefore individuals of this species are likely to be affected.

The following ratings are relevant to the PV panels, the internal access roads, the buildings, and to the proposed power line.

**PV panels, internal access roads, and buildings**

	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	Low (2)	Low (1)
<b>Probability</b>	Definite (5)	Definite (5)



<b>Significance</b>	<b>Medium (40)</b>	<b>Medium (35)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Not reversible	Not reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	Partially	
<b>Power line and associated towers</b>		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	Low (2)	Low (2)
<b>Probability</b>	Improbable (2)	Highly improbable (1)
<b>Significance</b>	<b>Low (16)</b>	<b>Low (8)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Not reversible	Not reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	Partially	
<b>Mitigation measures:</b>		
<ul style="list-style-type: none"> <li>» Rescue any plants that will be affected and plant them in adjacent habitat where they will not be disturbed further.</li> <li>» Avoid protected trees by keeping a 50 m buffer around individuals of any identified species.</li> </ul>		
<b>Cumulative impacts:</b>		
Loss of habitat, soil erosion, and alien invasions may all lead to additional impacts that will exacerbate this impact.		
<b>Residual impacts:</b>		
None likely		

**Nature: Loss of individuals of protected trees**

There are two individuals of *Boscia albitrunca* on site, both of which occur on the banks of a drainage line. This is based on the fact that the solar energy facility requires large areas of land. A permit would need to be obtained for any protected trees that are affected, so a legal obligation remains to determine the possible presence of protected trees irrespective of the significance of the impact.

The following ratings are relevant to the PV panels, the internal access roads, the buildings, and to the proposed power line.

**PV panels, internal access roads, and buildings**

	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	Minor (2)	Minor (2)
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Significance</b>	<b>Medium (32)</b>	<b>Medium (32)</b>
<b>Status (positive or negative)</b>	Negative	Negative

<b>Reversibility</b>	Not reversible	Not reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	Not necessary	
<b>Power line and associated towers</b>		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	Minor (2)	Minor (2)
<b>Probability</b>	Improbable (2)	Highly improbable (1)
<b>Significance</b>	<b>Low (16)</b>	<b>Low (8)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Not reversible	Not reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	Not necessary	
<b>Mitigation measures:</b>		
<ul style="list-style-type: none"> <li>» Avoid protected trees by keeping a 50 m buffer around individuals of any identified species.</li> <li>» Is it is not possible to avoid protected species, obtain a permit for any protected trees that have to be destroyed in order to construct the plant.</li> <li>»</li> </ul>		
<b>Cumulative impacts:</b>		
Impacts due to alien invasions and damage to watercourses may possibly cause damage to habitat where protected trees could grow that may exacerbate this impact.		
<b>Residual impacts:</b>		
None likely		

**Nature: Impacts on threatened animals**

Animal species are indirectly affected through habitat loss as they are generally mobile and, in most cases, can move away from a potential threat.

It is improbable that there will be impacts on populations of threatened species. This is based on the fact that none of the species of concern have been previously recorded in the grid in which the site is located or similar grids close to the Orange River. The site contains habitat which is considered to be potentially suitable, but is in close proximity to human activities, which will discourage many species from using the site.

The following ratings are relevant to the PV panels, the internal access roads, the buildings, and to the proposed power line.

**PV panels, internal access roads, and buildings**

	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Probability</b>	Improbable (2)	Improbable (2)

<b>Significance</b>	<b>Low (18)</b>	<b>Low (18)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Reversible with effective rehabilitation	Reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	To some degree	
<b>Power line and associated towers</b>		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Low (4)	Low (3)
<b>Probability</b>	Improbable (2)	Highly improbable (1)
<b>Significance</b>	<b>Low (18)</b>	<b>Low (8)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Reversible with effective rehabilitation	Reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	To some degree	
<b>Mitigation measures:</b>		
» None required.		
<b>Cumulative impacts:</b>		
Loss of indigenous natural vegetation, alien invasions may all lead to additional impacts that will exacerbate this impact.		
<b>Residual impacts:</b>		
None likely		

**Nature: Damage to watercourses and drainage lines**

Due to the fact that drainage lines occur on site, some fairly significant in size, it is probable that there will be drainage lines affected. This is also based on the fact that solar energy facilities require large areas of land and there is little transformation of natural habitat on site.

The impact will occur at the site of the area and linear infrastructure, but could have downstream impacts. However, the power line towers occupy a very small relative area and the position can be adjusted with a fair degree of flexibility. It is therefore considered improbable that there will be drainage lines affected by construction of the proposed power line.

The following ratings are relevant to the PV panels, the internal access roads, the buildings, and to the proposed power line.

<b>PV panels, internal access roads, and buildings</b>		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local and surroundings (2)	Local and surroundings (2)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	Minor (2)	Minor (1)

<b>Probability</b>	Improbable (2)	Highly improbable (1)
<b>Significance</b>	<b>Low (18)</b>	<b>Low (8)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Reversible with effective rehabilitation	Reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	To some degree	
<b>Power line and associated towers</b>		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local and surroundings (2)	Local and surroundings (2)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	Minor (2)	Minor (1)
<b>Probability</b>	Improbable (2)	Highly improbable (1)
<b>Significance</b>	<b>Low (18)</b>	<b>Low (8)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Reversible with effective rehabilitation	Reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	To some degree	
<b>Mitigation measures:</b>		
<ul style="list-style-type: none"> <li>» Control stormwater and runoff water to avoid erosion impacts on watercourses.</li> <li>» Power line towers must be positioned a minimum of 50 m outside the outer boundary of any watercourse.</li> <li>» Rehabilitate any disturbed areas as quickly as possible.</li> <li>» No structures should be permanently positioned within the bed of watercourses.</li> <li>» Avoid drainage lines as far as possible.</li> <li>» Obtain a permit from the Department of Water Affairs to impact on any wetland or water resource.</li> </ul>		
<b>Cumulative impacts:</b>		
Soil erosion, alien invasions may all lead to additional impacts on watercourses that will exacerbate this impact.		
<b>Residual impacts:</b>		
Despite proposed mitigation measures, it is expected that this impact will still occur to some degree.		

**Nature: Establishment and spread of declared weeds and alien invader plants**

Major factors contribute to invasion by alien invader plants including *inter alia* high disturbance such as clearing for construction activities. Consequences of this may include:

- » Loss of indigenous vegetation
- » Change in vegetation structure leading to change in various habitat characteristics
- » Change in plant species composition
- » Change in soil chemical properties
- » Loss of sensitive habitats
- » Loss or disturbance to individuals of rare, endangered, endemic and/or protected species

- » Fragmentation of sensitive habitats
- » Change in flammability of vegetation, depending on alien species
- » Hydrological impacts due to increased transpiration and runoff
- » Impairment of wetland function

There is a moderate likelihood that alien species will spread on site in the absence of control measures. There is also the potential for alien plants to spread or invade following disturbance on-site or along the power line servitude.

The following ratings are relevant to the PV panels, the internal access roads, the buildings, and to the proposed power line.

**PV panels, internal access roads, and buildings**

	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Site and surroundings (2)	Site and surroundings (2)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Moderate (5)	Low (3)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Medium (33)</b>	<b>Low (18)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Reversible	Reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	To some degree	

**Power line and associated towers**

	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Site and surroundings (2)	Site and surroundings (2)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Moderate (5)	Low (3)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Medium (33)</b>	<b>Low (18)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Reversible	Reversible
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	To some degree	

**Mitigation measures:**

- » Keep disturbance of indigenous vegetation to a minimum.
- » Rehabilitate disturbed areas as quickly as possible following completion of construction activities in an area.
- » Do not translocate soil stockpiles from areas with alien plants.
- » Control any alien plants immediately to avoid establishment of a soil seed bank that could take several decades to remove.
- » Establish an ongoing monitoring programme to detect and quantify any aliens that may become established.

**Cumulative impacts:**

Soil erosion, habitat loss, damage to wetlands may all lead to additional impacts that will

exacerbate this impact.

**Residual impacts:**

Will probably be very low if control measures are effectively applied.

**Nature: Dust creation**

The operation of vehicles on-site may lead to the creation of dust which can affect large areas depending on the environmental and climatic conditions.

<b>Extent</b>	Local (2)	Local (2)
<b>Duration</b>	Short term (2) *	Short term (2) *
<b>Magnitude</b>	Minor (2)	Minor (2)
<b>Probability</b>	Highly probable (4)	Improbable (2)
<b>Significance</b>	<b>Low (24)</b>	<b>Low (12)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Yes	Yes
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be mitigated?</b>	Yes	Yes

**Mitigation measures:**

» Limit vehicle movement to absolute minimum

**Cumulative impacts:**

The cumulative impact of this activity will be small if managed but can have widespread impacts if the recommended mitigation measures are not employed.

**Residual impacts:**

None

**Nature: Physical soil degradation and disturbance associated with the construction of PV panels, buildings and other infrastructure.**

The overall soil impacts are expected to be low as the establishment of solar energy structures and infrastructure will not impact negatively on high potential agricultural land, and will not significantly alter the soil conditions on the site. Erosion control measures will have to be implemented to prevent and contain erosion associated with soil surface disturbance due to construction activities.

