ENVIRONMENTAL BASIC ASSESSMENT PROCESS
DRAFT BASIC ASSESSMENT REPORT

PROPOSED ESTABLISHMENT OF THE MIDDLEBURG SOLAR PARK 1 EASTERN CAPE PROVINCE

(DEA Ref No:12/12/20/2465/2)

DRAFT FOR PUBLIC REVIEW
March 2012

Prepared for:

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environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

(For official use only)

File Reference Number:	
Application Number:	
Date Received:	

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

Kindly note that:

1. This basic assessment report is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2010 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.

2. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.

3. Where applicable tick the boxes that are applicable in the report.

4. An incomplete report may be returned to the applicant for revision.

5. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.

6. This report must be handed in at offices of the relevant competent authority as determined by each authority.

7. No faxed or e-mailed reports will be accepted.

8. The report must be compiled by an independent environmental assessment practitioner.

9. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
10. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.

PROJECT DETAILS

DEA Reference No.	:	12/12/20/2465/2
Title	:	Environmental Basic Assessment Process Proposed Establishment of the Middleburg Solar Park 1, Eastern Cape Province
Authors	:	Savannah Environmental Ravisha Ajodhapersadh Jo-Anne Thomas
Sub-consultants	:	David Hoare Consulting Albany Museum Rob Gess Consulting Outeniqua Geotechnical Services MetroGIS Tony Barbour Consulting Sustainable Futures ZA
Client	:	African Clean Energy Development (Pty) Ltd (ACED)
Report Status	:	Draft Basic Assessment Report for public review
Public Review Period		12 March 2012 - 16 April 2012

When used as a reference this report should be cited as: Savannah Environmental (2012) Draft Basic Assessment Report: Proposed Establishment of the Middleburg Solar Park 1, Eastern Cape Province.

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APPENDICES

SUMMARY AND OVERVIEW OF THE PROPOSED PROJECT

African Clean Energy Developments (Pty) Ltd (ACED) is proposing the development of a commercial Photovoltaic (PV) Solar Energy Facility on a site located approximately 20 km north of Middelburg (Eastern Cape Province) and ~14 km south of Noupoort (Northern Cape Province). The project is referred to as the **Middleburg Solar Park 1**. This site was previously investigated by ACED for the establishment of a wind energy facility (the Flagging Tress project), but has proven to be unfeasible for this technology due to the limited wind resource measured on the site. However, the site has proven to be potentially viable for the development of a PV solar energy facility. The Middleburg Solar Park 1 will be operated by a Special Purpose Vehicle (SPV) to be established for the project. The Middleburg Solar Park 2 is a separate ACED project which is proposed adjacent to the Middleburg Solar Park 1. Separate Environmental Authorisations and Basic Assessment reports have been prepared for each Solar Park. However, a single public involvement process being undertaken as the sites are adjacent two to one another. ***This draft Basic Assessment Report only deals with the Middleburg Solar Park 1. Solar Park 2 is dealt with in a separate Basic Assessment Report (DEA Ref. No: 12/12/20/2465/1.***

A broader area of approximately 859 ha is being considered within which the Photovoltaic (PV) facility (i.e. the Middleburg Solar Park 1) is to be constructed. The Middleburg Solar Park 1 is proposed on the Remainder of Farm 11 (Twee Fontein). The site is located within Ward 3 of the Inxuba Yethemba Local Municipality. A locality map showing the site is shown in **Figure 1.**

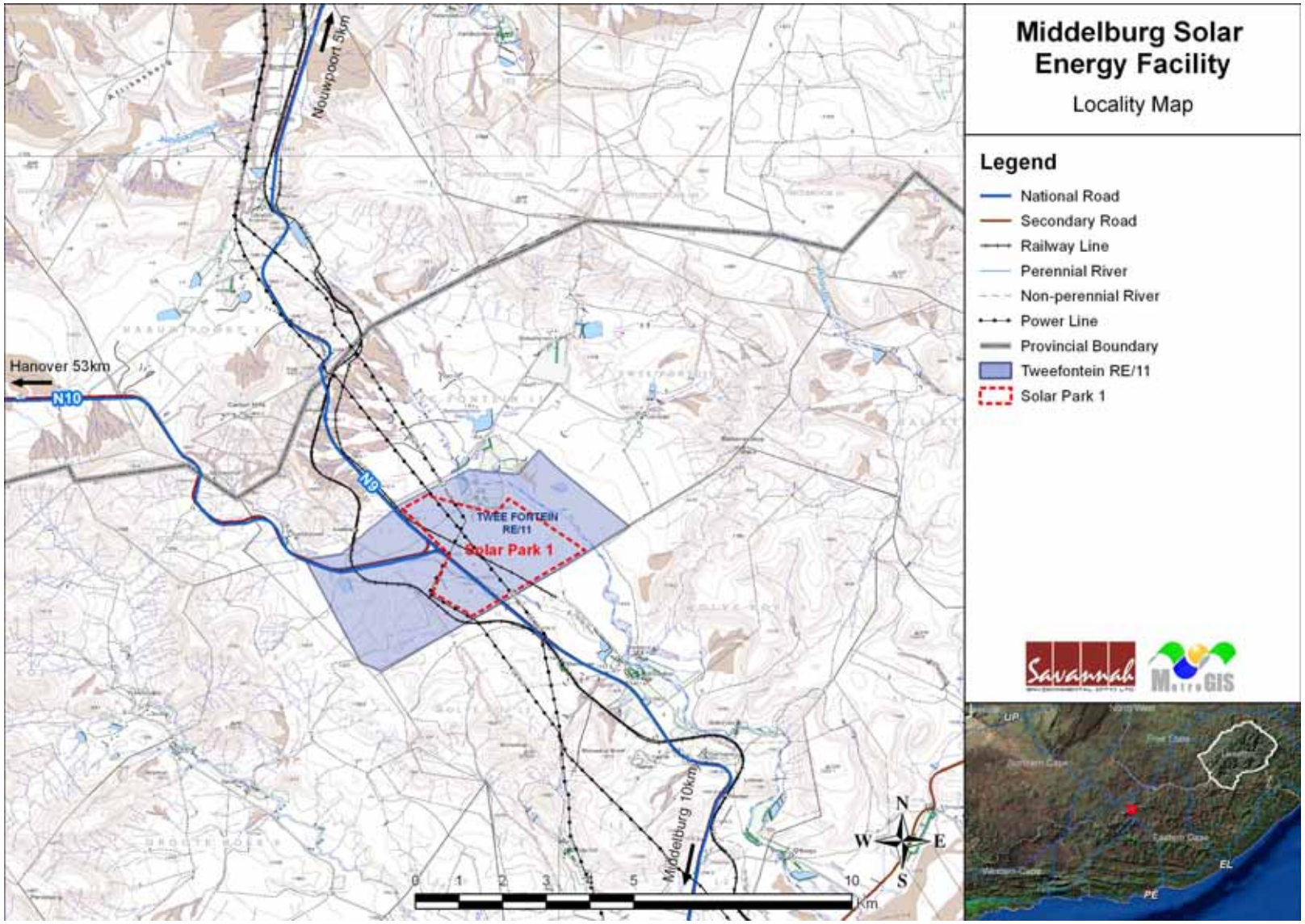

Figure 1: Locality Map for the Proposed Middleburg Solar Park 1

ENVIRONMENTAL BASIC ASSESSMENT PROCESS

An Environmental Assessment is an effective planning and decision-making tool. It allows the potential environmental consequences resulting from a technical facility during its establishment and its operation to be identified at an early stage, and appropriately managed. It provides the opportunity for the developer to be fore-warned of potential environmental issues, and allows for resolution of the issue(s) reported on in the design of the facility, as well as dialogue with affected parties.

There are two types of Environmental assessments, namely a Basic Assessment (BA) and a full Environmental Impact Assessment (EIA). A Basic Assessment is a simplified environmental assessment and a more concise analysis of the environmental impacts of smaller proposed developments, compared to a full EIA process which is usually associated with larger developments. The BA process is illustrated in the diagram below:

In terms of sections 24 and 24D of the National Environmental Management Act (Act No. 107 of 1998), as read with the EIA Regulations of GN R543 – R546, a Scoping and EIA process is required to be undertaken for the proposed project. However based on the motivation supplied to the National Department of Environmental Affairs (DEA) in terms of GN R543 20(4), a **downscaling** from a full EIA to a Basic Assessment Process has been approved for the proposed project and therefore a **Basic Assessment process** is being undertaken for the proposed project (DEA Correspondence is attached to **Appendix G3**) . The project has been registered with the DEA as the **competent authority** under the following application reference number: **12/12/20/2465/2.**

The following listed activities are applicable:

Notice Number	Activity	Description	Relevance of Regulation to Project
GN 544, 18 June 2010	10	*The construction of facilities or infrastructure for the transmission and distribution of electricity -* *(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or* *(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts*	The construction of a 132kV overhead power line from the solar facility to the Ludlow Substation.

Notice Number	Activity	Description	Relevance of Regulation to Project
		or more.	
GN 544, 18 June 2010	11	*The construction of:* *(i) canals;* *(ii) channels;* *(iii) bridges;* *(iv) dams;* *(v) weirs;* *(vi) bulk storm water outlet structures;* *(vii) marinas;* *(viii) jetties exceeding 50 square metres in size;* *(ix) slipways exceeding 50 square metres in size;* *(x) buildings exceeding 50 square metres in size; or* *(xi) 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, excluding where such construction will occur behind the development setback line.*	The construction of the proposed solar facility may impede on drainage lines on the site.
GN 544, 18 June 2010	13	*The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres.*	The facility may require the storage in containers with a combined capacity of 80 but not exceeding 500 cubic metres. This will be confirmed through the EIA process.
GN 544, 18 June 2010	22	*The construction of a road, outside urban areas,* *(i) with a reserve wider than 13,5 meters or,* *(ii) where no reserve exists where the road is wider than 8 metres, or* *(iii) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.*	The road width will be between 3 – 7m wide, therefore this listed activity does not apply to the proposed project.
GN 544, 18 June 2010	26	*Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).*	Impacts on orange or red data plant species may be a process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10

Notice Number	Activity	Description	Relevance of Regulation to Project
			of 2004). One red data specie that the site may provide habitat for *Boophane disticha* may occur on the site, therefore this activity may be applicable.
GN545, 18 June 2010	1	*The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more.*	The construction of a 75MW PV facility, for the generation of electricity.
GN545, 18 June 2010	15	*Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more; except where such physical alteration takes place for: (i) linear development activities; or (ii) agriculture or afforestation where activity 16 in this Schedule will apply.*	The development footprint is located within undeveloped land and will exceed 20ha in extent (The PV Facility and associated infrastructure will occupy any area of up to 350 hectares extent)

1.1 The Environmental Assessment Practitioners

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 these environmental studies, potential impacts have been assessed through detailed specialist studies, and interested and affected parties (I&APs) have been actively involved through a public involvement process. Neither Savannah Environmental nor any of its specialist sub-consultants on this project are subsidiaries of or are affiliated to ACED. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

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

The Savannah Environmental team have considerable experience in environmental impact assessments and environmental management, and have been actively involved in undertaking environmental studies, for a wide variety of projects throughout South

Africa, including those associated with electricity generation. The EAP's from Savannah Environmental who are responsible for this project are:

» Jo-Anne Thomas is a registered Professional Natural Scientist and holds a Master of Science degree. She has 14 years' experience consulting in the environmental field. Her key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. She is currently involved in undertaking siting processes as well as EIAs for several renewable energy projects across the country.
» Ravisha Ajodhapersadh, the principle author of this report, holds an Honours Bachelor of Science degree in Environmental Management and has 4 years' experience in environmental management. She has undertaken EIAs for other proposed solar energy facilities in South Africa.

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

» Ecology – David Hoare Consulting
» Soil and Agricultural Potential – Outeniqua Geotechnical Services
» Heritage Resources – Albany Museum
» Palaeontology – Rob Gess Consulting
» Social – Tony Barbour Consulting
» Visual Assessment - MetroGIS

CVs of the EIA project team is attached to **Appendix G1**.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section? NO ✓

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

Any specialist reports must be contained in Appendix D.

1. ACTIVITY DESCRIPTION

Describe the activity, which is being applied for, in detail[1]:

1.1 Components of a PV Facility

African Clean Energy Developments (Pty) Ltd (ACED) is proposing the development of the Middleburg Solar Park 1, on a site located approximately 20 km north of Middelburg (Eastern Cape Province) and ~14 km south of Noupoort (Northern Cape Province). The project is proposed on the Remainder of Farm 11. The electricity generation capacity of the facility will be up to 75MW.

Infrastructure associated with the proposed PV facility will include:

» Arrays of photovoltaic panels (roughly 340-350 PV panels (82 MWp) will be required for 75MW);
» Mounting structures to support the PV panels;
» Cabling between the project components, to be lain underground where practical;
» Invertors;
» Building a 132kV substation and one 132kV overhead power lines to connect into the existing Ludlow substation which is located on the same farm portion;
» Internal access roads; and
» Office building / workshop.

These components of the PV Facility is discussed in more detail below:

» **Photovoltaic panels**: A photovoltaic (PV) cell is made of silicone which acts as a semiconductor used to produce the photovoltaic effect. Individual PV cells are linked and placed behind a protective glass sheet to form a photovoltaic panel.
» **The Support Structure:** The PV panels will be fixed to a support structure set at an angle so to receive the maximum amount of solar radiation. The angle of the panel is dependent on the latitude of the proposed facility and the angles may be adjusted to optimise for summer or winter solar radiation characteristics.
» **Cables** between the PV panels: Underground cables from the arrays of panels will feed into the invertors.
» **Inverters:** The photovoltaic effect produces electricity in direct current. Therefore an inverter must be used to change it to alternating current. Approximately 132 inverters will

[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.

be required for the 75 MW facility.

» **Substation** (132 kV and 150 x 200m)
» One 132kV **overhead power line** (servitude width of 35m)
» Internal access **roads** (between 3 – 7m wide)
» **Office** / Workshop: The workshop area (13-20m long, 6-12m wide, 3-4m high)) will be used for storage and employees during the operational life of the facility.

A summary of the technical specification of the PV Facility is shown below.

PV Technology	**mono-axis tracker**
Installed capacity	75 MW
Panel Spec	Tier 1 Panels
Panel Dimensions	1665 x 991 x 50 mm (240W)
Number of Panels	341.880 (82 MWp)
Number of inverters	132
Distribution Transformers	66 (1250 kVA)
Main Transformer capacity	80 MVA
Final Height of installed panels from ground level	7 m
Height of inverters	2.15 m
Height of Transformers	2.15 m
Height of Buildings	3.10 m
Height of Fencing	2.20 m
Total area used for the plant	**~350 Hectares**

The entire farm portion will not be used for the PV facility and the actual area to be occupied by the PV Facility will be roughly 37 – 40 % of the farm portion (i.e. 512 hectares of a broader study area of 1392 hectares).

The PV panels are designed to operate continuously for more than 20 years, unattended and with low maintenance. An image of a PV facility is shown in **Figure 2**:

Figure 2: Illustration of a photovoltaic solar energy facility (Spain) (sourced from

http://australianmuseum.net.au/image/Solar-Power-Plant/)

1.2 Construction of a PV Facility:

In order to construct the proposed PV solar energy facility and associated infrastructure, a series of activities will need to be undertaken. The construction process is discussed in more detail below.

a) 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 servitudes.

b) Establishment of Access Roads to the Site

Access to the site (directly from the N19 onto gravel farm access roads) will be required. Within the site itself, access will be required to the individual facility components for construction purposes (and later limited access for maintenance). Upgrade of access roads within the site will be required and new access roads will be required. Access track construction would normally comprise of compacted rock-fill with a layer of higher quality surfacing stone on top. The strength and durability properties of the rock strata at the proposed site are not known at this stage; this will need to be assessed via a geotechnical study to be conducted by the project proponent. Depending on the results of these studies, it may be possible, in some areas, to strip off the existing vegetation and ground surface and level the exposed formation to form an access track surface. The final layout of the access roads will be determined following the identification of site related sensitivities.

c) Undertake Site Preparation

Site preparation activities will include clearance of vegetation at the footprint of each support structure, if required. These activities will require the stripping of topsoil which will need to be stockpiled, backfilled and/or spread on site.

d) 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)[2] 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 upgrade of the substation and site preparation.

e) Establishment of Laydown Areas on Site

Laydown and storage areas will be required for the typical construction equipment which will be required on site, and within the development footprint.

f) Erect PV Cells and Construct Substation & Inverters

The PV cells will be arranged in arrays. The frames will be fixed onto the ground with the use of

[2] A permit will be required for the transportation of these abnormal loads on public roads.

concrete / rammed into the ground, depending on the soil conditions, depending on the soil conditions at the site. This will make the installation of the plant less invasive for the territory and facilitate the decommissioning at the end of its production cycle. The height of the PV panel structure will be up to7 m.

Inverters will be installed to facilitate the connection between the solar energy facility and the Eskom electricity grid via the Ludlow substation (which is located on the site). The position of the inverters within the footprint of the broader site will be informed by the final positioning of the PV components.

g) Establishment of Ancillary Infrastructure (Power line, on site substation and office)

Ancillary infrastructure includes an on-site sub station, overhead 132kV power line feeding into the Eskom electricity network via the existing power line which located on the site to feed into the Ludlow substation, workshop, storage areas as well as a temporary contractor's equipment camp. Two feasible grid connection options are being considered, and are as follows

- Grid connection Option 1: This option includes a new substation (132kv) to be located next to the existing Ludlow substation and will have short (~210 m) 132 kV power line running back to Ludlow substation. Refer to **Figure 3.**
- Grid connection Option 2: This option includes 2 new substations (132kv) with a 132 kV line (~1 km in length) running back to Ludlow Substation. Refer to **Figure 4.**

Figure 3: Grid Connection **Option 1** (note: The new lines are pink and existing 66 kv line is orange and 132 kv lines are red).

