

**ENVIRONMENTAL IMPACT ASSESSMENT PROCESS
FINAL BASIC ASSESSMENT REPORT**

**PROPOSED WOLMARANSSTAD MUNICIPALITY SOLAR
ENERGY FACILITY
NEAR WOLMARANSSTAD, NORTH WEST PROVINCE
(DEA REF No: 14/12/16/3/3/1/1089)**

FINAL BASIC ASSESSMENT REPORT

MARCH 2014

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environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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File Reference Number:

Application Number:

Date Received:

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

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2010 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
2. This report format is current as of **1 September 2012**. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority
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4. Where applicable **tick** the boxes that are applicable in the report.
5. An incomplete report may be returned to the applicant for revision.
6. 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.
7. This report must be handed in at offices of the relevant competent authority as determined by each authority.
8. No faxed or e-mailed reports will be accepted.
9. The signature of the EAP on the report must be an original signature.
10. The report must be compiled by an independent environmental assessment practitioner.
11. 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.
12. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
13. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.
14. Two (2) colour hard copies and one (1) electronic copy of the report must be submitted to the competent authority.
15. Shape files (.shp) for maps must be included on the electronic copy of the report submitted to the competent authority.

PROJECT DETAILS

Title	:	Environmental Basic Assessment Process Final Basic Assessment Report: Proposed Wolmaransstad Municipality Solar Energy Facility, near Wolmaransstad, North West Province
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Applicant	:	Bluewave Capital SA (Pty) Ltd
Report Status	:	Final Basic Assessment Report

When used as a reference this report should be cited as: Savannah Environmental (2013)
Draft Basic Assessment Report: Proposed Wolmaransstad Municipality Solar Energy Facility, near
Wolmaransstad, North West Province

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SUMMARY AND OVERVIEW OF THE PROPOSED PROJECT

Bluewave Capital SA (Pty) Ltd, an Independent Power Producer (IPP), is proposing the establishment of a small-scale commercial solar energy facility (using photovoltaic technology) of approximately 5MW in capacity. The site where the 5MW PV facility is proposed to be constructed is municipal-owned land situated west of the town of Wolmaransstad in the North West Province, on the Remainder of Portion 2 of the Farm Wolmaransstad and Townlands 184. The proposed project will be referred to as the **Wolmaransstad Municipality Solar Energy Facility**. Two alternative areas for the proposed 5MW PV plant development have been identified within the broader property and are assessed in this Basic Assessment Report.

Project need and desirability

Immediate need and desirability of the project: The grid stability issue here is not as severe as at Boshof or Stella. However the 88kV line running from the Goat DS Substation feeds directly into the local municipal substation that feeds the entire town of Wolmaransstad. The 5MW facility will therefore ensure grid stability for the town of Wolmaransstad which is more prone to brown outs and blackouts during times of electricity constraints.

National perspective: The purpose of the project is to generate electricity which will be fed-into the national electricity grid. The project will participate in the Department of Energy's Small Projects Renewable Energy Independent Power Producer Procurement (REIPPP) Programme for small projects. The REIPPP Programme has been designed to contribute towards the South African government's renewable energy target of 17GW by 2030, and to stimulate the renewable industry in South Africa.

The facility development footprint will be less than 19.5 ha in extent within which the following infrastructure will be established:

- » Photovoltaic (PV) panels of between 4m – 6m in height (fixed or tracking technology) with a capacity of up to 5MW.
- » Mounting structures to be either rammed steel piles or piles with pre-manufactured concrete footing to support the PV panels.
- » Cabling between the project components, to be lain in trenches ~ 1-2m deep.
- » Power inverters between the PV arrays ($\pm 4.5\text{m}^2$).
- » Distribution power line to evacuate the power into the Eskom grid via the Goat DS 132/88kV Substation.
- » Main and internal access roads (up to 7m wide).
- » Water storage facilities/ reservoirs ($1\ 000\ \text{m}^3$).
- » Office, workshop area for maintenance and storage (50m^2).

- » During construction (temporary infrastructure) such a laydown area (~1 hectare in extent) will also be required.
- » Fencing.

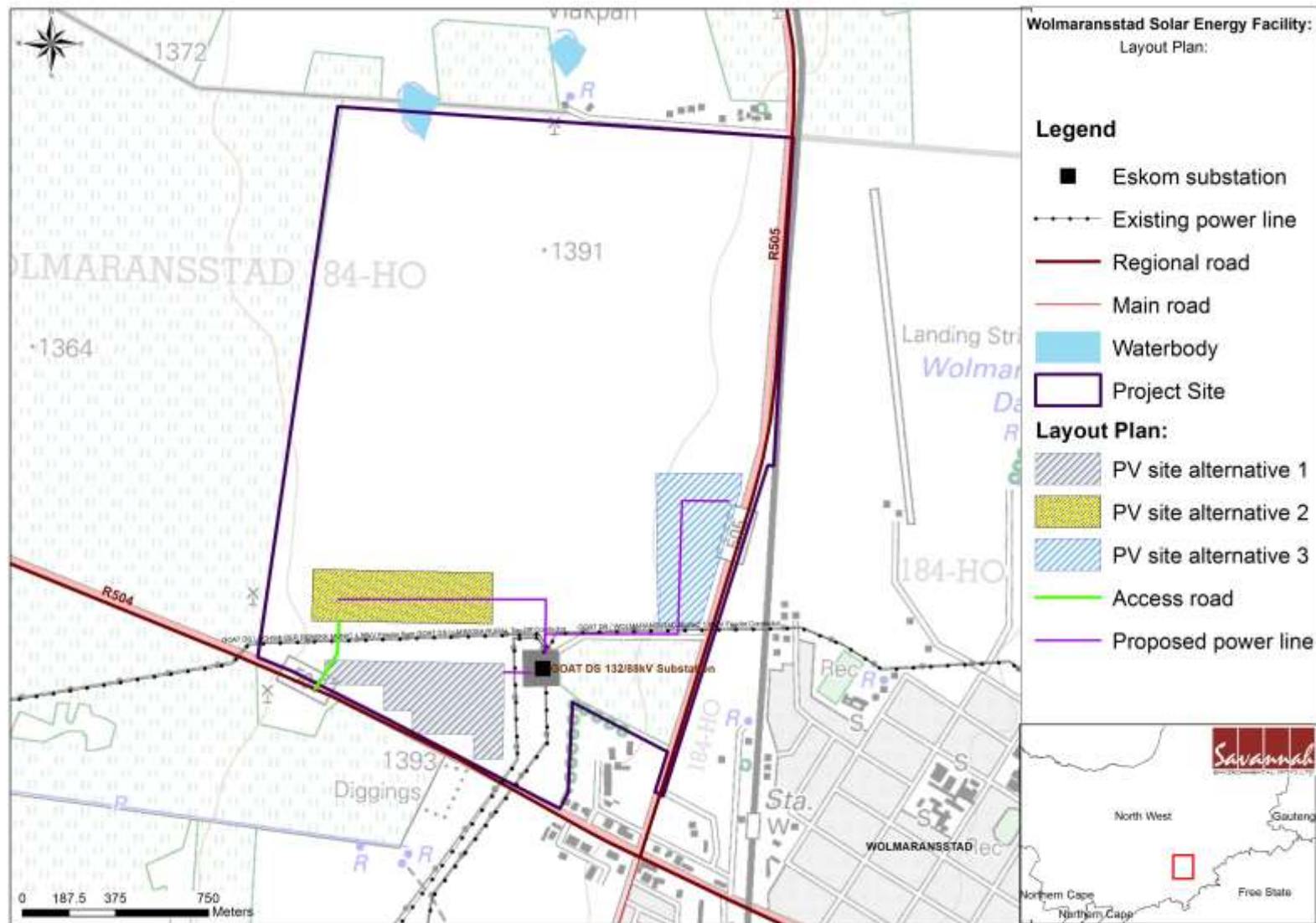


Figure 1: Locality map showing the three alternative sites for the assessment for the development area of the proposed Wolmaransstad Municipality 5MW Solar Energy Facility

1.1 NEED FOR THE PROPOSED DEVELOPMENT

Due to the exploitation of and large-scale reliance on non-renewable resources and the potential subsequent impacts on climate, there is increasing pressure globally to increase the share of renewable energy generation. South Africa currently depends on fossil fuels for the supply of approximately 90% of its primary energy needs. With economic development over the next several decades resulting in an ever increasing demand for energy, there is some uncertainty as to the availability of economically extractable coal reserves for future use. Furthermore, several of South Africa's coal-fired power stations are nearing the end of their economic life, require refurbishment, or have been recently returned to service (re-commissioned) at great expense (i.e. the Camden, Komati, and Grootvlei Power Stations).

The current electricity imbalances in South Africa highlight the significant role that renewable energy can play in terms of power supplementation. Given that renewables can generally 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. At present, South Africa is some way off from exploiting the diverse gains from renewable energy and from achieving a considerable market share in the industry. In order to meet the long-term goal of a sustainable renewable energy industry, a target of 17.8 GW of renewables by 2030 has been set by the Department of Energy (DoE) within the Integrated Resource Plan (IRP) 2010 and incorporated in the REIPPP Programme. This energy will be produced from various renewable energy technologies including solar energy facilities (i.e. such as PV technology). The proposed project is to contribute towards this goal for renewable energy.

1.2 REQUIREMENT FOR AN ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

In terms of the EIA Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA, Act No. 107 of 1998), authorisation is required from the National Department of Environmental Affairs (DEA) as the competent authority as mandated in terms of the Energy Response Plan, in consultation with the North West Department of Economic Development, Environment and Tourism (NWDEDET) for the establishment of the proposed solar energy facility. In terms of sections 24 and 24D of NEMA, as read with the EIA Regulations of GN R544 – R546 (as amended), a Basic Assessment process is required to be undertaken for the proposed project. An application has been submitted to the DEA.

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

1.3 DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER AND EXPERTISE TO CONDUCT THE BASIC ASSESSMENT PROCESS

Savannah Environmental was contracted by Bluewave Capital SA (Pty) Ltd as the independent environmental consultant to undertake the Basic Assessment process for the proposed solar energy facility. Neither Savannah Environmental, nor any of its specialist sub-consultants on this project are subsidiaries of, or are affiliated to Bluewave Capital SA (Pty) Ltd. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

Savannah Environmental is a specialist environmental consultancy which provides a holistic environmental management service, including environmental assessment and planning to ensure compliance with relevant environmental legislation. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team that has been actively involved in undertaking environmental studies for a wide variety of projects throughout South Africa and neighbouring countries. Strong competencies have been developed in project management of environmental processes, as well as strategic environmental assessment and compliance advice, and the assessment of environmental impacts, the identification of environmental management solutions and mitigation/risk minimising measures.

The Savannah Environmental team has considerable experience in environmental impact assessments and environmental management, and have been actively involved in undertaking environmental studies for a wide variety of projects throughout South Africa, including those associated with electricity generation, specifically from renewable sources.

The EAPs from Savannah Environmental who are responsible for this project are:

- » Steven Ingle, the principle author of this report, holds a Bachelors degree in Environmental Management and has 8 years experience in environmental

management and has undertaken numerous EIAs for a number of proposed large-scale infrastructure project and renewable energy facilities across South Africa.