	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (1)	
<b>Duration</b>	Permanent (5) *	
<b>Magnitude</b>	Minor (2)	
<b>Probability</b>	Improbable (2)	
<b>Significance</b>	<b>Low (16)</b>	
<b>Status (positive or negative)</b>	Negative	
<b>Reversibility</b>	No	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impacts be</b>	No	

<b>mitigated?</b>		
<b>Mitigation measures:</b> None possible - limit footprint to the immediate development area where possible.		
<b>Cumulative impacts:</b> The cumulative impact of the proposed construction activities will be small as it is constructed on land with low agricultural potential.		
<b>Residual impacts:</b> None		

<b>Nature: Physical soil degradation through the use of vehicles on-site</b> The operation of vehicles on site and their associated impacts in terms of spillages of lubricants and petroleum products may impact on soils on site.		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Short term (2) *	Short term (2) *
<b>Magnitude</b>	Minor (2)	Minor (2)
<b>Probability</b>	Highly probable (4)	Improbable (2)
<b>Significance</b>	<b>Low (20)</b>	<b>Low (10)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	No	No
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be mitigated?</b>	No	No
<b>Mitigation measures:</b> Maintain vehicles, prevent and address spillages		
<b>Cumulative impacts:</b> The cumulative impact of this activity will be small if managed.		
<b>Residual impacts:</b> None		

<b>Nature: Loss of agricultural potential and land capability</b> The agricultural potential of the site is very low due to climatic constraints as well as the shallow and rocky soils. The improvement of the agricultural potential is dependent on extensive soil preparation and establishment of irrigation infrastructure –a very intensive and costly exercise.		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Low (1)	Low (1)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	Low (2)	Low (2)
<b>Probability</b>	Improbable (2)	Improbable (2)
<b>Significance</b>	<b>16 (Low)</b>	<b>16 (Low)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium

<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be mitigated?</b>	No	No
<b>Mitigation measures:</b> There are no significant measures to combat this loss, however adequate management and erosion control measures should be implemented.		
<b>Cumulative impacts:</b> Soil erosion may arise owing to increased surface water runoff. The above mitigation measure should be implemented.		
<b>Residual impacts:</b> The loss of agricultural land is a long term loss which extends post-construction. However, the agricultural potential is very low.		

**Nature: Heritage impacts**

The National Heritage Resources Act stipulates the assessment criteria and grading of archaeological sites, with the following categories distinguished in Section 7 of the Act:

- » *Grade I* - heritage resources with qualities so exceptional that they are of special national significance. The occurrence of sites with a Grade I significance will demand that the development activities be drastically altered in order to retain these sites in their original state.
- » *Grade II* - heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region. The applicable of mitigation measures would allow the development activities to continue.
- » *Grade III* - other heritage resources worthy of conservation on a local authority level. The applicable of mitigation measures would allow the development activities to continue.

In terms of Section 7 of the NHRA, all the sites currently known or which are expected to occur in the study area are evaluated to have the following grading.

- » *Formal protections* – there are no identified national, or provincial heritage sites, no sites requiring provisional protection, and lastly no places listed as in a heritage register.
- » *General protections* – there are no structures older than 60 years, no archaeological or palaeontological sites or materials, no graves or burial grounds, and no public monuments or memorials.
- » *Other* – no other heritage sites have been identified.

Based on current information regarding sites in the surrounding area, all sites expected to occur in the study region are judged to have Grade III significance. The stone tools identified on the site have been evaluated to have a very low significance as it is surface material and does not occur in its original context any more. It therefore does not warrant any further action concerning the proposed development. Finally, as no sites, features, or objects of cultural heritage significance were identified in the study area there would be no impact from the proposed development. It is recommended that should archaeological sites or graves be



exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

**Nature: Visual impact**

There will be a noticeable increase in heavy vehicles utilising the external access roads. This may cause a visual nuisance to other road users and land owners in the area. Furthermore, in this environment, dust from construction work is also likely to represent a significant visual impact.

	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (4)	Local (4)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Magnitude</b>	Moderate (6)	Low (4)
<b>Probability</b>	High (4)	Improbable (2)
<b>Significance</b>	<b>Moderate (44)</b>	<b>Low (18)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Recoverable (3)	Recoverable (3)
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be enhanced?</b>	No	No

**Mitigation measures:**

- » Mitigation entails proper planning, management and rehabilitation of the construction site to forego visual impacts.
- » Plan internal access roads with due cognisance of the topography.
- » Reduce the construction period through careful planning and productive implementation of resources.
- » Rehabilitate all disturbed areas, construction areas, road servitudes and cut and fill slopes to acceptable visual standards.

**Cumulative impacts:**

None

**Residual impacts:**

None

**Nature: Creation of employment and business opportunities during the construction phase**

Based on the information from work carried out on other projects of this nature the construction phase is expected to extend over a period of 6 - 12 months and create approximately 40 employment opportunities, depending on the final design. The work associated with the construction phase will be undertaken by contractors and will include the establishment of the PV facility and the associated infrastructure.

	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	<ul style="list-style-type: none"> <li>» Local – Regional (2)</li> <li>» Rated as 2 due to potential opportunities for local communities and businesses</li> </ul>	<ul style="list-style-type: none"> <li>» Local – Regional (3)</li> <li>» Rated as 3 due to potential opportunities for local communities and businesses</li> </ul>

<b>Duration</b>	Very Short Term (1)	Very Short Term (1)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Significance</b>	<b>Low (28)</b>	<b>Medium (32)</b>
<b>Status (positive or negative)</b>	Positive	Positive
<b>Reversibility</b>	N/A	N/A
<b>Irreplaceable loss of resources?</b>	N/A	N/A
<b>Can impacts be enhanced?</b>	Yes	
<b>Enhancement measures:</b>		
<p><i>Employment</i></p> <ul style="list-style-type: none"> <li>» Where reasonable and practical, INCA Kakamas Solar should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.</li> <li>» Before the construction phase commences INCA Kakamas Solar should meet with representatives from the Kai! Garib Local Municipality to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase.</li> <li>» The local authorities, community representatives, and organisations on the I&amp;AP database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that INCA Kakamas Solar intends following for the construction phase of the project.</li> <li>» Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.</li> <li>» The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.</li> </ul> <p><i>Business</i></p> <ul style="list-style-type: none"> <li>» INCA Kakamas Solar should seek to develop a database of local companies, specifically BEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work;</li> <li>» The Kai! Garib Municipality, in conjunction with the local Chamber of Commerce and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.</li> </ul> <p>Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.</p>		
<b>Cumulative impacts:</b>		
Opportunity to up-grade and improve skills levels in the area. However, due to relatively small number of local employment opportunities this benefit is likely to be limited.		
<b>Residual impacts:</b>		
Improved pool of skills and experience in the local area. However, due to relatively small		

number of local employment opportunities this benefit is likely to be limited.

**Nature: Presence of construction workers in the area**

There are a relatively small number of farmsteads that could be affected by the proposed facility. However, there are a number of potentially vulnerable farming activities, such as livestock farming. In addition, the presence of construction workers also poses a potential risk to family structures and social networks in the area. The most vulnerable communities include the communities of Kakamas and Keimoes. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on the local community in terms of:

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

Given the relatively small labour force (i.e. approximately 100) during the construction phase, of which approximately 20 - 25 could be sourced from the local area, the potential risk to local family structures and social networks is regarded as low.

	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (3)	Local (2)
<b>Duration</b>	<ul style="list-style-type: none"> <li>» Very short term (1) for the community as a whole</li> <li>» Long term - permanent (5) for individuals who may be affected by STD's.</li> </ul>	<ul style="list-style-type: none"> <li>» Very short term (1) for the community as a whole</li> <li>» Long term - permanent (5) for individuals who may be affected by STD's</li> </ul>
<b>Magnitude</b>	<ul style="list-style-type: none"> <li>» Low (4) for the community as a whole</li> <li>» High - very high (10) for specific individuals who may be affected by STD's</li> </ul>	<ul style="list-style-type: none"> <li>» Low (4) for the community as a whole</li> <li>» High - very high (10) for specific individuals who may be affected by STD's</li> </ul>
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<ul style="list-style-type: none"> <li>» <b>Low (24)</b> for the community as a whole</li> <li>» <b>Moderate - high (57)</b> for specific individuals who may be affected by STD's</li> </ul>	<ul style="list-style-type: none"> <li>» <b>Low (21)</b> for the community as a whole</li> <li>» <b>Moderate - high (51)</b> for specific individuals who may be affected by STD's</li> </ul>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	No in case of HIV and AIDS	No in case of HIV and AIDS
<b>Irreplaceable loss of resources?</b>	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods	

<b>Can impacts be mitigated?</b>	Yes, to some degree. However, the risk cannot be eliminated	
<p><b>Mitigation measures:</b></p> <ul style="list-style-type: none"> <li>» Where possible, INCA Kakamas Solar should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically semi and low-skilled job categories. This will reduce the potential impact that this category of worker could have on local family and social networks.</li> <li>» INCA Kakamas Solar and the contractor should develop a Code of conduct for the construction phase. The code should identify what types of behaviour and activities by construction workers are not permitted. Construction workers that breach the code of good conduct should be dismissed. All dismissals must comply with the South African labour legislation.</li> <li>» INCA Kakamas Solar and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase.</li> <li>» The movement of construction workers on and off the site should be closely managed and monitored by the contractors. In this regard the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis.</li> <li>» The contractor should make the necessary arrangements for allowing workers from outside the area to return home over weekends and or on a regular basis during the 6-12 month construction phase. This would reduce the risk posed by construction workers to local family structures and social networks;</li> <li>» It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay overnight on the site. This will make it possible to manage the potential impacts effectively.</li> </ul>		
<p><b>Cumulative impacts:</b></p> <p>Persist for a long period of time. Also in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.</p>		
<p><b>Residual impacts:</b></p> <p>As per the cumulative impacts.</p>		

<p><b>Nature: Increased risk of stock theft, poaching and damage to farm infrastructure</b></p>		
<p>The presence of construction workers on the site increases the potential risk of stock theft and poaching. The movement of construction workers on and off the site also poses a potential threat to farm infrastructure, such as fences and gates, which may be damaged. Stock and game losses may also result from gates being left open and/or fences being damaged.</p>		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (4)	Local (2)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Magnitude</b>	Moderate (6)	Low (4)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Medium (33)</b>	<b>Low (21)</b>
<b>Status (positive or negative)</b>	Negative	Negative

<b>Reversibility</b>	Yes	Yes
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be mitigated?</b>	Yes	Yes
<b>Mitigation measures:</b>		
<ul style="list-style-type: none"> <li>» INCA Kakamas Solar should enter into an agreement with the affected landowners whereby the company will compensate for damages to farm property and disruptions to farming activities. This includes losses associated with stock theft and damage to property etc.</li> <li>» INCA Kakamas Solar should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between INCA Kakamas Solar, the contractors and neighbouring landowners. The agreement should also cover losses and costs associated with fires caused by construction workers or construction related activities.</li> <li>» Contractors appointed by INCA Kakamas Solar should ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.</li> <li>» Contractors appointed by INCA Kakamas Solar should ensure that construction workers who are found guilty of stealing livestock, poaching and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation.</li> <li>» The housing of construction workers on the site should be limited to security personnel.</li> </ul>		
<b>Cumulative impacts:</b>		
No, provided losses are compensated for.		
<b>Residual impacts:</b>		
See cumulative impacts.		