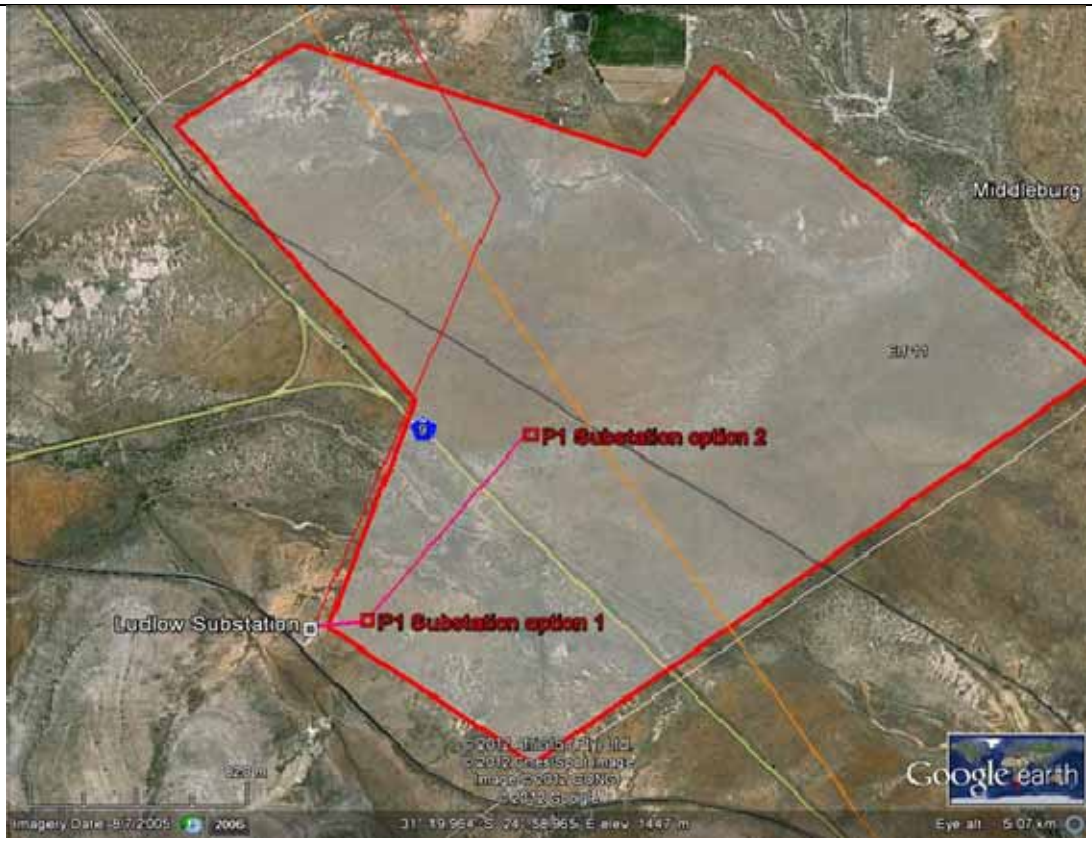

Figure 4: Grid Connection **Option 2** (note: The proposed new lines are indicated in pink, and existing 66 kV line is indicated in orange and the existing 132 kV lines are indicated in red).

Note that the final grid connection will depend on Eskom. These two options are both considered to be technically feasible potential connections (they are NOT alternative options).

The establishment of the above ancillary infrastructure will require the clearing of vegetation and levelling of the development site and the excavation of foundations prior to construction. A laydown area for building materials and equipment associated with these buildings will also be required.

h) Undertake Site Rehabilitation

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

1.3 Operation Phase

The electricity that is generated from the PV panels will be stepped up through the on-site inverters and feed into the Eskom Ludlow Substation which is located on the site, via overhead cables.

It is anticipated that a 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. Maintenance activities for the PV plant will include cleaning of the PV Panel's (using

water), trimming of vegetation (underneath the panels) and maintenance of the infrastructure. Water will be required for construction and cleaning the PV panels, as and when needed to remove dust that may collect on the panels. Approximately 4403 kilolitres of water per month (52883 m3/annum) will be during in construction phase and 463.7 kilolitres of water per month (15.25 m3/day or 5564 m3/annum) will be required during operations for cleaning the PV panels. ACED is looking into purchasing water from the relevant Local Municipality to supply water for the cleaning of the panels over the life of the solar park or the use of on-site bore holes (if sufficient water available).

1.4 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.

a) 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.

b) Disassemble Components

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

c) Rehabilitation

Disturbed area (where infrastructure has been removed) will be rehabilitated, if required, depending on the future eland-use of the facility.

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.

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

No site alternatives were proposed for this project as the placement of a solar facility is strongly dependent on several factors including climatic conditions, relief and orography, grid connection, the extent of the site, as well as availability of the site. This site has been identified by ACED 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*: This site was previously investigated by ACED for the establishment of a wind energy facility, but has proven to be unfeasible for this technology due to the limited wind resource measured on the site. However, the site has proven viable for the development of a PV solar energy facility. The economic viability of a photovoltaic plant is directly dependent on the annual direct solar irradiation values. A study of available radiation data shows that the proposed site is uniformly irradiated by the sun. In addition, compared to other areas in the country with similar irradiation, the site experiences moderate temperatures which are 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 topography of the area proposed for the PV facility is relatively flat.

» *Land availability and accessibility*: The land is available for lease or purchase by the developer. The site is also easily accessible from the N9road. 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.

» *Demand*: The evacuation of additional electricity into the Eskom National grid will serve to both strengthen the local grid itself and assist in the small scale alleviation of pressure on the electricity grid. PV panels provide reliable and uninterrupted power during daylight hours.

2.2 The type of activity to be undertaken

No activity alternatives were assessed because the site has been identified by ACED as being highly desirable for the establishment of a photovoltaic plant and not any other development or renewable technologies such as wind. ACED had previously investigated the site for the development of a wind energy facility; however after a year of wind measurement that was undertaken on the site, it was concluded that the site is not viable for a wind energy facility. Therefore wind energy installations were not considered as a feasible and reasonable alternative as the proposed developmental area does not have the required wind resource.

In addition, CSP installations were not considered as a feasible and reasonable alternative as they require a large amount of water unlike PV where water may only be required for cleaning purposes. CSP is well suited to very large scale generation sites that both take time to build and have a higher risk profile than a similarly related PV site. Therefore, a PV facility is considered by ACED to be the only feasible technology for the proposed site.

c) The design or layout of the activity

Design and Layout alternatives were not assessed during the compilation of the DBAR. However, based on the findings of the DBAR and environmental sensitivities identified, the layout may be revised in order to minimise environmental impacts.

No power line layout alternatives were assessed for the proposed route of the power line, as there is an existing powerline on the site and the intention is for the facility to connect to this powerline and the Ludlow substation. No feasible and reasonable alternatives were therefore identified for assessment.

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.

	Latitude (S):		Longitude (E):	
Alternative:				
Phase 1 (75MW) Alternative S1[3] (preferred or only site alternative)	31°	19.896'	24°	59.138'
Alternative S2 (if any)				
Alternative S3 (if any)	°	'	°	'

In the case of linear activities:

Powerline Options (both feasible):	Latitude (S):		Longitude (E):	
Option S1				
• Starting point of the activity	31°	20.375'	24°	58.523'
• Middle/Additional point of the activity	31°	20.379'	24°	58.465'
• End point of the activity	31°	20.385'	24°	58.403'
Alternative S2				
• Starting point of the activity	31°	19.995'	24°	58.912'
• Middle/Additional point of the activity	31°	20.231'	24°	58.669'
• End point of the activity	31°	20.385'	24°	58.403'
Alternative S3 (if any)				
• Starting point of the activity				
• Middle/Additional point of the activity				
• End point of the activity				

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

4. PHYSICAL SIZE OF THE ACTIVITY

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

Alternative:	**Size of the activity:**
Solar Park 1 (75MW) (preferred or only site alternative)	**5 120 000m²**
Alternative A2 (if any)	m²
Alternative A3 (if any)	m²

Or, for linear activities:

Alternative:	
Alternative A1 (preferred)	**m**
Alternative A2 (if any)	m
Alternative A3 (if any)	m

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

Alternative:	**Size of the site/servitude:**
Alternative A1	m²
Alternative A2 (if any)	m²
Alternative A3 (if any)	m²

5. SITE ACCESS

Does ready access to the site exist?	**YES ✓**
If NO, what is the distance over which a new access road will be built	

Describe the type of access road planned:

The site is directly accessible off the N9 national road, via farm access roads. The farm access roads will be upgraded. Existing roads are shown on **Figure 1**.

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

6. SITE OR ROUTE PLAN

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

The site or route plans must indicate the following:

6.1 The scale of the plan which must be at least a scale of 1:500;

6.2 The property boundaries and numbers of all the properties within 50 metres of the site;

6.3 The current land use as well as the land use zoning of each of the properties adjoining the site or sites;

6.4 The exact position of each element of the application as well as any other structures on the site;

6.5 The position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, street lights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;

6.6 All trees and shrubs taller than 1.8 metres;

6.7 Walls and fencing including details of the height and construction material;

6.8 Servitudes indicating the purpose of the servitude;

6.9 Sensitive environmental elements within 100 metres of the site or sites including (but not limited thereto):

- Rivers;
- The 1:100 year flood line (where available or where it is required by DWA);
- Ridges;
- Cultural and historical features;
- Areas with indigenous vegetation (even if it is degraded or invested with alien species);

6.10 For gentle slopes the 1 metre contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; and

6.11 The positions from where photographs of the site were taken.

A detailed site plan has been included 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?	R1,7-1,9 billion	
What is the expected yearly income that will be generated by or as a result of the activity?	R350-380 million	
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?	300-500	
What is the expected value of the employment opportunities during the development phase?	R30-50 million	
What percentage of this will accrue to previously disadvantaged individuals?	60-70%	
How many permanent new employment opportunities will be created during the operational phase of the activity?	12-20	
What is the expected current value of the employment opportunities during the first 10 years?	R2,75 million – 3,25 million	
What percentage of this will accrue to previously disadvantaged individuals?	70-80%	

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.	Explain:		
	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.		
3.	Will the land use / development have any benefits for the local communities where it will be located?	**YES** ✓	
4.	Explain:		
	Local communities surrounding the development site may benefit from limited job opportunities, primarily low to semi- skilled positions, during the construction phase, as well as from indirect benefits associated with accommodation, catering, local spending by contractors, etc. 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).		

10. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

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

Title of legislation, policy or guideline:	**Administering authority**:	**Date**:
National		
National Environmental Management Act (Act No 107 of 1998)	National and Provincial Department of Environmental Affairs	1998
Environment Conservation Act (Act No. 73 of 1989)	» Eastern cape DEDEA	1989
National Water Act (Act No 36 of 1998)	Department of Water Affairs	1998
Conservation of Agricultural Resources Act (Act No 43 of 1983)	Department of Agriculture	1983
National Environmental Management: Waste Act (Act No 59 of 2008)	Provincial (general waste) and national (hazardous waste) Department of Environmental Affairs	2008
National Heritage Resources Act (Act No 25 of 1999)	South African Heritage Resources Agency	1999
National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	National Department of Environmental Affairs	2004
National Forests Act (Act No. 84 of 1998)	National Department of Forestry	1998
Promotion of Access to Information Act (Act No 2 of 2000)	National Department of Environmental Affairs	2000
» Guidelines published in terms of the NEMA EIA Regulations, in particular: * Guideline 3: General Guide to Environmental Impact Assessment Regulations, 2010 (DEAT, June 2010) * Guideline 4: Public Participation in support of the Environmental Impact Assessment Regulations, 2010 (DEAT, June 2010) * Guideline 5: Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations, 2010 (DEAT, June 2010)	National Department of Environmental Affairs	2010
Aviation Act (Act No 74 of 1962)	CAA	1962
Provincial Legislation		
Eastern Cape Nature and Environmental Conservation Ordinance (No 19 of 1974)	EC DEDEA	1974
Eastern Cape Nature Conservation Act (No 10 of 1987)	EC DEDEA	1987
Land Use Planning Ordinance 15 of 1985	EC DEDEA	1985

Equator Principles		

11. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

11(a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	**YES** ✓
If yes, what estimated quantity will be produced per month?	± 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 vegetation, spoil material from cleaning activities as well as metal and cabling offcuts. Non-recyclable waste will be trucked to the nearest landfills in the area.

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

The Middleburg General Landfill.

Will the activity produce solid waste during its operational phase?	**NO** ✓
If yes, what estimated quantity will be produced per month?	m^3

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?	[redacted] **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?	[redacted] **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?	[redacted] **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 and when required, as dust accumulation reduces their efficiency. Water is proposed to be purchased from the local municipality or from boreholes. 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?	[redacted] **NO** ✓
If yes, is it controlled by any legislation of any sphere of government?	[redacted]

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 mining area. 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 X	Water board	Groundwater	River, stream, dam or lake	Other	The activity will not use water
Water required to clean the panels is proposed to be sourced and purchased from the local municipality.					

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:	Remainder of Farm 11 (Twee Fontein), within the Inxuba Yethemba Local Municipality.
	(Farm name, portion etc.) Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application.
	In instances where there is more than one town or district involved, please attach a list of towns or districts to this application.
Current land-use zoning:	Agricultural
	In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to , to this application.

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

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

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

The following plans have been 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

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

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

A slope map is shown in Figure 5.

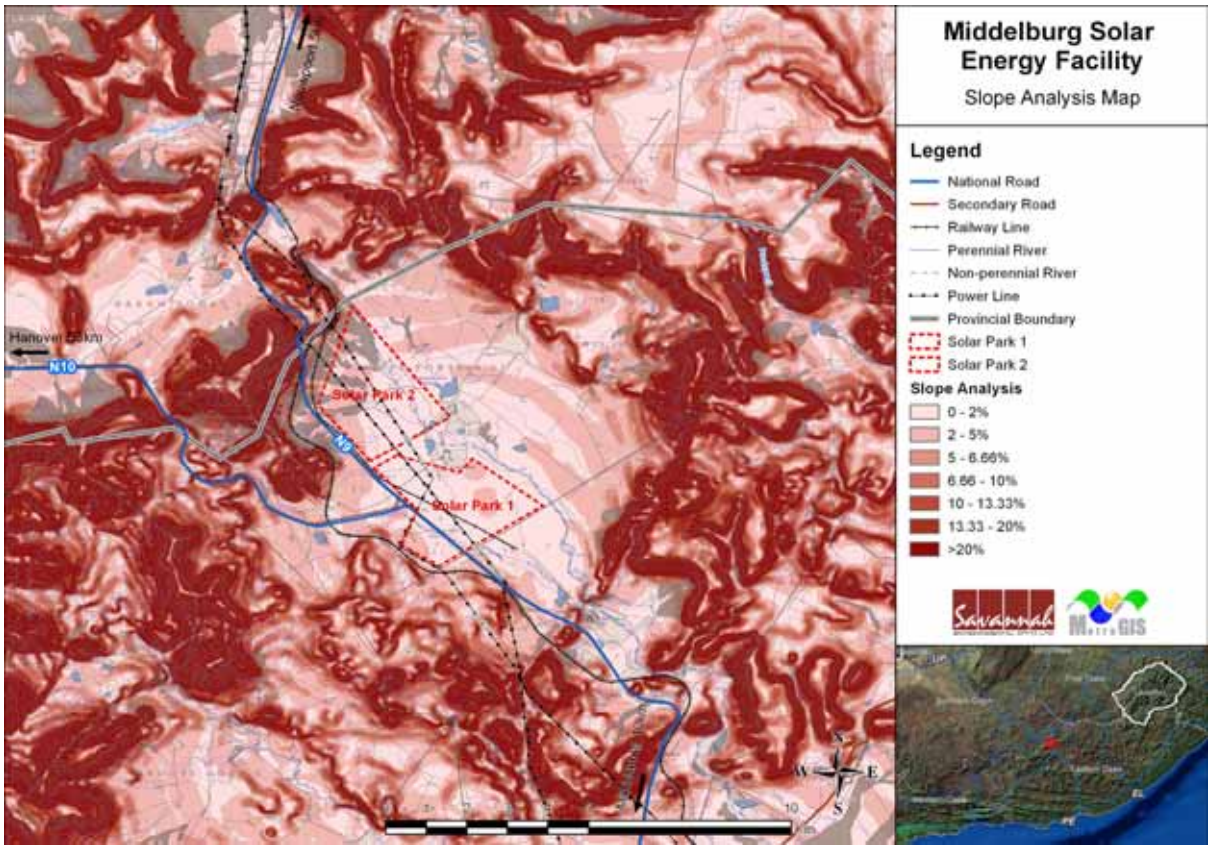

Figure 5: Slope Analysis Map

2. LOCATION IN LANDSCAPE

The site for the facility is located on plains and just south of the Kikvorsberg-Agter Renosterberg mountain range which include the scarp slopes and hills of these mountains. The plains (the site) are almost entirely surrounded by hills and mountain slopes.

