

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS
DRAFT BASIC ASSESSMENT REPORT

PROPOSED O'KIEP 3 PV SOLAR ENERGY
FACILITY ON A SITE ON O'KIEP COPPER
MINE IN O'KIEP NEAR SPRINGBOK,
NORTHERN CAPE PROVINCE

DEA Ref No: 14/12/16/3/3/1/510

DRAFT FOR PUBLIC REVIEW
27 June 2012 - 27 July 2012

Prepared for:

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environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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File Reference Number:

Application Number:

Date Received:

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

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2010 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
2. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
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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

DEA Reference No. : 14/12/16/3/3/1/510

Title : Environmental Basic Assessment Process
Draft Basic Assessment Report: Proposed O'Kiep 3
PV Solar Energy Facility on a site on O'Kiep Copper
Mine in O'Kiep near Springbok, Northern Cape
Province

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Client : Ilio Energy (Pty) Ltd

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When used as a reference this report should be cited as: Savannah Environmental (2012) Draft Basic Assessment Report: Proposed O'Kiep 3 PV Solar Energy Facility on a site on O'Kiep Copper Mine in O'Kiep near Springbok, Northern Cape Province

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SUMMARY AND OVERVIEW OF THE PROPOSED PROJECT

Ilio Energy (Pty) Ltd (Ilio Energy) is proposing the establishment of a commercial solar energy facility and associated infrastructure for the purpose of electricity generation on a site on O'Kiep Mine north of Springbok, Northern Cape Province (refer to Figure 1). The facility will be referred to as the **O'Kiep 3 PV Solar Energy Facility** and will have a generating capacity of up to **15 MW**. This proposed PV facility is proposed as the **third** phase of a broader development which also includes the projects referred to as O'Kiep 1 PV Facility (DEA ref: 12/12/20/2655) and O'Kiep 2 PV Facility (DEA ref: 12/12/20/2656) of which separate Basic Assessments were conducted

The facility is proposed on the remainder of Farm Brakfontein 133 in O'Kiep (SG Code C05300000000013300000), which is approximately 9 km north of Springbok. The site proposed for development is next to O'Kiep mine's **redundant tailings dam** (a copper mine owned by the O'Kiep Copper Co Ltd). Mining at the mine commenced around March 1945 and ceased in July 1993.

A broader study area of approximately 200 ha (entire farm portion) is being considered within which the facility is proposed to be constructed, although the actual development footprint of the proposed facility would be considerably smaller in extent (only a 20 ha area is required for the facility, refer to Appendix C). Therefore, the PV panels and the associated infrastructure can be appropriately placed within the boundaries of the broader site to avoid areas identified as technically difficult areas for construction of such a facility

Infrastructure associated with the PV facility will include:

- » Photovoltaic solar panels with a generating capacity of up to 15 MW;
- » On site switching station and a new short overhead power line. Two power line options are proposed. Option 1 will be to connect to the Nama Koi Substation south of the site via a short power line. Electricity generated will then be evacuated from this substation to Eskom's Nama Substation using existing transmission infrastructure. Option 2 would be to connect to Eskom's Groenbank/Nama 1 66 kV power line to the west of the site thereby evacuating the electricity directly into Eskom's Nama Substation.
- » Foundations to support the PV panels;
- » Cabling between the project components, to be laid underground where practical;
- » Internal access roads; and
- » Workshop area for maintenance and storage.



Figure 1: Locality map showing the remainder of Farm Brakfontein 133, which is the identified site for the proposed PV facility



Figure 2: Layout of the proposed facility showing the proposed power line routes and the PV facility

During the planning process, two possible areas for the PV facility were identified within the farm Brakfontein 133 (see figure 3 below). Area B was found not to be feasible from a technical point of view because it forms part of the slope of the tailings dam. Therefore, area A was found to be the most feasible from an environmental and technical point of view.

Area A is currently vacant and has undergone some level of disturbance from historical mining activities. Area B is therefore not considered further in the Basic Assessment Report. Only one area is considered feasible, and is assessed from an environmental perspective through this Basic Assessment.



Figure 3: Project area A within the Farm Brakfontein 133 is the approximate project area for the proposed development. Project area B was found not to be feasible from an environmental and technical point of view and is not assessed within this report (see appendix C for the facility layout).

1.1 Rationale for the Development of the Proposed Facility on the site next to O'Kiep mine's redundant tailings dam

The primary rationale for the proposed **O'Kiep 3** PV Solar Energy Facility is to add new generation capacity from renewable energy to the national electricity mix and to aid in achieving the goal of a 42% share of all new installed generating capacity (new build)

being derived from renewable energy forms, as targeted by the Department of Energy (DoE) (Integrated Resource Plan 2010 – 2030). In terms of the Integrated Resource Plan (IRP), approximately 8.4% of the renewable energy mix is planned to be generated from PV technologies over the next thirty years. This is, however, dependent on the assumed learning rates and associated cost reductions for renewable options.

In the event of the project being developed, it will contribute to the local electricity grid, as well as to the target for renewable energy as detailed in the IRP. In addition, the implementation of the proposed project will provide both economic stimulus to the local economy through the construction process and employment for the operational phase of the facility.

The site next to the O'Kiep Mine tailings dam has been earmarked for the development of a PV plant as it is considered preferable to install such industrial facilities within previously transformed/degraded sites, and areas of a similar land use. The site is next to the proposed O'Kiep 2 PV Solar Energy Facility (DEA ref: 12/12/20/2656) of which a separate Basic Assessment process was conducted (an industrial facility of a similar nature). This gives rise to the possibility of sharing resources between the two facilities.

In addition, the project location was specifically chosen for the construction of a PV facility for the following reasons:

- » Close proximity to the Municipality's Nama Koi Substation being constructed less than a kilometre south of the site and Eskom's Groenbank/Nama 1 66 kV power line west of the site. Therefore, two power line options are proposed. Option 1 will be to connect to the Nama Koi Substation south of the site via a short power line. Electricity generated will then be evacuated from this substation to Eskom's Nama Substation using existing transmission infrastructure. Option 2 would be to connect to Eskom's Groenbank/Nama 1 66 kV power line to the west of the site thereby evacuating the electricity directly into Eskom's Nama Substation.
- » The site is vacant and available to the developer.
- » A study of available radiation shows that the proposed site is uniformly irradiated by the sun hence has the required solar resource.
- » The site is relatively flat as preferred for the installation of PV panels. Therefore, no major earthworks would be required for the construction of the facility. This also contributes to a shorter construction period.

1.2 Requirement for an Environmental Impact Assessment Process

In terms of the Environmental Impact Assessment (EIA) 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 (NCDENC)), for the establishment of the proposed installation. In terms of sections 24 and 24D of NEMA, as read with the EIA Regulations of GNR543; GNR544; GNR545; and GNR546, a Basic Assessment process is required to be undertaken for the construction of the proposed facility. This project has been registered with National DEA under reference number **14/12/16/3/3/1/510**. The following listed activities are applicable:

Notice Number	Activity	Description	Relevance of Regulation to Project
544, 18 June 2010	1(i)	The construction of facilities or infrastructure for the generation of electricity where: ii. The electricity output is more than 10 megawatts but less than 20 megawatts; or	Construction of a Photovoltaic Solar Energy Facility with a maximum generating capacity of 15 MW in a transformed area approximately 20 ha in extent. Inverters, Step-Up transformers, reticulation cables, medium voltage connection and protection equipment and mounting structures are ancillary infrastructure for this facility.
544, 18 June 2010	10(i)	The construction of facilities or infrastructure for the transmission and distribution of electricity: i. Outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;	Construction of a power line with associated infrastructure for the transmission of electricity outside urban areas or industrial complexes
544, 18 June 2010	11(x)	The construction of: (x) Infrastructure or structures covering 50 square metres or more; Where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse.	The potential construction of infrastructure within a water course
544, 18 June 2010	23	The transformation of undeveloped, vacant or derelict land to: i. Residential, retails, commercial, recreational, industrial, or institutional use, outside an urban area, and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares.	Transformation of less than 20 hectares of derelict land (tailings dam) to a solar energy facility.

Savannah Environmental has been appointed as the independent environmental consultant, to undertake an Environmental Basic Assessment to identify and assess the potential environmental impacts associated with the proposed project. As part of this process interested and affected parties (I&APs) have been actively involved through a public involvement process.

1.3 Details of the Environmental Assessment Practitioner

Savannah Environmental was contracted by Ilio Energy as the independent EAP to undertake the EIA process for the proposed project. Savannah Environmental is not affiliated to Ilio Energy. 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 consultancy which provides a holistic environmental management service, including environmental assessment and planning to ensure compliance with relevant environmental legislation. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team that has been actively involved in undertaking environmental studies for a wide variety of projects throughout South Africa and neighbouring countries. Strong competencies have been developed in project management of environmental processes, as well as strategic environmental assessment and compliance advice, and the assessment of environmental impacts, the identification of environmental management solutions and mitigation/risk minimising measures. The proposed project team members include:

- » *Karen Jodas* - a registered Professional Natural Scientist and holds a Master of Science degree. She has 14 years of 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 responsible for the project management of EIAs for several renewable energy projects across the country.
- » *Bongani Darryl Khupe* – the principle author of this report is a registered Professional Natural Scientist who holds a Bachelor of Science Honours degree and has 6 years of experience in the environmental field. His key focus is on environmental impact assessments, environmental permitting, public participation, environmental management plans and programmes, strategic environmental advice, rehabilitation advice and monitoring, environmental compliance advice & monitoring as well as

providing technical input for projects in the environmental management field. He is currently the responsible EAP for several renewable energy projects and other EIAs across the country.

Savannah Environmental has gained extensive knowledge and experience on potential environmental impacts associated with electricity generation projects through their involvement in related EIA Processes.

Therefore, Savannah Environmental has developed a valuable understanding of impacts associated with the construction and operation of renewable energy facilities. In order to adequately identify and assess potential environmental impacts, Savannah Environmental has appointed the following specialist sub-consultants to conduct specialist impact assessments:

- » Ecology – Simon Todd Consulting
- » Heritage resources – G&A Heritage

SECTION A: ACTIVITY INFORMATION

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

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

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

Any specialist reports must be contained in Appendix D.