<b>Nature: Increased risk of veld fires</b>		
<p>The presence of construction workers and construction-related activities on the site poses an increased risk of veld fires that in turn pose a threat to the livestock, wildlife, and farmsteads in the area. In the process, farm infrastructure may also be damaged or destroyed and human lives threatened.</p>		
<ul style="list-style-type: none"> <li>» The potential risk of veld fires is heightened by windy conditions in the area, specifically during the dry, winter months.</li> <li>» A number of farms away from the Gariiep River farm cattle. As such, their livelihoods are dependent on their farms, and any loss of grazing due to a fire would impact negatively on the affected farmers livelihoods;</li> <li>» The risk of fire related damage is exacerbated by the distance to fire-fighting vehicles located in the nearest towns of Upington, Keimoes and Kakamas.</li> </ul>		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (4)	Local (2)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Magnitude</b>	Moderate - high (8) due to reliance on livestock for	Low - moderate (6)

	maintaining livelihoods	
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Medium (39)</b>	<b>Low (27)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Yes, compensation paid for stock and crop losses etc	
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation measures:</b>		
As indicated above, INCA Kakamas should enter into an agreement with the affected landowners whereby the company will compensate for damages. This includes losses associated veld fires. In addition, the potential increased risk of veld fires can be effectively mitigated through:		
<ul style="list-style-type: none"> <li>» Contractor to ensure that open fires on the site for cooking or heating are not allowed except in designated areas.</li> <li>» Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include clearing working areas and avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy winter months.</li> <li>» Contractor to provide adequate fire fighting equipment on-site.</li> <li>» Contractor to provide fire-fighting training to selected construction staff.</li> </ul>		
<b>Cumulative impacts:</b>		
No, provided losses are compensated for.		
<b>Residual impacts:</b>		
See cumulative impacts.		

**Nature: Impact of construction vehicles**

The movement of heavy construction vehicles has the potential to damage roads and create noise, dust, and safety impacts for other road users and local communities in the area, specifically the residents Kakamas. However, the findings of the SIA indicate that the current road use frequency is low and therefore the social impacts associated with the movement of construction related traffic is likely to be low.

	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (2)	Local (1)
<b>Duration</b>	Very Short Term (1)	Very Short Term (1)
<b>Magnitude</b>	Low (4)	Minor (2)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Low (21)</b>	<b>Low (12)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Yes	
<b>Irreplaceable loss</b>	No	No

<b>of resources?</b>		
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation measures:</b>		
<p>INCA Kakamas Solar have entered into an agreement with the affected landowners whereby the company will compensate for damages. This includes losses associated with damage to local internal farm roads that are affected by the site.</p> <ul style="list-style-type: none"> <li>» The contractor must ensure that damage caused to roads by the construction related activities, including heavy vehicles, is repaired before the completion of the construction phase. The costs associated with the repair must be borne by the contractor;</li> <li>» Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers;</li> <li>» All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.</li> </ul>		
<b>Cumulative impacts:</b>		
<p>If damage to roads is not repaired then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were not responsible for the damage.</p>		
<b>Residual impacts:</b>		
<p>See cumulative impacts.</p>		

**Nature: Damage to and loss of farmland**

The activities associated with the construction phase have the potential to damage farmlands and result in a loss of land available for grazing. The significance of the impacts is to some extent mitigated by the fact that the farming activities on the site are confined to cattle farming as opposed to crops. In addition, only one landowner is affected and it is assumed that he has entered into a lease or purchase agreement with INCA Kakamas Solar. The loss of production farmland has therefore been offset by such an agreement.

In addition, the final disturbance footprint can also be reduced by careful site design and placement of components. The impact on farmland associated with the construction phase can be mitigated by minimising the footprint of the construction related activities and ensuring that disturbed areas are fully rehabilitated on completion of the construction phase. Recommended mitigation measures are outlined below.

Mr. Boy Lubbe, and his son, Mr. Johan Lubbe are the owners of the affected farm. Mr. Boy Lubbe has been farming in the area for the last 70 years, while his son has farmed in the area for the last 17 years. Both father and son indicated that they felt that the construction activities would not impact on their farming activities.

	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (3)	Local (1)
<b>Duration</b>	Long term-permanent if disturbed areas are not effectively rehabilitated (5)	Short term if damaged areas are rehabilitated (1)
<b>Magnitude</b>	Moderate (4)	Minor (2)

<b>Probability</b>	Definite (5)	Highly probable (4)
<b>Significance</b>	<b>High (60)</b>	<b>Low (16)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	No	No
<b>Irreplaceable loss of resources?</b>	Yes through loss of farmland. However, disturbed areas can be rehabilitated	Yes through loss of farmland. However, disturbed areas can be rehabilitated
<b>Can impacts be mitigated?</b>	Yes, however, loss of farmland cannot be avoided	Yes, however, loss of farmland cannot be avoided
<b>Mitigation measures:</b>		
<ul style="list-style-type: none"> <li>» The footprint associated with the construction footprint should be minimised.</li> <li>» An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase.</li> <li>» All areas disturbed by the construction footprint, should be rehabilitated at the end of the construction phase.</li> <li>» The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed.</li> <li>» The implementation of the rehabilitation programme should be monitored by the ECO.</li> </ul>		
<b>Cumulative impacts:</b>		
Overall loss of farmland could affect the livelihoods of the affected farmers, their families, and the workers on the farms and their families. However, disturbed areas can be rehabilitated.		
<b>Residual impacts:</b>		
See cumulative impacts.		

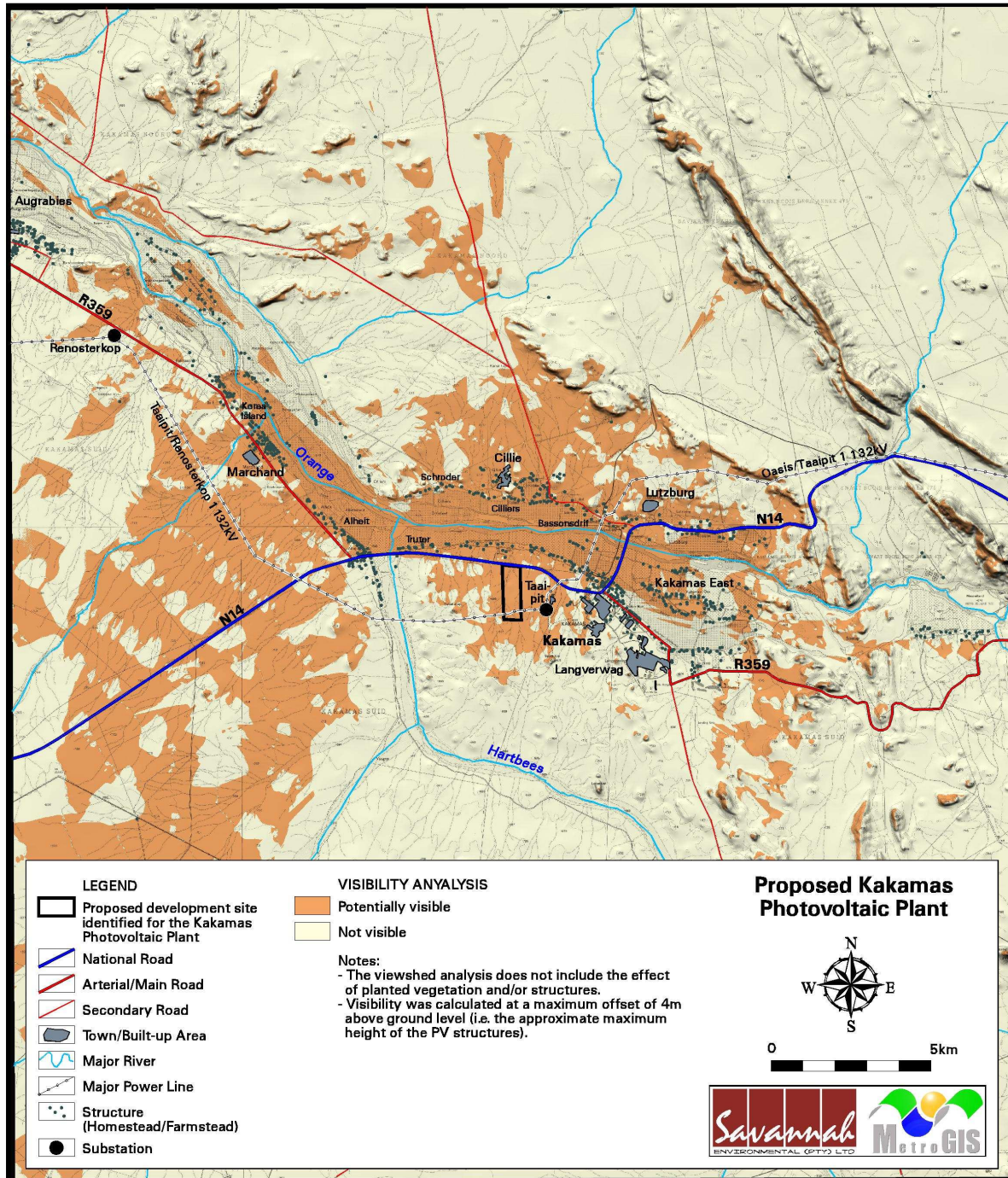
### 2.3. IMPACTS THAT MAY RESULT FROM THE OPERATIONAL PHASE