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

2.1 Ridgeline
2.2 Plateau
2.3 Side slope of hill/mountain
2.4 Closed valley
2.5 Open valley
2.6 Plain
2.7 Undulating plain / low hills
2.8 Dune
2.9 Seafront

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

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

	Alternative S1:		Alternative S2 (if any):		Alternative S3 (if any):	
Shallow water table (less than 1.5m deep).	YES ✓		YES	NO	YES	NO
Dolomite, sinkhole, or doline areas.		**NO** ✓	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies).	**YES** ✓		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 proposed solar park is situated in a wide drainage basin surrounded by prominent mountainous terrain. The most prominent peaks surrounding the valley are Carlton Hills (1862m), which is situated to the northwest, and Bakkeneeskop (1838m), which is situated to the east of the site. The valley floor is drained by numerous ephemeral channels which generally flow in a south-easterly direction.

» **Geology**

The proposed site is underlain by significantly thick deposits of largely unconsolidated alluvium of Quaternary age (less than 2Ma). This alluvium has been deposited over many thousand years from the continual erosion of the surrounding hills. The alluvium is underlain at an unknown depth by interbedded layers of fine grained sandstone and red, green or grey mudstone of the Katberg Formation (Triassic age). Similarly, the surrounding hills are also formed from the same rock types. In places, these sedimentary rocks have been intruded by Jurassic-age dolerite dykes and sills. Horizontal dolerite intrusions (sills) typically form resistant caps to the surrounding hills, inhibiting erosion of the underlying softer sedimentary strata, and thus resulting in flat-topped hills. This is a common topographical feature in the Karoo landscape.

Two inconspicuous dolerite dykes, trending north-south and east-west occur on the valley floor in close proximity to the proposed sites, crossing each other in the vicinity of the Guest Lodge**.** The dykes form very low ridges on the valley floor and are not easily detected by the untrained eye. There are no geological faults indicated on the 1:250 000 map in the immediate vicinity of the site and the site is situated in a zone of low seismic activity.

» **Soils and Land Types**

The soil texture on the site is variable, ranging from alluvial gravels to fine silt deposits. The latter type is highly erodible and significant erosion has taken place in this area in the past. Pro-active measures have been put in place by the farmers in affected areas in order to attenuate stormwater flow from the surrounding hills and reduce erosion of valuable soil.

Detailed soil information is not available for broad areas of the Eastern Cape. As a surrogate, landtype data was used to provide a general description of soils in the study area (landtypes are areas with largely uniform soils, topography and climate). There are a variety of landtypes in the study area. The most common landtypes in the study area are Da, Fb and Ib (Land Type Survey Staff, 1987). The landtype associated with the exact position of Solar Parks 1 is the Da landtype (refer to **Figure 5**), associated with the lowland plains of the study area. The Da landtype consists of duplex soils (sandier topsoil on clay subsoil) with red B horizons. These are the deeper, more structured soils of the plains areas. The Fb landtype consists mostly of shallow and/or rocky, slightly leached soils, often with lime. These also occur primarily on the plains, but also on the flat slopes on the summits of the mountains. The Ib landtype consists of 60-80% rock with shallow and/or rocky soils. These are the soils on the scarp slopes of the mountains and hills overlooking the plains.

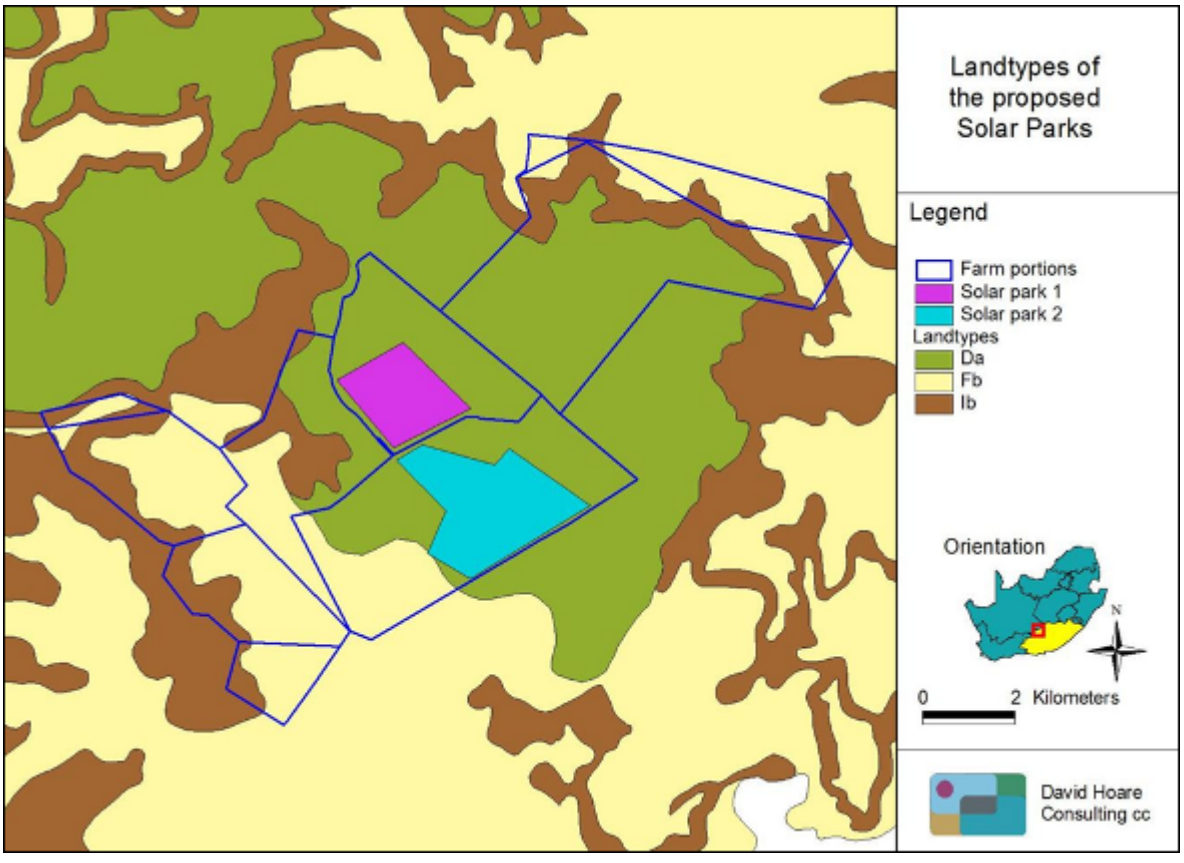

Figure 5: Landtypes of the site and broader study area

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.

A full ecological report is contained in **Appendix D1**. The dominant landcover is classified as "Shrubland and low fynbos", a reference to the karroid vegetation on site. The upland areas have greater grass cover, but are still characterised by the dominance of karroid dwarf shrubs. Modifications to the natural vegetation in the study area include some small areas of cultivation, farms dams and conservation works, the national roads passing through the area, homesteads and a railway line.

» **Broad vegetation types of the region**

The study area falls on the interface between the Nama-Karoo and Grassland Biomes (Rutherford & Westfall 1986, Mucina & Rutherford 2006). The most recent and detailed description of the vegetation of this region is part of a national map (Mucina, Rutherford & Powrie, 2005; Mucina et al. 2006). This map shows four vegetation types occurring within the broad study area, namely ***Eastern Upper Karoo***, ***Besemkaree Koppies Shrubland***, ***Tarkastad Montane Shrubland*** and ***Karoo Escarpment Grassland***. However, only Eastern Upper Karoo vegetation will be directly affected by the proposed project, as shown in **Figure 6.**

Eastern Upper Karoo vegetation is dominated by dwarf microphyllous shrubs with 'white' grasses, mostly of the genera *Aristida* and *Eragrostis*. It occurs on the flats and gently sloping plains that are interspersed with hills and rocky areas. It is found on the lowland plains of the study area (Figure 6) and is the most commonly occurring vegetation type on site. This is the only vegetation type that will be directly affected by the proposed project. Eastern Upper Karoo is considered to be Least Threatened, with <1% conserved of a target of 21% and 2% transformed (Mucina *et al*. 2006b).

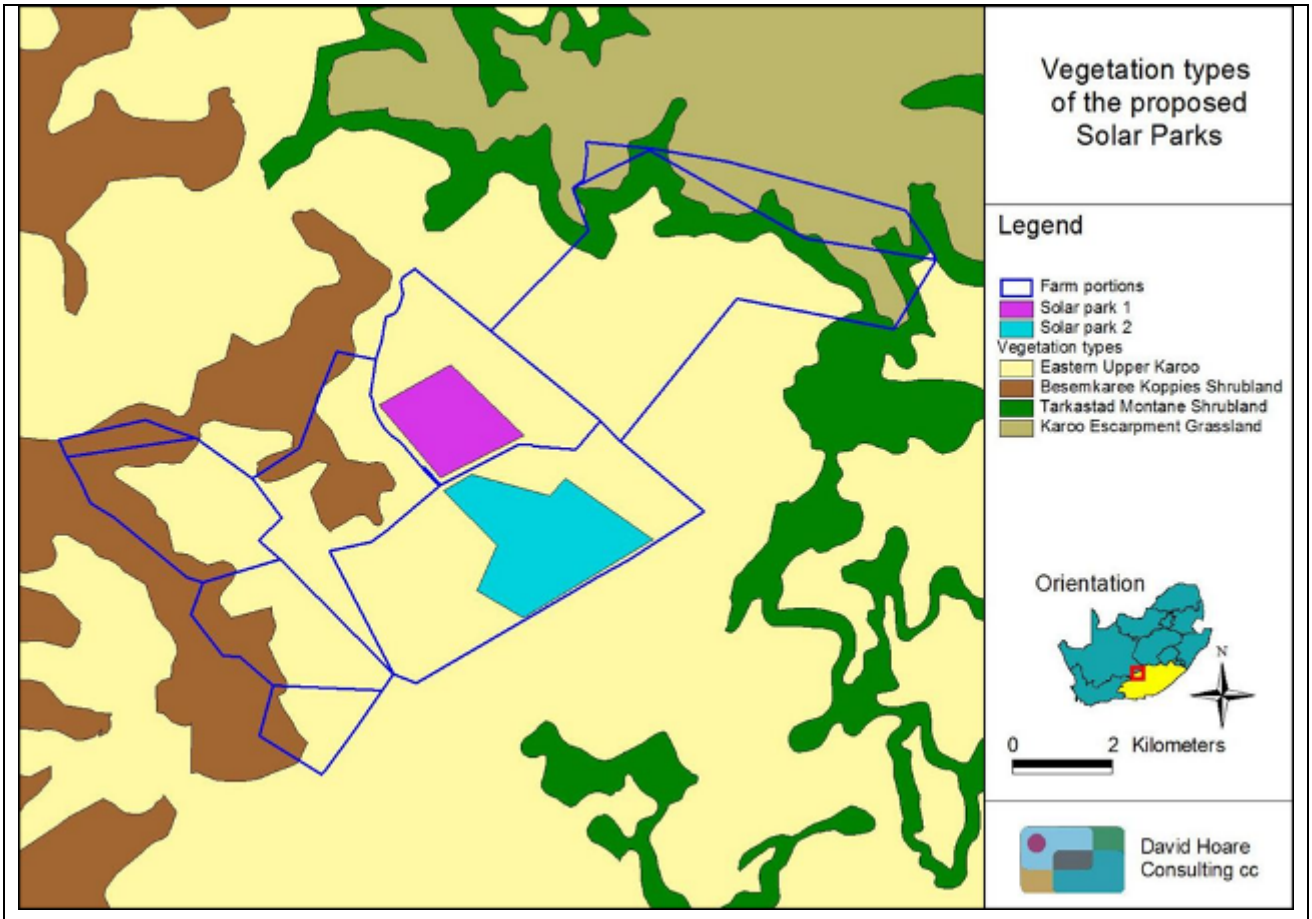

Figure 6: Vegetation types of the study area

» **Plant species of conservation concern in the study area**

Species of conservation concern that have historically been recorded from the area were evaluated to determine the likelihood of any of them occurring on site. Of the species that are considered to occur within the geographical area under consideration, there was one species of conservation concern recorded that could occur in habitats that are available in the study area and that has been previously recorded nearby (see Appendix 4 of ecology report). This species (*Boophane disticha*) is listed as Declining in South Africa and is not considered to be of major conservation concern for the project. Furthermore, it is unlikely to occur in the lowland habitats of the site.

» **Conservation Planning**

The site does not occur within any Critical Biodiversity Areas (CBAs) as defined by the Eastern Cape Biodiversity Conservation Plan (ECBCP).

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 this impact will / be impacted upon by the proposed activity?
If YES, specify and explain:
If YES, specify:

The land-use character of the site and surrounding area consists primarily of agricultural farms used as rangeland for commercial livestock production. Commercial farming systems are characterised by land stocked at economically sustainable levels. This region h been commercially farmed as stock ranches for close to 100 years. The following features occur around the site and are shown in **Figure 7**:

- N9 National Road – The N9 national road passes the site. The PV panels will not impact on the road, as no PV panels will occur on or directly next to the road. ACED will use a buffer from the road, based on discussion with SANRAL.
- Railway Line – A railway line runs alongside the site, the PV facility will not impact on the railway line as no infrastructure will occur on or directly next to the railway line.
- River, stream or wetland – non-perennial drainage lines occur outside the site, however the PV facility will not impact directly on these drainage lines.
- Mountain range - The site is located just south of the Kikvorsberg-Agter Renosterberg mountain range. It includes the scarp slopes and hills of these mountains, but mostly the plains just to the south of the mountain ranges. The plains are almost entirely surrounded by hills and mountain slopes. The PV facility will not impact directly on this mountain range.
- Farm dams – These are farm dams scattered in the surrounding are, however the PV facility will no impact on these farm dams.

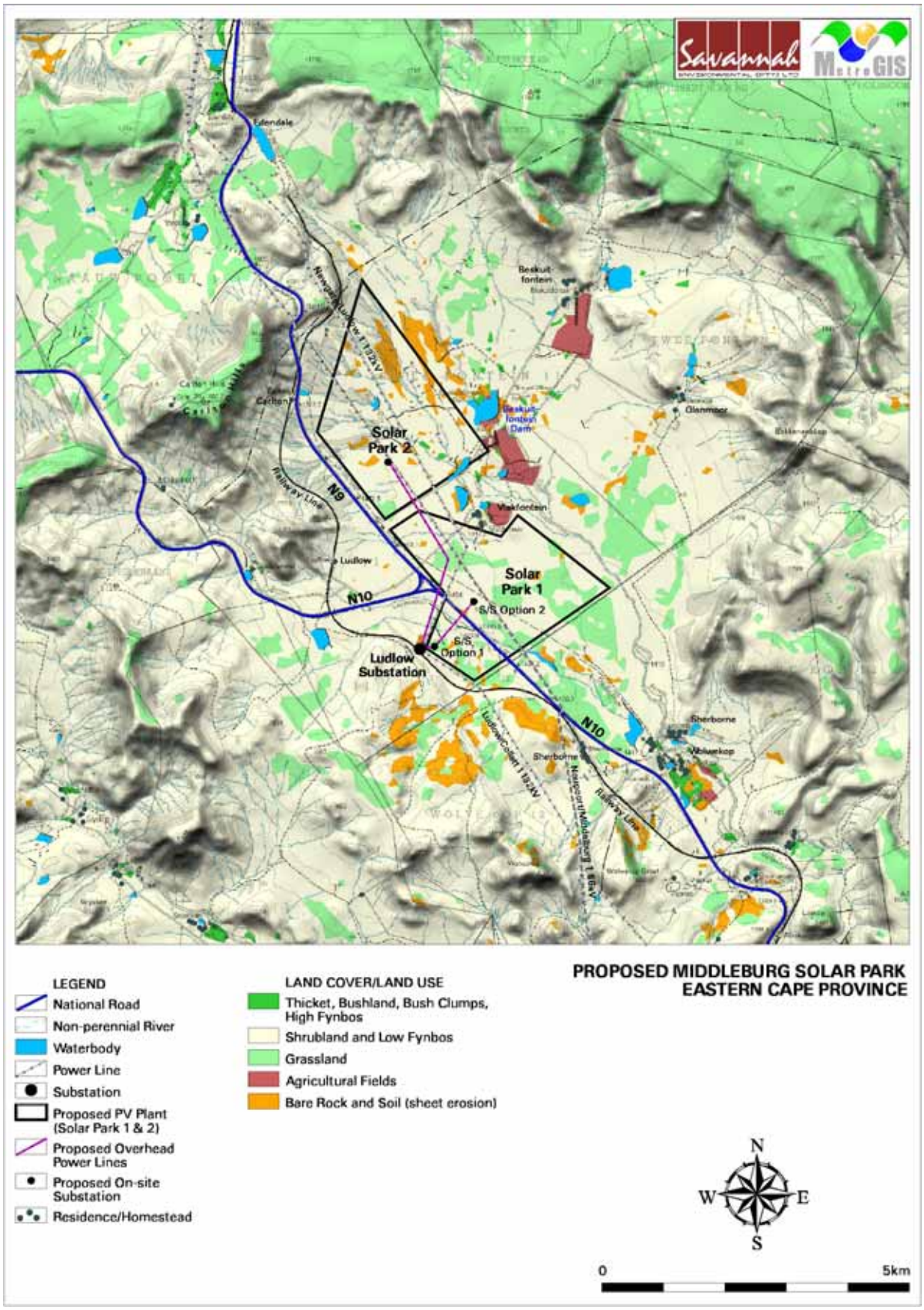

Figure 7: Land Cover and Land0Use Map of the study area

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

If YES, explain:

A Heritage Impact Assessment was conducted by an archaeologist and is contained in **Appendix D2**, and heritage artefacts have been recorded on the site itself and their location is shown in **Figure 8**. Heritage artefacts recorded on the site include:

» Stone artefacts.
» Isolated scatters of weathered Middle Stone Age (MSA) stone artefacts (including flakes and blades with retouch (including some pronounced denticulation) and edge-damage mainly manufactured on hornfels and some shale raw materials).
» A rocky outcrop located near the central northern corner border of the proposed area contained several Middle Stone Age (MSA) and Later Stone Age (LSA) stone artefacts as well as some historical artefacts. The rocky outcrop runs east-west and is approximately 100m in extent. The Middle Stone Age (MSA) stone artefact collection comprised weathered and patinated hornfels flakes and blades showing evidence of retouch, edge-damage, and recent damage caused by trampling and/or human activities. The scatter of Middle Stone Age (MSA) stone artefacts extends to the central northern border of the proposed development area, although less stone artefacts occur to the south of the rocky outcrop.
» Later Stone Age (LSA) stone artefacts occur mainly from the centre of the rocky outcrop to the eastern-most extent of the stone artefact scatters. Other stone implements included scraper-like stone artefacts. All of the Later Stone Age (LSA) flakes, chips, and formal implements (mainly scrapers) were manufactured on hornfels (fine-grained black material) raw material. Worked glass artefacts, mostly dark green and dark blue, shaped into scraper-like implements, were observed and documented within the central area of the rocky outcrop. A few worked fragments of stoneware pottery were also observed in association with the Later Stone Age (LSA) and worked glass artefact scatters.
» A circular dry stone walling feature is situated approximately 350m south of the Vlakfontein farmstead house.
» The remains of the original railway line runs across the south-eastern corner of the area east of the N9 national road.