1. ACTIVITY DESCRIPTION

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

Ilio Energy (Pty) Ltd (Ilio Energy) is proposing the establishment of a commercial solar energy facility and associated infrastructure for the purpose of electricity generation on a site on O'Kiep Mine north of Springbok, Northern Cape Province (refer to Figure 1). The facility will be referred to as the O'Kiep 3 PV Solar Energy Facility and will have a generating capacity of up to 15 MW. This proposed PV facility is proposed as the third phase of a broader development which also includes the projects referred to as O'Kiep 1 PV Facility (DEA ref: 12/12/20/2655) and O'Kiep 2 PV Facility (DEA ref: 12/12/20/2656) of which separate Basic Assessments were conducted.

The facility is proposed on the remainder of Farm Brakfontein 133 in O'Kiep (SG Code C05300000000013300000), which is approximately 9 km north of Springbok. The site proposed for development is next to O'Kiep mine's redundant tailings dam (a copper mine owned by the O'Kiep Copper Co Ltd). Mining at the mine commenced around March 1945 and ceased in July 1993.

A broader study area of approximately 200 ha (entire farm portion) is being considered within which the facility is proposed to be constructed, although the actual development footprint of the proposed facility would be considerably smaller in extent (only a 20 ha area is required for the facility, refer to Appendix C). Therefore, the PV panels and the associated infrastructure can be appropriately placed within the boundaries of the broader site to avoid areas identified as technically difficult areas for construction of such a facility

The PV facility will be comprised of the following:

- » **Photovoltaic solar panels with a generating capacity of up to 15 MW:**
- » **On-site Substation:** Step Up Transformers, Circuit Breakers, Switching Station and protective devices will be built above the ground to form a mini sub-station
- » **Power line:** Two power line options are proposed. Option 1 will be to connect to the Nama Koi Substation south of the site via a short power line. Electricity generated will then be evacuated from this substation to Eskom's Nama Substation using existing transmission

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

infrastructure. Option 2 would be to connect to Eskom's Groenbank/Nama 1 66 kV power line to the west of the site thereby evacuating the electricity directly into Eskom's Nama Substation.

- » **Inverters:** Which are required to convert the electricity from direct current to alternating current which can be evacuated into the National Eskom grid.
- » **Support structures:** Which are required to mount the photovoltaic panels so as to receive the maximum amount of solar radiation without the buffeting effects of the wind. The angle of the panels will be tilted at 20° to 30° from the horizontal plane, facing north and may be adjusted to optimise for summer or winter solar radiation characteristics and for daily movement of the sun from east to west.
- » **Cabling:** between the project components, to be laid underground where practical.
- » **Internal access roads:** Internal gravel access roads (4 to 6 metres wide) will be constructed within the site for maintenance purposes.



Figure 4: View of photovoltaic panels (please note this is an example just to give a visual perspective of PV panels at this level and not necessarily identical to what Illo Energy is proposing)

In order to construct the proposed facility and its associated infrastructure, a series of activities will need to be undertaken during the design, pre-construction construction, operation, and decommissioning phases which are briefly discussed below.

Solar Energy as a Power Generation Technology

The generation of electricity can be easily explained as the conversion of energy from one form to another. Solar energy facilities operate by converting solar energy into a useful form (i.e. electricity). Solar technologies can be divided into two categories, those that use thermal energy from the sun and those that use the light energy. The former uses water (i.e. solar thermal) whereas the latter does not (i.e. photovoltaic technology which is proposed for the proposed

O'Kiep 3 PV Solar Energy Facility).

The use of solar energy for electricity generation is a non-consumptive use of a natural resource and consumes no fuel for continuing operation. Renewable energy is considered a 'clean source of energy' with the potential to contribute greatly to a more ecologically, socially, and economically sustainable future. The challenge now is ensuring solar energy projects are able to meet all economic, social, and environmental sustainability criteria.

How do Grid Connected Photovoltaic Facilities Function?

Photovoltaic facilities generate electricity through the use of photovoltaic panels (semiconductors) which are comprised of individual photovoltaic cells which absorb solar energy to produce electricity. The absorbed solar radiation excites the electrons inside the cells and produces what is referred to as the "**photovoltaic effect**". The individual photovoltaic cells, are commonly constructed from silicon, are linked together and placed behind a protective glass sheet to operate in unison as a photovoltaic panel (refer to Figure 5).

In order to produce 15 MW of power, the proposed plant will require numerous panels arranged in multiples/arrays which will be fixed to a support structure. In order to maximise the amount of electricity generated the panels need to be angled in such a fashion so to receive the maximum amount of solar radiation throughout the year. The preferred angle of the panels (which is dependent on the latitude of the proposed facility) may be adjusted to optimise for summer or winter solar radiation characteristics. Lastly, an **inverter** will be used to convert the electricity which is produced as direct current (DC) to alternating current (AC).



Figure 5: Photograph illustrating photovoltaic panels

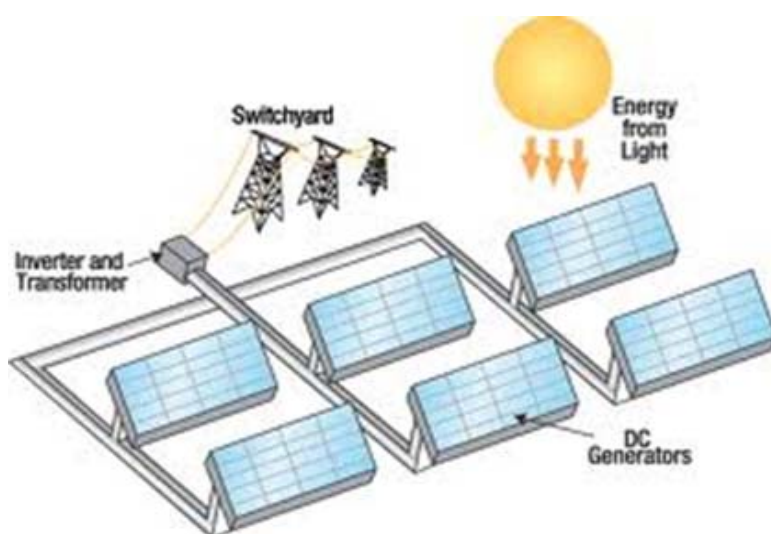


Figure 6: Schematic diagram of a PV plant (Sourced from: <http://www.solar-green-wind.com/archives/tag/solar-cells>)

Overview of the Construction Phase

In order to construct the proposed facility and its associated infrastructure, a series of activities will need to be undertaken and are discussed in more detail below.

- » **Conduct Surveys:** Prior to initiating construction, a number of surveys will be required including, but not limited to, a geotechnical survey, a site survey and, survey of substation site and road and power line servitudes.
- » **Establishment of Access Roads to the Site:** The identified farm portion for the proposed facility can be accessed via a tarred road that links O'Kiep and Concordia. It is not envisaged that any new access roads will be required to be constructed in order to access the site. However, internal access roads (4-6 m wide) will be required to access the individual components within the facility during construction and operation.
- » **Undertake Site Preparation:** Site preparation activities will include clearance of vegetation at the footprint of certain components (i.e. inverters and transformer position) and the establishment of the internal access roads. The PV panels will be sited a certain distance away from each other (to avoid shading). The vegetation between the panels will not be cleared and will be mechanically maintained. Clearing activities, where required, will involve the stripping of topsoil which will need to be stockpiled and/or spread on site.
- » **Transport of Components and Equipment to Site:** The components and equipment required for the construction of the proposed facility will be brought to site in sections by means of national and provincial roads and then proposed internal access road. Some of the components (i.e. transformer) may be defined as abnormal loads in terms of the Road Traffic Act (Act No. 29 of 1989) by virtue of the dimensional limitations (i.e. weight).

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 plant substation construction and site preparation.

- » **Erect PV Cells and Construct Substation & Invertors:** 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 so as to prevent shadows falling in an easterly direction from shading adjacent panels.

The PV panels will be mounted via steel structures which will be attached to uprights which are stabilised by concrete foundations where necessary. The angle of the panels will be tilted at 25° from the horizontal plane, facing north and may be adjusted to optimise for summer or winter solar radiation characteristics and for daily movement of the sun east to west.

The panel foundation holes will be excavated to a depth of less than 200 cm. The concrete foundations where necessary will be poured and then be left for up to a week to cure. Aggregate and cement to be transported from the closest centre to the development. The installation of the underground cables will require the excavation of trenches of approximately 40 cm – 100 cm deep within which they can then be laid

- » **Establishment of Ancillary Infrastructure:** Ancillary infrastructure will include the power line (see Appendix C for the power line route). Other structures to be constructed will include security offices and an operations centre.

The establishment of these structures/buildings will require the clearing of vegetation and levelling of the development site and the excavation of foundations prior to construction.

Overview of the Operation Phase

The electricity that is generated from the PV panels will be stepped up through the on-site inverters and transformers at the substation. Thereafter the power will be evacuated from the on-site substation to the Eskom's grid either through the power line option 1 or power line option 2.

The PV panels will need to be cleaned on a regular basis, as dust accumulation reduces their efficiency. Water to be sourced from the municipality will be used for this purpose.

It is anticipated that full-time security, maintenance and control room staff will be required on site. Each component within the solar energy facility will be operational except under circumstances of mechanical breakdown, unfavourable weather conditions or maintenance activities.

Overview of the Decommissioning Phase

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

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

The following describes the potential alternatives identified as well as reasons why some were not assessed.

a) 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/appropriateness of the site. This site has been identified by Ilio Energy as being highly desirable from a technical perspective for the establishment of a photovoltaic plant as per the following technical, logistical and environmental reasons:

- » *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 hence suitable for PV technology.
- » *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 site proposed for development is relatively flat and no major earthworks will be required. This would also mean a very short construction period.