- » Karen Jodas is a registered Professional Natural Scientist and holds a Master of Science degree. She has 16 years of experience consulting in the environmental field. Her key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. She is currently responsible for the project management of EIAs for several renewable energy projects across the country.

In order to adequately identify and assess potential environmental impacts, several specialists have been appointed to conduct specialist studies, as required:

Specialist Studies Undertaken	Specialists
Ecology Impact Assessment	Simon Todd of Simon Todd Consulting (Ecologist)
Soil and Agricultural Potential Impact Assessment	Johann Lanz (Soil Scientist)
Heritage Impact Assessment	Jaco van der Walt of Heritage Contracts and Archaeological Consulting (Archaeologist)
Palaeontology Desktop Study	Dr John Almond (Palaeontologist)
Visual Impact Assessment	Karen Hansen (Visual specialist)

Curricula vitae for the Savannah Environmental and specialist project team are included in **Appendix J1**.

DRAFT BASIC ASSESSMENT REPORT FOR REVIEW

The Draft Basic Assessment Report was made available for public review at the following venues:

- » Maquassi Hills Local Municipality Library – 19 Kruger Street
- » www.savannahSA.com/projects

The 30-day period for review was from **11 December 2013 – 28 January 2014**.

Written comments were to be forwarded to:

Please submit your comments to:
Gabriele Wood of Savannah Environmental Post: PO Box 148, Sunninghill, Johannesburg, 2157 Telephone: 011 656 3237 Fax: 086 684 0547 Email: gabriele@savannahsa.com
The due date for comments on the Draft Basic Assessment Report is 28 January 2014 .

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 the specialist appointed and attach in Appendix I.

1. PROJECT DESCRIPTION

Describe the project associated with the listed activities applied for

Bluewave Capital SA (Pty) Ltd is proposing the establishment of a small-scale commercial solar energy facility (using photovoltaic technology) of approximately 5MW in capacity. The site where the 5MW PV facility is proposed to be situated is municipal-owned land situated west of Wolmaransstad, on the Remainder of Portion 2 of the Farm Wolmaransstad and Townlands 184, in the North West Province.

The facility development footprint will be less than 19.5 ha in extent within which the following infrastructure will be established:

- » Photovoltaic (PV) panels of between 4m – 6m in height (fixed or tracking technology) with a capacity of up to 5MW.
- » Mounting structures to be either rammed steel piles or piles with pre-manufactured concrete footing to support the PV panels.
- » Cabling between the project components, to be lain in trenches ~ 1-2m deep.
- » Power inverters between the PV arrays ($\pm 4.5\text{m}^2$).
- » A distribution power line to evacuate the power into the Eskom grid via the Goat DS 132/88kV Substation situated in close proximity to the proposed PV site.
- » Internal access roads (up to 7m wide).
- » Water storage facilities/reservoirs ($1\ 000\ \text{m}^3$).
- » Office, workshop area for maintenance and storage (50m^2).
- » During construction (temporary infrastructure) such a laydown area (~1 hectare in extent) will also be required.
- » Fencing.

General site description: The broader site (Portion 2 of the Farm Wolmaransstad and Townlands 184) is the property of the Maquassi Hills Local Municipality within 1km north-west of Wolmaransstad bordered by the R505 and R504. The broader site is a total of 2661 ha in extent and is situated on the Highveld plateau with minimal relief. The farm is at an elevation of 1 380m and the slope across the site is approximately 2%. Site Alternatives 1 and 2 have never been cultivated and the majority of the site remains in a natural condition although soil disturbances from soil borrowing activities in the southern section of the site (on Site Alternative 2) are apparent. A large

proportion of the farm (and where Site Alternative 3 is situated) consists of old croplands that have been ploughed in the past, and which show various degrees of recovery. Three site alternatives for the siting of the proposed PV facility are included for assessment within the greater farm portion (as discussed below). The areas adjacent to the site alternatives are characterised by several overhead power lines (four) from the south, east and west which feed into the Goat DS Substation situated within 300m from the site alternatives. The greater site is therefore already characterised by linear disturbances and electrical infrastructure.

Site Alternatives: Three alternative locations for the potential siting of the 5MW PV facility have been proposed on different locations within the greater farm boundary. These alternatives were identified based on their near proximity to the Goat DS Substation. The edge of both site alternatives is located within close proximity (between 300m to 430m) from the existing Goat DS substation. The site alternatives are separated by an east-west running power line (Goat DS – Schweizer Reneke Municipality 1 88kV) which feeds into this substation. A large proportion of Site Alternative 1 lies within an area that has been highly disturbed in the past from soil borrowing/mining activities with some intact vegetation remaining. Site Alternative 2 is dominated by intact Klerksdorp Thornveld habitat type. Land cover on Site Alternative 3 is situated on old croplands which have been ploughed in the past.

Footprint: The footprint of the facility including all temporary laydown areas will exceed 10ha in extent but will not exceed 19,5ha in extent. It is anticipated that the final footprint of the 5MW facility will be approximately 16ha.

Critical Biodiversity Areas: Site Alternatives 1 and 2 are situated within a Terrestrial and Aquatic CBA mapped in terms of the North-West Province Biodiversity Conservation Assessment. The CBA's are aimed at protecting the intact remnants of Klerksdorp Thornveld from further transformation. The vegetation on Site Alternative 2 is less representative of this CBA status due to the disturbances due to historic soil mining/borrowing. Site Alternative 3 is not located within a CBA and is situated on old croplands which have been ploughed in the past.

1. Components of the PV Facility

The main components of the PV facility will comprise of the following:

Photovoltaic Cells

Solar energy facilities, such as those using PV panels, use the energy from the sun to generate electricity through a process known as the Photovoltaic Effect. This effect refers to photons of light colliding with electrons, and therefore placing the electrons into a higher state of energy to create electricity.

Solar photovoltaic (PV) panels consist primarily of glass and various semiconductor

materials and in a typical solar PV project, will be arranged in rows to form solar arrays. The PV cell is positively charged on one side and negatively charged on the other side and electrical conductors are attached to either side to form a circuit. This circuit then captures the released electrons in the form of an electric current (direct current). An inverter must be used to change the direct current (DC) it to alternating current (AC). The electricity is then transmitted through a power line for distribution to the grid and use. The PV panels are designed to operate continuously for more than 25 years with minimal maintenance required.



Figure 2: Photovoltaic panels (Photo courtesy of BlueWave Capital SA)

Support Structure

The photovoltaic (PV) modules will be mounted to steel support structures. These can either be mounted at a fixed tilt angle, optimised to receive the maximum amount of solar radiation and dependent on the latitude of the proposed facility, or a tracking mechanism where at a maximum tilt angle of 45° the modules would be approximately 0.3m off the ground.



Figure 3: PV panel support structures (Photo courtesy of BlueWave Capital SA)

Inverter

The photovoltaic effect produces electricity in direct current (DC). Therefore an

inverter must be used to change it to alternating current (AC) for transmission in the national grid. The inverters convert the DC electric input into AC electric output, and then a transformer steps up the current to 33 kV for on-site distribution of the power. The inverter and transformer are housed at the power conversion station (PCS). The PV combining switchgear, which are dispersed among the arrays, collects the power from the arrays for distribution to the project's substation. The inverters that Bluewave intend to use on the project are shown below and have a footprint of 9m by 3m and are typically 3m in height. These are usually bolted to a concrete pad similar in size to the inverter.

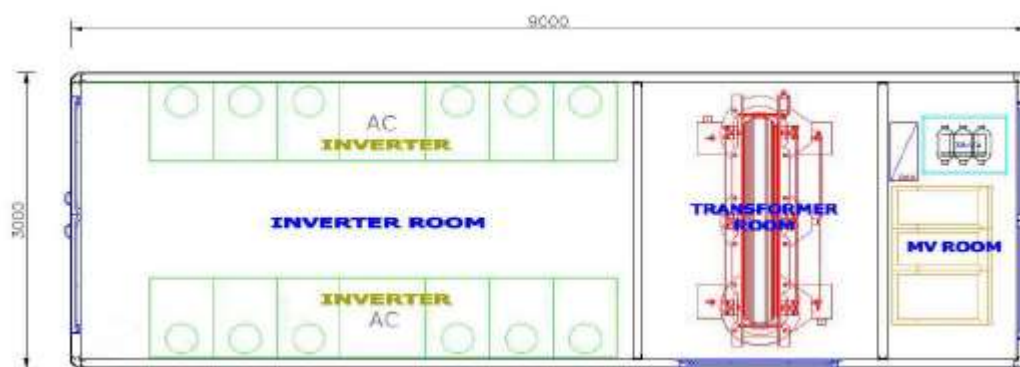


Figure 4: Inverter schematic diagram (courtesy of Bonfiglioli SA)



Figure 5: Inverter (Photo courtesy of BlueWave Capital SA)

2. Overview of the Construction Phase

The 5MW solar energy facility could take approximately 6 - 10 months to construct and commission, and would require the expertise of skilled, semi-skilled and low skilled staff.

In order to construct the proposed PV solar energy facility and associated

infrastructure, a series of activities will need to be undertaken. Site preparation activities will include clearance of vegetation at the footprint of certain components (i.e. inverters and transformer position) and the establishment of the internal access roads. The PV panels will be sited a certain distance away from each other (to avoid shading) within the broader development site. Clearing activities, where required, will involve the stripping of topsoil which will need to be stockpiled and/or spread on site. Anticipated activities during construction are described below.

Conduct Surveys

Prior to initiating construction, a number of surveys will be required including, but not limited to, a geotechnical survey, a site survey and, survey of substation site and access road servitudes.

Establishment of Access Roads

Internal access roads of up to 7m in width will be required. An existing gravel access road will be upgraded and utilised to access the site. The existing gravel road is connected to the R504 and R505 which form the southern and eastern boundaries of the affected farm portion respectively, both of which provide access to the Goat DS Substation which is located in close proximity to the proposed 5MW PV site and all three site alternatives.

Undertake Site Preparation

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

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 via the existing internal access road. Some of the components (i.e. transformer) may be defined as abnormal loads in terms of the Road Traffic Act (Act No. 29 of 1989) by virtue of the dimensional limitations (i.e. weight).

Typical civil engineering construction equipment will need to be brought to the site (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.) as well as components required for the upgrade of the substation and site preparation.

Establishment of Laydown Areas on Site

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

Erect PV Cells and Construct Substation & Inverters

The PV cells will be arranged in arrays. The support structures will be fixed into the

ground with the use of concrete, depending on the soil conditions at the site. The height of the PV panel structure will be between 4m – 6m in height.

An overhead power line of approximately 150m (Site Alternative 1) – 650m (Site Alternative 3) in length to tie into the existing Goat DS 132/88kV substation located within the farm boundaries.

Inverters and PV plant transformer/substation will be installed to facilitate the connection between the solar energy facility and the Eskom electricity grid. Connection will be dependent on final engagement with Eskom, but it is expected to be via the Goat DS 132/88kV Substation investigated in this study. The position of the inverters within the footprint of the broader site will be informed by the final positioning of the PV components.

Establishment of Ancillary Infrastructure

Ancillary infrastructure may include a workshop, storage areas as well as a temporary contractor's equipment camp. The establishment of these facilities/buildings 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. Water storage tanks will also be placed on-site to collect water for cleaning of the PV panels.