The NHRA stipulates the assessment criteria and grading of archaeological sites. The following categories are distinguished in Section 7 of the Act as

follows:

- Grade I: Heritage resources with qualities so exceptional that they are of special national significance;
- Grade II: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region; and
- Grade III: Other heritage resources worthy of conservation on a local authority level.

The occurrence of sites with a Grade I significance will demand that the development activities be drastically altered in order to retain these sites in their original state. For Grade II and Grade III sites, the applicable mitigation measures would allow the development activities to continue.

These heritage artefacts that occur on the site have been given a rating of Grade III, therefore mitigation will be required.

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

Briefly explain the findings of the specialist:

» The area proposed for Middleburg Solar Park 1 has a medium to high cultural sensitivity.
» The exposed Middle Stone Age (MSA) stone artefact surface scatters show evidence of the landscape was inhabited by pre-colonial populations from about 250 000 years ago. It is unlikely that these stone artefacts may be found in situ, and generally considered to be in a disturbed and secondary context. No other organic or material culture was documented in association with the isolated occurrences of the Middle Stone Age (MSA) stone artefacts. The site (Site TF1 – see HIA report) and associated material on and around the rocky outcrop show evidence that the San hunter-gatherers inhabited this landscape although may have occupied caves and rock shelters within the surrounding mountains. The occurrence of both historical material such as glass and ceramics in association with Later Stone Age (LSA) stone artefacts indicate interaction between the early colonial settlers, trekboers, or pioneers travelling through the area.
» The dry stone walling feature shows evidence of historical domestic stock farming if the feature was intentionally packed as a kraal.
» The remains of the original railway line marks the first attempt to connect South Africa through the railway lines.
» Should the identified heritage artefacts be removed / destroyed, a permit will be required from SAHRA.
» The area is of a medium-high cultural sensitivity, the following recommendations have been made:
    o The remains of the old railway and railway siding are situated outside of the border of the proposed development and must be protected during all construction and development activities to avoid negative impact.

- A 50m diameter protection perimeter around the circular dry stone walling feature must be established before and during all construction and development activities to avoid negative impact.
- A 100m diameter protection perimeter around the archaeological site on the rocky outcrop must be established before and during all construction and development activities to avoid negative impact.
- The location of the undetermined brick feature must be noted and avoided during all construction and development activities.
- A professional archaeologist (with an already authorised collection permit) must be appointed during all construction and development activities including vegetation clearing and the excavation activities to monitor and identify possible archaeological material remains and features that may occur below the surface and make further appropriate recommendations on removing and / or protecting the archaeological material remains and features.
- If concentrations of archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the Albany Museum (046 622 2312) and/or the South African Heritage Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation/ excavation can be undertaken.
- Construction managers/foremen should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.

Where possible the design of the PV plant may accommodate certain heritage sites however in some cases removal of the artefacts and a permit from SAHRA will be required.

Will any building or structure older than 60 years be affected in any way?	**YES** ✓	
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	**YES** ✓	

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.

A **permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999 will be done once the design of the facility has been** finalised.

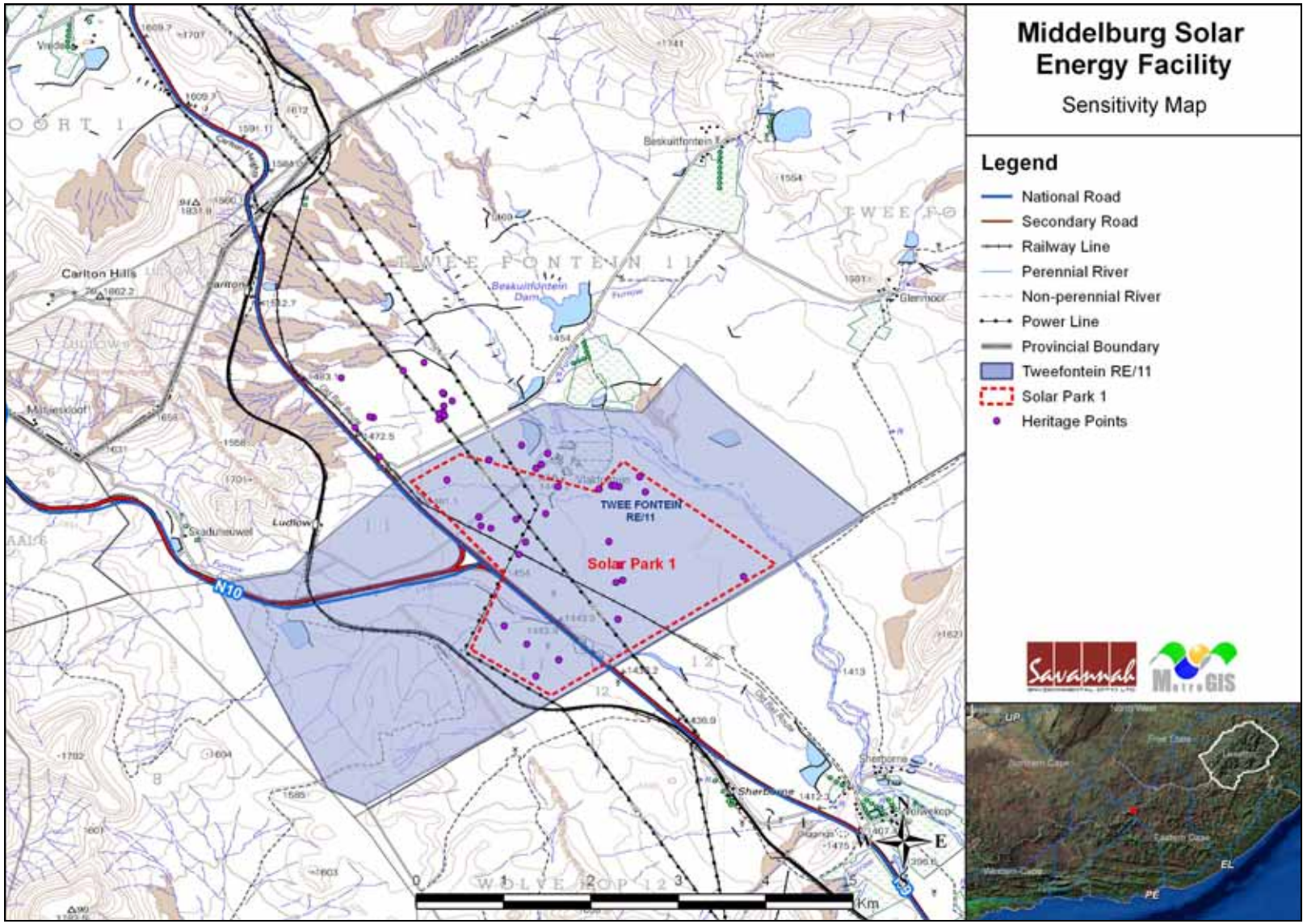

Figure 8: Grade III Heritage Artefacts located on the site

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT

Notices advertising the proposed project were placed / distributed as follows (refer to **Appendix E1** for these documents):

» A2 site notices were placed on the entrance to the proposed development site in December 2011.
» A4 notices were placed at the entrance at the Middleburg Spar and Middleburg Library in December 2011.
» A newspaper advert advertising the EIA process and project was placed in the following newspapers:
    o The Eastern Cape Herald (10 February 2012)
    o The Somerset Budget (9 February 2012).

A second round of newspaper adverts will be published in March 2012 advertising the draft BA report for public review and public meeting date.

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 Somerset Budget) and additionally in a provincial newspaper (The Eastern Cape Herald).

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. Proof of the advertisement placed is included within **Appendix E1**.

4. DETERMINATION OF APPROPRIATE MEASURES

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

The following mechanism were deemed appropriate and used as part of the public participation process:

» Hosting of a public meeting on 13 March 2012 at the Middleburg Town Hall from 17:30 -18:30.
» Distribution of letters to all relevant Organs of State (February 2012).
» Focus group meetings to be held during the public review period for the draft BAR.
» Identification of adjacent landowners, and notification via registered letters (current).
» Distribution of a Background Information Document (BID) to registered I&APs.

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 issues, comments, and/or concerns have been raised to date. any additional comments will be included in the Final BA report to be submitted to DEA within the Comments and Response 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 via letter included:

» Eastern Cape Department of Economic Development and Environmental Affairs
» Inxuba Yethemba Local Municipality
» Ward Councillor – Sydney Goniwe
» Chris Hani District Municipality
» Civil Aviation Authority
» Eastern Cape Transport - District Roads -Infrastructure
» SAHRA
» Eastern Cape Department of Water Affairs
» National Department of Agriculture, Forestry and Fisheries (DAFF)
» SANPARKS
» SANRAL- Southern Region

Refer to **Appendix E6** for proof of notification of these organs of state.

List of authorities from whom comments have been received:

Comments were received from the following authorities and are contained in **Appendix E7**:

» SANPARKS: This area is nowhere near any actual or proposed national parks and so SANParks is not an interested or affected party.
» DAFF: your application has been captured in our electronic AgriLand tracking and management system. It is strongly recommended that you use the on-line AgriLand application facility in future.

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 E4** and with proof of consultation with stakeholders attached in **Appendix E5.**

		NO
Has any comment been received from stakeholders?		✓

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

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 issues raised by interested and affected parties to date.

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

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 agricultural activities and therefore no excavation/exploratory work which may affect the environment is anticipated to be required.

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 / only 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 details the potential environmental impacts on heritage resources, soil erosion and agricultural potential and ecological impacts on flora and fauna.

a) Potential impacts on heritage resources

As discussed under Section 6 of this report (and in Appendix D2 – the HIA report) there are 20 heritage sites / artefacts that have been identified within the Park 1 area, and are shown in **Figure 9**. These heritage artefacts are from the Stone Age and Middle Stone Age. They have been given a Grade III rating in terms of the NHR Act 25 of 1999, which means mitigation against negative impacts (damage) is required, along with a permit for removal of these artefacts (from SAHRA). Damage to these heritage artefacts may occur during construction in the absence of mitigation measures (i.e. removal of the artefacts prior to construction), as the placement of the PV panels and associated infrastructure is proposed in and around these heritage sites. The construction of the PV facility will require clearing of vegetation for access roads, cutting of vegetation for the PV panel structures, as well as the presence of construction personnel on the site. The construction activities pose a risk to damage of the heritage artefacts while using construction machinery such as trucks, excavators and hand held tools. The site has been rated as having a medium-high cultural sensitivity and the following recommendations are made:

- » The remains of the old railway and railway siding situated outside of the border of the proposed development must be retained.
- » A 50m diameter protection perimeter (buffer) around the circular dry stone walling feature must be established before and during all construction and development activities to avoid negative impact. Should this not be possible, a permit must be obtained from SAHRA.
- » A 100m diameter protection perimeter (buffer) around the archaeological site on the rocky outcrop must be established before and during all construction and development activities to

avoid negative impact. Should this not be possible, a permit must be obtained from SAHRA.

» The location of the undetermined brick feature must be noted and avoided during all construction and development activities. Should this not be possible, a permit must be obtained from SAHRA.

Impact Table summarising heritage impacts:

Nature: The destruction of heritage artefacts that occur on the site during construction.		
	Without mitigation	**With mitigation**
Extent	Regional (5)	Low (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Very High (10)	Moderate (6)
Probability	Highly Probable (4)	Probable (3)
Significance	**High (80)**	**Medium (36)**
Status (positive or negative)	Negative	Negative
Reversibility	None	Low
Irreplaceable loss of resources?	Yes	Low
Can impacts be mitigated?	Yes	Yes

Mitigation:

» A professional archaeologist (with an already authorised collection permit) must be appointed during the various phases of development including vegetation clearing and the excavation activities to monitor and identify possible archaeological material remains and features that may occur below the surface and further make appropriate recommendations on removing and / or protecting the archaeological material remains and features.

» If concentrations of archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the Albany Museum (046 622 2312) and/or the South African Heritage Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation/ excavation can be undertaken.

» Construction managers/foremen should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.

Cumulative impacts:

- Irreplaceable loss of archaeological heritage resources.

Residual impacts:

- Irreplaceable loss of archaeological heritage resources.

Implications for project implementation:

» A professional archaeologist (with an already authorised collection permit) must be appointed during the various phases of development including vegetation clearing and the excavation activities to monitor and identify possible archaeological material remains and features that may occur below the surface and further make appropriate recommendations on removing and / or protecting the archaeological material remains and features.
» A permit from SAHRA is required for the removal or destruction of heritage artefacts as shown in Figure 9.

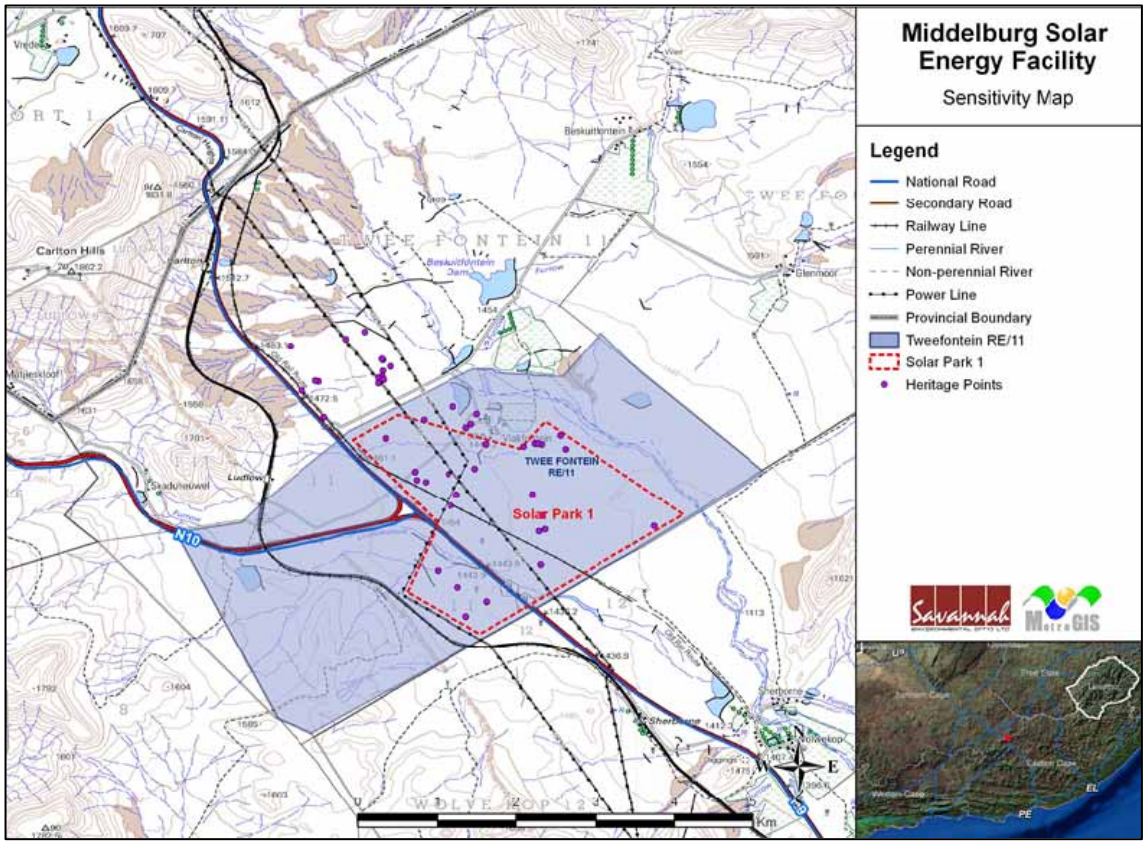

Figure 9: Grade III Heritage Artefacts located on the site

b) Potential impacts on Palaeontology

The alluvial cover in the northern central part of Solar Park 1 is very thin or absent, exposing uppermost Balfour Formation mudstones. These are fossiliferous, containing significant vertebrate fossil remains of a high quality as well as plant fossil remains. These are made all the more important by their proximity in age to the faunal and floral turnover of the end Permian extinction event. It is highly likely that construction of new roads and infrastructure within these areas will result in exposure of important paleontological resources. It is therefore recommended that the environmental management plan should require that new exposures of mudstone resulting from the construction phase should be inspected by a palaeontologist. Any fossil material noticed during construction activities should be reported to SAHRA and a palaeontologist.

c) Potential impacts on soil

The PV Facility will not impact on agricultural potential. The landtype associated with the Solar Parks 1 is the Da landtype (refer to **Figure 5**), associated with the lowland plains of the study area. The Da landtype consists of duplex soils (sandier topsoil on clay subsoil) with red B horizons. These are the deeper, more structured soils of the plains areas. Construction of the solar park may cause a negative direct impact of degradation of soil and/or rock (excavation/removal, loosening, compaction, contamination/pollution, etc.) or soil erosion which may also lead to indirect impacts such as dust pollution and siltation away from the site. The negative impacts are dominantly related to the construction phase with insignificant additional impacts in the post construction, operations and decommissioning phases.