#### **Potential visual impact assessment – visibility analysis / exposure**

The visual exposure of any structure or activity is the point of departure for the visual impact assessment. It stands to reason that if the proposed PV facility and its associated infrastructure were not visible, no impact would occur. The result of the viewshed analysis was undertaken at offsets of 4 m above average ground level (i.e. the approximate maximum height of the PV structures), in order to determine the general visual exposure of the area under investigation. This viewshed analysis indicates areas from which the proposed plant would be visible (refer to Figure 2.1).

The analysis indicates that the PV plant is likely to be visually exposed to a primary area within approximately 7 km of the proposed facility. This includes the site itself, and the areas predominantly to the north, north, west, and east. Areas to the direct south of the facility appear to fall outside of the viewshed. The visually exposed areas tend to be concentrated along the lower lying Orange River Valley, and become patchy and sparse further away from the drainage line. The south west facing slopes of the ridges in the north east of the study area may also be visually exposed. Further afield to the south west, larger areas are evident within the viewshed, but it is unlikely that the facility will be visible from such a distance.





**Figure 2.1:** Potential visual exposure of the proposed PV plant, assuming no vegetation absorption capacity (VAC), the pink shading indicates areas from which the facility or parts thereof could be visible

**Potential visual impact assessment –observer proximity to the facility**

In order to refine the visual exposure of the facility on surrounding areas/receptors, the principle of reduced impact over distance was applied in order to determine the core area of visual influence for the facility. Proximity radii for the proposed development site were created in order to indicate the scale and viewing distance of the facility and to determine the prominence of the structures in relation to their environment (refer to Figure 2.2). These proximity radii are as follows:

- » 0 – 2.5 km - short distance view where the facility would dominate the frame of vision and

constitute a very high visual prominence.

- » 2.5 – 5 km - medium distance views where the facility would be easily and comfortably visible and constitute a high visual prominence.
- » 5 – 10 km - medium to longer distance view where the facility would become part of the visual environment, but would still be visible and recognisable. This zone constitutes a medium visual prominence.
- » > 10 km - Long distance view where the facility would still be visible though not as easily recognisable. This zone constitutes a low visual prominence for the facility.

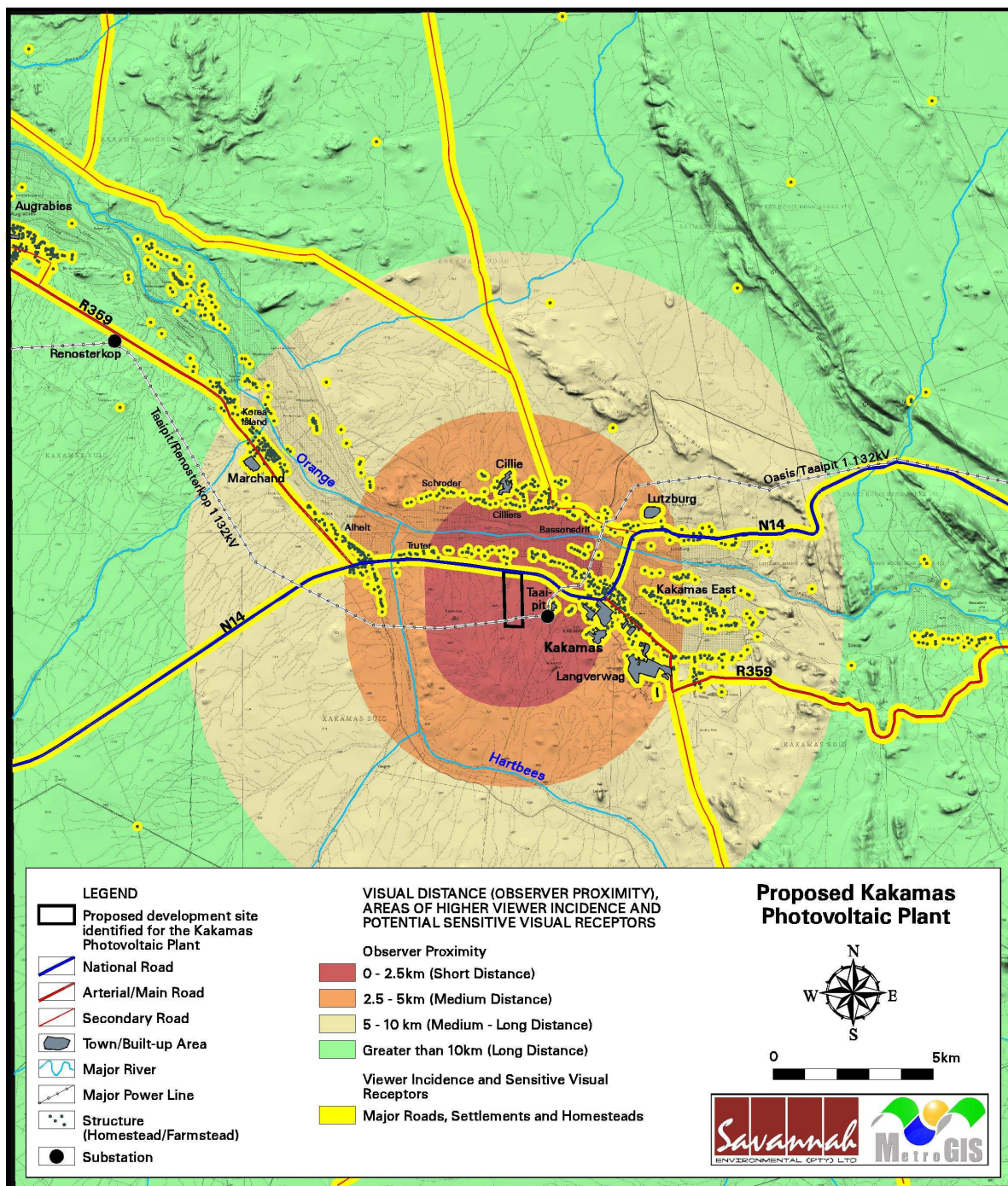


Figure 2.2: Observer proximity to the proposed Kakamas PV Facility

**Potential visual impact assessment –viewer incidence / viewer perception**

The number of observers and their perception of a structure/facility determine the concept of visual impact. If there are no observers or if the visual perception of the structure is favourable to all the observers, there would be no visual impact. It is therefore necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed PV facility and its associated infrastructure. It would be impossible not to generalise the viewer incidence and sensitivity to some degree, as there are many variables when trying to determine the perception of the observer; regularity of sighting, cultural background, state of mind, and purpose of sighting which would create a myriad of options.

Viewer incidence is calculated to be the highest along the national and arterial roads (i.e. the N14 and R359) as well as the secondary roads within the study area (refer to Figure 2.2). Commuters using these roads *could* be negatively impacted upon by visual exposure to the facility. Other than along the above roads, viewer incidence within a 10 km radius of the proposed facility is concentrated in the towns, urban areas, and the significant number of farms and homesteads clustered along the Orange River. The remaining areas consist predominantly of vacant natural land, rural settlements, and homesteads with a low occurrence of observers. Tourists visiting and travelling through the area are seen as possible sensitive visual receptors upon which the presence of the proposed facility *could* have a negative visual impact. Of particular relevance is the N14 which is the primary tourist access route to the west coast, as well as the Orange River belt, which includes tourist destinations and holds potential for further tourist development. The severity of the visual impact on these receptors decreases with increased distance from the proposed facility.

**Potential visual impact assessment –determine the visual absorption capacity (VAC)**

This is the capacity of the receiving environment to absorb the potential visual impact of the proposed facility. The VAC is primarily a function of the vegetation, and will be high if the vegetation is tall, dense, and continuous. Conversely, low growing sparse and patchy vegetation will have a low VAC. Topography and built form also have the capacity to 'absorb' visual impact. The digital terrain model utilised in the calculation of the visual exposure of the facility does not incorporate potential visual absorption capacity (VAC). It is therefore necessary to determine the VAC by means of the interpretation of the vegetation cover, topography and built form.

The vegetation present in the study area is predominantly shrubland, with thicket and bushland along the drainage lines. Vegetation types include Namaqualand broken veld and Orange River broken veld. Overall, the VAC of the receiving environment is deemed to be negligible by virtue of the vegetation, the relatively homogenous landform and the low occurrence of industrial type infrastructure. The VAC will therefore not be taken into account.

**Potential visual impact assessment – determine the visual impact index**

The results of the above analyses are merged in order to determine where the areas of likely visual impact would occur. These areas were further analysed in terms of the previously mentioned issues (related to the visual impact) and in order to judge the severity of each impact (refer to Figure 2.3).