» *Power distribution considerations:* Close proximity to the Municipality's Nama Koi Substation being constructed less than a kilometre south of the site and Eskom's Groenbank/Nama 1 66 kV power line west of the site. Therefore, two power line options are proposed. Option 1 will be to connect to the Nama Koi Substation south of the site via a short power line. Electricity generated will then be evacuated from this substation to Eskom's Nama Substation using existing transmission infrastructure. Option 2 would be to connect to Eskom's Groenbank/Nama 1 66 kV power line to the west of the site thereby evacuating the electricity directly into Eskom's Nama Substation.

» *Environmentally suitable:* The site is relatively degraded and is close to a tailings dam and associated leachate ponds. The site is not considered to be of environmental sensitivity, and the land use is compatible with the proposed PV plant. From an environmental point of view it is considered preferable to use a transformed/degraded site for the development of the facility.

» *Land availability and accessibility:* The site is on land owned by the O'Kiep copper company and is adjacent to a disused tailings dam. Mining operations at the mine ceased in July 1993 and the tailings dam have since been covered with a layer of boiler ash. An area >20ha in extent is therefore available to the developer for the proposed development. The land use is compatible with that of a PV plant. The site is also easily accessible from a tarred road that links O'Kiep and Concordia on the western border of the site. An access gate to the site is currently located along this road. The site is therefore appropriately located for easy transport of components and equipment as well as labour movement to and from the site.

b) The type of activity to be undertaken

No activity alternatives were assessed because the site has been identified by Ilio Energy as being highly desirable for the establishment of a photovoltaic plant and not any other development or renewable technologies such as wind or concentrated solar power (CSP).

- » Wind energy installations were not considered as a feasible and reasonable alternative as the proposed developmental area does not have the required wind resource.
- » CSP installations were not considered as a feasible and reasonable alternative as they require a large amount of water for cooling, unlike PV where water is only required for cleaning purposes (considering the fact that the site is in an arid area.). PV is also relatively easier to construct as opposed to CSP.

Therefore, a PV facility is considered by Ilio Energy to be the only feasible activity for the proposed site.

c) The design or layout of the activity

During the planning process, two possible areas for the PV facility were identified within the farm Brakfontein 133 (see figure 3). Area B (east of the tailings dam) was found not to be feasible from a technical point of view because it forms part of the slope of the tailings dam. Therefore, area A (north of the tailings dam) was found to be the most feasible from an environmental and technical point of view. Area B is therefore not considered further in the Basic Assessment Report. Only one area is considered feasible, and is assessed from an environmental perspective through this Basic Assessment.

Two power line options are proposed. Option 1 will be to connect to the Nama Koi Substation south of the site via a short power line. Electricity generated will then be evacuated from this substation to Eskom's Nama Substation using existing transmission infrastructure. Option 2 would be to connect to Eskom's Groenbank/Nama 1 66 kV power line to the west of the site thereby evacuating the electricity directly into Eskom's Nama Substation. The power line options proposed are technical alternatives, and were not assessed as alternatives to each other. These can therefore be viewed as technical alternatives. The selection of the preferred option would be dependent on Eskom's requirements

d) The technology to be used in the activity

Very few technological options exist in as far as PV technologies are concerned; those that are available are usually differentiated by weather and temperature conditions that prevail – so that optimality is obtained by the final choice. The impacts of any of the PV technology choices are the same. Therefore, the choice of technology does not affect the environmental impact of the proposed development. The construction, operation and decommissioning of the facility will also be the same irrespective of the technology chosen. Therefore, no alternatives were assessed in this regard.

e) The operational aspects of the activity

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

f) The option of not implementing the activity.

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

3. ACTIVITY POSITION

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

List alternative sites, if applicable.

Alternative:	Latitude (S):	Longitude (E):
Alternative S1 ² (preferred or only site alternative)	29°	34'34.41"
Alternative S2 (if any)	17°	52'55.34"
Alternative S3 (if any)		

In the case of linear activities:

Alternative:	Latitude (S):	Longitude (E):
Alternative S1 (preferred or only route alternative)		
<ul style="list-style-type: none"> Starting point of the activity Middle/Additional point of the activity End point of the activity 		
Alternative S2 (if any)		
<ul style="list-style-type: none"> Starting point of the activity Middle/Additional point of the activity End point of the activity 		
Alternative S3 (if any)		
<ul style="list-style-type: none"> 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.

² "Alternative S." refers to site alternatives.

4. PHYSICAL SIZE OF THE ACTIVITY

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

Alternative:

Alternative A1³ (preferred activity alternative)

Alternative A2 (if any)

Alternative A3 (if any)

Size of the activity:

200 000 m ²
m ²
m ²

Or, for linear activities:

Alternative:

Alternative A1 (preferred)

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):

Size of the site/servitude:

Alternative:

Alternative A1

Alternative A2 (if any)

Alternative A3 (if any)

m ²
m ²
m ²

5. SITE ACCESS

Does ready access to the site exist?

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

YES ✓	

Describe the type of access road planned:

Access to the site exists via a tarred road that links O'Kiep and Concordia and on the western boundary of the site (refer to Appendix A for site map attached).

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.

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

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 indicating the above where applicable has been included and attached 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 on site together 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?	Approximately R350 000 000.00
What is the expected yearly income that will be generated by or as a result of the activity?	Approximately R 58 916 817.60
Will the activity contribute to service infrastructure?	YES ✓
Is the activity a public amenity?	NO ✓
How many new employment opportunities will be created in the development phase of the activity?	± 400
What is the expected value of the employment opportunities during the development phase?	± R 13 068 000.00
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?	± 20
What is the expected current value of the employment opportunities during the first 10 years?	± R 30 000 000.00
What percentage of this will accrue to previously disadvantaged individuals?	± 90%

9(b) Need and desirability of the activity

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

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

DESIRABILITY:			
1.	Does the proposed land use / development fit the surrounding area?	YES ✓	
2.	Does the proposed land use / development conform to the relevant structure plans, SDF, and planning visions for the area?	YES ✓	
3.	Will the benefits of the proposed land use / development outweigh the negative impacts of it?	YES ✓	
4.	If the answer to any of the questions 1 - 3 was NO, please provide further motivation / explanation:		
5.	Will the proposed land use / development impact on the sense of place?		NO ✓
6.	Will the proposed land use / development set a precedent?		NO ✓
7.	Will any person's rights be affected by the proposed land use / development?		NO ✓
8.	Will the proposed land use / development compromise the "urban edge"?		NO ✓
9.	If the answer to any of the question 5 - 8 was YES, please provide further motivation / explanation.		

BENEFITS:			
1.	Will the land use / development have any benefits for society in general?	YES ✓	
2.	<p>Explain:</p> <p>The evacuation of additional electricity into the Eskom National 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, and will contribute to the National Government target for renewable energy. 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 in the area and across the country the long term impact may prove significant.</p>		
3.	Will the land use / development have any benefits for the local communities where it will be located?	YES ✓	

4.	Explain:
	<p>Local communities surrounding the development site may benefit from job opportunities (albeit limited opportunities), primarily low to semi- skilled positions, during the construction phase.</p> <p>In addition, the Independent Power Producers (IPP) Renewables Procurement Programme requires that every project must have a proportion of participation / ownership by local communities (i.e. South Africans of historically disadvantaged demographic groups).</p>

10. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

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

Title of legislation, policy or Administering authority:
guideline:

Date:

National Environmental Management Act (Act No. 107 of 1998)	<ul style="list-style-type: none"> » National Department of Environmental Affairs » Northern Cape Department of Environment and Nature Conservation (NCDENC) 	1998
National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	» National Department of Environmental Affairs	2004
National Environmental Management: Waste Act (Act No. 59 of 2008)	<ul style="list-style-type: none"> » National Department of Water Affairs » Provincial Department of Environmental Affairs 	2008
National Water Act (Act No. 36 of 1998)	<ul style="list-style-type: none"> » National Department of Water Affairs » Northern Cape Department of Water Affairs 	1998
Environment Conservation Act (Act No. 73 of 1989)	<ul style="list-style-type: none"> » National Department of Environmental Affairs » Northern Cape Department of Environment and Nature Conservation » Local Authority 	1989
Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)	» Department of Minerals and Energy	2002
National Heritage Resources Act (Act No. 25 of 1999)	» South African Heritage Resources Agency	1999
National Forests Act (Act No. 84 of 1998)	» National Department of Forestry	1998
National Veld and Forest Fire Act (Act 101 of 1998)	» Department of Forestry	1998
Government Notice No. 1477 of 2009: Draft National List of Threatened Ecosystems	» Provincial Department of Environmental Affairs	2009

Subdivision of Agricultural Land Act (Act No. 70 of 1970)	» National Department of Agriculture	1970
Hazardous Substances Act (Act No. 15 of 1973)	» Department of Health	1973
National Road Traffic Act (Act No 93 of 1996)	» South African National Roads Agency Limited (national roads) » Provincial Department of Transport	1996
Development Facilitation Act (Act No 67 of 1995)	» Local and District Municipality	1995
Promotion of Access to Information Act (Act No. 2 of 2000)	» National Department of Environmental Affairs	2000
Promotion of Administrative Justice Act (Act No. 3 of 2000)	» National Department of Environmental Affairs	2000
Guideline Documents		
Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads	» Provincial Department of Transport	
Provincial Planning		
Land Use Planning Ordinance 15 of 1985	» Details land subdivision and rezoning requirements and procedures	1985
Policies and White Papers		
The White Paper on the Energy Policy of the Republic of South Africa (December 1998)	» N/A	1998
The White Paper on Renewable Energy (November 2003)	» N/A	2003
The White Paper on the Energy Policy of the Republic of South Africa (December 1998)	» N/A	N/A
Miscellaneous		
Nama Koi Local Municipality IDP	» N/A	2011-2012

11. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

11(a) Solid waste management

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

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

YES ✓	
± 4m ³ of solid construction waste consisting mainly of vegetation, spoil material from clearing activities and metal and cabling off cuts.	

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

It is anticipated that construction waste will be comprised mainly of spoil material from cleaning activities as well as metal and cabling offcuts. Non-recyclable waste will be trucked to the nearest registered Landfill site.