Soil degradation is the negative alteration of the natural soil profile, usually directly or indirectly related to human activity. Soil degradation due to construction activity will negatively affect soil formation, natural weathering processes, moisture levels, and soil stability. This will, in turn, affect biological processes operating in the soil. Soil degradation includes erosion (i.e. due to water and wind), soil removal, mixing, wetting, compaction, pollution, salinisation, crusting, and acidification.

Soil erosion is a natural process whereby the ground level is lowered by wind or water action and may occur as a result of *inter alia* chemical processes and/or physical transport on the land surface. Soil erosion induced or increased by human activity is termed *accelerated erosion* and is an integral element of global soil degradation. Erosion of soil due to water run-off is generally considered as more important due to the magnitude of the potential impact over a relatively short period of time which can be very difficult to control or rehabilitate. Erosion by water occurs when the force exerted on the soil by flowing water exceeds the internal shear strength of the soil and the soil fails and becomes mobilised into suspension. Erosion potential is typically increased in areas where soil is loosened and vegetation cover is stripped (such is the case on construction sites). Removal of vegetation (ground cover) may increase the risk of soil erosion, making the soil less fertile, and less able to support the regeneration of vegetation in future.

In the event of heavy rainfall, surface run-off will result in erosion along drainage lines (and in areas that are cleared of vegetation, although in the case of this development, full vegetation clearing is not envisaged across the entire site (vegetation will be shortened/maintained to prevent spread of fire and shadows on the panels). The proposed sites for Park 1 and Park 2 are presently in a moderate to poor state of erosion, specifically in the highly sensitive areas identified in **Figure 10**. Erosion is a historical problem on the farm which is actively being addressed by the current landowner. Additional soil erosion control could aid this process if it is handled carefully.

Specifically relating to the site in question, the geology of the site indicates that the proposed development is potentially underlain by thick deposits of unconsolidated alluvium. Certain parts of the site have been identified as being sensitive in terms of erosion as shown in **Figure 10** and these areas are listed in the table below.

Table 1: Water erosion sensitivity areas of the site

Sensitivity Level	Geological Formation / Terrain Units	Comments / Recommend
High	Natural drainage lines/watercourses	No-go areas without mitigating measures. presently taking place.
Medium	Other areas underlain by unconsolidated sediment (e.g. alluvium, aeolium)	Moderate levels of erosion if land-disturbing activities (construction). Mitigating to be applied to minimise i
Low	Areas underlain by shallow rock	Minor erosion will natura Normal mitigating measure

Soil contamination may occur during construction due to the use of chemicals, oils, and diesel, in the absence of mitigation measures.

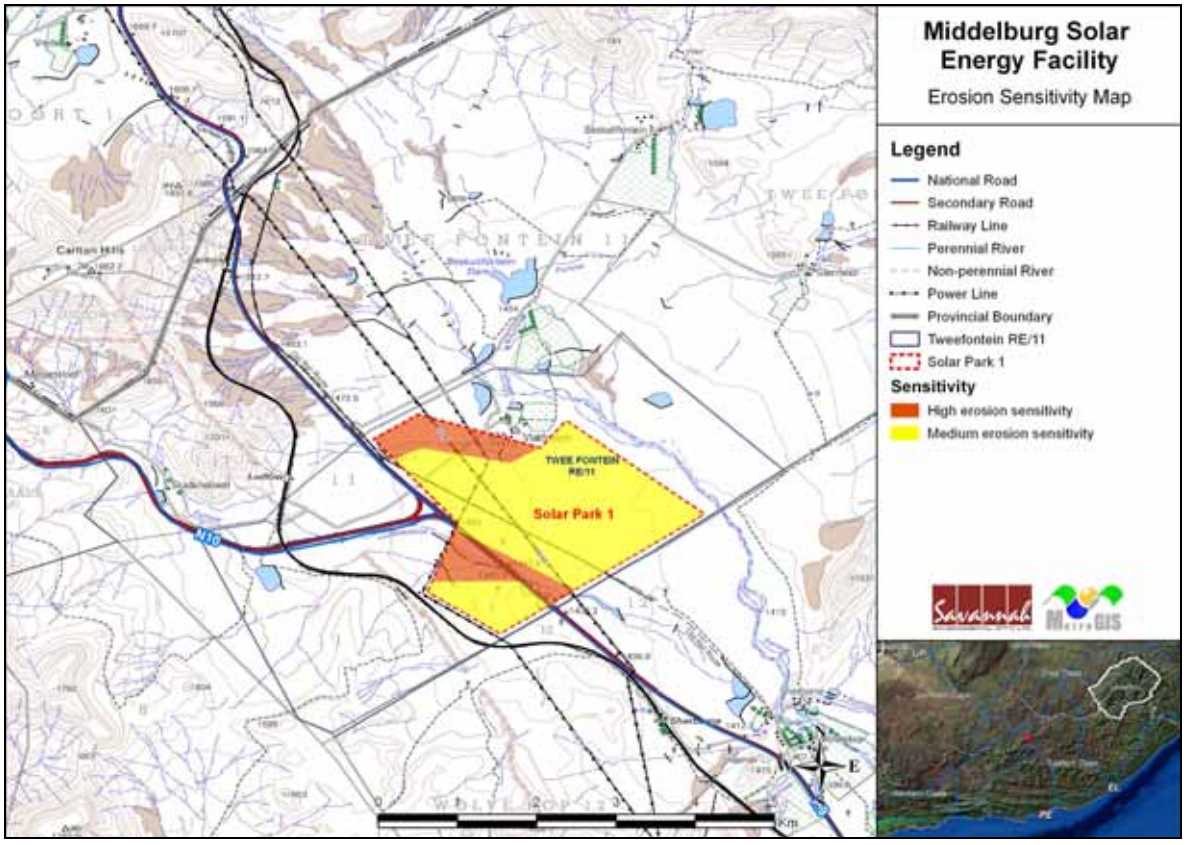

Figure 9: Erosion Sensitivity Map for the site

Based on the erosion sensitivity map for the site, it is clear that erosion control measures will be essential for the entire site, with particular attention being given on the areas of high erosion sensitivity (i.e. the extreme northern section of the site and extreme southern section of the site during the construction and operation of the PV facility.

Impact Tables summarising impacts on soil:

Nature: Soil degradation / erosion due to the construction (soil/rock removal, mixing, compaction, etc.) of PV panel foundations, access roads and substations / powerline.			
	Without mitigation	***With mitigation***	
Extent	Local (1)	Local (1)	
Duration	Short term (2)	Very Short term (1)	
Magnitude	Minor (2)	Minor (2)	
Probability	Definite (5)	Definite (5)	
Significance	**Low (25)**	**Low (20)**	
Status	Negative	Negative	
Reversibility	Partially reversible	Partially reversible	
Irreplaceable loss of resources?	Yes	Yes	
Can impacts be mitigated?	Yes, to a certain extent.		
Mitigation: » Rehabilitate topsoil & vegetation around site after construction.			
Cumulative impacts: » The cumulative impact of earthworks in the area is considered low at this stage due to the low density of development in the area at present. Further development of the area may have increasing impact on the natural soil.			
Residual impacts: » Minor negative – slow regeneration of topsoil.			

Nature: Soil degradation due to increased soil erosion by wind and/or water on co areas.		
	Without mitigation	***With mitigation***
Extent	Local (1)	Local (1)
Duration	Long term (4)	Short term (1)
Magnitude	Moderate (6)	Low (4)
Probability	Very probable (4)	Very probable (4)
Significance	**Moderate (44)**	**Low (24)**
Status	Negative	Negative
Reversibility	Irreversible	Practically irreversible
Irreplaceable loss of resources?	Yes, minor	Yes, minor
Can impacts be mitigated?	Yes. However, large tracts of the site is presently in a moderate to po erosion	
Mitigation: » Minimise size of the construction footprint/camp around each panel array. » Restrict activity outside of construction camp areas. » Implement effective erosion control measures. » Carry out earthworks in phases across site to reduce the area of exposed ground at any one » Protect and maintain denuded areas and material stockpiles to minimise erosion and instabi		
Cumulative impacts: » The cumulative impact of soil erosion in the area is considered low at present due to the u nature of the area but further development may have an increasing impact on soil erosi stage, large tracts of the site are presently in a moderate to poor state of erosion		

Residual impacts: » Minor localised erosion.

Nature: Soil degradation due to pollution of soil by contaminants used on sit construction (e.g. fuel, oil, chemicals, cement).		
	Without mitigation	***With mitigation***
Extent	Local (1)	Local (1)
Duration	Medium term (3)	Very short term (1)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (18)**	**Low (12)**
Status	Negative	Negative
Reversibility	Partially reversible	Partially reversible
Irreplaceable loss of resources?	Yes	Minor
Can impacts be mitigated?	Yes, to a certain extent	
Mitigation: » Control use and disposal of potential contaminants or hazardous materials. » Remove contaminants and contaminated topsoil and replace topsoil in affected areas.		
Cumulative impacts: » The cumulative impact of soil pollution is considered low at present due to the undeveloped the study area but further development may have an increasing impact.		
Residual impacts: » Minor negative – slow regeneration of soil processes in and under topsoil		

Implications for project implementation:

» Erosion control measures (as contained in the EMP) will have to be implemented during the construction of the PV facility and erosion to be monitored during the operational life of the facility.
» Development and implementation of a storm water management plan during all phases of the development is essential to minimise the potential for erosion.

d) Impact on ecology

A specialist ecological assessment has been conducted for the site (full report attached to **Appendix D1**). The following is a summary of the main ecological features for the site:

» The site consists of the Eastern Upper Karoo vegetation, Least Threatened, with <1% conserved of a target of 21% and 2% transformed (Mucina et al. 2006b).
» One plant species of conservation concern that could occur in habitats that are available in the study area and that has been previously recorded nearby is *Boophane disticha*), which is listed as Declining in South Africa and is not considered to be of major conservation concern for the project. Furthermore, it is unlikely to occur in the lowland habitats of the site.
» There are a number of watercourses on site. These have been mapped and are shown in **Figure 11**. Many of these are ephemeral drainage areas without any natural channel, but

there are also significant areas that are channelled and which may be classified as watercourses. There are no areas on site, except for small farm dams, in which there is perennial water.

» There is one threatened reptile species (Plain Mountain Adder) that has a distribution close to the study area, but suitable habitat only occurs in the mountainous areas and not on site. Other threatened and near threatened animal species of potential concern for the site are as follows:
    - o Lesser Kestrel (VU),
    - o Blue Crane (VU),
    - o Cape Vulture (VU),
    - o Martial Eagle (VU),
    - o Tawny Eagle (VU),
    - o Kori Bustard (VU),
    - o Ludwig's Bustard (VU),
    - o Giant Bullfrog (protected).
» The site does not occur within any Critical Biodiversity Areas (CBAs) as defined by the Eastern Cape Biodiversity Conservation Plan (ECBCP).
» There are very few concentrations of alien plants on site. The shrub, *Prosopis glandulosa* (honey mesquite), is found in the general area.

An ecological sensitivity map of the site is shown in **Figure 10** and includes the following:

» Watercourses and drainage areas: this represents a number of ecological processes including groundwater dynamics, hydrological processes, nutrient cycling and wildlife dispersal;
» Habitat for and potential occurrences of populations of Boophane disticha – a red list plant specie.

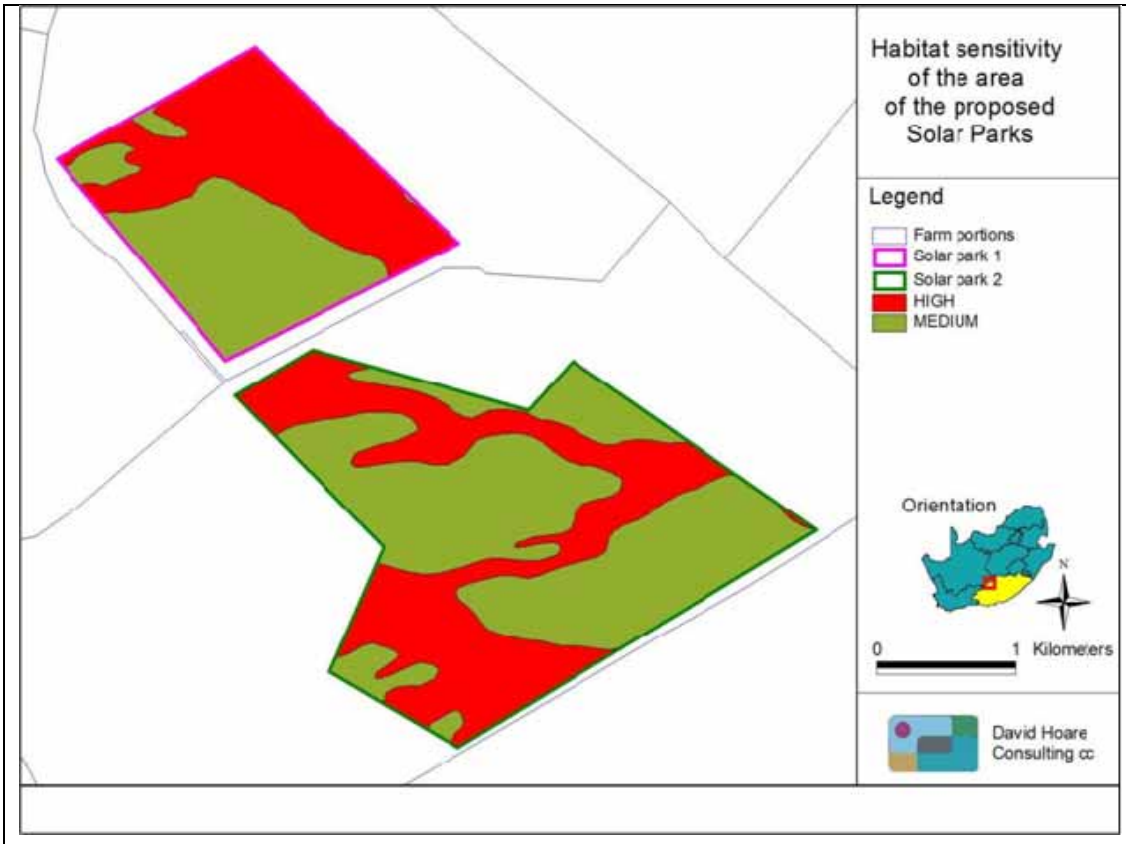

Figure 11 Ecological Habitat sensitivity of the site

A number of direct risks to ecosystems that would result from **construction** of the proposed solar energy facility:

» Clearing of land for construction.
» Construction of access roads.
» Placement of power lines, cables and water pipelines (if applicable).
» Establishment of borrow and spoil areas.
» Chemical contamination of the soil by construction vehicles and machinery.
» Operation of construction camps.
» Storage of materials required for construction.

Potential issues relevant to the impacts on the ecology of the study area during construction include the following:

» Impacts on biodiversity: this includes any impacts on populations of individual species of concern (flora and fauna), including protected species, and on overall species richness. This includes impacts on genetic variability, population dynamics, overall species existence or health and on habitats important for species of concern.
» Impacts on sensitive habitats: this includes impacts on any sensitive or protected habitats, including indigenous vegetation and wetland vegetation that leads to direct or indirect loss of such habitat.
» Impacts on ecosystem function: this includes impacts on any processes or factors that maintain ecosystem health and character, including the following:
    o Disruption to nutrient-flow dynamics;
    o Impedance of movement of material or water;

- Habitat fragmentation;
- Changes to abiotic environmental conditions;
- Changes to disturbance regimes, e.g. Increased or decreased incidence of fire;
- Changes to successional processes;
- Effects on pollinators;
- Increased invasion by alien plants.
- Changes to factors such as these may lead to a reduction in the resilience of plant communities and ecosystems or loss or change in ecosystem function.

» Secondary and cumulative impacts on ecology: this includes an assessment of the impacts of the proposed project taken in combination with the impacts of other known projects for the area or secondary impacts that may arise from changes in the social, economic or ecological environment.

» Impacts on the economic use of vegetation: this includes any impacts that affect the productivity or function of ecosystems in such a way as to reduce the economic value to users, e.g. reduction in grazing capacity, loss of harvestable products. It is a general consideration of the impact of a project on the supply of so-called ecosystem goods and services.

Impact Table summarising ecological impacts:

Nature: Loss of habitat within indigenous natural vegetation		
	Without mitigation	**With mitigation**
Extent	local (1)	local (1)
Duration	permanent (5)	permanent (5)
Magnitude	low (4)	Small to low (3)
Probability	Definite (5)	Definite (5)
Significance	**medium (50)**	**medium (45)**
Status (positive or negative)	negative	negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	To some extent	
Mitigation: » Avoid unnecessary impacts on natural vegetation surrounding infrastructure. Impacts should be contained, as much as possible, within the footprint of the infrastructure.		
Cumulative impacts: Soil erosion, alien invasions may lead to additional loss of habitat that will exacerbate this impact.		
Residual Impacts: Some loss of this vegetation type will occur, but this is insignificant relative to the total extent of the vegetation type.		