Undertake Site Rehabilitation

Once construction is completed and once all construction equipment is removed from site, 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.

3. Overview of the Operation Phase

The electricity that is generated from the PV panels will be stepped up through the on-site inverters and transformers at the substation. Thereafter energy will be transmitted via the 33kV overhead power line into the Goat DS 132/88kV Substation.

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

Cleaning of the PV Panels Using Water

Two panel cleaning events per year are estimated which should accommodate dust storm events and regular cleaning. For operations, approximately 500 000 litres (or 500m³) of water per annum is proposed to be trucked in from the nearest water source as per a water purchase agreement from a local authorised user or service provider.

4. Overview of the Decommissioning Phase

The solar energy facility is expected to have a lifespan of more than 20 years (with maintenance) and the power plant infrastructure would only be decommissioned once it has reached the end of its economic life. If economically feasible/desirable the decommissioning activities would comprise the disassembly and replacement of the individual components with more appropriate technology or infrastructure available at that time. However, if not deemed so, then the facility would be completely decommissioned which would include the following decommissioning activities.

Site Preparation

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

Disassemble and Remove Components

All above ground facilities that are not intended for future use at the site would be disassembled, and reused and recycled (where possible), or disposed of in accordance with regulatory requirements. Much of the above ground wire, steel, and PV panels of which the system is comprised are recyclable materials and would be recycled to the extent feasible. The components of the plant would be deconstructed and recycled or disposed of in accordance with regulatory requirements. The site will be rehabilitated and can be returned to the current or other beneficial land-use.

Provide a detailed description of the listed activities associated with the project as applied for

The following listed activities are relevant to the proposed development:

Notice Number	Activity	Description	Relevance of Regulation to Project
GN 544, 18 June 2010	Activity 1(ii):	The construction of facilities or infrastructure for the generation of electricity where; ii. the electricity output is 10 megawatts or less but the total extend of the facility is covers an area in excess of 1 hectare.	The proposed 5MW PV facility would be less than 10MW in capacity but will cover an area greater than 1 hectare but less than 20 hectares in extent
GN 544, 18 June 2010	Item 10(i):	The construction of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more	The project will require the construction of a new overhead power line (outside an urban area) to connect to the Goat DS 88/22 kV Substation.

		than 33kv but less than 275kv.	
GN 544, 18 June 2010	Activity 11	The construction of: x. buildings exceeding 50 square metres in size; or xi. infrastructure or structure 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.	This activity was included in the Application Form however no surface water features will be affected by the development of the PV facility and associated infrastructure (both site alternatives).
GN 544, 18 June 2010	Activity 23(ii)	The transformation of undeveloped, vacant or derelict land to- ii residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares.	The site is outside of the Wolmaransstad urban area and the proposed facility will have a development footprint of more than 1 hectare but less than 20 hectares.
GN 546, 18 June 2010	Activity 4	The construction of a road wider than 4m with a reserve less than 13,5m, outside urban areas in critical biodiversity areas identified in systematic biodiversity plans	The proposed solar energy facility will require the construction of internal roads wider than 4m located within a Terrestrial Critical Biodiversity Area (Tier 2) and an Aquatic Critical Biodiversity Area (Tier 1) as mapped as part of the North-West Province Biodiversity Conservation Assessment (Skowno & Desmet 2008).
GN 546, 18 June 2010	Activity 12(b)	The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetation cover constitutes indigenous vegetation (b) Within critical biodiversity areas identified in bioregional plans	The proposed solar energy facility is located within a Terrestrial Critical Biodiversity Area (Tier 2) and an Aquatic Critical Biodiversity Area (Tier 1) as mapped as part of the North-West Province Biodiversity Conservation Assessment, the construction of which may result in the clearance of 300 m ² or more of vegetation where 75% of which constitutes indigenous vegetation.
GN 546, 18 June 2010	Activity 13(2)(a)	The clearance of vegetation of an area of 1 hectares or more of vegetation where 75% or more of	The proposed solar energy facility is located within a Terrestrial Critical Biodiversity

		the vegetative cover constitutes indigenous vegetation (a) In Critical Biodiversity Areas and Ecological Support Areas identified in regional	Area (Tier 2) and an Aquatic Critical Biodiversity Area (Tier 1) as mapped as part of the North-West Province Biodiversity Conservation Assessment and may require the clearance of vegetative cover which may be more than 75% indigenous.
GN 546, 18 June 2010	Activity 14(a)(i)	The clearance of an area of 5 hectares or more of vegetation, where 75% or more of the vegetative cover constitutes indigenous vegetation. (a) North West i. All areas outside urban areas	The solar energy facility will be located outside urban areas and will require the clearance of more than 5ha of vegetation cover, which may comprise more than 75% indigenous vegetation.

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 as required by Regulation 22(2)(h) of GN R.543. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the, competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

The identification of alternatives should be in line with the Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004. Should the alternatives

include different locations and lay-outs, the co-ordinates of the different alternatives must be provided. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

a) Site alternatives

A site alternative refers to the identification of more than one potential site which may be suitable for the establishment of a proposed facility. Due to the nature of the proposed development (i.e. a renewable energy facility), the location of the project is largely dependent on technical and environmental factors such as solar irradiation (i.e. the fuel source), climatic conditions, available extent and the relief/topography of the site, and available grid connection.

The following characteristics were considered in determining the feasibility of the proposed site alternatives included in this assessment:

Site Screening - An environmental screening study conducted served to identify areas within the site which were suitable for the siting of the proposed 5MW facility. Following an evaluation of the broader farm, two siting alternatives adjacent to the Goat DS Substation (separated by a power line) were tested for environmental suitability and were deemed not to be fatally flawed. These site alternatives have subsequently been put forward for environmental evaluation through a Basic Assessment process.

Site Extent - space is an important factor for the development of a PV facility. A development footprint area of approximately 19.5 ha would be required for the 5MW facility (includes laydown areas during construction). The final footprint of the facility and associated infrastructure would be approximately 16ha in extent. The extent of the site for the proposed 5MW facility therefore allows for the avoidance of any identified environmental and/or technical constraints in terms of the final design of the facility.

Land availability and site access - The land which accommodates both alternatives is available for lease from the Maquassi Hills Local Municipality by Bluewave Capital. An existing gravel access road will be upgraded and utilised to access the site. The existing gravel road is connected to the R504 and R505 which form the southern and eastern boundaries of the affected farm portion respectively, both of which provide access to the Goat DS Substation which is located in close proximity to the proposed 5MW PV site.

Climatic Conditions - the economic viability of a PV facility is directly dependent on the annual direct solar irradiation values. The site has been demarcated as an area of high irradiation, which indicates that the regional location of the project is appropriate for a solar energy facility.

Site gradient - a level surface area is preferred for the installation of PV panels (i.e. a gradient of 3% or less). The gradient of the site is flat, and no significant slopes or ridges are present within the study area which reduces the need for extensive earthworks and associated levelling activities, thereby minimising environmental impacts.

Grid Connection - Due to the proposed size and location of the facility, a 33kV connection to the Goat DS Substation is the preferred option. A connection application has been made to Eskom. The generated energy will feed directly into the Goat DS Substation, in turn feeding into the municipal substation which provides Wolmaransstad with electricity. The proposed 5MW facility will thereby ensure grid stability for the town.

The proposed Wolmaransstad Municipality 5MW PV facility is expected to have a development footprint of approximately 16ha within the larger farm portion which is approximately 244ha in extent. Three potential site alternatives located on the site, with their power line and access road alternatives have been identified and assessed as part of this BA.

Site Alternative 1		
<p>Site Alternative 1 is located on the Remainder of Portion 2 of the Farm Wolmaransstad and Townlands 184. The PV array is proposed to occupy an area approximately 150m to the west from the Goat DS Substation (shown in the image below). This site alternative is bordered by two 88kV power lines to the north and east and the R504 to the south.</p> <p>There has been much disturbance and excavation on the site from soil mining, and there are numerous un-rehabilitated open excavations remaining on the site. This section of the site has not been cultivated in the past. The current land use on the site is grazing.</p> <p>This option would require an overhead power line of approximately 145m in length to connect to the Eskom grid, as well as an access road of approximately 50m from the R504 to the south.</p>	<p>Lat 27° 11' 06" S</p>	<p>Long 25° 57' 29" E</p>

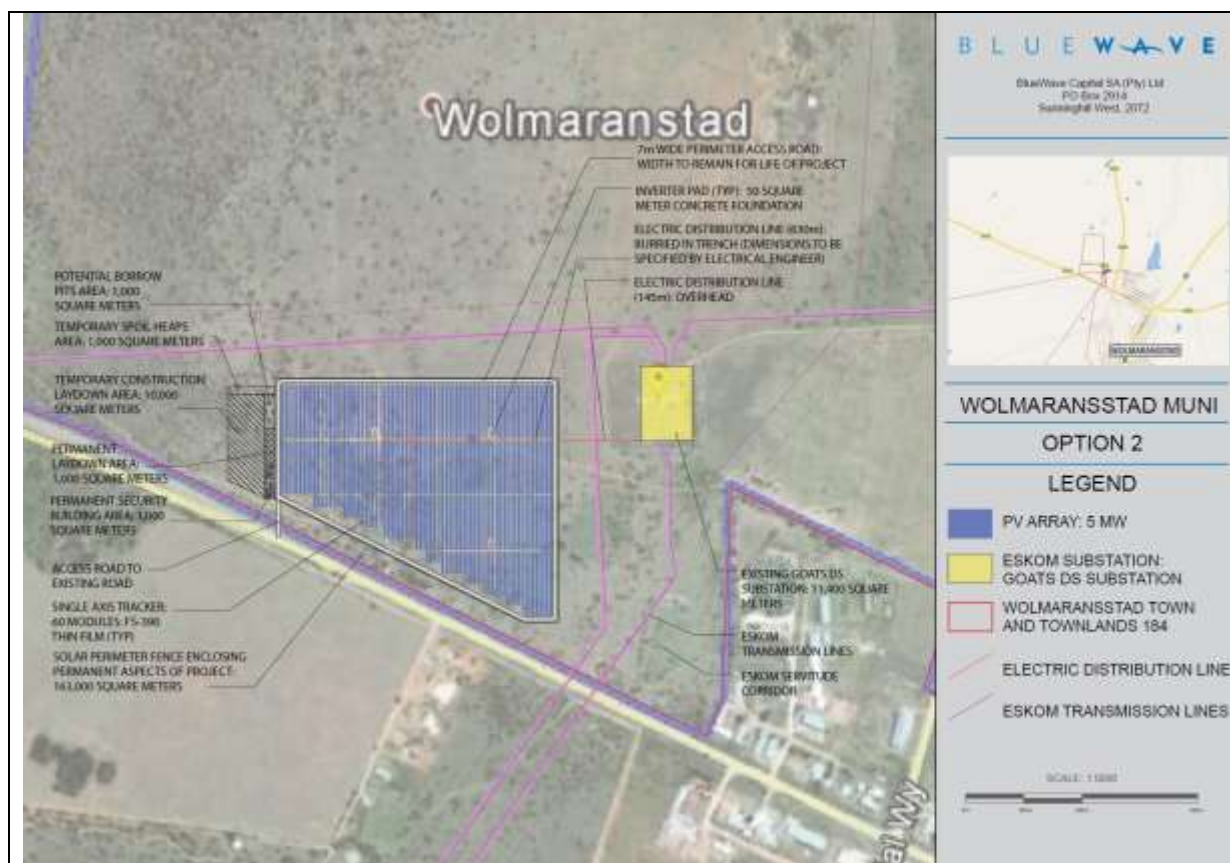


Figure 6: Site Alternative 1 layout plan

Site Alternative 2

Site Alternative 2 is also located on the Remainder of Portion 2 of the Farm Wolmaransstad and Townlands 184. Site Alternative 2 is situated within 200m to the north of Site Alternative 1 and north west of the Goat DS Substation. Vegetation on this site is relatively intact as no soil mining activities or disturbances have been undertaken in this section of the farm portion. Current land use across the entire farm is grazing of cattle only.