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

In order to comply with legal requirements should there be excess solid construction waste after recycling options have been exhausted, the waste will be trucked to the nearest registered landfill site.

Will the activity produce solid waste during its operational phase?

	NO ✓
m ³	

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

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

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?

	NO ✓
--	----------------

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

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

	NO ✓
--	----------------

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

11(b) Liquid effluent

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

	NO ✓
--	----------------

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

m ³	
----------------	--

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

	NO ✓
--	----------------

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

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

	NO ✓
--	----------------

If yes, provide the particulars of the facility:

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

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

The PV panels will need to be cleaned on a regular basis, as dust accumulation reduces their efficiency. Approximately 45 000 L (for 15 MW at an allocation of 3 000 L per MW) of water proposed to be sourced from the local municipality will be used per month. This water will not accumulate any chemicals or hazardous materials and therefore is not regarded as waste water. The water from the panel cleaning process will be allowed to percolate as normal.

11(c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere?

	NO ✓
--	----------------

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

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

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

PV installations convert solar energy into electricity, and consume no fuel during operation. PV installations produce an insignificant quantity of greenhouse gases over their lifecycle when compared to conventional coal-fired power stations. The operational phase of a solar facility produces little to zero carbon dioxide, sulphur dioxide, mercury, particulates, or any other type of air pollution.

11(d) Generation of noise

Will the activity generate noise?

	NO ✓
--	----------------

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

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

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

Limited noise will be generated during the construction phase. However, this will be insignificant in light of the types of noise already generated by the adjacent industrial activities. 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	The activity will not use water
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Water will be required for cleaning of panels and ablution facilities. Approximately 45 000 L (for 15 MW at an allocation of 3 000 L per MW) of water proposed to be sourced from the local municipality will be used per month.

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?

No ✓	
----------------	--

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

13. ENERGY EFFICIENCY

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

The activity will use very little of the energy it produces and is in itself an activity that is proposed to generate electricity from a cleaner alternative energy source (i.e. solar radiation).

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

The purpose of a PV installation is to utilise an alternative energy source (i.e. solar radiation) for the production of electricity. Therefore it is not required to consider any additional alternative energy sources.

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 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?

	NO ✓
--	----------------

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

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

Property
description/physical
address:

The remainder of Farm Brakfontein 133 in O'Kiep, Northern Cape Province

(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
zoning:

land-use

Mining

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

Is a change of land-use or a consent use application required?
Must a building plan be submitted to the local authority?

YES ✓	
YES ✓	

Locality map:

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

- An indication of the project site position as well as the positions of the alternative sites, if any;
- Road access from all major roads in the area;
- Road names or numbers of all major roads as well as the roads that provide access to the site(s);
- All roads within a 1km radius of the site or alternative sites; and
- A north arrow;
- A legend; and
- Locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection).

The locality map is included and attached as **Appendix A**

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

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 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
------	----------------	----------------	----------------	--------------	-------------	------------------

2. LOCATION IN LANDSCAPE

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

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

2.6 Plain

- 2.7 Undulating plain / low hills
- 2.8 Dune
- 2.9 Seafront

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

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

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

The facility is proposed on the flat section of the site close to tailings dam and associated leachate ponds.

4. GROUNDCOVER

Indicate the types of groundcover present on the site:

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

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

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

The site falls within the Namaqualand Klipkoppe Shrubland vegetation type. This vegetation unit occupies 10936 km² of central Namaqualand from Steinkopf to Nuwerus in the south. Namaqualand Klipkoppe Shrubland is associated with the rocky hills, granite and gneiss domes of the mountains of central Namaqualand. Due to its' steep and rocky nature, this vegetation type has not been impacted by intensive agriculture and 6% is currently conserved, mainly within Goegap and Namaqua National Park. Namaqualand Klipkoppe Shrubland is classified as Least Threatened.

The majority of the lowlands and plains at the site are however highly degraded and would once have been dominated by succulent shrubs such as *Ruschia robusta* but now consist largely of *Galenia Africana* (see figure 7). Although such transformation can usually be ascribed to heavy grazing pressure, extensive cultivation of the lowlands in the distant past has probably also played a role. Apart from *Galenia africana*, other shrubs which occasionally occurred within this plant community include *Lycium cinereum*, *Hermannia amoena*, *Zygophyllum retrofractum* and *Psilocaulon coriarium*. Given the highly degraded nature of this plant community and the low plant diversity which characterizes it, this is not considered to be a sensitive plant community.

The rocky parts of the site, particularly the low hill which characterizes the central section of the site, north of the slimes dam, contained greater plant diversity than the adjacent lowlands. Common and dominant species in these areas include *Hirpicium alienatum*, *Eriocephalus ericoides*, *Euphorbia mauritanica*, *Tylecodon wallachi*, *Pteroni divaricata*, *Tetragonia fruticosa*, *Triperis sinuata*, *Pentzia incana*, *Pteronia glauca*, *Wiborgia monoptera*, *Thesium lineatum*, *Didelta spinosa* and *Hermannia desertorum*. Although this area was quite heavily grazed it is more resilient to grazing pressure and can be considered to be in a reasonable condition.

A series of low rocky outcrops runs around the edge of the hill, some of which were quartzitic in nature. A number of species were observed to be largely restricted to this habitat including *Pelargonium crithmifolium*, *Adromischus alstonii* and *Tylecodon reticulatus*. Such habitats often contain endemic and listed plant species, but no such species were observed at the time of the

site visit. However, as it was very dry it is possible that some species were overlooked or were not present at the time of the site visit. The rocky ridge is therefore considered more sensitive than the surrounding plains and development within this area should proceed with more caution.



Figure 7. *Galenia africana*-dominated degraded plains north of the site in the foreground with the more diverse low hill in the background

The abundance of alien plant species at the site was low. A few individuals of *Nicotiana glauca* were observed in one of the drainage lines and some *Bromus* spp. was observed on the rocky hills and plains.

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 ^A

5.6 Retail commercial and warehousing

5.7 Light industrial

5.8 Medium industrial ^{AN}

- 5.9 Heavy industrial ^{AN}
- 5.10 Power station
- 5.11 Office/consulting room
- 5.12 Military or police base/station/compound

5.13 Spoil heap or slimes dam ^A

- 5.14 Quarry, sand, or borrow pit
- 5.15 Dam or reservoir
- 5.16 Hospital/medical centre
- 5.17 School
- 5.18 Tertiary education facility
- 5.19 Church
- 5.20 Old age home
- 5.21 Sewage treatment plant ^A
- 5.22 Train station or shunting yard ^N
- 5.23 Railway line ^N
- 5.24 Major road (4 lanes or more) ^N
- 5.25 Airport ^N
- 5.26 Harbour
- 5.27 Sport facilities
- 5.28 Golf course
- 5.29 Polo fields
- 5.30 Filling station ^H
- 5.31 Landfill or waste treatment site
- 5.32 Plantation
- 5.33 Agriculture
- 5.34 River, stream or wetland
- 5.35 Nature conservation area
- 5.36 Mountain, koppie or ridge**
- 5.37 Museum
- 5.38 Historical building
- 5.39 Protected Area
- 5.40 Graveyard
- 5.41 Archaeological site
- 5.42 Other land uses (describe)

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

--

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:

A tailings dam and associated leachate ponds are located within the site. The development will not have an impact on the tailings dam. However, depending on the prevailing wind direction any dust emanating from the tailings dam could have a negative impact on the efficiency of the PV panels. The developer will therefore need to clean the panels on a regular basis.

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

NO ✓

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

NO ✓

If YES, explain:

See below. A Heritage Impact Assessment was conducted, the results of which are elaborated on below.

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:

No sites, features or objects of cultural heritage significance were identified in the study area. However, some sites of living heritage were identified on site. Two living heritage sites with present occupants were identified on the periphery of the study area. The first is a homestead with associated infrastructure while the second is a concrete platform with stone perimeter. These however fall outside the area proposed for development.

(Refer to Heritage Impact Assessment report attached in **Appendix D**).

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

NO ✓

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

NO ✓

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

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT

Notices advertising the proposed project were placed / distributed as follows on 24 April 2012 (refer to Appendix E):

- » A2 site notices were placed on the entrance to the proposed development site as well as on the boundary of the site.
- » A4 notices were placed at the entrance to the O'Kiep Country Hotel as well as the O'Kiep Caltex Garage.
- » Stakeholder letters were distributed to the database of registered parties. This included relevant officials from the National and Provincial Authorities, the local and district municipalities, key stakeholders and organs of state relevant to the proposed project. A stakeholder letter was sent to:
 - * Notify I&APs of the proposed project;
 - * To invite I&APs to review the Draft Basic Assessment Report and;
 - * To invite I&AP to attend the public meeting to be held in the area.
- » A notice was placed in The Namakwalander to advertise the Basic Assessment process and to advertise the availability of the Draft Basic Assessment Report and the public meeting.

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 project will not result in any impacts that extend beyond the municipal area where it is located. In addition to this, the small scale nature of the proposed project as well as the transformed and fragmented nature of the identified site, it was only deemed necessary to advertise in a local newspaper.

The advertisement, site notices, and stakeholder letters detailed the Basic Assessment process, 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. The advertisement also indicated the availability of the draft Basic Assessment Report and the details of the public meeting.

Proof of the advertisements placed is 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.

A public meeting will be held during the review period. The aim of this meeting is to inform attendees of the findings of the Basic Assessment process. Focus group meetings with different stakeholder groups will also be conducted during the public review period. Further to this the use of a stakeholder database, an advertisement, and site notices is deemed adequate for the public involvement process.

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.

No comments have been received at this stage. However, all issues, comments, and/or concerns that will be raised will be captured and recorded within the Comments and Response Report to be attached in the Final Basic Assessment Report.