Nature: Loss of habitat for threatened animals		
	Without mitigation	**With mitigation**

Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	small (2)	small (2)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (16)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible to some degree	Reversible to some degree
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Not required	
Mitigation: None required.		
Cumulative impacts: None		
Residual Impacts: None likely		

Nature: Damage to wetland / watercourse areas resulting in hydrological impacts

	Without mitigation	**With mitigation**
Extent	local and surroundings (2)	local and surroundings (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (6)	Low (4)
Probability	definite (5)	Highly probable (4)
Significance	**medium (60)**	**medium (40)**
Status (positive or negative)	Negative	negative
Reversibility	Reversible with effective rehabilitation	Reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	To some degree	

Mitigation:

(1) Ground surfaces within the solar array must be properly maintained to avoid erosion impacts.

(2) There is a legal obligation to apply for a Water Use Licence for any wetlands that may be affected, since they are classified in the National Water Act as a water resource. Any activity within 500 m of a wetland or watercourse boundary may require a WUL, depending on the activity.

(3) A wetland delineation is required to determine the exact boundary of any features

protected according to the National Water Act.

(4) A comprehensive storm-water management plan must be compiled for the solar array. This must indicate how water velocities will be reduced before storm water is allowed to enter natural channels and how natural processes for water infiltration of the affected landscape will be accommodated.

Cumulative impacts:

Soil erosion, alien invasions, may all lead to additional impacts on watercourse habitats that will exacerbate this impact.

Residual Impacts:

None.

Nature: Establishment and spread of declared weeds and alien invader plants		
	Without mitigation	**With mitigation**
Extent	Site & surroundings (2)	Site & surroundings (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	medium (6)	minor (2)
Probability	Probable (3)	Improbable (2)
Significance	**Medium (36)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	

Mitigation:

(1) Keep disturbance of vegetation surrounding the solar array to a minimum

(2) Rehabilitate disturbed areas as quickly as possible following completion of construction activities in an area

(3) Do not translocate soil stockpiles from areas with alien plants

(4) Control any alien plants immediately to avoid establishment of a soil seed bank that would take decades to remove

(5) Establish an on-going monitoring programme to detect and quantify any alien plants that may become established within the development site

Cumulative impacts:

Other disturbance to parts of the site could lead to similar impacts.

Residual Impacts:

Will probably be very low if control measures are effectively applied

Implications for project implementation:

» Areas of high ecological sensitivity require mitigation measures during construction to avoid negative impacts on ecology, and to be contained in the EMP.

e) Potential impacts on agricultural potential

The present land use is agricultural grazing for sheep and cattle. The impact on soils will be limited to the immediate area or site of development (local). However these soils are

predominantly shallow and rocky and are therefore not deemed of high agricultural potential. The development of the solar park will entail a change in land-use of the site itself from agricultural to "special use – solar energy facility". This is considered acceptable as the site occurs in an area of low agricultural potential, with no irrigated pastures.

Nature of impact: Loss of agricultural potential and land capability due to construction.		
	Without mitigation	**With mitigation**
Extent	Low (1) – Local	Low (1)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Probability	Probable (3)	Probable (3)
Significance	**21 (Low)**	**21 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	No	
Mitigation: » Not applicable		
Cumulative impacts: » Not applicable		
Residual impacts: The loss of agricultural land is a long term loss which will extends post-construction, into the operational life of the solar park.		

Implications for project implementation:
N/A

f) Impacts on the Social Environment

A full Social Impact Assessment is contained within Appendix D4. The proposed site is located in the Inxuba Yethemba LM (IYLM) which is one of eight local municipalities and a district management area that make up the Chris Hani District Municipality (CHDM) (DC13), which is located in the central part of the Eastern Cape Province. The Eastern Cape is also the poorest province in South Africa. The main settlements on the IYLM are Middleburg and Cradock. Cradock is the administrative seat of the IYLM.

The key social issues associated with the construction phase include:

» Potential positive impacts
  - o Creation of employment and business opportunities and opportunity for skills development and on-site training (The majority of the employment opportunities, specifically the low and semi-skilled opportunities which make up ~80 jobs, are likely to be available to local residents in the area).

» Potential negative impacts
- Impacts associated with the presence of construction workers on site;
  - o Influx of job seekers to the area;
  - o Loss of farm labour to the construction phase;
  - o Increased risk of stock theft, poaching and damage to farm infrastructure associated with presence of construction workers on the site;
  - o Increased risk of veld fires associated with construction-related activities;
  - * Impact of heavy vehicles, including damage to roads, safety, noise and dust;
  - * Potential loss of grazing land associated with construction-related activities.

Impact Table summarising social impacts:

Nature: Creation of employment and business opportunities during the construction phase		
	Without Mitigation	**With Enhancement**
Extent	Local – Regional (1) (Rated as 1 due to potential opportunities for local communities and businesses)	Local – Regional (3) (Rated as 3 due to potential opportunities for local communities and businesses)
Duration	Short Term (2)	Short Term (2)
Magnitude	Low (4)	Moderate (6)
Probability	Highly probable (4)	Highly probable (4)
Significance	**Low (28)**	**Medium (44)**
Status	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	N/A	N/A
Can impact be enhanced?	Yes	
Enhancement : **Employment** » Where reasonable and practical, ACED should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area. » Where feasible, efforts should be made to employ local contactors that are compliant with Black Economic Empowerment (BEE) criteria; » Before the construction phase commences ACED should meet with representatives from the IYLM to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase. » The IYLM should be informed of the final decision regarding the project and the potential		

job opportunities for locals and the employment procedures that ACED intends following for the construction phase of the project.

» Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.

» The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

Business

» ACED should identify local companies, specifically BEE companies, that qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work;

» Where possible, ACED should assist local BEE companies to complete and submit the required tender forms and associated information.

» The IYLM should identify strategies aimed at maximising the potential benefits associated with the project.

Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.

Cumulative impacts:

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

Residual impacts:

Improved pool of skills and experience in the local area. However, due to relatively small number of local employment opportunities this benefit is likely to be limited.

Nature: Potential impacts on family structures and social networks associated with the presence of construction workers

	Without Mitigation	**With Mitigation**
Extent	Local (3) and (5) (Rated as 3 in terms of the impact on the community and 5 for individuals)	Local (2) and (5) (Rated as 2 in terms of the impact on the community and 5 for individuals)
Duration	Short term for community as a whole (2) Long term-permanent for individuals who may be affected by STD's etc. (5)	Short term for community as a whole (2) Long term-permanent for individuals who may be affected by STD's etc. (5)
Magnitude	Low for the community as a whole (4) High-Very High for specific individuals who may be affected by	Low for community as a whole (4) High-Very High for specific individuals who may be affected by STD's etc. (10)

	STD's etc. (10)	
Probability	Probable (3)	Probable (3)
Significance	**Low** for the community as a whole **(27)** **High** for specific individuals who may be affected by STDs etc. **(60)**	**Low** for the community as a whole **(24)** **High** for specific individuals who may be affected by STDs etc. **(60)**
Status	Negative	Negative
Reversibility	No in case of HIV and AIDS	No in case of HIV and AIDS
Irreplaceable loss of resources?	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods	
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be eliminated	

Mitigation:

» Where possible, ACED will make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically semi and low-skilled job categories. This will reduce the potential impact that this category of worker could have on local family and social networks in Middleburg and other surrounding towns;

» ACED, in consultation with the IYLM and local farmers, should consider the need for the establishment of a Monitoring Forum (MF) for the construction phase. The role of the MF would be to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should also be briefed on the potential risks to the local community associated with construction workers;

» ACED and the contractor should, in consultation with representatives from the MF, develop a Code of Conduct for the construction phase. The code should identify what types of behaviour and activities by construction workers are not permitted. Construction workers that breach the code of good conduct should be dismissed. All dismissals must comply with the South African labour legislation;

» ACED and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase;

» The movement of construction workers on and off the site should be closely managed and monitored by the contractors. In this regard the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis;

» The contractor should make the necessary arrangements for allowing workers from outside the area to return home over weekends. This would reduce the risk posed by construction workers to local family structures and social networks;

» It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay overnight on the site. This will make it possible to manage the potential impacts effectively.

Cumulative impacts:

Impacts on family and community relations that may, in some cases, persist for a long period of time. Also in cases where unplanned / unwanted pregnancies occur or members of the

community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.
Residual impacts: See cumulative impacts.

Nature: Potential impacts on family structures, social networks and community services associated with the influx of job seekers		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (24)**	**Low (18)**
Status	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	
Can impact be mitigated?	Yes, by employing local residents	
***Mitigation*:** » ACED, in consultation with the IYLM, should implement a local employment policy for all low and semi-skilled jobs; » Implement a policy that no employment will be available at the gate; » ACED, in consultation with the IYLM, should investigate the need to establish a MF (see above) to monitor and identify any potential problems that may arise due to the influx of job seekers to the area.		
Cumulative impacts: Impacts on family and community relations that may, in some cases, persist for a long period of time. Also in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.		
Residual impacts: See cumulative impacts.		

Nature: Potential loss of livestock, poaching and damage to farm infrastructure associated with the presence of construction workers on site		
	Without Mitigation	**With Mitigation**

Extent	Local (3) (Rated as 3 due to potential severity of impact on local farmers)	Local (2)
Duration	Short Term (2)	Short Term (2)
Magnitude	Moderate (6) (Due to reliance on agriculture and livestock for maintaining livelihoods)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Medium (33)**	**Low (24)**
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock losses etc.	Yes, compensation paid for stock losses etc.
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	Yes

Mitigation:

» ACED should enter into an agreement with the affected landowners whereby the company will compensate farmers for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below);

» ACED should investigate the option of establishing a MF (see above) that includes local farmers and developing a Code of Conduct for construction workers. Should such a MF be required it should be established prior to commencement of the construction phase. The Code of Conduct should be signed by ACED and the contractors before the contractors move onto site;

» The EMP must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested;

» Contractors appointed by ACED should ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft, poaching and trespassing on adjacent farms;

» Contractors appointed by ACED should ensure that construction workers who are found guilty of stealing livestock and or poaching are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation;

» The housing of construction workers on the site should be limited to security personnel.

Cumulative impacts:

No**,** provided losses are compensated for

Residual impacts:

See cumulative impacts.

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

	Without Mitigation	**With Mitigation**
Extent	Local (4) (Rated as 4 due to potential severity of impact on local farmers)	Local (2) (Rated as 2 due to potential severity of impact on local farmers)
Duration	Short Term (2)	Short Term (2)
Magnitude	High due to reliance on livestock for maintaining livelihoods (10)	Low (4)
Probability	Highly Probable (4)	Probable (3)
Significance	**High (64)**	**Low (24)**
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock and crop losses etc.	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	

Mitigation:

» A firebreak should be established around the perimeter of the site prior to the commencement of the construction phase. The fire break should be maintained throughout the lifespan of the site. This would also protect the facility from veld fires in the area;

» The contractor should contact all of the adjacent farm owners prior to the commencement of the construction phase and ensure that he/she has the contact numbers so that they can be contacted in the event of a fire;

» The contractor to ensure that open fires on the site for cooking or heating are not allowed except in designated areas;

» The contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include clearing working areas and avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, winter months;

» The contractor should provide adequate fire fighting equipment on-site;

» The contractor should provide fire-fighting training to selected construction staff;

» In the event of a fire being caused by construction workers and or construction activities, the responsible contractor must compensate farmers for damage caused to their farms. The contractor should also compensate the fire fighting costs borne by farmers and local authorities.

» In addition the local landowners and contractor (while on site) should ensure that they are members of the local fire protection agency.

Cumulative impacts: No, provided losses are compensated for.
***Residual impacts*:** See cumulative impacts.

Nature: Potential noise, dust and safety impacts associated with movement of construction related traffic to and from the site		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Short Term (2)	Short Term (2)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (24)**	**Low (15)**
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	

Mitigation:

» The movement of construction vehicles along the local gravel access road of the N9, specifically heavy construction vehicles, should be confined to the period of 06h00 and 18h00. This is aimed at reducing the potential dust and safety impacts for other road users;
» All drivers employed during the construction phase should be briefed and notified of the potential safety risks posed by construction vehicles to other road users, specifically road users along the gravel access road off the N9;
» The contractor must ensure that damage caused to roads by the construction related activities, including heavy vehicles, is repaired before the completion of the construction phase. The costs associated with the repair must be borne by the contractor;
» The contractor should ensure that appropriate dust suppression measures are implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers;
» The contractor should ensure that all vehicles must be road-worthy and regularly serviced, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.
» In addition, it is recommended that ACED investigate the option of using rail to transport materials and equipment from Port Elizabeth to the site.

Cumulative impacts:

Should other PV Facilities be built in the area, there may be a cumulative increase in

construction nuisances in the area.

Nature: ***Potential impact on farmland due to construction related.***
The activities associated with the construction phase, such as establishment of access roads and the construction camp, movement of heavy vehicles and preparation of foundations for the PV plant and power lines will damage farmlands and result in a loss of farmlands for future farming activities.

	Without Mitigation	**With Mitigation**
Extent	Local (3)	Local (1)
Duration	Long term-permanent if disturbed areas are not effectively rehabilitated (5)	Short term if damaged areas are rehabilitated (2)
Magnitude	Moderate, due to importance of farming in terms of local livelihoods (4)	Minor (2)
Probability	Definite (5)	Highly Probable (4)
Significance	**High (60)**	**Low (20)**
Status	Negative	Negative
Reversibility	Yes, disturbed areas can be rehabilitated	Yes, disturbed areas can be rehabilitated
Irreplaceable loss of resources?	No, disturbed areas can be rehabilitated	No, disturbed areas can be rehabilitated
Can impact be mitigated?	Yes, however, loss of farmland cannot be avoided for the duration of the project	Yes, however, loss of farmland cannot be avoided for the duration of the project

Mitigation:
As indicated above, ACED has entered into a lease agreement with the landowner which will compensate for the loss of income from farming. The potential impacts associated with damage to and loss of farmland can also be effectively mitigated. The aspects that should be covered include:

» The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be minimised;
» An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase;
» All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase;
» The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed;
» The implementation of the Rehabilitation Programme should be monitored by the ECO.

Cumulative impacts: Overall loss of farmland could affect the livelihoods of the affected farmers, their families, and the workers on the farms and their families. However, disturbed

areas can be rehabilitated.
Residual impacts: See cumulative impacts.

Implications for project implementation:

» Job creation needs to be managed in order to enhance this positive impact, during construction and operations, via various mechanism as proposed in the impact assessment above and the EMP.
» Mitigation measures to ensure safety and security of the site, surrounding landowners and properties must be in place during construction and operation of the facility.
» ACED, in consultation with the IYLM and local farmers, should consider the need for the establishment of a Monitoring Forum (MF) for the construction phase.

No Go Alternative

The 'Do-Nothing' alternative is the option of not constructing the proposed Middleburg Solar Park 1. 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 CO_2 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.

The No-Go alternative is not preferred as South Africa needs to diversify our electricity sources, which this project will contribute to.

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**. The long term impacts due to the operational life (more than 25 years) of the PV facility include:

» Soil erosion
» Social impacts
» Visual impacts

a. <u>Potential impacts on Soil Erosion</u>

Soil erosion may become an on-going negative impact during operational life of the PV Facility, should regular erosion control not be undertaken.

<u>Impact Table summarising soil impacts:</u>

Nature: Soil erosion due to the operation of the PV facility.		
	Without mitigation	**With mitigation**
Extent	High (4)	Low (1)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	Low (2)
Probability	Very Probable (5)	Improbable (2)
Significance	**80 (Very High)**	**14 (Low)**
Status (positive or negative)	Negative	-
Reversibility	Low	-
Irreplaceable loss of resources?	Yes	-
Can impacts be mitigated?	Yes	

Mitigation:

» Use of erosion control measures as contained in the EMP.
» Development and implementation of a storm water management plan.

Cumulative impacts:

Soil erosion might extend to areas outside the area of development, especially along the water course. This will lead to higher sediment and solute content of water leaving the area, thus lowering water quality and possibly influencing agricultural practices in the area and posing a threat to human health. This is especially true for subsistence farmers and informal settlements downstream.

Residual impacts:

Soil erosion related impacts may influence surrounding areas.

Implications for project implementation:

» Erosion control measures (as contained in the EMP) will have to be implemented during the construction of the PV facility and erosion to be monitored during the operational life of the facility.

b. Visual Impacts

The Solar Park will consist of PV panels and power lines that will be visible on the site and to the surrounds. The visibility of PV panels may be a negative impact, depending on the people who live near the site or travel past the site on a regular basis. What is perceived as a negative impact is subject to individual preferences. Nevertheless, as part of the assessment of potential impacts, visual impacts (which is a social impact) has been explored in this assessment.

The regional study area for the visual assessment (for the full report refers to **Appendix D6**) encompassed a geographical area of 1643 km². However due to the constrained visual exposure of the facility the maps depict a smaller more concentrated area of 217.5 km² and include a minimum 4 km buffer zone from the boundaries of the proposed development area.