The PV array is proposed to occupy an area approximately 300m to the north west of the Goat DS Substation. The general site character is shown in the image below. This site alternative is bordered by one 88kV power line to the south.

This option would require a longer overhead power line (approximately 450m) to connect to the Eskom grid, and a longer access road from the R504 to the south (approximately 250m).

Lat	27° 10' 53" S	Long	25° 57' 26" E
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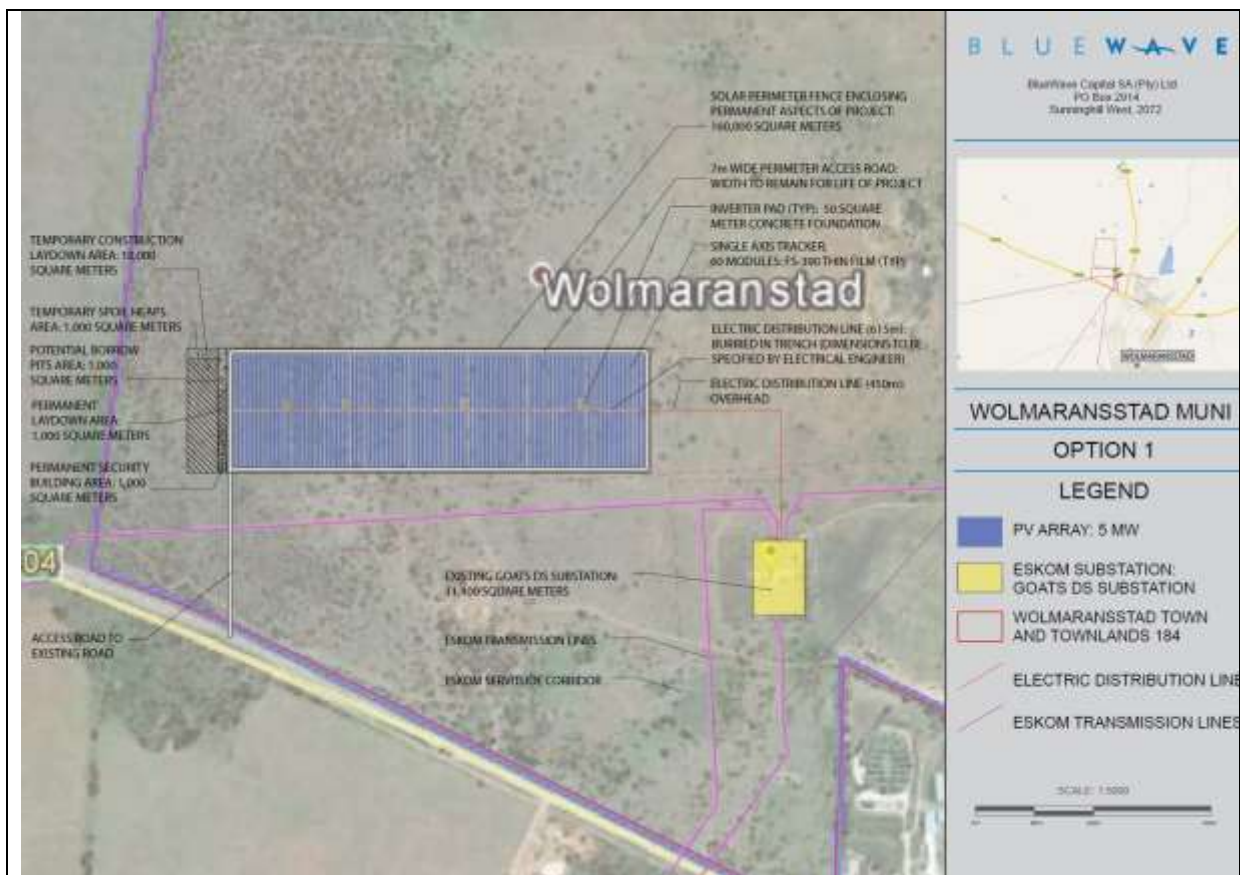


Figure 7: Site Alternative 2 layout plan

Site Alternative 3

Site Alternative 3 is also located on the Remainder of Portion 2 of the Farm Wolmaransstad and Townlands 184. Site Alternative 3 is situated within 670m to the east of Site Alternative 2 and approximately 430m to the north east of the existing Goat DS Substation. Vegetation on this site consists of old croplands, that have been ploughed in the past, but which show signs of recovery to a natural status.

This site alternative is bordered by one 88kV power line to the south, old croplands to the north, the R505 to the east, an internal farm road within 20m to the west and a wetland system (pan) approximately 150m further to the west.

This option would require a longer overhead power line (approximately 650m) to connect to the Eskom grid, and an access road from the R505 to the east (approximately 50m).

Lat	Long
27° 10' 50" S	25° 58' 06" E



Figure 8: Site Alternative 3 layout plan

In the case of linear activities:

The co-ordinates for the power line of suitable voltage to connect into the existing Goat DS substation are provided below:

Power line (~145m) linked to Site Alternative 1	Latitude (S):			Longitude (E):		
• Starting point of the activity	27°	11'	04.50"	25°	57'	39.00"
• Middle/Additional point of the activity						
• End point of the activity	27°	11'	04.50"	25°	57'	44.71"

Power line (~450) linked to Site Alternative 2	Latitude (S):			Longitude (E):		
• Starting point of the activity	27°	10'	55.37"	25°	57'	37.45"
• Middle/Additional point of the activity	27°	10'	55.37"	25°	57'	45.49"

• End point of the activity	27°	11'	02.44"	25°	57'	45.83"
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Power line (~650m) linked to Site Alternative 3	Latitude (S):			Longitude (E):		
• Starting point of the activity	27°	10'	58.57"	25°	58'	04.83"
• Middle/Additional point of the activity	27°	10'	59.80"	25°	57'	54.14"
• End point of the activity	27°	11'	02.45"	25°	57'	45.43"

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

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A.

b) Layout alternatives

Alternative 1		
Description:	Lat (DDMMSS)	Long (DDMMSS)
The proposed Wolmaransstad Municipality 5MW Solar Energy Facility is expected to have a development footprint during operation of ~16ha. Alternative sites within the greater farm portion and their linear components have been addressed above. No layout alternatives are provided for assessment.		
Alternative 2		
Description:	Lat (DDMMSS)	Long (DDMMSS)
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

c) Technology alternatives

Alternative 1 (preferred alternative)
As it is the intention of Bluewave Capital to develop renewable energy projects as part of the DoE's Small-scale (i.e. ≤5MW) Renewable Energy Independent Power Procurement (REIPPP) Programme, only renewable energy technologies are being considered. Solar energy is considered to be the most suitable renewable energy technology for this site,

based on the site location, ambient conditions and energy resource availability (i.e. solar irradiation). PV technology is considered more feasible from a technical perspective at this scale of development (i.e. a small scale project). Furthermore, PV does not require large volumes of water power generation purposes.

The selection of available PV technologies is usually differentiated by weather and temperature conditions that prevail, such that optimality is obtained by the final choice. The impacts of any of the PV technology choices on the environment are very similar and differentiated by different landscapes and technologies. The construction, operation and decommissioning activities associated with the facility will also be the same irrespective of the technology chosen. There are a number of different solar PV technologies, i.e.:

- » Fixed / static PV panels;
- » Tracking PV panels (with solar panels that rotate to follow the sun’s movement).

Single-axis tracking PV is being considered for the proposed facility. The preferred option will be informed by financial, technical and environmental factors. No technology alternatives are considered further.

Alternative 2

Alternative 3

d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)

Alternative 1 (preferred alternative)

Operating Alternatives

This refers to the manner in which a proposed facility would function. For example, should a wind energy facility prove problematic for avifauna during migrating periods, an operating alternative of switching off certain turbines during those times could be proposed. No operating alternatives would be applicable to the proposed solar energy facility as there are no feasible means of alternative operation for a facility of this nature. No operating alternatives are considered further.

Alternative 2

Alternative 3

e) No-go alternative

This is the option of not constructing the Wolmaransstad Municipality Solar Energy Facility. This option is assessed as the “no go alternative” in this Basic Assessment

Report (Section D and Appendix F), against which the project impacts are assessed. If the project does not proceed, there will still be a need for alternative energy projects to supplement the current power requirements of the country. The site will remain unchanged and there will be no opportunities for temporary and permanent employment created through this project.

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

3. PHYSICAL SIZE OF THE ACTIVITY

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

Alternative:

Alternative A1¹ (preferred activity alternative)
 Alternative A2 (if any)
 Alternative A3 (if any)

Size of the activity:

PV Facility - ~160 000 m ²
m ²
m ²

or, for linear activities:

Alternative:

Alternative A1 (from alternative site 1)
 Alternative A2 (from alternative site 2)
 Alternative A3 (from alternative site 3)

Length of the activity:

Power line - 145 m
Power line - 450 m
Power line - 650 m

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

Alternative:

Alternative A1 (preferred activity alternative)
 Alternative A2 (if any)
 Alternative A3 (if any)

Size of the site/servitude:

Site - 19.5ha
Power line- 3 190 m ² (22m X 145m)
Site - 19.5ha
Power line- 9 900 m ² (22m X 450m)
Site - 19.5ha
Power line- 14 300 m ² (22m X 650m)

¹ "Alternative A.." refer to activity, process, technology or other alternatives.

4. 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

m

Describe the type of access road planned:

For Site Alternatives 1 and 2 an existing gravel access road will be upgraded and utilised to access the site. The existing gravel road is connected to the R504 which forms the southern boundary of the affected farm portion. For Site alternative 3 a 45m access road from the R505 will be required.

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. See Appendix A.

A site plan showing the position of the access road, as well as an indication of the road in relation to the site is included within **Appendix A**.

5. 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 accurate indication of the project site position as well as the positions of the alternative sites, if any;
- indication of all the alternatives identified;
- closest town(s);
- 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).

An A3 Locality Map is attached within **Appendix A**.

6. LAYOUT/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:

- the property boundaries and numbers of all the properties within 50 metres of the site;
- the current land use as well as the land use zoning of the site;
- the current land use as well as the land use zoning each of the properties adjoining the site or sites;
- the exact position of each listed activity applied for (including alternatives);
- servitude(s) indicating the purpose of the servitude;
- a legend; and
- a north arrow.

A detailed site plan(s) for each alternative activity is attached within **Appendix A**

7. SENSITIVITY MAP

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

- watercourses;
- 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 infested with alien species); and
- critical biodiversity areas.