6. AUTHORITY PARTICIPATION

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

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

List of authorities informed:

Authorities informed of the Basic Assessment process included:

- » Northern Cape Department of Environment and Nature Conservation
- » Department of Agriculture, Forestry and Fisheries
- » Department of Minerals and Energy
- » Department of Water Affairs
- » South African National Roads Agency Limited
- » Northern Cape Department of Roads and Public Works
- » Northern Cape Department of Economic Development
- » South African Civil Aviation Authority
- » South African Heritage Resources Agency
- » Northern Cape Heritage Authority / Ngwao Bošwa Kapa Bokone

List of authorities from whom comments have been received:

Comments have not yet been received from authorities. All comments received will be included in the Final Basic Assessment Report

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.

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

- » Neighbouring landowners;
- » Parastatals and conservation authorities;
- » Members of the public

A stakeholder database is attached in Appendix E

Has any comment been received from stakeholders?

NO ✓

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

No comments have been received at this stage.

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 on the project to date. All comments received, as well as responses provided will be captured and recorded within the Comments and Response Report attached with the final Basic Assessment Report.
--

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):

No comments have been received to date.

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 that may result from the planning and design phase of the proposed development. The identified site has already been transformed by previous mining and agricultural activities (grazing) and therefore no excavation/exploratory work which may affect the environment is anticipated.

2.2 IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION PHASE

Potential impacts associated with the construction of the proposed project are discussed below.

The following methodology was used in assessing impacts related to the proposed development.

All impacts are assessed according to the following criteria:

- » The **nature**, a description of what causes the effect, what will be affected, and how it will be affected.
- » The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high).
- » The **duration**, wherein it is indicated whether:
 - * The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
 - * The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
 - * Medium-term (5–15 years) – assigned a score of 3;
 - * Long term (> 15 years) - assigned a score of 4; or;
 - * Permanent - assigned a score of 5.
- » The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
 - * 0 is small and will have no effect on the environment;
 - * 2 is minor and will not result in an impact on processes;
 - * 4 is low and will cause a slight impact on processes;

- * 6 is moderate and will result in processes continuing but in a modified way;
- * 8 is high (processes are altered to the extent that they temporarily cease); and
- * 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- » The **probability** of occurrence, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
 - * Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
 - * Assigned a score of 2 is improbable (some possibility, but low likelihood);
 - * Assigned a score of 3 is probable (distinct possibility);
 - * Assigned a score of 4 is highly probable (most likely); and
 - * Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- » The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- » The **status**, which is described as positive, negative, or neutral.
- » The degree to which the impact can be reversed.
- » The degree to which the impact may cause irreplaceable loss of resources.
- » The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

$S = (E + D + M)P$; where

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance** weightings for each potential impact are as follows:

- » < **30 points**: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- » **30-60 points**: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- » > **60 points**: High (i.e. where the impact must have an influence on the decision process to develop in the area).

Alternative S1 (preferred alternative)

The potential impacts associated with the construction of the proposed PV facility are discussed below. Detailed specialist studies are included within Appendix D which detail the potential environmental impacts on heritage resources and ecological impacts on flora and fauna.

2.2.1. Potential Impacts on Heritage Resources

Impact tables summarising the significance of impacts on heritage resources

Nature: Potential impacts on Paleontological sites		
No paleontological sites of high value were identified on site. However, paleontological sites could be affected if bedrock was to be disturbed during the excavation activities associated with the construction of the generation facility and associated infrastructure.		
	Without mitigation	With mitigation
Extent	Local (2)	Local (2)
Duration	Short term (2)	Long term (5)
Magnitude	High (8)	Low (1)
Probability	Improbable (2)	Improbable (1)
Significance	Low (12)	Low (8)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation:		
No mitigation is recommended provided bedrock is not to be disturbed		
Cumulative impacts:		
Non		
Residual Impacts:		
Non		

Nature: Potential impacts on cultural landscapes		
The construction of the solar generation sites could result in alteration in the cultural characteristics of the landscape.		
	Without mitigation	With mitigation
Extent	Local (2)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Low (1)	Low (1)
Probability	Improbable (3)	Improbable (3)
Significance	Low (15)	Low (15)
Status (positive or negative)	Negative	Negative

Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: No mitigation is recommended		
Cumulative impacts: Non		
Residual Impacts: Non		

Nature: Potential impacts on the Living Heritage (Built Environment)		
Two living heritage sites with present occupants were identified on the periphery of the study area. The first is a homestead with associated infrastructure while the second is a concrete platform with stone perimeter. These however fall outside the area proposed for development.		
	Without mitigation	With mitigation
Extent	Local (2)	Local (2)
Duration	Long term (4)	Short term (2)
Magnitude	Low (1)	Low (1)
Probability	Improbable (3)	Improbable (3)
Significance	Medium (21)	Low (15)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: Should it be found necessary to relocate the inhabitants of these structures, it is recommended that a social consultant be engaged to facilitate the process.		
Cumulative impacts: Non		
Residual Impacts: Non		

2.2.2. Potential Impacts on Ecology

Impact tables summarising the significance of ecological impacts

In terms of ecological sensitivity on site, the majority of the area proposed for development is classified as Medium Sensitivity. The rocky outcrops north of the tailings dam area classified as Very High Sensitivity on account of the plant and reptile diversity that is likely to be associated with these habitats. The rocky slopes around the outcrops are classified as Medium-High Sensitivity. Overall, the site is not considered to be highly sensitive from an ecological perspective. A large proportion of the site is considered to be highly degraded and even the rocky outcrops were not observed to contain any listed species of plants or reptiles. Although it would be preferable to avoid the exposed rocky outcrops in the central part of the site, their extent is less than 4 ha and is not significant at the landscape scale given the abundance of similar rocky habitat in the area. Figure 8 below shows the ecological sensitive areas as identified.

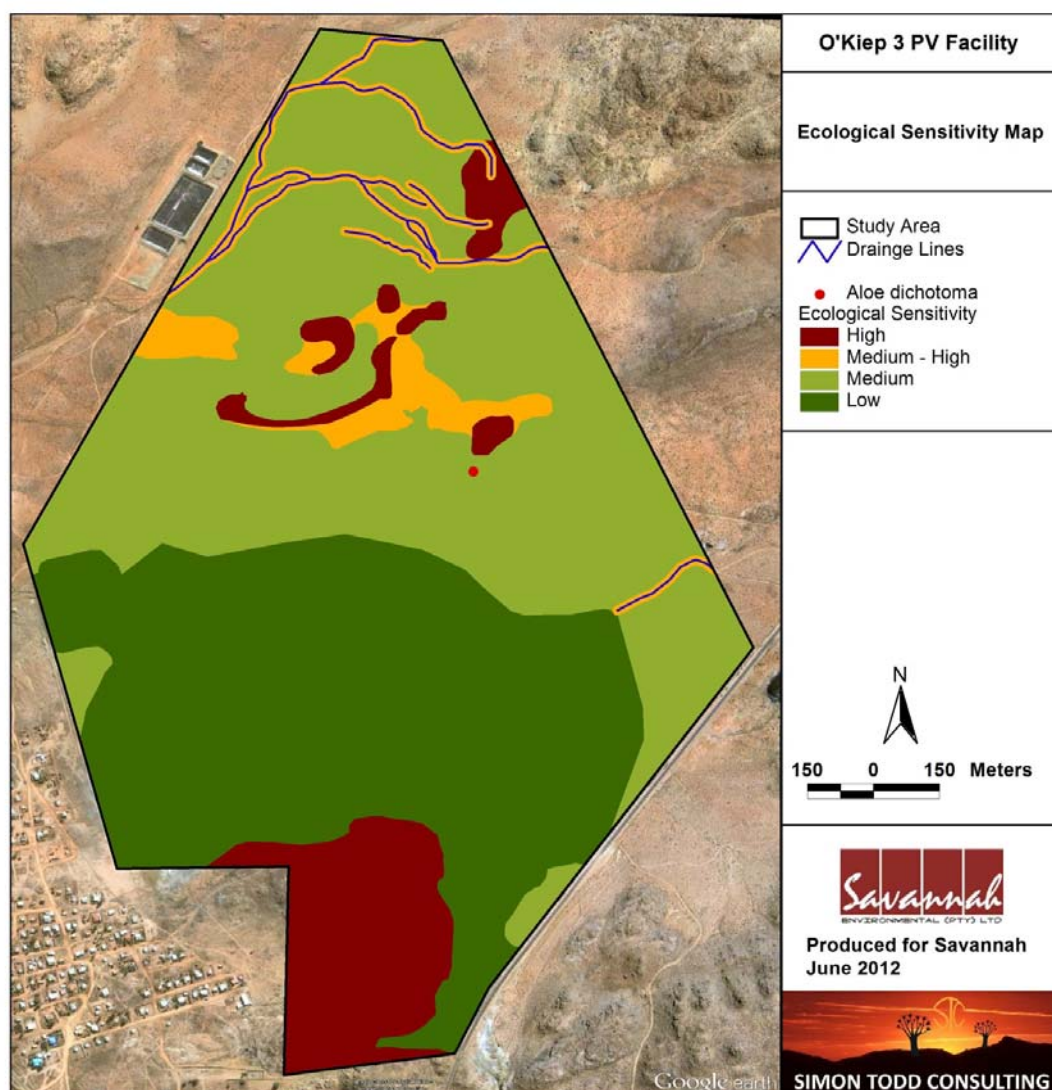


Figure 8. Ecological Sensitivity map of the proposed O'Kiep 3 PV Facility site

Nature: Impacts on vegetation and protected plant species

Some loss of vegetation is an inevitable consequence of the development and the potential impacts on listed plant species are a potential concern given the high number of listed species which are known to occur in the area.

	<i>Without mitigation</i>	<i>With mitigation</i>
<i>Extent</i>	Local (1)	Local (1)
<i>Duration</i>	Long term (4)	Long term (4)
<i>Magnitude</i>	Medium - Low (4)	Low (3)
<i>Probability</i>	Probable (3)	Probable (3)
<i>Significance</i>	Low (27)	Low (24)
<i>Status (positive or negative)</i>	Negative	
<i>Reversibility</i>	Yes	
<i>Irreplaceable loss of resources?</i>	No	
<i>Can impact be mitigated?</i>	Yes	
<i>Mitigation:</i>		
<ul style="list-style-type: none">» Follow-up surveys to be conducted during the flowering season to establish the presence and abundance of listed species at the site.» Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared.» The final development area should be surveyed for species suitable for search and rescue.» Surveys for and clearing of alien plants should take place on at least an annual basis		
<i>Cumulative impact:</i>		
<ul style="list-style-type: none">» The potential for cumulative impacts is quite low on account of the small development footprint of the facility.		
<i>Residual impact:</i>		
<ul style="list-style-type: none">» Some loss of vegetation is inevitable and cannot be avoided		

Nature: Increased erosion risk.