**High visual impact**

The visual impact index map clearly indicates potential areas of high visual impact within a 2.5 km radius of the proposed facility, including the western outskirts of the town of Kakamas, the southern outskirts of Cillie as well as a number of farms and homesteads on either side of the Orange River. These include the following:

- » Bassondrift
- » Cilliers
- » Truter

A limited stretch of the N14 road up to the 2.5 km radius is also likely to experience a high visual impact due to the higher frequency of observers travelling along this road. It is important to note that this is an important national and provincial tourist access routes.

#### ***Moderate visual impact***

Farmland along the river and to the south of the proposed site may be exposed to moderate visual impact. Between 2.5 km and 5 km from the facility, relatively continuous stretches of the N14 as well as the secondary road to the north are likely to be exposed to moderate visual impact. The towns of Lutzburg and Cillie may also be exposed to moderate visual impact, as may the eastern outskirts of Kakamas. The following farms and homesteads may be similarly affected:

- » Schroder
- » *Alheit*

#### ***Low visual impact***

Farmland along the river and to the north may be exposed to low visual impact. Between 5 km and 10 km, visual impact is significantly reduced. Relatively continuous stretches of the N14, the R359 and secondary roads may be exposed to low visual impact. The town of Marchland and Korea Island farm may be similarly impacted upon.

Remaining impacts, where they occur at all, are expected to be very low to negligible. It is, however, important to note the pastoral visual quality of the farmland, and the rugged aesthetic appeal of the undeveloped, wide open expanse of this region. This lends the area a specific sense of place and a tourism potential that has not yet been optimised.

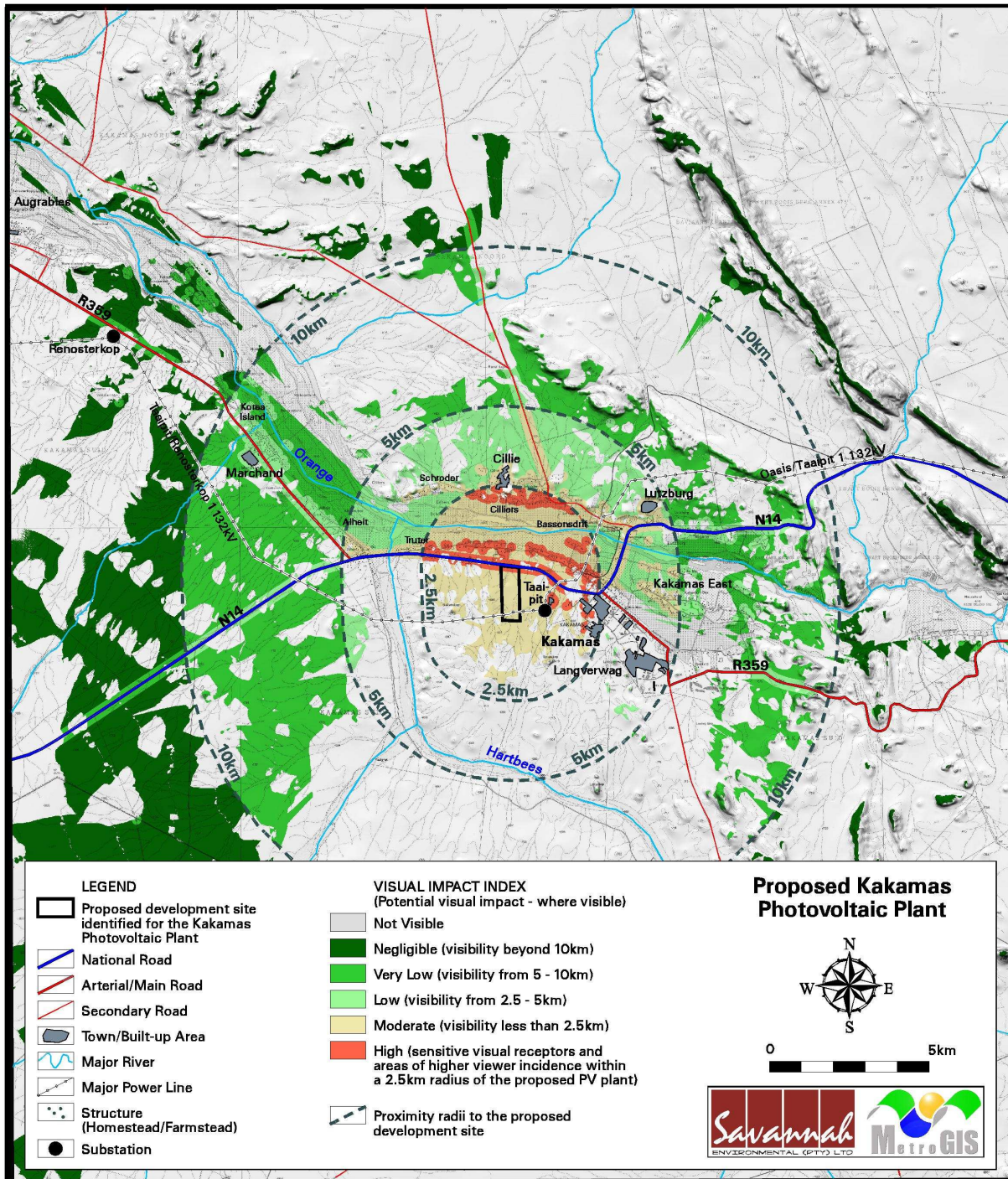


Figure 2.3: Visual impact index of the proposed PV facility

**Nature: Potential visual impact on residents of urban areas in close proximity to the proposed facility**

The visual impact of the proposed facility on the western outskirts of Kakamas and the southern outskirts of Cillie (within 2,5km) is expected to be of high significance.

	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (4)	N/A
<b>Duration</b>	Long term (4)	N/A
<b>Magnitude</b>	High (8)	N/A

<b>Probability</b>	High (4)	N/A
<b>Significance</b>	<b>High (64)</b>	N/A
<b>Status (positive or negative)</b>	Negative	N/A
<b>Reversibility</b>	Recoverable (3)	N/A
<b>Irreplaceable loss of resources?</b>	No	N/A
<b>Can impacts be mitigated?</b>	No	N/A
<b>Mitigation:</b> Decommissioning - removal of the PV facility and associated infrastructure.		
<b>Cumulative impacts:</b> The construction of the PV facility and the associated infrastructure will increase the cumulative visual impact of electricity related infrastructure within the region. This is relevant in light of the existing substation and power line infrastructure already present in the area, albeit limited in extent and scale.		
<b>Residual impacts:</b> None - the visual impact will be removed after decommissioning.		

<b>Nature: Visual impact on urban areas in close proximity to the proposed facility</b>		
The visual impact of the proposed facility on the western outskirts of Kakamas and the southern outskirts of Cillie (within 2.5 km) is expected to be of high significance.		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (4)	N/A
<b>Duration</b>	Long term (4)	N/A
<b>Magnitude</b>	High (8)	N/A
<b>Probability</b>	High (4)	N/A
<b>Significance</b>	<b>High (64)</b>	N/A
<b>Status (positive or negative)</b>	Negative	N/A
<b>Reversibility</b>	Recoverable (3)	N/A
<b>Irreplaceable loss of resources?</b>	No	N/A
<b>Can impacts be mitigated?</b>	No	N/A
<b>Mitigation:</b> Decommissioning - removal of the PV facility and associated infrastructure.		
<b>Cumulative impacts:</b> The construction of the PV facility and the associated infrastructure will increase the cumulative visual impact of electricity related infrastructure within the region. This is relevant in light of the existing substation and power line infrastructure already present in the area, albeit limited in extent and scale.		
<b>Residual impacts:</b> None - the visual impact will be removed after decommissioning.		

<b>Nature: Visual impact on residents in close proximity to the proposed facility</b>		
The visual impact of the proposed facility on the farms on homesteads along the Orange River, and within 2.5 km of the site is expected to be of high significance.		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (4)	N/A
<b>Duration</b>	Long term (4)	N/A
<b>Magnitude</b>	High (8)	N/A
<b>Probability</b>	High (4)	N/A
<b>Significance</b>	<b>High (64)</b>	N/A
<b>Status (positive or negative)</b>	Negative	N/A
<b>Reversibility</b>	Recoverable (3)	N/A
<b>Irreplaceable loss of resources?</b>	No	N/A
<b>Can impacts be mitigated?</b>	No	N/A
<b>Mitigation:</b> Decommissioning - removal of the PV facility and associated infrastructure.		
<b>Cumulative impacts:</b> The construction of the PV facility and the associated infrastructure will increase the cumulative visual impact of electricity related infrastructure within the region. This is relevant in light of the existing substation and power line infrastructure already present in the area, albeit limited in extent and scale.		
<b>Residual impacts:</b> None - the visual impact will be removed after decommissioning.		

<b>Nature: Visual impact on sensitive visual receptors within the region</b>		
The visual impact on users of roads and on residents of urban areas, farms, and homesteads within the region (i.e. beyond the 2.5 km radius) is expected to be of moderate significance.		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Regional (3)	N/A
<b>Duration</b>	Long term (4)	N/A
<b>Magnitude</b>	Moderate (6)	N/A
<b>Probability</b>	Probable (3)	N/A
<b>Significance</b>	<b>Moderate (39)</b>	N/A
<b>Status (positive or negative)</b>	Negative	N/A
<b>Reversibility</b>	Recoverable (3)	N/A
<b>Irreplaceable loss of resources?</b>	No	N/A
<b>Can impacts be mitigated?</b>	No	N/A
<b>Mitigation:</b> Decommissioning - removal of the PV facility and associated infrastructure.		
<b>Cumulative impacts:</b> The construction of the PV facility and the associated infrastructure will increase the cumulative		

visual impact of electricity related infrastructure within the region. This is relevant in light of the existing substation and power line infrastructure already present in the area, albeit limited in extent and scale.