The sensitivity map must also cover areas within 100m of the site and must be attached in **Appendix A**.

A sensitivity map covering areas within 100m of the site is attached within **Appendix A**.

8. 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 report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

Colour photographs have been taken from the centre of the proposed site in the eight major compass directions for both Site Alternatives. Annotated photographs are included in **Appendix B**.

9. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of at least 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.




A preliminary facility illustration which represents a realistic image of the planned solar energy facility is attached within **Appendix C**.

10. ACTIVITY MOTIVATION

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

1. Is the activity permitted in terms of the property's existing land use rights?	NO ✓	Please explain
The proposed development site is currently zoned for agricultural use. The development footprint or site will be required to be rezoned to 'special use' as required by the Municipality.		
2. Will the activity be in line with the following?		
(a) Provincial Spatial Development Framework (PSDF)	YES ✓	Please explain
The Renewable Energy Strategy (RES) for the North West Province (2012) was developed by North West Department of Economic Development, Environment, Conservation and Tourism (DEDECT) to enable the Province to participate competitively within the emerging renewable energy sector of South Africa, while addressing the Province's contribution to greenhouse gas emissions and the use of non-renewable fossil fuel resources. Various renewable energy source options were investigated in the RES. Solar (photovoltaic as well as solar water heaters), municipal solid waste, hydrogen and fuel cell technologies, biomass, and energy efficiency were identified as sub-sectors/sources which hold the greatest competitive potential in the Province. Therefore, the project can contribute positively to the RES for the North West Province.		
(b) Urban edge / Edge of Built environment for the area	YES ✓	Please explain
The proposed site is located immediately outside of the urban edge of the town of		

Wolmaransstad. The farm portion is owned by the Maquassi Hills Local Municipality who are in support of the application for the solar energy facility and will be in line with the planning policies of the Municipality.			
(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	Yes ✓		Please explain
The North West Province Biodiversity Conservation Assessment identifies Wolmaransstad as being situated within a "not currently threatened" terrestrial ecosystem (not described in terms of the IDP or SDF), although both site alternatives are situated within a CBA in terms of the North West Province Conservation Assessment. The solar facility will also create direct and indirect job opportunities that will stimulate local economic growth. The project will not compromise the integrity of the IDP.			
(d) Approved Structure Plan of the Municipality	YES ✓		Please explain
One of the Maquassi Hills Local Municipality's objectives is to upgrade bulk electricity networks and associated infrastructure. This project will assist with the upgrading of this infrastructure and creating jobs. The farm portion is owned by the Maquassi Hills Local Municipality, who are in support of the application for the solar energy facility.			
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)		NO ✓	Please explain
The Dr Kenneth Kaunda District does not have an Environmental Management Framework although the IDP identifies an Environmental Management Framework as a project which is currently in process which will inform and guide Environmental Management activities, programmes and projects within District.			
(f) Any other Plans (e.g. Guide Plan)	YES	NO	Please explain
N/A			

<p>3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?</p>	<p>YES ✓</p>		<p>Please explain</p>
<p>The land use of the specific area is not defined within any SDF or IDP although one of the Maquassi Hills Local Municipality's objectives is to upgrade bulk electricity networks and associated infrastructure. This project will assist with the upgrading of this infrastructure and creating jobs. The farm portion is owned by the Maquassi Hills Local Municipality who are in support of the application for the solar energy facility.</p>			
<p>4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)</p>	<p>YES ✓</p>		<p>Please explain</p>
<p>The evacuation of additional power into the Eskom grid, although only 5MW, will serve to improve the stability of the grid for the immediate area, assist the government in achieving the goal of 17GW renewable energy as part of the electricity generation technology mix by 2030, and assist in the reduction in the need to mine non-renewable resources such as coal for conventional power generation.</p> <p>The proposed development will benefit the local community through job creation, skills development opportunities and training which will, in turn, assist in reducing poverty levels that the area is currently facing, and strengthen electricity supply for the area.</p>			
<p>5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)</p>	<p>YES ✓</p>		<p>Please explain</p>
<p>All the services required for the project have been adequately provided for and, should any need for other services arise, the relevant authority will be communicated with.</p> <p>Existing services provided by the Maquassi Hills Local Municipality are of adequate capacity to absorb the proposed small-scale 5MW PV development.</p> <p>Roads: Access provision from the R504 or the R505 which border the larger farm portion may result in localised traffic impacts but the cost of any access provisions will be absorbed by the applicant.</p> <p>Water: The municipality will provide the applicant with confirmation of the availability</p>			

of water for the construction phase. Approximately 500m³ of water per annum will be required for the cleaning of the PV panels. Failing this suitable water sources will be identified for the construction and operational phase.

Electricity: The development will generate power, and will strength the local electricity supply as the electricity generated will be fed directly into the Eskom grid.

6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)



NO
✓

Please explain

The proposed project is to be developed by a private developer (i.e. Bluewave Capital) and not the Local Municipality, however the farm portion is owned by the Maquassi Hills Local Municipality (who are in support of the application for the solar energy facility on this site).

The generated energy will feed directly into the Goat DS Substation, in turn feeding into the municipal substation which provides Wolmaransstad with electricity. The proposed 5MW facility will thereby ensure grid stability for the town.

The proposed project is therefore positively aligned with the electrical infrastructure planning of the Municipality. The project will not place pressure on other services provided by the Municipality.

7. Is this project part of a national programme to address an issue of national concern or importance?

YES ✓



Please explain

This project is proposed to be developed under the Department of Energy REIPPP Programme. The evacuation of additional power into the Eskom grid will serve to improve the stability of the grid for the immediate area, assist the government in achieving the goal of 17GW renewable energy as part of the electricity generation technology mix by 2030, and assist in the reduction in the need to mine non-renewable resources such as coal for conventional power generation. In order to meet the long-term goal of a sustainable renewable energy industry, a target of 17.8GW of renewables by 2030 has been set by the Department of Energy (DoE) within the Integrated Resource Plan (IRP) 2010 and incorporated in the REIPPP Programme. This energy will be produced from various renewable energy technologies including solar energy facilities (such as PV technology). The proposed project is to contribute towards this goal for renewable energy and is identified as a Strategic Infrastructure Project in terms of the South African National Infrastructure Plan.

<p>8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)</p>	<p>YES ✓</p>	<p>Please explain</p>
<p>» <i>Land use and grid connection</i> The Goat DS Substation is located within 200m of the proposed site within the greater farm portion, which is highly favourable for this development. The farm portion is characterised by four overhead power lines from the south, east and west which feed into the Goat DS Substation and is therefore already affected by linear disturbances and electrical infrastructure. The proposed development (both site alternatives) would therefore be consistent with the bulk of the land use characteristic of and on the western periphery of Wolmaransstad.</p> <p>» <i>Site access and availability</i> The land is owned and confirmed to be available for lease by the Maquassi Hills Local Municipality.</p> <p>» <i>Site access</i> An existing gravel access road will be upgraded and utilised to access the site (both site alternatives). The existing gravel road is connected to the R504 and R505 roads, which form the southern and eastern boundaries of the affected farm portion respectively. Both of these existing roads provide access to the Goat DS Substation, which is located in close proximity to the proposed 5MW PV site.</p> <p>» <i>Climatic conditions</i> 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 and considered suitable for the development of a PV facility.</p> <p>» <i>Gradient</i> A level surface area is preferred for the installation of PV panels and specifically for PV technologies. This reduces the need for extensive earthworks associated with the levelling of a site, thereby minimising environmental impacts. The proposed area for the proposed PV plant is generally on a flat location with slopes less than 5 degrees.</p>		
<p>9. Is the development the best practicable environmental option for this land/site?</p>	<p>YES ✓</p>	<p>Please explain</p>
<p>Electrical infrastructure: The Goat DS Substation is located within 200m of the proposed site within the greater farm portion, which is relevant for this development. The greater farm portion is characterised by four overhead power lines from the south, east and west which feed into the Goat DS Substation and is therefore already characterised by linear disturbances and electrical infrastructure. The proposed development is in line with current land use on and around the site, and would therefore not significantly alter the sense of place.</p>		

<p>Access: The site is easily accessed from existing major roads and no long access roads are required in order to connect to the proposed development (both site alternatives).</p> <p>Ecological sensitivity: Sensitive areas identified in the study include the intact areas of Klerksdorp Thornveld and some small pans, which are well outside the proposed site development options. The old croplands, as well as the disturbed area within Site Alternative 1 and 3 are considered low to medium sensitivity and within the context of the site, provide the best opportunity for development.</p>			
<p>10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?</p>	<p>YES ✓</p>	<p>█</p>	<p>Please explain</p>
<p>The negative impacts associated with the proposed activity include impacts on vegetation, soils and land use and are expected to be limited to the development footprint, and are not considered to be of high significance. All impacts can be managed and mitigated to acceptable levels, as outlined in the Environmental Management Programme.</p> <p>Positive impacts associated with the facility include i) an alternative income source for the landowner; ii) generation of electricity from a renewable resource also reduces reliance (albeit limited) on conventional power sources; iii) local economic upliftment and job creation. These positive impacts will extend beyond the boundary of the site and are expected to outweigh the negative impacts.</p>			
<p>11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?</p>	<p>█</p>	<p>NO ✓</p>	<p>Please explain</p>
<p>There are no known similar commercial solar energy facilities being applied for within the local municipality, however the existing power lines and a substation support the proposed siting of a PV facility in this location. No development precedent has been set which would see accumulation of similar power generation developments within a specific portion of the municipal area.</p>			
<p>12. Will any person's rights be negatively affected by the proposed activity/ies?</p>	<p>█</p>	<p>NO ✓</p>	<p>Please explain</p>
<p>The proposed project will take place on municipal-owned land which is currently underutilised for any economic purpose. The proposed facility would impact indirectly on adjacent landowners from a visual perspective. Adjacent farmsteads may be affected from a visual perspective (up to 3.5km from the PV facility). It is not expected that this would impact on their rights. Parties who might be interested in or affected by the construction of the facility are consulted with regards to the proposed project through the EIA process.</p>			
<p>13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?</p>	<p>█</p>	<p>NO ✓</p>	<p>Please explain</p>
<p>The farm portion is owned by the Maquassi Hills Local Municipality who are in support of the application for the solar energy facility.</p>			

14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	YES ✓	Please explain
<p>The proposed activity covers the objectives of Strategic Infrastructure Projects (SIPS) 8, 9 and 10:</p> <ul style="list-style-type: none"> • SIP 8: Green energy of support of South African economy - Support sustainable green energy initiatives on a National scale through a diverse range of clean energy options envisaged in the Integrated Resource Plan(IRP 2010) • SIP 9: Electricity Generation to support socio-economic development: Accelerate construction of new electricity capacity in accordance with IRP 2010 to meet the need of the economy and address historical imbalance. • SIP 10: Electricity transmission and distribution for all - Expansion of the transmission and distribution network for all and support economic development. 		
15. What will the benefits be to society in general and to the local communities?	Please explain	
<p>Job opportunities, albeit limited, will be created during the construction and operation of the proposed facility. In addition, local and regional economic benefits would be realised through the additional revenue generated as a result of the proposed project (through direct and indirect job opportunities, local spend, local procurement, etc.).</p>		
16. Any other need and desirability considerations related to the proposed activity?	Please explain	
<p>As indicated in the IDP, one of the objectives is to provide an affordable and sustainable electricity supply to the community. The area is also in need of infrastructure which will benefit the municipal economy. This project will assist in addressing this need.</p>		
17. How does the project fit into the National Development Plan for 2030?	Please explain	
<p>One of the objectives of the National Development Plan for 2030 is the transition to low carbon energy through speeding up and expanding renewable energy. This project will fit into this vision since it aims to contribute towards electricity supply through carbon-free methods.</p>		
18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.		
<p>The general objectives of Integrated Environmental Management have been taken into account for this Basic Assessment Report by means of identifying, predicting and evaluating the actual and potential impacts on the environment, socio-economic conditions and cultural heritage component. The risks, consequences, alternatives as well as options for mitigation of activities have also been considered with a view to minimise negative impacts, maximise benefits, and promote compliance with the principles of environmental management.</p>		

19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.