Increased erosion risk would result from soil disturbance and the loss of plant cover within cleared and disturbed areas. The slopes of the hill are reasonably steep and the risk of erosion in this area would be heightened by the additional runoff generated by the panels and other cleared or hardened areas.

	<i>Without mitigation</i>	<i>With mitigation</i>
<i>Extent</i>	Local (1)	Local (1)
<i>Duration</i>	Long term (4)	Short term (2)
<i>Magnitude</i>	Medium - Low (4)	Low (3)
<i>Probability</i>	Probable (3)	improbable (2)
<i>Significance</i>	Low (27)	Low (12)
<i>Status (positive or negative)</i>	Negative	
<i>Reversibility</i>	Yes	
<i>Irreplaceable loss of resources?</i>	No	
<i>Can impact be mitigated?</i>	Yes	
<i>Mitigation:</i>		
» Roads should run along the contour wherever possible and roads that do not should		

<p>have diversion structures in place at regular intervals to ensure that water flow and movement is regulated in a manner which minimizes erosion risk.</p> <ul style="list-style-type: none"> » Roads which cross drainage lines should be constructed in manner which does not encourage erosion of the downstream channel and does not disrupt the natural flow of water down the channel. » Post-construction revegetation of all bare areas with local species. » Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance. » All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.
<p>Cumulative impact:</p> <ul style="list-style-type: none"> » Higher sediment loads in rivers and streams will affect in-stream vegetation and biota
<p>Residual impact:</p> <ul style="list-style-type: none"> » If erosion at the site is controlled, then there will be no residual impact

Nature: Impacts on Fauna

Increased levels of noise, pollution, disturbance and human presence will be detrimental to fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present. Some mammals and reptiles such as tortoises would be vulnerable to illegal collection or poaching during the construction phase as a result of the large number of construction personnel that are likely to be present.

	<i>Without mitigation</i>	<i>With mitigation</i>
<i>Extent</i>	Local (1)	Local (1)
<i>Duration</i>	Long term (4)	Long term (4)
<i>Magnitude</i>	Medium - Low (4)	Medium - Low (3)
<i>Probability</i>	Probable (3)	Probable (3)
<i>Significance</i>	Low (27)	Low (24)
<i>Status (positive or negative)</i>	Negative	
<i>Reversibility</i>	Yes	
<i>Irreplaceable loss of resources?</i>	No	
<i>Can impact be mitigated?</i>	Yes	

Mitigation:

- » Any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person.
- » The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the construction site.
- » Fires should only be allowed within fire-safe demarcated areas.
- » No fire wood collection should be allowed on-site.
- » No dogs should be allowed on site.
- » If the site must be lit at night for security purposes, this should be done with low-UV type lights (such as most LEDs), which do not attract insects.
- » If the site must be fenced, then provision should be made for faunal access at least at strategic sites such as where drainage lines enter or leave the site.
- » All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the

<p>site should be cleaned up in the appropriate manner as related to the nature of the spill.</p> <ul style="list-style-type: none"> » No unauthorized persons should be allowed onto the site. » Staff present during the operational phase should receive environmental education so as to ensure that that no hunting, killing or harvesting of plants and animals occurs. .
<p>Cumulative impact:</p> <ul style="list-style-type: none"> » The potential for cumulative impacts is low given the overwhelmingly intact nature of the surrounding landscape and the fact that no rare or restricted habitats have been impacted on a cumulative basis.
<p>Residual impact:</p> <ul style="list-style-type: none"> » Residual impacts for fauna would be largely restricted to a small amount of habitat loss.

Nature: Impacts on Avifauna		
Direct and indirect impacts of the development during construction on avifauna would result from habitat loss.		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Medium - Low (4)	Medium - Low (3)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Low (24)
Status (positive or negative)	Negative	
Reversibility	Yes	
Irreplaceable loss of resources?	No	
Can impact be mitigated?	Yes	
Mitigation: <ul style="list-style-type: none">» Any new lines required as part of the development should be aligned with existing lines if possible.» Ensure that all new lines are marked with bird flight diverters in areas of likely impact.» All new power line infrastructure should be bird-friendly in configuration and adequately insulated (Lehman et al. 2007). These activities should be supervised by someone with experience in this field.» Any electrocution and collision events that occur should be recorded, including the species affected and the date. If repeated collisions occur within the same area, then further mitigation and avoidance measures may need to be implemented. .		
Cumulative impact: <ul style="list-style-type: none">» The development would contribute a small amount to cumulative avifaunal impacts in the area resulting from electrocution and collisions. However, these impacts can be avoided to a large extent through mitigation.		
Residual impact: <ul style="list-style-type: none">» The facility itself would represent some habitat loss for avifauna that would persist for the life of the facility.		

2.2.3. Potential Impacts on the Social Environment

Impact tables summarising the significance of social impacts

Nature: Impacts on Job creation		
From a social perspective, there may be some positive impacts resulting from limited job opportunities and skills development for low – semi skilled jobs		
	Without Enhancement	With Enhancement
Extent	1 (Local)	1 (Site only)
Duration	1 (Very short)	2 (Short duration)
Magnitude	2 (Minor)	4 (low)
Probability	3 (Probable)	3 (Probable)
Significance	Low (12)	21 (Low)
Status (positive or negative)	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	N/A	N/A
Can impacts be mitigated?	Yes	
Enhancement measures:		
The use of local labour for low – semi skilled jobs should be maximised as far as possible		

Nature: Potential loss or damage to infrastructure associated with the presence of construction workers on site		
The movement of construction workers on and off the site poses a potential threat to infrastructure associated with the adjacent properties, which may be damaged. The impact significance is considered to be very low considering the size of the workforce during construction.		
	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Very Short Term (1)	Very Short Term (1)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (2)	Probable (1)
Significance	Low (8)	Low (4)
Status	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	Yes
Mitigation:		

- » Ilio Energy should hold contractors liable for compensating communities in full for any losses and/or damage to infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between Ilio Energy, the contractors and neighbouring landowners. The agreement should also cover losses and costs associated construction related activities (see below);
- » Contractors appointed by Ilio Energy 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 trespassing on adjacent properties.
- » The housing of construction workers on the site should be limited to security personnel

Cumulative impacts: No, provided losses are compensated for.

Residual impacts: None

Nature: Potential visual impacts on observers in close proximity to the proposed solar energy facility.

There will be a noticeable increase in heavy vehicles utilising the roads to the development site that may cause, at the very least, a visual nuisance to other road users and land owners in the area. Dust from construction work could also result in potential visual impact.

	<i>Without mitigation</i>	<i>With mitigation</i>
<i>Extent</i>	Local (4)	Local (4)
<i>Duration</i>	Long term (4)	Long term (4)
<i>Magnitude</i>	High (8)	Moderate (6)
<i>Probability</i>	Improbable (2)	Improbable (2)
<i>Significance</i>	Moderate (32)	Low (28)
<i>Status (positive or negative)</i>	Negative	
<i>Reversibility</i>	Recoverable (3)	
<i>Irreplaceable loss of resources?</i>	No	
<i>Can impact be mitigated?</i>	Yes	

Mitigation:

Planning:

- » Retain and maintain natural vegetation in all areas outside of the development footprint.

Construction:

- » Proper planning and management of the construction site

Cumulative impact:

- » Non.

Residual impact:

- » The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed. Failing this, the visual impact will remain.

No Go Alternative

The 'Do-Nothing' alternative is the option of not constructing the proposed O'Kiep 3 PV Solar Energy Facility. Should this alternative be selected then the socio-economic and environmental benefits of this renewable energy facility will not be realised. These benefits are explored in further detail in the South Africa REFIT Regulatory Guideline published by NERSA (March 2009), and include:

- » **Increased energy security:** The current electricity crisis in South Africa highlights the significant role that renewable energy can play in terms of power supplementation. In addition, given that renewables can often be deployed in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality, while reducing expensive transmission and distribution losses.
- » **Resource saving:** Conventional coal fired plants are major consumers of water during their requisite cooling processes. It is estimated that the achievement of the targets in the Renewable Energy White Paper will result in water savings of approximately 16.5 million kilolitres, when compared with wet cooled conventional power stations; this translates into revenue savings of R26.6 million. As an already water-stressed nation, it is critical that South Africa engages in a variety of water conservation measures, particularly due to the detrimental effects of climate change on water availability.
- » **Exploitation of our significant renewable energy resource:** At present, valuable national resources including biomass by-products, solar radiation and wind power remain largely unexploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio.
- » **Pollution reduction:** The releases of by-products through the burning of fossil fuels for electricity generation have a particularly hazardous impact on human health and contribute to ecosystem degradation.
- » **Climate friendly development:** The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through the reduction of greenhouse gas (GHG) emissions. South Africa is estimated to be responsible for ~1 % of global GHG emissions and is currently ranked 9th worldwide in terms of per capita CO₂ emissions.
- » **Support for international agreements:** The effective deployment of renewable energy provides a tangible means for South Africa to demonstrate its commitment to its international agreements under the Kyoto Protocol, and for cementing its status as a leading player within the international community.
- » **Employment creation:** The sale, development, installation, maintenance and management of renewable energy facilities have significant potential for job creation in South Africa.
- » **Acceptability to society:** Renewable energy offers a number of tangible benefits to society including reduced pollution concerns, improved human and ecosystem health and climate friendly development.
- » **Protecting the natural foundations of life for future generations:** Actions to reduce our disproportionate carbon footprint can play an important part in ensuring our role in preventing dangerous anthropogenic climate change; thereby securing the natural foundations of life for generations to come.