The result of the combined viewshed analysis for the site (including the Solar Park 2) is shown in **Figure 12**. The initial viewshed analysis was undertaken at an offset of 2m above average ground level (i.e. the approximate maximum height of the PV structures). This was done in order to determine the general visual exposure of the area under investigation, simulating the proposed structures associated with the solar energy facility. The viewshed revealed the following:

» The escarpment in the north and north west as well as the raised topography to the east, south east, south and south west effectively screen the landscape beyond from potential visual exposure. In addition, sections of higher ground to the immediate west, south west and south of the facility results in visually screened pockets within the 4km core buffer area.
» To the south east, north east, north and west of the above mentioned core area; the viewshed of the proposed facility is fragmented, with areas of visual exposure located in the medium distance. These areas of visual exposure are concentrated on the southern slopes of the Great Escarpment.
» Stretches of the N10 and N9 and a number of secondary roads all fall within the zone of potential visual exposure. Similarly, a number of homesteads may also be exposed to potential visual impact.

» The railway line to the west of the site will also be visually exposed.
» The proposed facility would be visible to observers travelling along roads and railway lines and to residents of homesteads and farms as well as tourists visiting the region, within (but not restricted to) a 4km radius of the proposed facility.

The following is of relevance for the sites:

» Areas of potentially moderate visual impact are indicated within a 4km radius of the proposed facility.
» Within the 4km radius, sensitive visual receptors are limited to users of the N9 and N10 and the farmsteads of Beskuitfontein; Glenmoor; Vlakfontein; Ludlow and Carlton (both railway stations), Users of the N9 and N10, driving in close proximity to the facility as well as the homestead Vlakfontein are likely to be exposed to potentially very high visual impact, while the farmsteads and other visual receptors within the 4km zone will experience a potentially high visual impact. The north western outskirts of Sherborne and Wolwekop may also experience potentially high visual impact.
» The extent of potential visual impact decreases somewhat beyond the 4km radius. Visually exposed areas lie mostly in the north, north east, south east and west of this zone and are likely to experience potentially low visual impact. Large areas in this zone, particularly to the north west, north and north east (beyond the Great Escarpment), east, and south will experience no visual exposure at all.
» Sensitive visual receptors are limited to users of a stretch of the N10 in the south east. These receptors are likely to experience a potentially moderate visual impact.

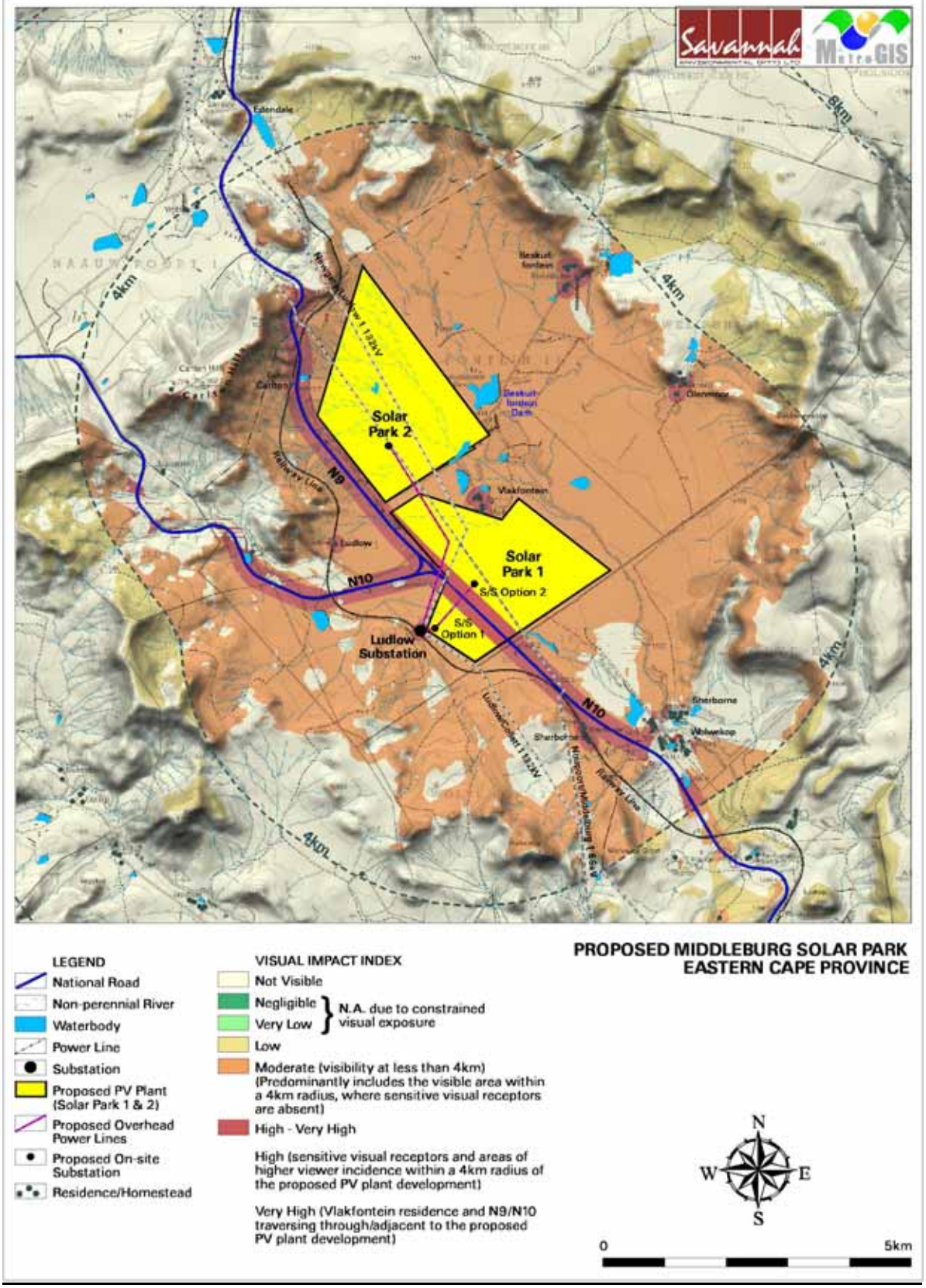

Figure 12: Visual impact index of the Middleburg Solar Park 1 and Solar Park 2.

Impact Table summarising visual impacts:

Nature of Impact: Potential visual impact on sensitive visual receptors within the region.		
	No mitigation	***Mitigation considered***
Extent	Regional **(3)**	Regional **(3)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Moderate **(6)**	Moderate **(6)**
Probability	Probable **(3)**	Improbable **(2)**
Significance	**Moderate (39)**	**Low (26)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

Planning:

» Retain a buffer (approximately 30-50m wide) of intact natural vegetation along the perimeter of the development site.
» Retain and maintain natural vegetation in all areas outside of the development footprint.
» Plan internal roads and ancillary infrastructure in such a way and in such a location that clearing of vegetation is minimised. Consolidate infrastructure as much as possible, and make use of already disturbed areas rather than pristine sites wherever possible.

Construction:

» Rehabilitation of all construction areas.
» Ensure that vegetation is not cleared unnecessarily to make way for the access road and ancillary buildings.

Operations:

» Maintain the general appearance of the facility as a whole.
» Maintenance of roads to avoid erosion and suppress dust.

Decommissioning:

» Remove infrastructure and roads not required for the post-decommissioning use of the site.
» Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.
» Monitor rehabilitated areas post-decommissioning and implement remedial actions.

Cumulative impacts:

The construction of the solar energy facility and ancillary infrastructure will increase the cumulative visual impact of industrial type infrastructure within the region. This is relevant in light of the existing power lines, the Ludlow Substation.

Residual impacts:

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

Nature of Impact: Potential visual impact on of lighting on visual receptors in close proximity of the proposed solar energy facility.		
	No mitigation	***Mitigation considered***
Extent	Local **(4)**	Local **(4)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Moderate **(6)**	Moderate **(6)**
Probability	Probable **(3)**	Improbable **(2)**
Significance	**Moderate (42)**	**Low (28)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

Planning & operation:

» Shielding the sources of light by physical barriers (walls, vegetation, or the structure itself);
» Limiting mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights;
» Making use of minimum lumen or wattage in fixtures;
» Making use of down-lighters, or shielded fixtures;
» Making use of Low Pressure Sodium lighting or other types of low impact lighting.
» Making use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.

Cumulative impacts:

» Some existing light impact exists as a result of settlements and homesteads in close proximity as well as the existing Ludlow Substation. The development of the proposed solar energy facility will therefore contribute to a cumulative lighting impact within an otherwise rural region.

Residual impacts:

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

Nature of Impact: Potential visual impact of facility on the visual character and sense of place of the region.		
	No mitigation	***Mitigation considered***
Extent	Local **(4)**	Local **(4)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	High **(6)**	High **(6)**
Probability	Definite**(5)**	Probable **(3)**
Significance	**High (70)**	**Moderate (42)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No

Can impacts be mitigated?	Yes

Mitigation:

Planning:

» Retain a buffer (approximately 30-50m wide) of existing intact natural vegetation along the perimeter of the development site.
» Retain and maintain natural vegetation in all areas outside of the development footprint.
» Plan internal roads and ancillary infrastructure in such a way and in such a location that clearing of vegetation is minimised. Consolidate infrastructure as much as possible, and make use of already disturbed areas rather than pristine sites wherever possible.

Construction:

» Rehabilitation of all construction areas.
» Ensure that vegetation is not cleared unnecessarily to make way for the access road and ancillary buildings.

Operations:

» Maintain the general appearance of the facility as a whole.
» Maintenance of roads to avoid erosion and suppress dust.

Decommissioning:

» Remove infrastructure and roads not required for the post-decommissioning use of the site.
» Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.
» Monitor rehabilitated areas post-decommissioning and implement remedial actions.

Cumulative impacts:

The construction of the solar energy facility and ancillary infrastructure will increase the cumulative visual impact of industrial type infrastructure within the region. This is relevant in light of the existing power lines and the Ludlow Substation.

Residual impacts:

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

Nature: Potential visual impact and impact on sense of place associated with power lines

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (24)**	**Low (21)**
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources?	No	
Can impact be mitigated?	Yes	

Mitigation: *N/A*
Cumulative impacts: Limited visual and impact on sense of place
Residual impacts: See cumulative impacts

Implications for project implementation:

» The following mitigation is recommended:
  - Retain a buffer (approximately 30-50m wide) of intact natural vegetation along the perimeter of the development site. This measure will give some distance between the facility footprint and the visual receptors.
  - Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint. This measure will help to soften the appearance of the facility within its context.
  - In terms of ancillary infrastructure, it is recommended that the access road and ancillary infrastructure be planned in such a way and in such a location that clearing of vegetation is minimised. This implies consolidating infrastructure as much as possible and making use of already disturbed areas rather than pristine sites wherever possible.
  - Mitigation of lighting impacts includes the pro-active design, planning and specification lighting for the facility by a lighting engineer. The correct specification and placement of lighting and light fixtures for the Solar facility and the ancillary infrastructure will go far to contain rather than spread the light. Mitigation measures include the following:
    - Shielding the sources of light by physical barriers (walls, vegetation, or the structure itself);
    - Limiting mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights;
    - Making use of minimum lumen or wattage in fixtures;
    - Making use of down-lighters, or shielded fixtures;
    - Making use of Low Pressure Sodium lighting or other types of low impact lighting.
    - Making use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.

c. Social Impacts

The key social issues associated with the long-term operational life (more than 25 years) of the PV facility include:

» Potential positive impacts
  - Creation of employment and business opportunities (Based on information from ACED De Aar PVSEF the proposed Middleburg facility will create ~ 25 full time employment opportunities for the 20 year life of the project). . The operational phase will also create opportunities for skills development and training.
  - Benefits associated with the establishment of a local community trust;

- The establishment of renewable energy infrastructure.

» Potential negative impacts
- The visual impacts and associated impact on sense of place;
- Potential impact on tourism.

Nature: Creation of employment and business opportunities associated with the maintenance and operations of the solar park.		
	Without Mitigation	**With Enhancement**
Extent	Local and Regional (2)	Local and Regional (4)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Moderate (6)
Probability	Probable (3)	Highly Probable (4)
Significance	**Medium (30)**	**Medium (56)**
Status	Positive	Positive
Reversibility	N/A	
Irreplaceable loss of resources?	No	
Can impact be enhanced?	Yes	
Enhancement: ACED should implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme should be to maximise the number of South African's and locals employed during the operational phase of the project.		
Cumulative impacts: Should other Pv facilities be develop dint he region, there may be a cumulative positive impacts by creation of more jobs in the region.		
Residual impacts: Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area. See cumulative impacts		

Nature: Development of infrastructure to generate clean, renewable energy		
	Without Mitigation	**With Enhancement**
Extent	Local, Regional and National (3)	Local, Regional and National (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Medium (44)	Medium (44)

Status	Positive	Positive
Reversibility	Yes	
Irreplaceable loss of resources?	Yes, impact of climate change on ecosystems	
Can impact be mitigated?	Yes	

Enhancement:

» Use the project to promote and increase the contribution of renewable energy to the national energy supply.

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

Cumulative impacts:

Potential contribution to establishing an economically viable commercial renewables generation sector in the Eastern Cape and South Africa.

Residual impacts:

See cumulative impacts

Nature: Potential impact of the Solar Park on local tourism.

The N9 is an important access route linking the Eastern Cape with the inland provinces in South Africa. The N9 can therefore also be regarded as an important tourist route. Based on the site visit the proposed solar energy facility will be visible from sections of the N9. The findings of the VIA in this regard indicate the site will be visible from the N9. However, the VIA indicates that this impact is not considered to be a fatal flaw from a visual perspective. The overall tourism potential of the area is also low. In addition, the owners of the two guesthouses in the immediate vicinity of the site (Mrs Erasmus, Carlton Heights Guesthouse and Mrs Moore, Sherborne Guesthouse) both indicated that the proposed facility was not likely to have an impact on tourism in the area. The potential impact on tourism is therefore assessed to be of low significance with and without mitigation.

	Without Mitigation	**With Enhancement / Mitigation**
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (24)**	**Low (21)**
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable	No	

loss of resources?		
Can impact be enhanced?	Yes	
Enhancement: n/a		
***Cumulative impacts*:** Potential negative and or positive impact on tourism in the IYLM		
Residual impacts: See cumulative impacts		

Implications for project implementation:

» The proposed project is likely to have benefits and negative impacts on the social environment,
» In order to enhance positive social impacts via job creation, ACED is to implement a training and skills development programme.
» The contribution of the project to the generation of electricity from a renewable energy source is considered to be a significant positive impact.

No Go Alternative

The 'Do-Nothing' alternative is the option of not constructing the proposed Middleburg Solar Park 1. 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,**
» **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 75MW of energy would be beneficial to Eastern Cape region. The integration of an additional 75 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. The No-Go alternative is not preferred as South Africa needs to diversify our electricity sources, which this project will contribute to.

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 Middleburg Solar Park 1 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 would be beneficial to the Eastern Cape region.

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, in no particular order:

- The area is of a **medium-high heritage and cultural sensitivity**. The heritage impacts will be of a medium significance. There are 20 heritage sites / artefacts that have been identified as part of this assessment. These heritage artefacts are from the Stone Age and Middle Stone Age. They have been given a Grade III rating in terms of the NHR Act 25 of 1999, which means mitigation against negative impacts (damage) is required, along with a permit (from SAHRA) for removal of those artefacts which cannot be avoided.
- **Soil degradation (erosion**) has been identified as potentially significant for this site in the absence of erosion control. The soils on the site are susceptible to erosion and areas of high erosion and erosion control during construction and operational is essential, after which the **impact on soils is rated as a low significance**.
- The site has been given a ranking of a **medium ecological sensitivity** (in terms of the vegetation, habitats that the site supports currently, animals, drainage areas and soils that occur on the site).
- The agricultural potential of the site is low and therefore the **impact on existing livestock** grazing on the site **is low, on a regional scale**.
- Social impacts include both positive (job creation) impacts and negative social impacts

(community risks. Enhancement measures to increase positive impacts and mitigation measures to decrease negative impacts have been proposed in this report. **Social impacts** have been rated as having **a medium-low significance.**

» **Visual impacts** mainly from the PV panels and powerline will be of a **moderate significance**, with the recommendation of the use of landscaping and visual screening, where feasible.

The establishment of the facility will have positive benefits as the integration of an additional 75 MW of power generation 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 Environmental Basic Assessment process, no environmental fatal flaws were identified with the establishment of the proposed Middleburg Solar Park 1 and associated infrastructure (including the short power line and substation options). Therefore, it is recommended that the project should be authorised. However, a number of issues requiring mitigation have been highlighted. Environmental specifications for the management of these 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 Middleburg Solar Park 1. 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 75MW of energy would be beneficial to national electricity grid and would contribute to meeting the government's target for renewable energy. Therefore the No-Go Alternative is not preferred.

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 insurmountable environmental or social constraints that prevent the establishment of the proposed Middleburg Solar Park 1. However, several sensitive areas / features were identified on the site, and are contained within this basic assessment report and are highlighted **below. The following environmental and/ social features have been identified (and are showed in Figure 13 – 16**) for the proposed project, that require specific management action and should be included in the Environmental Authorisation (EA) for the project, in keeping with the principles of sustainable development, and balancing environmental, social and economic needs:

SENSITIVE FEATURE	IMPLICATIONS FOR PROJECT IMPLEMENTATION TO BE INCLUDED IN EA
There are 20 heritage sites / artefacts that have been identified as part of this assessment. These heritage artefacts are from the Stone Age and Middle Stone Age. They have been given a Grade III rating in terms of the NHR Act 25 of 1999, which means mitigation against negative impacts (damage) is required, along with a permit for removal of these artefacts (from SAHRA).	» A professional archaeologist (with an already authorised collection permit) must be appointed during the various phases of development including vegetation clearing and the excavation activities to monitor and identify possible archaeological material remains and features that may occur below the surface and further make appropriate recommendations on removing and / or protecting the archaeological material remains and features. » A permit from SAHRA is required for the removal or destruction of heritage artefacts as identified in the basic assessment report.
Areas of high soil erosion sensitivity on the site.	Erosion control measures (as contained in the EMP) will have to be implemented during the construction of the PV facility and erosion to be monitored during the operational life of the facility.