The principle of environmental management as set out in section of NEMA states that:

- » Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably;
- » Development must be sustainable socially (people), environmentally (planet) and economically (prosperity);and
- » Sustainable development requires the consideration of all the relevant factors,

From project perspective the development can be considered sustainable as it makes use of renewable energy resource and does not have a high significant impact on the environment.

These principles of sustainable development is further taken into account by including measures within the Environmental Management Programme (EMPr) to mitigate impacts that may occur thereby further reducing the environmental impacts. The EMPr would provide mitigation measures in terms of disturbance to ecosystems, loss of biodiversity, pollution and degradation to the environment, waste and stormwater management.

11. 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:

Table 1: List all legislation, policies and/or guidelines for the Wolmaransstad Municipality 5MW Solar Energy Facility

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Legislation			
National Environmental Management Act (Act No 107 of 1998)	<p>The EIA Regulations have been promulgated in terms of Chapter 5 of the Act. Listed activities which may not commence without an environmental authorisation are identified within these Regulations.</p> <p>In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation.</p> <p>In terms of GNR 544 - 546 of June 2010 a Scoping and EIA Process is required to be undertaken for the proposed project.</p>	Department of Environmental Affairs – competent authority North West Department of Economic Development, Environment, Conservation and Tourism	<p>The listed activities triggered by the proposed solar energy facility have been identified and assessed in the EIA process being undertaken (i.e. Basic Assessment Process).</p> <p>This Basic Assessment Report will be submitted to the competent and commenting authority in support of the application for authorisation.</p>
National Environmental Management Act (Act No 107 of 1998)	<p>In terms of the Duty of Care Provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised.</p> <p>In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.</p>	Department of Environmental Affairs	<p>While no permitting or licensing requirements arise directly by virtue of the proposed project, this section has found application during the EIA Phase through the consideration of potential impacts (cumulative, direct, and indirect). It will continue to apply throughout the life cycle of the project.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
<p>Environment Conservation Act (Act No 73 of 1989)</p>	<p>National Noise Control Regulations (GN R154 dated 10 January 1992)</p>	<p>Department of Environmental Affairs</p> <p>Department of Economic Development, Environment, Conservation and Tourism</p> <p>Local Authorities</p>	<p>Noise impacts are expected to be associated with the construction phase of the project and are not likely to present a significant intrusion to the local community. Therefore is no requirement for a noise permit in terms of the legislation.</p> <p>On-site activities should be limited to 6:00am - 6:00pm, Monday - Saturday (excluding public holidays).</p> <p>Should activities need to be undertaken outside of these times, the surrounding communities will need to be notified and appropriate approval will be obtained from DEA and the Local Municipality.</p>
<p>National Water Act (Act No 36 of 1998)</p>	<p>Water uses under S21 of the Act must be licensed unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorisation.</p>	<p>Department of Water Affairs</p> <p>Provincial Department of Water Affairs</p>	<p>A water use license (WUL) is required to be obtained if drainage lines are impacted on or if the facility is located within 500m of a wetland. No surface water features have been identified to occur within 500m of site alternatives 1 and 2 however a pan is located 150m to the west of site alternative 3.</p> <p>Should water be abstracted from the borehole on site or any other natural resource for use within the facility, a water use license may be required.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Water Act (Act No 36 of 1998)	In terms of S19, the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to prevent and remedy the effects of pollution to water resources from occurring, continuing, or recurring.	Department of Water Affairs Provincial Department of Water Affairs	This section of the Act will apply with respect to the potential impact on drainage lines, primarily during the construction phase (i.e. pollution from construction vehicles).
Minerals and Petroleum Resources Development Act (Act No 28 of 2002)	<p>A mining permit or mining right may be required where a mineral in question is to be mined (e.g. materials from a borrow pit) in accordance with the provisions of the Act. Requirements for Environmental Management Programmes and Environmental Management Plans are set out in S39 of the Act.</p> <p>S53 Department of Mineral Resources: Approval from the Department of Mineral Resources (DMR) may be required to use land surface contrary to the objects of the Act in terms of section 53 of the Mineral and Petroleum Resources Development Act, (Act No 28 of 2002): In terms of the Act approval from the Minister of Mineral Resources is required to ensure that proposed activities do not sterilise a mineral resources that might occur on site</p>	Department of Mineral Resources	<p>As no borrow pits are expected to be required for the construction of the facility, no mining permit or right is required to be obtained.</p> <p>A Section 53 application will be submitted the North West DMR office to be initiated by the applicant.</p>
National Environmental Management: Air Quality Act (Act No 39 of 2004)	<p>S18, S19, and S20 of the Act allow certain areas to be declared and managed as "priority areas."</p> <p>Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with</p>	Department of Environmental Affairs	<p>No permitting or licensing requirements arise from this legislation.</p> <p>The Act provides that an air quality officer may require any person to</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	relevant emission standards.		submit an atmospheric impact report if there is reasonable suspicion that the person has failed to comply with the Act.
National Heritage Resources Act (Act No 25 of 1999)	<p>S38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including:</p> <ul style="list-style-type: none"> » The construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300 m in length; and » Any development or other activity which will change the character of a site exceeding 5 000 m² in extent. <p>Stand alone HIAs are not required where an EIA Process is carried out as long as the EIA contains an adequate HIA component that fulfils the provisions of S38. In such cases only those components not addressed by the EIA should be covered by the heritage component.</p>	<p>South African Heritage Resources Agency</p> <p>North West Provincial Heritage Resources Authority</p>	<p>A permit may be required should identified cultural/heritage sites on site be required to be disturbed or destroyed as a result of the proposed development.</p> <p>A HIA has been undertaken as part of the Basic Assessment Process to identify heritage sites. No heritage sites are located within the study area. See Appendix D2.</p>
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	In terms of S57, the Minister of Environmental Affairs has published a list of critically endangered, endangered, vulnerable, and protected species in GNR 151 in Government Gazette 29657 of 23 February 2007 and the regulations associated therewith in GNR 152 in GG29657 of 23 February 2007, which came into effect on 1 June 2007.	Department of Environmental Affairs	<p>As the applicant will not carry out any restricted activity, as is defined in S1 of the Act, no permit is required to be obtained in this regard.</p> <p>Specialist flora and fauna studies have been undertaken as part of the basic Assessment process. As such the potential occurrence of critically</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>In terms of GNR 152 of 23 February 2007: Regulations relating to listed threatened and protected species, the relevant specialists must be employed during the EIA Phase of the project to incorporate the legal provisions as well as the regulations associated with listed threatened and protected species (GNR 152) into specialist reports in order to identify permitting requirements at an early stage of the EIA Phase.</p> <p>The Act provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (G 34809, GoN 1002), 9 December 2011).</p>		<p>endangered, endangered, vulnerable, and protected species, as well as critically endangered (CR), endangered (EN), vulnerable (VU) or protected ecosystems and the potential for them to be affected has been considered, this report is contained in Appendix D1.</p> <p>The provisions of the NEMBA are not triggered by the proposed PV development.</p>
<p>Conservation of Agricultural Resources Act (Act No 43 of 1983)</p>	<p>Regulation 15 of GNR1048 provides for the declaration of weeds and invader plants, and these are set out in Table 3 of GNR1048.</p>	<p>Department of Agriculture Forestry and Fisheries</p>	<p>This Act will find application throughout the life cycle of the project. In this regard, soil erosion</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>Weeds are described as Category 1 plants, while invader plants are described as Category 2 and Category 3 plants. These regulations provide that Category 1, 2 and 3 plants must not occur on land and that such plants must be controlled by the methods set out in Regulation 15E.</p>		<p>prevention and soil conservation strategies must be developed and implemented. In addition, a weed control and management plan must be implemented.</p> <p>The permission of agricultural authorities will be required if the Project requires the draining of vleis, marshes or water sponges on land outside urban areas.</p>
<p>National Forests Act (Act No. 84 of 1998)</p>	<ul style="list-style-type: none"> » In terms of S5(1) no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license granted by the Minister to an (applicant and subject to such period and conditions as may be stipulated”. » GN 1042 provides a list of protected tree species. 	<p>Department of Agriculture Forestry and Fisheries</p>	<p>A permit would need to be obtained for any protected trees that are affected by the development.</p>
<p>National Veld and Forest Fire Act (Act 101 of 1998)</p>	<p>In terms of S21 the applicant would be obliged to burn firebreaks to ensure that should a veldfire occur on the property, that it does not spread to adjoining land.</p> <p>In terms of S12 the applicant must ensure that the firebreak is wide and long enough to have a reasonable chance of preventing the</p>	<p>Department of Water Affairs</p>	<p>While no permitting or licensing requirements arise from this legislation, and this Act will find application during the construction and operational phase of the project.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>fire from spreading, not causing erosion, and is reasonably free of inflammable material.</p> <p>In terms of S17, the applicant must have such equipment, protective clothing, and trained personnel for extinguishing fires.</p>		
<p>Hazardous Substances Act (Act No 15 of 1973)</p>	<p>This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.</p> <p>Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc, nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance</p> <p>Group IV: any electronic product; and</p> <p>Group V: any radioactive material.</p> <p>The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license</p>	<p>Department of Health</p>	<p>It is necessary to identify and list all the Group I, II, III, and IV hazardous substances that may be on the site and in what operational context they are used, stored or handled. If applicable, a license is required to be obtained from the Department of Health.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	being in force.		
Development Facilitation Act (Act No 67 of 1995)	<p>Provides for the overall framework and administrative structures for planning throughout the Republic.</p> <p>S(2 - 4) provide general principles for land development and conflict resolution.</p>	<p>Local Municipality</p> <p>District Municipality</p>	<p>The applicant must submit a land development application in the prescribed manner and form as provided for in the Act. A land development applicant who wishes to establish a land development area must comply with procedures set out in the Act.</p>
Subdivision of Agricultural Land Act (Act No 70 of 1970)	<p>Details land subdivision requirements and procedures. Applies for subdivision of all agricultural land in the province</p>	<p>Local Municipality</p> <p>District Municipality</p>	<p>The land will be leased by the municipality and no subdivision application will be submitted.</p>
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	<p>The Minister may by notice in the <i>Gazette</i> publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment.</p> <p>The Minister may amend the list by –</p> <ul style="list-style-type: none"> » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. <p>In terms of the Regulations published in terms of this Act (GN 921), A Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities.</p>	<p>National Department of Water and Environmental Affairs</p> <p>Provincial Department of Environmental Affairs (general waste)</p>	<p>Waste handling, storage and disposal during construction and operation is required to be undertaken in accordance with the requirements of the Act. As waste is not expected to be stored in quantities exceeding the thresholds specified in this Act, no waste license is expected to be required.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that:</p> <ul style="list-style-type: none"> » The containers in which any waste is stored, are intact and not corroded or in » any other way rendered unfit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise; and » Pollution of the environment and harm to health are prevented. 		
<p>National Road Traffic Act (Act No 93 of 1996)</p>	<ul style="list-style-type: none"> » The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. » Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. 	<ul style="list-style-type: none"> » South African National Roads Agency Limited (national roads) » Provincial Department of Transport 	<ul style="list-style-type: none"> » An abnormal load/vehicle permit may be required to transport the various components to site for construction. These include route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads. » Transport vehicles exceeding the dimensional limitations (length) of 22m. » Depending on the trailer configuration and height when loaded, some of the required substation components may not meet specified dimensional