**Residual impacts:**

None - the visual impact will be removed after decommissioning.

**Nature: Visual impact of the substation and workshop on observers in close proximity to the proposed facility**

The proposed substation could represent a potential visual impact. Although no dedicated viewshed has been generated for the substation, this structure will be located within the proposed PV facility footprint, and is not likely to exceed the PV panels in terms of height. It is thus expected that the area of potential visual exposure will lie within that of the PV facility. The table below illustrates the assessment of this anticipated impact, which is likely to be of low significance.

	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (4)	N/A
<b>Duration</b>	Long term (4)	N/A
<b>Magnitude</b>	Low (4)	N/A
<b>Probability</b>	Improbable (2)	N/A
<b>Significance</b>	<b>Low (24)</b>	N/A
<b>Status (positive or negative)</b>	Negative	N/A
<b>Reversibility</b>	Recoverable (3)	N/A
<b>Irreplaceable loss of resources?</b>	No	N/A
<b>Can impacts be mitigated?</b>	No	N/A

**Mitigation:**

Decommissioning - removal of the PV facility and associated infrastructure.

**Cumulative impacts:**

The construction of the substation and other associated infrastructure will increase the cumulative visual impact of electricity related infrastructure within the region. This is relevant in light of the existing substation and power line infrastructure already present in the area, albeit limited in extent and scale.

**Residual impacts:**

None - the visual impact will be removed after decommissioning.

**Nature: Visual impact of the power line on observers in close proximity to the proposed facility**

The proposed new 22 kV power line will link with the existing Taaiput Substation located approximately 1 km east of the proposed site. An existing transmission line already traverses the site to link with Taaiput, and the new 22 kV power line should follow this alignment. The new power line will not exceed the existing power line structures in height. Therefore, the visual impact of the new power line could be largely absorbed by the existing visual impact of the existing transmission line.



	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (4)	Local (4)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Probability</b>	Improbable (2)	Improbable (2)
<b>Significance</b>	<b>Low (24)</b>	<b>Low (24)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Recoverable (3)	Recoverable (3)
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be mitigated?</b>	No	No
<b>Mitigation:</b> Planning phase - follow the alignment of the existing transmission power line to the Taaiput Substation. Decommissioning phase - removal of the PV plant and ancillary infrastructure.		
<b>Cumulative impacts:</b> The construction of the power line will increase the cumulative visual impact of electricity related infrastructure within the region. This is relevant in light of the existing substation and power line infrastructure already present in the area, albeit limited in extent and scale.		
<b>Residual impacts:</b> None - the visual impact will be removed after decommissioning.		

<b>Nature: Visual impact of internal access roads on observers in close proximity to the proposed facility</b>		
Within the facility's footprint, access roads will be required for both construction and operation of the proposed PV plant. Internal access roads have the potential of manifesting as a network of landscape scarring, and may thus represent a potential visual impact within the viewshed area. The layout and construction of the internal access roads in sympathy with the topography, as well as adequate rehabilitation post construction will go far to ameliorate potential visual impact in this regard.		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (4)	N/A
<b>Duration</b>	Long term (4)	N/A
<b>Magnitude</b>	Minor (2)	N/A
<b>Probability</b>	Improbable (2)	N/A
<b>Significance</b>	<b>Low (20)</b>	N/A
<b>Status (positive or negative)</b>	Negative	N/A
<b>Reversibility</b>	Recoverable (3)	N/A
<b>Irreplaceable loss of resources?</b>	No	N/A
<b>Can impacts be mitigated?</b>	No	N/A
<b>Mitigation:</b>		

Planning phase - layout and construction of roads and infrastructure with due cognisance of the topography.  
Construction phase - rehabilitation.  
Decommissioning - ripping and rehabilitation of the road and servitude.

**Cumulative impacts:**

The construction of access roads will increase the cumulative visual impact of disturbance due to vegetation clearing and disturbance within the region.

**Residual impacts:**

None - the visual impact will be removed after decommissioning.

**Nature: Visual impact of lighting at night on observers in close proximity to the proposed facility**

The area surrounding the proposed facility has a relatively low incidence of receptors, being mainly agricultural and rural in nature. However, light trespass and glare from the security and after-hours operational lighting (flood lights) for the facility infrastructure may have significance for residents in the area. Another potential lighting impact is known as sky glow. Sky glow is the condition where the night sky is illuminated when light reflects off particles in the atmosphere such as moisture, dust, or smog. The sky glow intensifies with the increase in the amount of light sources. Each new light source, especially upwardly directed lighting, contribute to the increase in sky glow. The facility may contribute to the effect of sky glow in an otherwise dark environment.

	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (4)	N/A
<b>Duration</b>	Long term (4)	N/A
<b>Magnitude</b>	Low (3)	N/A
<b>Probability</b>	High (4)	N/A
<b>Significance</b>	<b>Moderate (44)</b>	N/A
<b>Status (positive or negative)</b>	Negative	N/A
<b>Reversibility</b>	Recoverable (3)	N/A
<b>Irreplaceable loss of resources?</b>	No	N/A
<b>Can impacts be mitigated?</b>	No	N/A

**Mitigation:**

Planning phase - pro-active lighting design and planning.  
Decommissioning phase - removal of the PV plant and ancillary infrastructure.

**Cumulative impacts:**

The construction of the facility and the required lighting will increase the cumulative visual impact of electricity related infrastructure within the region. This is relevant in light of the existing substation and power line infrastructure already present in the area, albeit limited in extent and scale.

**Residual impacts:**

None - the visual impact will be removed after decommissioning.

**Nature: Secondary visual impact of the proposed facility on the visual character and**

<b>sense of place of the region</b>		
<p>Sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. Visual criteria and specifically the visual character of an area which are informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features, cultural / historical features, etc, play a significant role. A visual impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light. Specific aspects contributing to the sense of place of this region include the pastoral visual quality of the farmland and the aesthetic appeal of the undeveloped, expansive views. The anticipated visual impact of the facility on the regional visual character, and by implication, on the sense of place, is expected to be moderate.</p>		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Regional (3)	N/A
<b>Duration</b>	Long term (4)	N/A
<b>Magnitude</b>	Low (4)	N/A
<b>Probability</b>	Probable (3)	N/A
<b>Significance</b>	<b>Moderate (33)</b>	N/A
<b>Status (positive or negative)</b>	Negative	N/A
<b>Reversibility</b>	Recoverable (3)	N/A
<b>Irreplaceable loss of resources?</b>	No	N/A
<b>Can impacts be mitigated?</b>	No	N/A
<b>Mitigation:</b>		
Decommissioning - removal of the PV facility and associated infrastructure.		
<b>Cumulative impacts:</b>		
The construction of the PV facility, the substation and other associated infrastructure will increase the cumulative visual impact of electricity related infrastructure within the region. This is relevant in light of the existing substation and power line infrastructure already present in the area, albeit limited in extent and scale.		
<b>Residual impacts:</b>		
None - the visual impact will be removed after decommissioning.		

<b>Nature: Secondary visual impact of the proposed facility on tourist routes, tourist destinations and tourism potential within the region</b>		
<p>The fertile Orange River farmlands and the visual characteristics of the Northern Cape landscape afford the area a unique aesthetic appeal, and a resultant tourism potential. This tourism potential may not yet be optimised, but tourist facilities do exist along the Orange River belt and there is certainly potential for more to develop. In addition, the N14 is the primary tourist access route to Namaqualand and the West Coast, which are established tourist destinations. Visual intrusion through the development of industrial type infrastructure within this environment could jeopardise the area's tourism value and potential. The anticipated visual impact of the facility on existing tourist routes, as well as on the tourism potential of the region, is expected to be low.</p>		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Regional (3)	N/A

<b>Duration</b>	Long term (4)	N/A
<b>Magnitude</b>	Low (4)	N/A
<b>Probability</b>	Improbable (2)	N/A
<b>Significance</b>	<b>Low (22)</b>	N/A
<b>Status (positive or negative)</b>	Negative	N/A
<b>Reversibility</b>	Recoverable (3)	N/A
<b>Irreplaceable loss of resources?</b>	No	N/A
<b>Can impacts be mitigated?</b>	No	N/A
<b>Mitigation:</b> Decommissioning - removal of the PV facility and associated infrastructure.		
<b>Cumulative impacts:</b> The construction of the PV facility, the substation and other associated infrastructure will increase the cumulative visual impact of electricity related infrastructure within the region. This is relevant in light of the existing substation and power line infrastructure already present in the area, albeit limited in extent and scale.		
<b>Residual impacts:</b> None - the visual impact will be removed after decommissioning.		

**Nature of impact: Waste creation**

A PV facility uses no fuel to operate and therefore produces no waste or emissions. Regular maintenance may include washing of the panels should excess dust or dirt accumulate. The panels will be static (i.e. they will not be tracking) and therefore due to the lack of moving parts no oils or greases will be required. Therefore the potential for significant environmental impacts is very low and is not evaluated further.

**Nature: Creation of employment and business opportunities**

Based on information from other projects of this nature the proposed PV facility plant is likely to employ approximately 20 - 30 full time employees over a 25 - 30 year period. Based on other renewable projects approximately 3 - 6% of the posts will be managerial, 12 - 18% engineers, 35 - 40% technicians and 40 - 50% craftsmen. The proposed facility will therefore create potential employment opportunities in the Northern Cape Province and the Kai! Garib Municipality. However, given that the solar energy sector in South Africa is relatively new, it may be necessary to import the required operational and maintenance skills from other parts of South Africa or even overseas. However, it will be possible to increase the number of local employment opportunities through the implementation of a skills development and training programme linked to the operational phase. Such a programme would support the strategic goals of promoting local employment and skills development contained in the Kai! Garib IDP.