In addition, the injection of an additional 15 MW of energy within the O'Kiep area would be beneficial to the mines that abound in the area. The integration of an additional 15 MW should alleviate the pressure on the local grid to some extent and would contribute in a small way to meeting the government's target for renewable energy. Furthermore, implementation of the no go alternative would mean that the additional job opportunities would be lost.

Assessment of Power line Options

Two power line options are proposed for the evacuation of electricity from the site. Option 1 will be to connect to the Nama Koi Substation south of the site via a short power line. Electricity generated will then be evacuated from this substation to Eskom's Nama Substation using existing transmission infrastructure. Option 2 would be to connect to Eskom's Groenbank/Nama 1 66 kV power line to the west of the site thereby evacuating the electricity directly into Eskom's Nama Substation. These options are however technical options and not alternatives to one another, as the selection of the preferred option would be dependent on Eskom's requirements.

Most of the potential impacts associated with the power line options are similar to the impacts associated with the PV facility. Therefore, the tables above present the assessment of potential impacts associated with the power lines and the PV facility. A summary of the relevant potential impacts and impact ratings due to the construction of the various power line options after mitigation measures have been applied is given in table below.

Summary of the significance of impacts for different power line options after mitigation measures have been applied.

Impact	Option 1	Option 2
Potential impacts on Paleontological sites	Low	Low
Potential impacts on cultural landscapes	Low	Low
Potential impacts on the Living Heritage (Built Environment)	Low	Low
Impacts on vegetation and protected plant species	Low	Low
Increased erosion risk.	Low	Low
Impacts on Fauna	Low	Low
Impacts on Avifauna	Low	Low
Impacts on Job creation	Low	Low
Potential loss or damage to infrastructure associated with the presence of construction workers on site	Low	Low
Potential visual impacts on observers in close proximity to the proposed solar energy facility.	Low	Low

As can be seen from the above table, the two power line options are similar in their impact on the environment, and the impacts can be adequately mitigated. Therefore, either of the power line options is potentially suitable from an environmental perspective. The choice of power line option will therefore depend on technical considerations.

2.3 IMPACTS THAT MAY RESULT FROM THE OPERATIONAL PHASE

Alternative (preferred alternative)

Potential impacts associated with the operation of the proposed PV facility are discussed below. Detailed specialist studies are included within Appendix D. Expected impacts include potential impacts on soil erosion, impacts on job creation and visual impacts.

Nature: Impacts on Avifauna		
Direct and indirect impacts of the development during operation on avifauna would result from electrocution and collisions with power lines. Larger species, such as eagles, flamingos, cranes and bustards many of which are listed, are particularly vulnerable to impacts from transmission infrastructure.		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Medium - Low (4)	Medium - Low (3)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Low (24)
Status (positive or negative)	Negative	
Reversibility	Yes	
Irreplaceable loss of resources?	No	
Can impact be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none">» Ensure that all new lines are marked with bird flight diverters in areas of likely impact.» All new power line infrastructure should be bird-friendly in configuration and adequately insulated (Lehman et al. 2007). These activities should be supervised by someone with experience in this field.» Any electrocution and collision events that occur should be recorded, including the species affected and the date. If repeated collisions occur within the same area, then further mitigation and avoidance measures may need to be implemented. .		
Cumulative impact:		
<ul style="list-style-type: none">» The development would contribute a small amount to cumulative avifaunal impacts in the area resulting from electrocution and collisions. However, these impacts can be avoided to a large extent through mitigation.		
Residual impact:		
<ul style="list-style-type: none">» The facility itself would represent some habitat loss for avifauna that would persist for the life of the facility.		

Nature: Impacts on soils due to operation of vehicles on site		
It is assumed that vehicle movement will be restricted to the construction site and established roads. Vehicle impacts in this sense are restricted to spillages of lubricants and petroleum products.		
	Without mitigation	With mitigation
Extent	Site (1)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Low (2)	Low (2)
Probability	Highly probable (4)	Probable (2)
Significance	20 (Low)	10 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: Maintain vehicles, prevent and address spillages		
Cumulative impacts: The cumulative impact of this activity will be small as it is constructed on land that has undergone some form of degradation.		
Residual Impacts: non		

Nature: Dust generation		
This activity entails the operation of vehicles on site and their associated dust generation. Generated dust can impact large areas depending on environmental and climatic conditions		
	Without mitigation	With mitigation
Extent	Site (1)	Site (1)
Duration	Short term (2)	Short term (2)
Magnitude	Low (2)	Low (2)
Probability	Highly probable (4)	Probable (2)
Significance	20 (Low)	10 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: Limit vehicle movement to absolute minimum, construct proper roads for access.		
Cumulative impacts: The cumulative impact of this activity will be small as it is constructed on land that has undergone some form of degradation.		

Residual Impacts:

Non

Nature: Promotion of renewable energy

The evacuation of additional electricity into the Eskom National Grid should alleviate the pressure on the local grid to a small extent and would contribute in a small way to meeting the government's target for renewable energy

Extent	Regional (2)
Duration	Long term (4)
Magnitude	Minor (2)
Probability	Highly probable (4)
Significance	Low (24)
Status (positive or negative)	Positive
Reversibility	N/A
Irreplaceable loss of resources?	N/A
Can impacts be enhanced during construction phase?	Yes

Enhancement:

N/A

Nature: Impacts on Job creation

From a social perspective, there may be some positive impacts resulting from limited job opportunities and skills development for low – semi skilled jobs during the operation of the facility.

	Without Enhancement	With Enhancement
Extent	1 (Local)	1 (Site only)
Duration	1 (Very short)	2 (Short duration)
Magnitude	2 (Minor)	4 (low)
Probability	3 (Probable)	3 (Probable)
Significance	Low (12)	21 (Low)
Status (positive or negative)	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	N/A	N/A
Can impacts be mitigated?	Yes	

Enhancement measures:

The use of local labour for low – semi skilled jobs should be maximised as far as possible

Nature: Potential visual impacts on observers in close proximity to the proposed solar energy facility.

The visual impact on users of main roads, secondary roads and residents of O'Keip is expected to be of low significance, both before and after mitigation due to the large number of industrial/mining related infrastructure in the area. At a maximum height of 2.5 meters the PV panels will not be as visually intrusive as the mining related infrastructure in the area.

	<i>Without mitigation</i>	<i>With mitigation</i>
<i>Extent</i>	Local (4)	Local (4)
<i>Duration</i>	Long term (4)	Long term (4)
<i>Magnitude</i>	High (8)	Moderate (6)
<i>Probability</i>	Improbable (2)	Improbable (2)
<i>Significance</i>	Moderate (32)	Low (28)
<i>Status (positive or negative)</i>	Negative	
<i>Reversibility</i>	Recoverable (3)	
<i>Irreplaceable loss of resources?</i>	No	
<i>Can impact be mitigated?</i>	Yes	
<i>Mitigation:</i>		
» Non		
<i>Cumulative impact:</i>		
» The construction of the solar energy facility and its ancillary infrastructure will increase the cumulative visual impact of industrial type infrastructure within the region. This is relevant in light of the mining related infrastructure within the region.		
<i>Residual impact:</i>		
» The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed. Failing this, the visual impact will remain.		

No Go Alternative

The 'Do-Nothing' alternative is the option of not constructing the proposed O'Kiep 3 PV Solar Energy facility. Should this alternative be selected, none of the anticipated impacts would occur and the current land use could continue. However, should this option be implemented, the socio-economic and environmental benefits of this renewable energy facility will not be realised. These benefits are explored in further detail in the South Africa REFIT Regulatory Guideline published by NERSA (March 2009), and include:

- » **Increased energy security,**
- » **Resource saving,**
- » **Exploitation of our significant renewable energy resource,**
- » **Pollution reduction,**
- » **Climate friendly development,**
- » **Support for international agreements,**
- » **Employment creation,**
- » **Acceptability to society and**
- » **Protecting the natural foundations of life for future generations**

The integration of an additional 15 MW should alleviate the pressure on the local grid to some extent and would contribute in a small way to meeting the government's target for renewable energy. Furthermore, implementation of the no go alternative would mean that the additional

job opportunities would be lost. The use of the proposed site for the facility will allow for the possible control of alien species in that site, however, if the no go alternative is implemented this opportunity will be lost..

Assessment of Power line Options

Two power line options are proposed for the evacuation of electricity from the site. Option 1 will be to connect to the Nama Koi Substation south of the site via a short power line. Electricity generated will then be evacuated from this substation to Eskom's Nama Substation using existing transmission infrastructure. Option 2 would be to connect to Eskom's Groenbank/Nama 1 66 kV power line to the west of the site thereby evacuating the electricity directly into Eskom's Nama Substation. These options are however technical options and not alternatives to one another, as the selection of the preferred option would be dependent on Eskom's requirements.

The potential impacts associated with the power lines are similar to the impacts associated with the PV facility. Therefore, the tables above present the assessment of potential impacts associated with the power lines and the PV facility. A summary of the relevant potential impacts and impact ratings due to the operation of the various power line options after mitigation measures have been applied is given in table below.

Summary of the significance of impacts for different power line options after mitigation measures have been applied.

Impact	Option 1	Option 2
Impacts on Avifauna	Low	Low
Impacts on soils due to operation of vehicles on site	Low	Low
Dust generation	Low	Low
Promotion of renewable energy	Low	Low
Impacts on Job creation	Low	Low
Potential visual impacts on observers in close proximity to the proposed power lines	Low	Low

The two power line options are similar in their impact on the environment and it is expected that the impacts can be adequately mitigated. Therefore, either of the power line options is potentially suitable from an environmental perspective. The choice of power line option will therefore depend on technical considerations.

2.4 IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING AND CLOSURE PHASE

Alternative (preferred alternative)

The impacts during the decommissioning and closure phases will be similar to impacts of the construction phase as discussed above.

No Go Alternative

The 'Do-Nothing' alternative is the option of not decommissioning the proposed O'Kiep 3 PV Solar Energy Facility at the end of its life span. At the end of its life span the efficiency of the facility would be reduced such that less electricity is produced. However, the additional electricity that could continue to be evacuated into the Eskom grid in the O'Kiep area would be beneficial to the mines that abound in the area. In addition, implementation of the no go alternative would mean that job opportunities are not lost.