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	» The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.		limitations (height and width).
National Dust Control Regulations (1 November 2013)	» The regulations prescribe general measures for the control of dust (settleable particulate matter) in all areas including restriction areas, residential and non-residential areas	» National DEA » Provincial authorities	» To prescribe general measures for the control of dust in all areas.
Provincial Legislation			
Transvaal Nature Conservation Ordinance, No. 12 of 1983 Note: The North West Biodiversity Conservation Bill was published for comments under Notice Nr. 394, Provincial Gazette 6719, dated 23 December 2009	Lists plant and animal species as protected	North West Department of Economic Development, Environment, Conservation and Tourism	According to the SANBI SIBIS database, five listed plant species are known from the area. Only one of these <i>Acacia erioloba</i> (protected tree species) can be confirmed present based on the site visit. However, although the survey was done within the growing season, it was still dry at the time of the site visit and the other listed species could potentially have been dormant at the time and their presence at the site cannot be discounted at this point. The

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			abundance of listed species would however be significantly higher within Site Alternative 2 than Site Alternative 1 a large proportion of which has been disturbed in the past. It is not likely that there are any listed species present within Site Alternative 3.

12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

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

YES ✓	
± 9m ³ of solid construction waste consisting mainly of vegetation, spoil material from clearing activities and metal and cabling off cuts – over 10 month period	

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

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

It is anticipated that construction waste will be disposed of at the nearest licensed municipal landfill site. An area of the site of approximately 0.1 ha has been identified for a spoil heap.

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

In order to comply with legal requirements should there be excess solid construction waste after recycling options have been exhausted, the waste will be trucked to landfill (to be confirmed in consultation with the municipality).

Will the activity produce solid waste during its operational phase?

	NO ✓
n/a	

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

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

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

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Where will the solid waste be disposed of 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 NEM:WA? **NO**
✓

If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

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. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system? **NO**
✓

If YES, what estimated quantity will be produced per month? m³

Will the activity produce any effluent that will be treated and/or disposed of on site? **NO**
✓

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

Will the activity produce effluent that will be treated and/or disposed of at another facility? **NO**
✓

If YES, provide the particulars of the facility:

Facility name:			
Contact person:			
Postal address:			
Postal code:			
Telephone:		Cell:	

E-mail: **Fax:**

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

Water will be used for the cleaning of panels during operation and for dust suppression during construction. Wastewater (other than sewage) will not be produced.

c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere other than exhaust emissions and dust associated with construction phase activities?

	NO ✓
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If YES, is it controlled by any legislation of any sphere of government?

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

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

During construction dust and vehicle emissions will be generated. The contractor is required to adhere to the mitigation measures stipulated in the Environmental Management Programme and the National Dust Control Regulations (1 November 2013) in terms of dust abatement and control.

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.

d) Waste permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA?

	NO ✓
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If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority

e) 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:

A limited amount of noise will be generated during the construction phase of the facility due to movement of heavy machinery on site. The operation phase will not generate noise.

13. WATER USE

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

Municipal ✓	Water board	Groundwater	River, stream, dam or lake	Other	The activity will not use water
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The source of water has not been confirmed at this stage. Alternative water sources could be supplied by the municipality, or a borehole identified in the vicinity of suitable yield.

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 authorisation (general authorisation or water use license) from the Department of Water Affairs?

	NO ✓

If YES, please provide proof that the application has been submitted to the Department of Water Affairs.

14. ENERGY EFFICIENCY

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

The activity 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 a renewable 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:

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

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

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

3. Has a specialist been consulted to assist with the completion of this section? YES ✓

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in **Appendix D**.

Property description/physical address:

Province	North West Province
District Municipality	Dr Kenneth Kaunda District Municipality
Local Municipality	Maquassi Hills Local Municipality
Ward Number(s)	Ward 1 and 5
Farm name and number	Farm Wolmaransstad and Townlands 184
Portion number	Remainder of Portion 2
SG Code	T0HO000000000018400002

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

Current land-use zoning as per local municipality IDP/records:

Agriculture (Grazing of livestock)

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 ✓

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat ✓	1:50	-	1:20	-	1:15	-	1:10	-	1:7,5	-	Steeper than 1:5
	1:20		1:15		1:10		1:7,5		1:5		

Alternative S2 (if any):

Flat ✓	1:50	-	1:20	-	1:15	-	1:10	-	1:7,5	-	Steeper than 1:5
	1:20		1:15		1:10		1:7,5		1:5		

Alternative S3 (if any):

Flat ✓	1:50	-	1:20	-	1:15	-	1:10	-	1:7,5	-	Steeper than 1:5
	1:20		1:15		1:10		1:7,5		1:5		

2. LOCATION IN LANDSCAPE

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

2.1 Ridgeline	<input type="checkbox"/>	2.4 Closed valley	<input type="checkbox"/>	2.7 Undulating plain / low hills	<input type="checkbox"/>
2.2 Plateau	<input type="checkbox"/>	2.5 Open valley	<input type="checkbox"/>	2.8 Dune	<input type="checkbox"/>
2.3 Side slope of hill/mountain	<input type="checkbox"/>	2.6 Plain	<input checked="" type="checkbox"/>	2.9 Seafront	<input type="checkbox"/>

Visual statement: Based on the Visual Specialist study undertaken, the character of the landscape is defined as open, undulating, sparsely populated land, extensively agricultural in nature. Vertical elements in the immediate landscape are the grain silos, the water tower, transmission pylons, and telegraph poles. These introduce some industrial character into this rural area. There are lines and groups of trees planted around farmsteads. The visual signposts to signal the exact location of the proposed project site are derived from its relationship with the R504, R505 and the Goat DS substation. The site could be held in view by users of the roads, by users of other local roads and by rail users. People living in farmsteads locally may become visually aware of the proposed facility. The town of Wolmaransstad is mostly shielded from the proposed development by existing built structures / form.

Visual comparison of Site Alternatives: Site Alternatives 1 and 2 affect the R504, and areas to the west of Wolmaransstad, and have a more comprehensive and wide spread impact than Site Alternative 3. Alternative 2 is further away from the built up area, the roads and more of the farmsteads, but the topography can both play a larger

role than the location on the site. Alternative 3 only directly affects two farmsteads but impacts substantially upon the R505 northbound.

Site Alternative 3 affects a portion of Wolmaransstad town, while Site Alternatives 1 and 2 only affect the edges of the town. Site Alternatives 1 and 2 both affect 4 farmsteads, while Site Alternative 3 affects 2 farmsteads. Site Alternatives 1 and 2 affect more road traffic than Site Alternative 3. Site Alternative 3 would impact upon a somewhat greater number of receptors than Site Alternatives 1 or 2 and to a greater degree. Site Alternative 2 would have a wider impact on a lesser number of receptors but to a reduced degree and is therefore preferred from a visual perspective.

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

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

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

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

4. GROUND COVER

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).

Site Alternative 1

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 ✓

Site Alternative 2

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

Site Alternative 3

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.

An Ecological assessment has been completed for the proposed facility - refer to Appendix D1.

5. SURFACE WATER

Indicate the surface water present on and or adjacent to the site and alternative sites?

Site Alternative 1

Perennial River		NO ✓	
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Non-Perennial River (Drainage lines)		NO✓	
Permanent Wetland		NO✓	
Seasonal Wetland		NO✓	
Artificial Wetland		NO✓	
Estuarine / Lagoonal wetland		NO✓	

Site Alternative 2

Perennial River		NO✓	
Non-Perennial River (Drainage lines)		NO✓	
Permanent Wetland		NO✓	
Seasonal Wetland		NO✓	
Artificial Wetland		NO✓	
Estuarine / Lagoonal wetland		NO✓	

Site Alternative 3

Perennial River		NO✓	
Non-Perennial River (Drainage lines)		NO✓	
Permanent Wetland	YES ✓		
Seasonal Wetland		NO✓	
Artificial Wetland		NO✓	
Estuarine / Lagoonal wetland		NO✓	

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

No surface water features are present on the three site alternatives considered for the proposed PV facility. Site Alternative 3 is situated within 150m to the east of a pan/wetland feature and Site Alternative 2 is situated within 450m to the west of this pan (refer to Figure 10).

6. LAND USE CHARACTER OF SURROUNDING AREA

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

Site Alternatives S1, S2 and S3

Natural area ✓	Dam or reservoir	Polo fields
Low density	Hospital/medical centre	Filling station ^H

residential ✓		
Medium density residential	School	Landfill or waste treatment site
High density residential	Tertiary education facility	Plantation
Informal residential ^A	Church	Agriculture ✓
Retail commercial & warehousing	Old age home	River, stream or wetland✓ (Drainage Line)
Light industrial ✓	Sewage treatment plant ^A	Nature conservation area
Medium industrial ^{AN}	Train station or shunting yard ^N	Mountain, koppie or ridge
Heavy industrial ^{AN}	Railway line^N ✓	Museum
Power station	Major road (4 lanes or more) ^N	Historical building
Office/consulting room	Airport ^N	Protected Area
Military or police base/station/compound	Harbour	Graveyard
Spoil heap or slimes dam ^A	Sport facilities	Archaeological site
Quarry, sand or borrow pit	Golf course	Other land uses: Substation and power line infrastructure

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

The railway line will not be impacted upon by the proposed activity, as it falls outside of the project boundary. The project will not generate any significant noise during construction or operation and will therefore not add to the existing noise generated from the railway line.

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

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

Does the proposed site (including any alternative sites) fall within any of the following:

Site Alternative S1

Critical Biodiversity Area (as per provincial conservation plan)	YES ✓	
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Core area of a protected area?		NO✓
Buffer area of a protected area?		NO✓
Planned expansion area of an existing protected area?		NO✓
Existing offset area associated with a previous Environmental Authorisation?		NO✓
Buffer area of the SKA?		NO✓

Site Alternative S2

Critical Biodiversity Area (as per provincial conservation plan)	YES ✓	
Core area of a protected area?		NO✓
Buffer area of a protected area?		NO✓
Planned expansion area of an existing protected area?		NO✓
Existing offset area associated with a previous Environmental Authorisation?		NO✓
Buffer area of the SKA?		NO✓

Site Alternative S3

Critical Biodiversity Area (as per provincial conservation plan)		NO✓
Core area of a protected area?		NO✓
Buffer area of a protected area?		NO✓
Planned expansion area of an existing protected area?		NO✓
Existing offset area associated with a previous Environmental Authorisation?		NO✓
Buffer area of the SKA?		NO✓

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A.