Given the location of the proposed facility the majority of permanent staff is likely to reside in the towns of Upington, Keimoes or Kakamas. In terms of accommodation options, a percentage of the permanent employees may purchase houses in one of these towns, while others may decide to rent. Both options would represent a positive economic benefit for the region. In addition, a percentage of the monthly wage bill earned by permanent staff would be spent in the

regional and local economy, which will benefit local businesses in these towns. The benefits to the local economy will extend over the operational lifespan of the project.

The local hospitality industry in Upington, Keimoes, or Kakamas is also likely to benefit from the operational phase. These benefits are associated with site visits by company staff members and other professionals (engineers, technicians etc) who are involved in the company and the project but who are not linked to the day-to-day operations.

	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local and Regional (2)	Local and Regional (3)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Medium (30)</b>	<b>Medium (33)</b>
<b>Status (positive or negative)</b>	Positive	Positive
<b>Reversibility</b>	N/A	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impacts be enhanced?</b>	Yes	

**Enhancement measures:**

» INCA Kakamas Solar should implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme should be to maximise the number of South African's and locals employed during the operational phase of the project.

**Cumulative impacts:**

Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area

**Residual impacts:**

See cumulative impacts.

**Nature: Impact on tourism**

Caution must be taken to ensure that the development of large renewable energy projects do not affect the tourism potential of the province. However, based on the findings of the site visit, the proposed facility is not likely to impact on the tourism sector in the area or the province. The significance of this issue is therefore rated as low negative. In some instances the plant may also attract tourists to the area. However, the significance of this potential benefit is also rated as low.

The findings of the visual assessment indicate that the anticipated visual impact of the facility on existing tourist routes, as well as on the tourism potential of the region, is expected to be low.

	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (2)	Local (3)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Low (2)	Low (2)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Low (24) (Applies to both -</b>	<b>Low (27) (Applies to both -</b>

	<b>and +)</b>	<b>and +)</b>
<b>Status (positive or negative)</b>	Negative /positive	Negative /positive
<b>Reversibility</b>	Yes	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impacts be mitigated / enhanced?</b>	Yes	
<b>Enhancement measures:</b>		
» INCA Kakamas Solar should liaise with representatives from the Kai! Garib Municipality and local tourism representatives to raise awareness of the proposed facility.		
<b>Cumulative impacts:</b>		
Potential negative and or positive impact on tourism in the Kai! Garib Municipality Area.		
<b>Residual impacts:</b>		
See cumulative impacts		

**Nature of impact: Promotion of renewable energy**

South Africa currently relies on coal-powered energy to meet more than 90% of its energy needs. The establishment of a clean, renewable energy facility will therefore reduce, albeit minimally, South Africa's reliance on coal-generated energy.

The overall contribution to South Africa's total energy requirements of the proposed PV facility is relatively small. However, the 10 MW produced will help to offset the total carbon emissions associated with energy generation in South Africa. Given South Africa's reliance on Eskom as a power utility, the benefits associated with an IPP based on renewable energy are regarded as an important contribution.

	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local, Regional and National (4)	Local, Regional and National (4)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Probability</b>	Highly Probable (4)	Highly Probable (4)
<b>Significance</b>	<b>Medium (48)</b>	<b>High (48)</b>
<b>Status (positive or negative)</b>	Positive	Positive
<b>Reversibility</b>	Yes	
<b>Irreplaceable loss of resources?</b>	Yes, impact of climate change on ecosystems	
<b>Can impacts be enhanced?</b>	Yes	
<b>Enhancement measures:</b>		
» Use the project to promote and increase the contribution of renewable energy to the national energy supply.		
» Maximise the public's exposure to the project via an extensive communication and advertising programme.		
<b>Cumulative impacts:</b>		

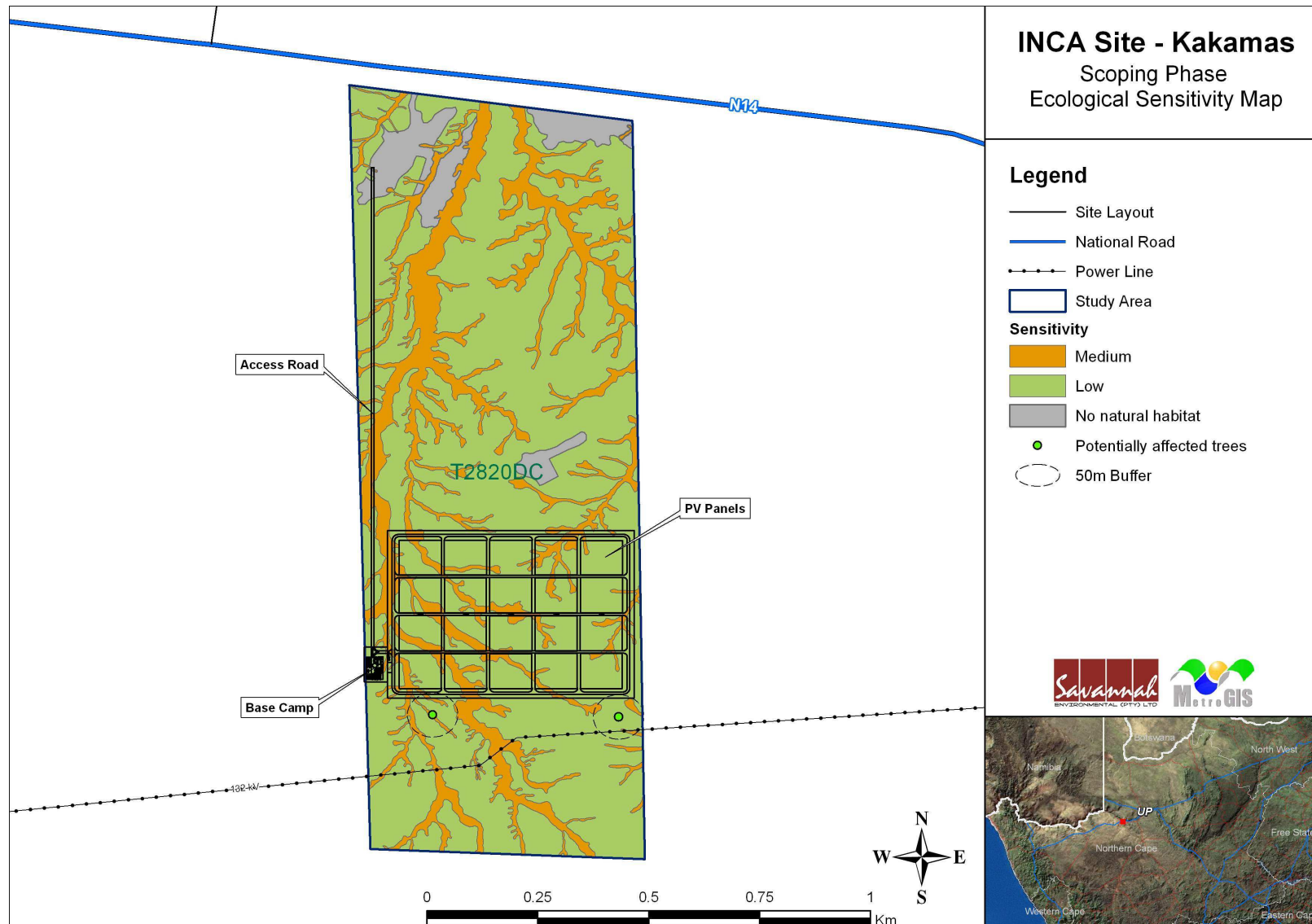
Development of several renewable energy facilities.

***Residual impacts:***

N/A

**No Go Alternative**

The impact that will result from the no-go alternative will mean that an additional 10 MW will not be evacuated into the Eskom grid. In the context of coal fired power stations, some of which generate in excess of 3 GW, the loss of 10 MW is not significant in the local, regional, or national context. The evacuation of 10 MW will not contribute significantly as a stand-alone facility, however several solar energy facilities are proposed into the Northern Cape grid and therefore there could be a cumulative positive effect. The site is also well suited for development of this nature being relatively flat topographically, easy to access and very close to the existing Eskom Taaiput substation.



**Figure 2.4** Combined Sensitivity Map for the project showing areas of ecological sensitivity



## 2.4. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING PHASE

### Alternative (preferred alternative)

During the decommissioning and closure phases environmental or social impacts are not expected to differ from those of the construction phase of the project which have already been indicated in the above tables.

## 3. ENVIRONMENTAL IMPACT STATEMENT

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

INCA Kakamas Solar (Pty) Ltd (a subsidiary of INCA Energy) is proposing the establishment of a PV facility for the purpose of commercial electricity generation on an identified site located 2.5 km west of Kakamas in the Northern Cape Province. The proposed project will have maximum generating capacity of 10 MW which will be evacuated into the national electricity grid via the Taaiput Substation as part of a power purchase agreement with Eskom and the South African Treasury.

Due to the localised nature and relatively short-term duration of the proposed project, the establishment of the proposed PV facility is considered environmentally acceptable should the following potential impacts be mitigated and/managed for:

**Impacts on the biodiversity (i.e. flora and fauna)** – There is one major vegetation type that occurs in the study area, namely Bushmanland Arid Grassland. This vegetation type is classified as Least Threatened and also has a wide distribution and extent. The site falls within an area classified in a Northern Cape Conservation Plan as being a corridor area. These are areas that are moderately to significantly disturbed, but still able to maintain basic functionality and are important terrestrial migration corridors in which basic ecological functionality needs to be maintained. The natural vegetation across most of the site is therefore not considered to have high conservation status, but that ecological functionality of the broader landscape may need to be taken into consideration in determining the desirability of development of the site. Recommended land management within corridor areas is to limit any further habitat loss or, where hard transformation is proposed, only to permit it with appropriate biodiversity offsets. The current site is situated between existing cultivated areas. It is therefore considered unlikely that development of the site will compromise ecological connectivity within this corridor area. Some loss of natural habitat will occur, but this will be insignificant in comparison to the total area of the vegetation type concerned or the width of the corridor area (10 km wide).