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.

Alternative A (preferred alternative)

This section provides a summary of the assessment conclusions for the proposed development site. In doing so, it draws on the information gathered as part of the Basic Assessment process and the knowledge gained by the environmental consultants during the course of the process and presents an informed opinion of the environmental impacts associated with the proposed project.

- » The overall **heritage** impact is likely to be of **low significance** as no sites, features or objects of cultural heritage significance were identified in the study area. In addition, the potential for impacts on palaeontology is very low.
- » The overall impact on **ecology** is likely to be of **low significance** given the implementation of mitigation measures. The impact rating should be seen from the point of view of the history of land-use on the site. The degraded nature of the site and the proximity to O'Kiep suggests that the development of the site would not significantly impact the connectivity of the landscape or disrupt any broad-scale ecological processes. No listed plant or animal species were observed on site, and there is little to suggest that the site would be an important area for any such species.
- » The overall **social and socio-economic** impact in terms of positive and negative impacts is likely to be of a **low significance** during both the construction and operational phases with the implementation of enhancement/mitigation measures. The potential negative impacts associated with the construction phase are typical of construction related projects and are expected to respond to the mitigation measures proposed. The possible job creation and

skills development are regarded as a **significant positive** injection into the area. The project would result in significant positive economic spin-offs for the local area and region primarily because of the labour intensive operational practices that would be associated with it.

The two power line options are relatively similar in their impact on the environment. Therefore, any of the power line options is potentially suitable. The choice of power line option will therefore depend on technical considerations.

The establishment of the facility will have positive benefits as the integration of an additional 15 MW capacity may alleviate the pressure on the local grid to a small extent and would contribute (albeit small) to the national target for renewable energy.

Therefore, based on the findings of the studies undertaken, in terms of environmental constraints identified through the initial Environmental Basic Assessment process, no environmental fatal flaws were identified with the establishment of the proposed O'Kiep 3 PV Plant and associated infrastructure (including the power line). The impacts which were identified and assessed were all of low significance due to the nature and scale of the project, as well as the nature of the site proposed to be developed. Therefore, it is recommended that the project should be authorised.

Environmental specifications for the management of issues / impacts are detailed within the Draft Environmental Management Programme (EMP) included within Appendix F.

No-go alternative (compulsory)

The 'Do-Nothing' alternative is the option of not constructing the proposed O'Kiep 3 PV Solar Energy Facility. Should this alternative be selected then the socio-economic and environmental benefits of this renewable energy facility will not be realised. These benefits include:

- » **Increased energy security,**
- » **Resource saving,**
- » **Exploitation of our significant renewable energy resource,**
- » **Pollution reduction,**
- » **Climate friendly development,**
- » **Support for international agreements,**
- » **Employment creation,**
- » **Acceptability to society and**
- » **Protecting the natural foundations of life for future generations**

In addition, the injection of an additional 15 MW of energy would be beneficial to the mines that abound in the area. The integration of an additional 15 MW should alleviate the pressure on the local grid to some extent and would contribute in a small way to meeting the government's target for renewable energy.

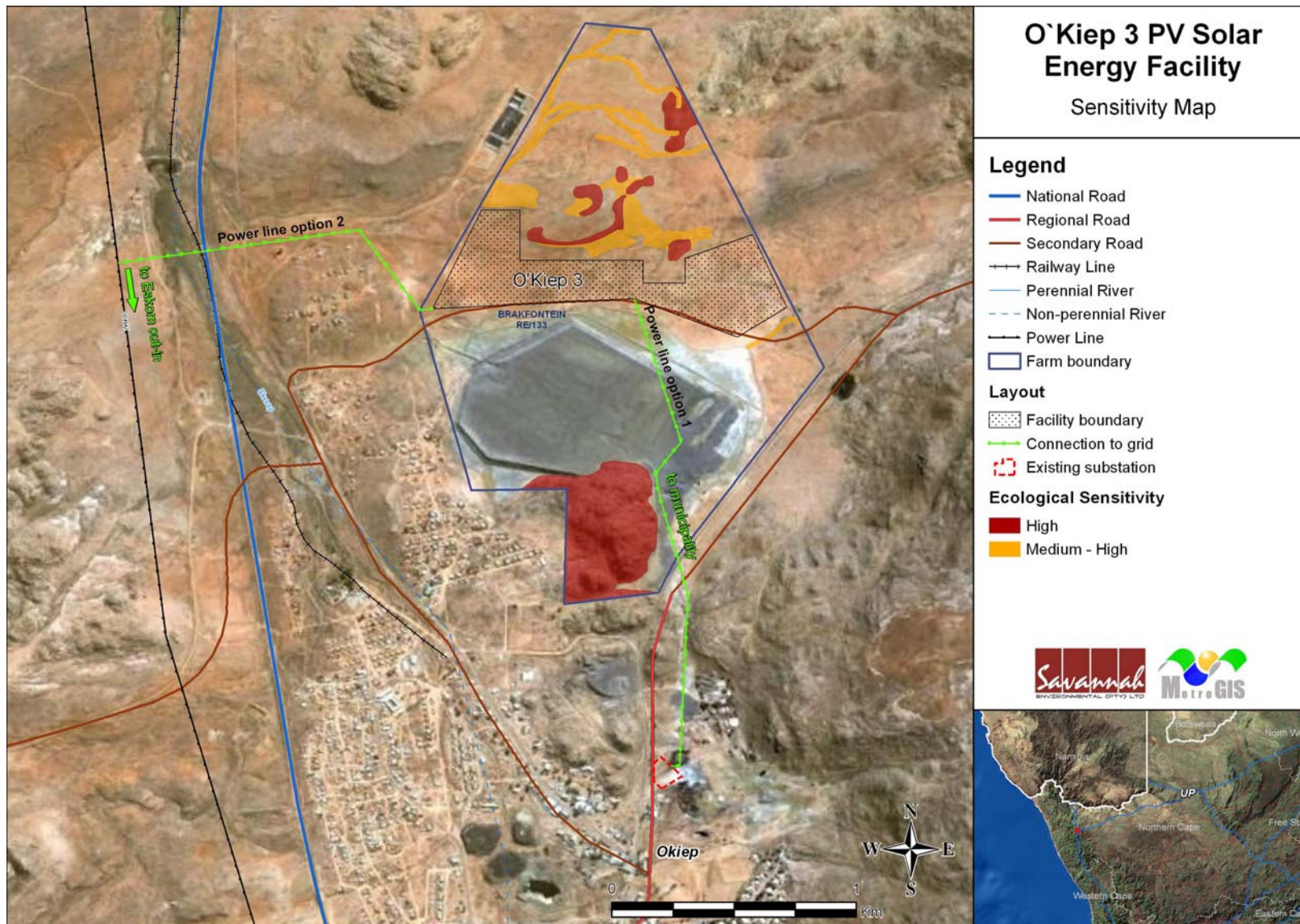


Figure 9: Sensitive areas as identified in relation to the proposed facility

SECTION E. RECOMMENDATION OF PRACTITIONER

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

YES



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

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

There are no fatal flaws associated with the establishment of the proposed O'Kiep 3 PV Plant. The facility has also avoided areas of high sensitivity as identified (see figure 9). The impacts which were identified and assessed were all of low significance due to the nature and scale of the project, as well as the nature of the site proposed to be developed. The impacts are considered acceptable from an environmental perspective, and any potential negative impacts can be mitigated to acceptable levels.

The construction of the proposed O'Kiep 3 PV Plant should be implemented according to the EMP to adequately mitigate and manage potential impacts associated with construction activities. The construction activities and relevant rehabilitation of disturbed areas should be monitored against the approved EMP, the Environmental Authorisation and all other relevant environmental legislation.

Relevant conditions to be adhered to include:

Design and Construction Phase:

The following mitigation and management measures should be implemented during the construction phase in order to minimise potential environmental impacts:

- » Appoint a suitably qualified independent Environmental Control Officer (ECO).
- » Establish the Terms of Reference for the ECO prior to the onset of the construction phase.
- » Demarcate all areas where no impacts will be allowed, clearly marking these areas with high visibility signs, inform all contractors and construction workers to refrain from entering/affecting these areas.
- » Prevent impacts on any surface water as a result of hazardous materials, contamination, unnecessary crossing by vehicles or personnel, extraction, drinking or other human uses, construction and maintenance activities.
- » Implement a weed monitoring and control programme.
- » All declared aliens must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (see Appendix 3), the implementation of a monitoring programme in this regard is recommended.
- » The removal or picking of any protected or unprotected plants shall not be permitted and no horticultural specimens (even within the demarcated working area) shall be removed, damaged, or tampered with unless agreed to by the ECO.

- » Make use of existing access roads, ensuring proper upgrade/ construction/ maintenance in order to limit erosion, proliferation of weeds.
- » Use of branches of trees and shrubs for fire making purposes is strictly prohibited.
- » Prevent open fires; provide demarcated fire-safe zones, facilities, and fire control measures.
- » Fire fighting equipment shall be made available on all vehicles and at various suitable points within the development site.
- » No animal may be hunted, trapped, or killed for any purpose whatsoever.
- » In the event that animals are present that may pose a risk to human safety, a suitable animal handler must be requested to remove the animal in an environmentally responsible manner. This specifically refers to snakes and scorpions.
- » Limit construction, maintenance, and inspection activities to dry periods in order to curb occurrence/ augmentation of erosion in areas of existing erosion, destabilizing of substrate in areas of high slopes, riparian zones, etc.
- » Develop an emergency maintenance operational plan to deal with any event of contamination, pollution, or spillages, particularly in riparian areas.
- » Use only local indigenous species in the rehabilitation/ revegetation process.
- » Compile a detailed waste management plan
- » Compile a storm water management plan.

Operation Phase:

The following mitigation and management measures should be implemented during the operation phase in order to minimise potential environmental impacts:

- » Development and implementation of a stormwater management plan.

Is an EMPR attached?

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