» Watercourses and drainage areas: this represents a number of ecological processes including groundwater dynamics, hydrological processes, nutrient cycling and wildlife dispersal; » Potential occurrences of populations of Red List animals that have been evaluated as having a chance of occurring within remaining natural habitats within the study area.	Areas of high ecological sensitivity require mitigation measures during construction to avoid negative impacts on ecology, and to be contained in the EMP.
Visual Impacts on the rural landscape	» Consider the use of visual screening. » Retain a buffer (approximately 30-50m wide) of intact natural vegetation along the perimeter of the development site. This measure will give some distance between the facility footprint and the visual receptors
Job creation during construction and operations / decommissioning.	» Job creation needs to be managed in order to enhance this positive impact, during construction and operations, via various mechanism as proposed in the impact assessment above and EMP. » Mitigation measures to ensure safety and security of the site, surrounding landowners and properties must be in place, during construction and options of the facility. » ACED, should consider the need for the establishment of a Monitoring Forum (MF) for the construction phase.

Considering, the above-mentioned recommendations, the EAP is of opinion that the potential impacts to the social, economic and biophysical environment can be mitigated to acceptable levels. The construction of the proposed Middelburg Solar Park 1 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:

» Ensuring that the slope of any stockpiled material is such that surface runoff is minimal.
» Additions of stabilising agents such as organic material or vegetative cover for erosion control.
» Building of swales and berms to decrease water runoff speed.

» Building of attenuation ponds to ensure slow release of water into the water course.
» Exclude areas of wetland related habitat from the proposed development.
» Appoint an Environmental Control Officer (ECO).
» 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 an alien 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) the implementation of a monitoring programme in this regard is recommended.
» Make use of existing access roads as far as reasonably practical, 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.
» 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 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.
» Implement erosion control measures.

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 storm water management plan.
» Use and maintenance of erosion control measures, where deemed necessary.

Is an EMPR attached? **YES ✓**

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

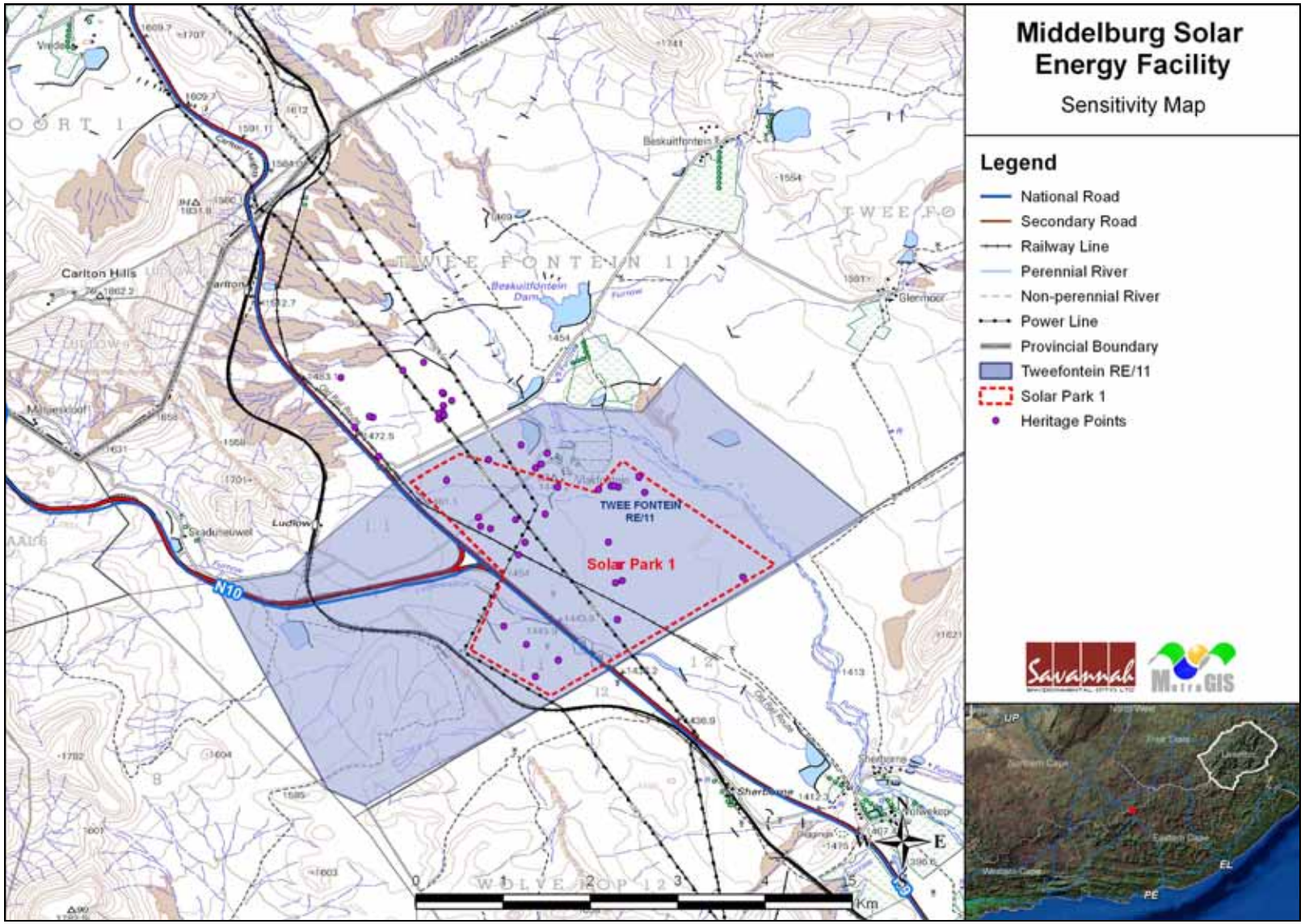

Figure 13: Grade III Heritage Artefacts located on the site

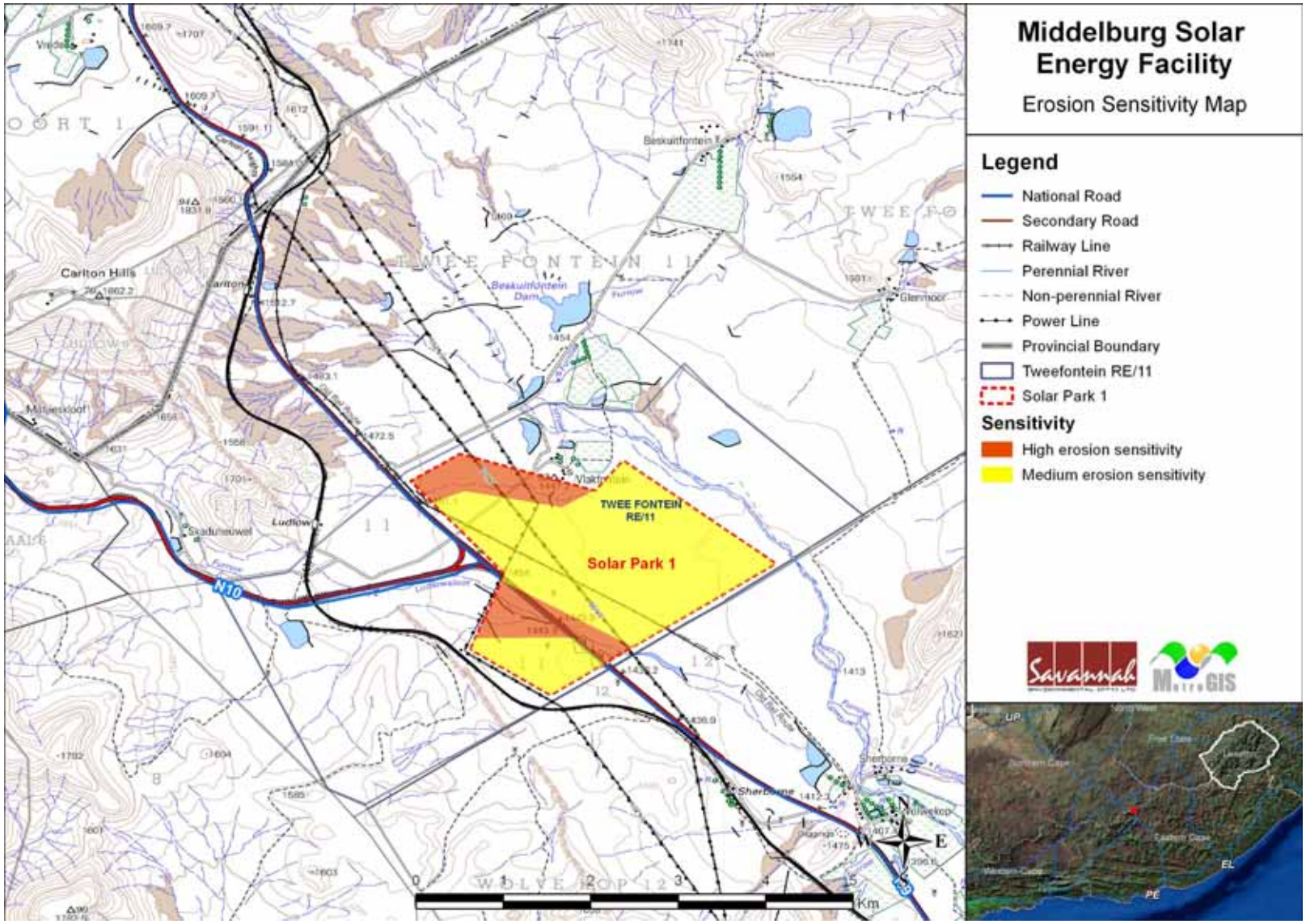

Figure 14: Erosion Sensitivity Map for the site

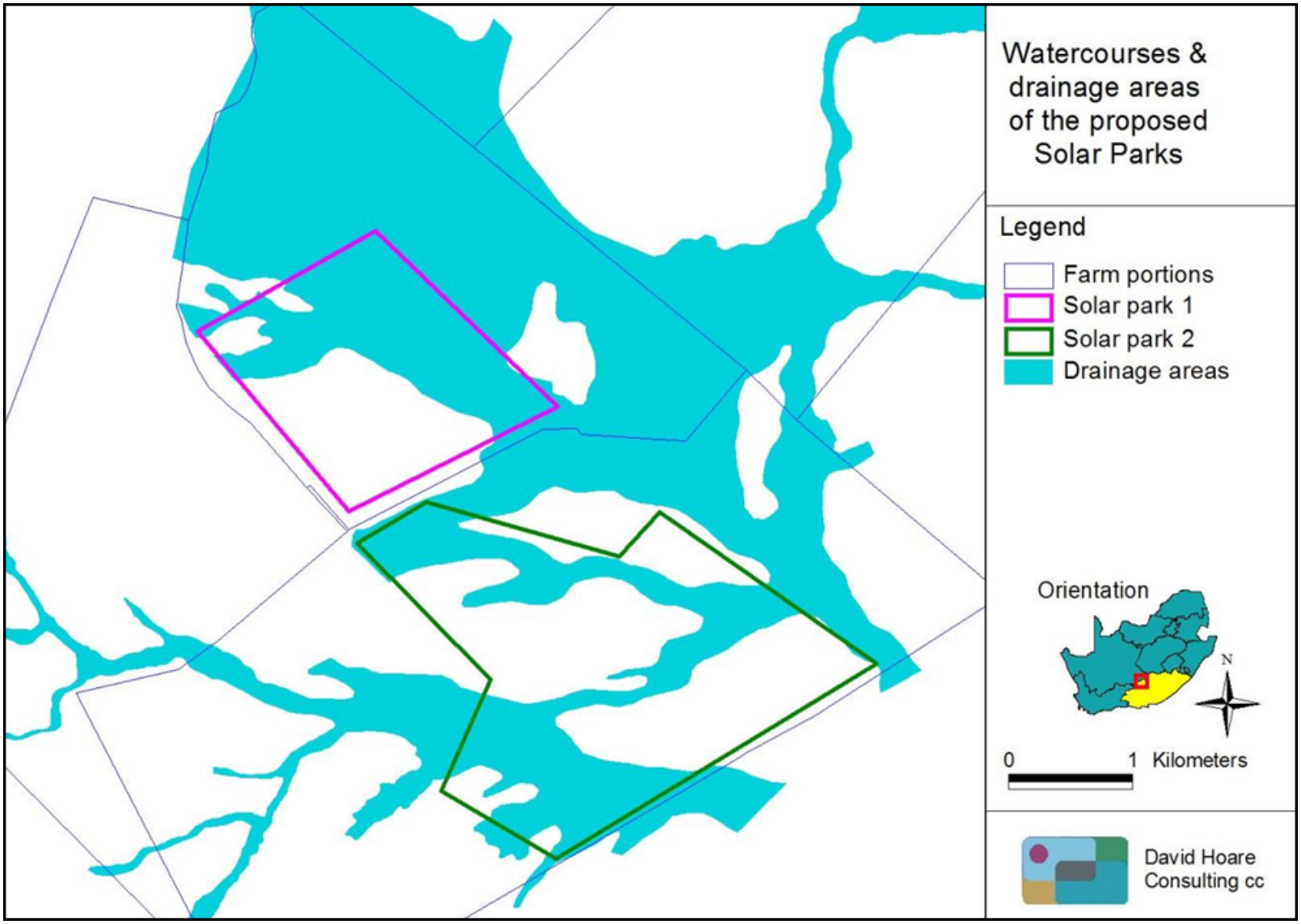

Figure 15: Drainage areas on the site and surrounding / broader study area

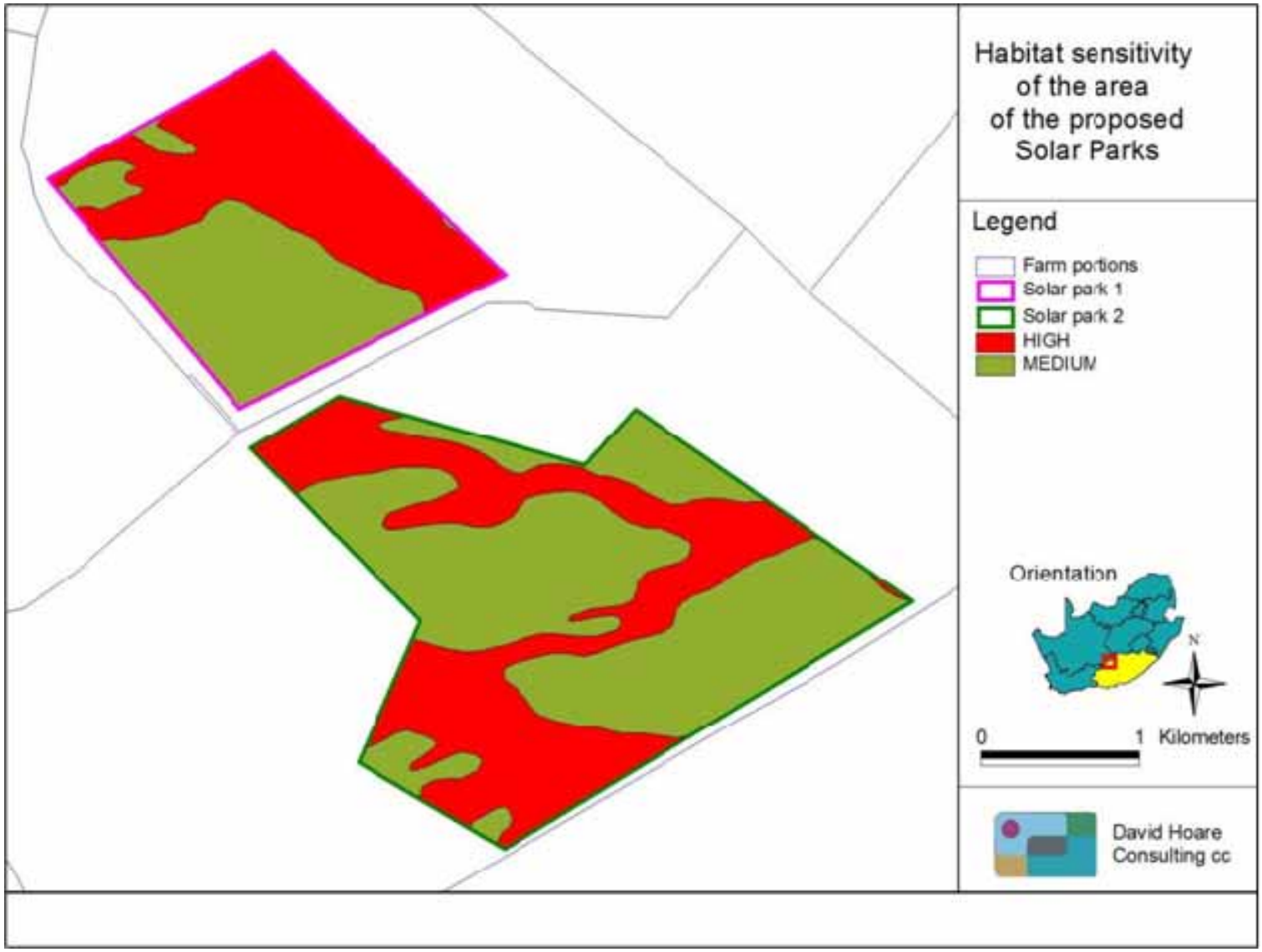

Figure 16: Ecological Habitat sensitivity of the site