Other factors that may lead to parts of the study area having elevated ecological sensitivity are the presence of dry watercourses on site and the potential presence of various plant and animal species of conservation concern.

There are four protected tree species that occur in the general area that includes the site. Only one of these occur on site, two individuals of *Boscia albitrunca*, both of which occur in close proximity to drainage lines. The geographical co-ordinates of these two individuals are as follows: Specimen 1: South 28.76528 East 20.58435, Specimen 2 South 28.77674 East 20.58849.

There is one threatened plant species that occurs on site, the Vulnerable species, *Aloe dichotoma* (kokerboom). Two individuals of this species were found on site, both in the southern part of the site near to the existing powerline. The geographical co-ordinates of these two individuals are as follows: Specimen 1: South 28.77424 East 20.58481, Specimen 2 South 28.77428 East 20.58858.

There are two bird species of potential conservation concern that were considered to potentially make use of habitats on site, either for foraging or breeding. These are Ludwig's Bustard and the Kori Bustard. After a field assessment of the site, it was considered unlikely that Ludwig's Bustard would occur there. This is based on the fact that there is a regular presence of humans on site and in the surrounding orchards. Field experience of Ludwig's Bustard is that it avoids humans and flies away when it detects them, even from far away. In addition, the vegetation on site is very sparse and offers little cover for individual birds. It is therefore considered unlikely that the site constitutes important habitat for this species and that it is unlikely that any of these birds would be found regularly on site. For similar reasons, the Kori Bustard is also not likely to be found on site. It is therefore considered improbable that there will be impacts on populations of these two threatened species.

The overall significance these impacts pre-mitigation is **moderate – high**. With the implementation of mitigation measures the overall significance could be reduced to a more acceptable **low significance**.

**Impacts on identified heritage resources** - a low density of stone tools were identified on the development site which has been evaluated to have a very low significance. Therefore as no other sites, features, or objects of cultural heritage significance were identified there would be **no impact** resulting from the proposed development. Therefore, from a heritage point of view it is recommended that the proposed development be allowed to continue. However, should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

**Geology, soil and erosion/agricultural potential** – the land capability and land use comprises mainly extensive grazing due to climatic and soil constraints. Therefore the agricultural potential in the area is very low due to these constraints. Crop production is only possible with very intensive preparation, in the form of ripping and land form shaping, and if water is supplied through irrigation. There are three aspects that have to be managed on the site:

- » Erosion must be controlled through adequate mitigation and control structures.
- » Impacts from vehicles, such as spillages of oil and hydrocarbons, should be prevented and mitigated.
- » Dust generation on site should be mitigated and minimised as the dust can affect surrounding vineyards.

Overall impact significance post mitigation is regarded as being **low**.

**Visual impacts on sensitive visual receptors near the facility** - the rural visual quality and wide open views surrounding the site will be transformed for the entire operational lifespan. The following is a summary of impacts remaining, assuming mitigation as recommended is exercised:

- » The potential visual impact of the facility on users of national, arterial, and secondary roads in close proximity to the proposed facility will be of high significance.
- » The anticipated visual impact on residents of urban areas, farms, and homesteads in close proximity to the proposed facility will be of high significance.
- » Within the greater region, the potential visual impact on sensitive visual receptors (i.e. Users of roads and residents of towns, farms, and homesteads) will be of moderate significance.
- » In terms of ancillary infrastructure, the anticipated visual impact of the substation, the new power line and the internal access roads will be of low significance in close proximity to the proposed facility.
- » Similarly, visual impacts related to lighting will be of moderate significance.
- » The anticipated visual impact of construction is also expected to be of moderate significance.
- » In terms of secondary visual impacts, the significance of the anticipated impact on the visual character and sense of place of the region will be of moderate significance, while the anticipated impact on tourist routes, tourist destinations, and tourism potential will be of low significance.
- » These anticipated visual impacts are not considered fatal flaws from a visual perspective, considering the relatively contained area of potential visual exposure and the low occurrence of visual receptors. Furthermore, the anticipated visual impact is not likely to detract from the regional tourism appeal or the numbers of tourists travelling along the N14 or the tourism potential of the area. These receptors will be exposed to the proposed facility for a very short period of their journey, and it is unlikely that the facility will be visible from many tourist destinations.

The overall impact significance of the visual impacts is considered **moderate**.

**Socio-Economic Impacts** - the proposed PV facility is strongly supported at a national, provincial, and local level in terms of the relevant policy and planning documents for the area (i.e. The National Energy Act (2008), The White Paper on the Energy Policy of the Republic of South Africa (December 1998), The White Paper on Renewable Energy (November 2003), Northern Cape Provincial Growth and Development Strategy (2004-2014), The Kai! Garib Local Municipality Integrated Development Plan (2009).

The key social issues associated with the *construction phase* include:

- » *Positive impacts* - creation of employment and business opportunities, and the opportunity for skills development and on-site training.
- » *Negative impacts* - influx of construction workers employed on the project; increased risk of stock theft, poaching and damage to farm infrastructure associated with construction workers; increased risk of veld fires associated with construction related activities; impact of heavy

vehicles, including damage to roads, safety, noise and dust; loss of agricultural land associated with construction related activities.

The overall impact significance of these impacts is considered **moderate**.

The key social issues associated with the *operational phase* include:

- » *Positive impacts* - creation of employment and business opportunities, opportunities for skills development and training, and the establishment of infrastructure to generate renewable energy.
- » *Negative impacts* - the visual impacts and associated impact on sense of place and the landscape, and the potential impact on tourism.

The overall impact significance of these impacts is considered **moderate**.

As part of the Environmental Management Programme (EMP), mitigation measures will be proposed to manage /and or mitigate these potential impacts. Positive benefits/impacts related to limited job creation during the construction phase will be enhanced, where possible, through the selection of local labourers.

#### **No-go alternative (compulsory)**

The impact that will result from the no-go alternative will mean that an additional 10 MW will not be evacuated into the Eskom grid. In the context of coal fired power stations, some of which generate in excess of 3 GW, the loss of 10 MW is not that significant in the regional and national context. The evacuation of 10 MW will not contribute significantly as a stand-alone facility, however several solar energy facilities are proposed into the Northern Cape grid and therefore there could be a cumulative positive effect.

At a site level the implications of the no-go alternative are that the site would remain as is, without any of the positive or negative impacts of the project affecting the area. The implementation of the no-go alternative will result in the 10MW not being available to generate power towards meeting the government's goal of 17GW of renewable energy capacity, and will also result in the loss of local and regional economic upliftment opportunities.

## SECTION E. RECOMMENDATION OF THE PRACTITIONER

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

YES  
✓

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

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

From the conclusions of the Basic Assessment undertaken, the proposed PV facility is considered to be acceptable from an environmental perspective.

### MITIGATION MEASURES

In order to mitigate and manage for potential impacts the following mitigation measures are recommended to form part of the Environmental Authorisation:

- » Vehicles should use existing access roads only.
- » The construction area should be clearly defined and demarcated by a fence.
- » Spoil material should be removed from the site for disposal.
- » All areas disturbed by the construction footprint, should be rehabilitated at the end of the construction phase.
- » The footprint associated with the construction footprint should be minimised.
- » An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase.
- » The housing of construction workers on the site should be limited to security personnel.
- » Dust suppression measures must be implemented for heavy vehicles
- » Erosion must be controlled through adequate mitigation and control structures.
- » Impacts from vehicles, such as spillages of oil and hydrocarbons onto bare soil, should be prevented.
- » The proposed 22kV power line must follow the alignment of the existing transmission power line linking with Taaiput Substation.
- » The construction period should be reduced through careful planning and productive implementation of resources.
- » Limit vehicle movement to absolute minimum.
- » Keep disturbance of indigenous vegetation to a minimum.
- » Control any alien plants immediately to avoid establishment of a soil seed bank that could take several decades to remove. Establish an ongoing monitoring programme to detect and quantify any aliens that may become established.
- » Control stormwater and runoff water to avoid erosion impacts on watercourses.
- » Power line towers must be positioned a minimum of 50 m outside the outer boundary of any watercourse.
- » No structures should be permanently positioned within the bed of watercourses.

- » Internal access roads should be planned with due cognisance of the topography and the construction of roads should be undertaken with adequate drainage structures in place to forego potential erosion problems.
- » Access roads not required for the post-decommissioning use of the site should be ripped and rehabilitated during decommissioning.
- » A lighting engineer should be consulted to assist in the planning and placement of light fixtures for the facility and all ancillary infrastructure in order to reduce visual impacts associated with glare and light trespass.
- » Where possible, INCA Kakamas Solar should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically semi and low-skilled job categories. This will reduce the potential impact that this category of worker could have on local family and social networks.
- » Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction / operation phases.
- » Only one protected tree species occurs on site, two individuals of *Boscia albitrunca*. The geographical co-ordinates of these two individuals are as follows: Specimen 1: South 28.76528 East 20.58435, Specimen 2 South 28.77674 East 20.58849. A no-go buffer of 50 m should be placed around these two identified specimens.

Is an EMPR attached?

**YES**

✓

The EMPR must be attached as **Appendix F**.