A map indicating the location of the Site Alternatives 1 and 2 within a Level 2 terrestrial Critical Biodiversity Area and a Level 1 aquatic Critical Biodiversity Area is provided in Appendix A.

7. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:

NO✓

Regional perspective: The study area is located well outside of the known distribution of Iron Age sites in the North West province and no Iron Age sites were recorded. No Stone Age material was recorded in the study area and this can be attributed to the lack of raw material suitable for knapping and also the lack of water sources (like pans) and landscape features like hills or rocky outcrops that would have attracted human activity in the past within the immediate study area. There are no buildings or other structures within the development footprint and therefore no impact on the built environment is expected.

Site Alternatives (S1, S2 and S3): No archaeological sites were identified during the field survey and desktop study. Several stone cairns were identified just outside of the western boundary of Site Alternative 3 that are attributed to clearing of the agricultural fields in order to plough the area. The impacts to heritage resources by the proposed development are considered to be low and no further mitigation is proposed.

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

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

If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

PALAEONTOLOGY

A paleontological study was undertaken by Dr John Almond. The following is of relevance to both site alternatives:

Geological background: The study area is entirely underlain by various subunits of the predominantly volcanic Ventersdorp Supergroup of Archaean (early Precambrian) age. The Ventersdorp Supergroup represents a major episode of igneous extrusion (LIP = Large Igneous Province) that is associated with fracturing of the Kaapvaal Craton some 2.7 Ga (billion years) ago. The basal lava pile termed the Klipriviersberg Group - mainly basaltic lavas welling up in fissure eruptions, totalling up to two kilometres thick and 100 000 km² in extent - accumulated over a comparatively short period of some six million years (McCarthy & Rubidge 2005). The overlying Platberg Group comprises a range of felsic to mafic volcanic rocks, including lavas and pyroclastics, such as the porphyritic felsites and pyroclastic flows of the Makwassie Formation (Schutte 1994, Van der Westhuizen et al. 2006). These igneous rocks are associated with rift-related sediments, including colluvial, alluvial fan and lacustrine deposits, and are overlain by fluvial polymict conglomerates and quartzites of the Bothaville Formation. The Rietgat Formation at the top of the Platberg Group consists of intercalated volcanic rocks (basic

to intermediate lavas, pyroclastics), shales and greywackes as well as chemical sediments.

Palaeontological potential: The fossil record within the very ancient (Archaean / early Precambrian), predominantly volcanic Ventersdorp Supergroup succession is very limited but nevertheless of considerable palaeontological interest. Domicol stromatolites (microbial mounds) are recorded from shallow water lacustrine calcarenites within the volcano-sedimentary succession of the Rietgat Formation at the top of the Platberg Group. Although the Rietgat Formation is known for important Archaean stromatolite occurrences, the Rietgat rocks represented in the Wolmaransstad study area are volcanic in origin as is the case with the other Ventersdorp Supergroup rocks here, and are therefore not fossiliferous. These bedrocks are unlikely to be significantly impacted by the solar energy development since they are probably mantled by a blanket of superficial sediments (weathered regolith, soils) of very low palaeontological sensitivity.

It is therefore recommended that, pending the discovery of substantial new fossil remains during construction, exemption from further specialist palaeontological studies is granted for the proposed Wolmaransstad Municipality Solar Energy Facility.

8. SOCIO-ECONOMIC CHARACTER

a) Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

Level of unemployment:

Overview of key demographic indicators for the Maquassi Hills Local Municipality	
ASPECT	2011
Population	77 794
Households	20 505
Household size (average)	3.6
% Female headed households	34.2
Sex Ratio (males per 100 females)	98.9
Dependency ratio per 100 (15-64)	61.8
% Population <15 years	33
% Population 15-64	61.8
% Population 65+	5.2
Unemployment rate (official)	33.4
- % of economically active population	
Youth unemployment rate (official)	42.6

- % of economically active population 15-34	
No schooling - % of population 20+	23.5
Higher Education - % of population 20+	4.7
Matric - % of population 20+	18.9

Source: Compiled from StatsSA Census 2011 Municipal Fact Sheet

Economic profile of local municipality:

Wolmaransstad is a maize farming town which lies in an important alluvial diamond mining area. Wolmaransstad serves a large community and is an important diamond buying centre.

Level of education:

With regard to education levels, the portion of the population older than 20 years without formal education is 23.5%. The percentages of the adult population with tertiary (4.7%) and secondary (18.9%) qualifications have increased since 2001 census.

b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	R100 million
What is the expected yearly income that will be generated by or as a result of the activity?	R12 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 and construction phase of the activity/ies?	Approximately 80 5% highly skilled; 20% skilled; 75% unskilled
What is the expected value of the employment opportunities during the development and construction phase?	This will become known after an initial total price has been calculated for the project.
What percentage of this will accrue to previously disadvantaged individuals?	80%
How many permanent new employment opportunities will be created during the operational phase of the activity?	Approximately 5 including technical and security staff. This excludes people employed for cleaning of the panels.
What is the expected current value of the employment opportunities during the first 10 years?	Not known at this stage

What percentage of this will accrue to previously disadvantaged individuals?	20% to be employed from PDI as a minimum standard in accordance with the Department of Energy requirements
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9. BIODIVERSITY

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult <http://bgis.sanbi.org> or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP’s responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as **Appendix D** to this report.

a) Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)

Systematic Biodiversity Planning Category	If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan
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<p style="text-align: center;">Critical Biodiversity Area (CBA) ✓</p>	<p style="text-align: center;">Ecological Support Area (ESA)</p>	<p style="text-align: center;">Other Natural Area (ONA)</p>	<p style="text-align: center;">No Natural Area Remaining (NNR)</p>	<p>The study area falls within the planning domain of the North West Province Biodiversity Conservation Assessment (Skowno & Desmet 2008), which maps Critical Biodiversity Areas and Ecological Support Areas within the North West Province. PV site alternative 1 and 2 fall within a Tier 2 Critical Biodiversity Area aimed at protecting the intact remnants of Klerksdorp Thornveld from further transformation. The western third of the greater farm portion also falls within an aquatic CBA 1 as part of a sub-quaternary priority catchment. These are catchments which have a low level of transformation and are therefore considered important for the maintenance of aquatic ecological processes. Although this catchment is considered a CBA under the North West CBA layer, it is important to note that this area is not considered a priority catchment under the National Freshwater Ecosystem Priority Areas (NFEPA), this suggests that its significance is at the local level and that at a broader level it is not considered highly significant. As such, it is clear that Site Alternative 1 poses less of the threat to this purpose than Site Alternative 2, which includes a relatively low extent of currently intact vegetation. Site Alternative 3 falls outside of the aquatic CBA and is unlikely to generate significant impact on the CBA and is the preferred option in this regard.</p>
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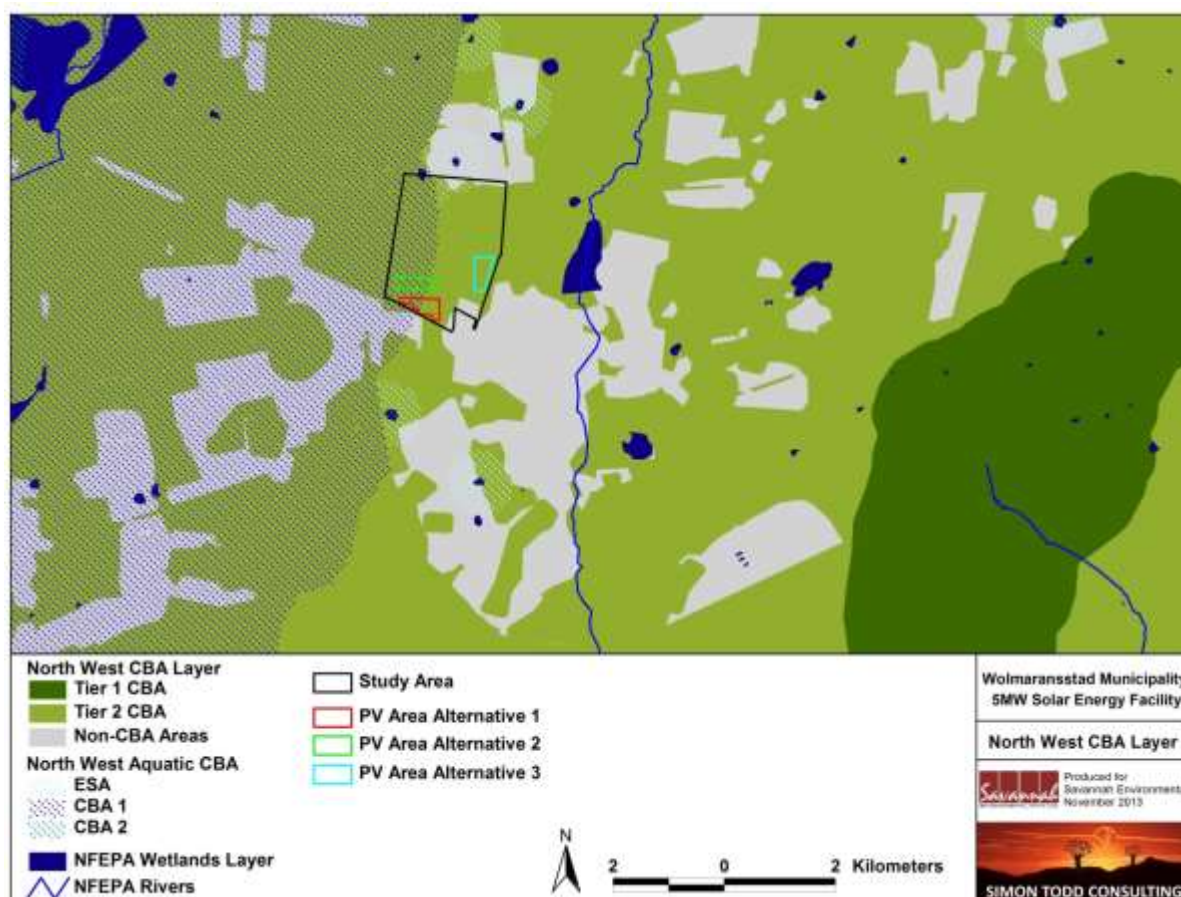


Figure 9: Study area and PV Site Alternatives in relation to terrestrial and aquatic CBA's mapped under the North West Province Biodiversity Conservation Assessment

b) Indicate and describe the habitat condition on site

Site Alternative S1

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	0%	
Near Natural (includes areas with low to moderate level of alien)	35% (Intact Klerksdorp Thornveld)	A number of different habitats were identified to occur within the farm portion by the specialist ecologist. In terms of the two development Site Alternatives (S1 and S2), there are however only two habitats of concern, being pans (located off site) and Klerksdorp Thornveld. The dominant indigenous species in this area are

<p>invasive plants)</p>		<p><i>Zizyphus mucronata</i> and <i>Acacia karoo</i>. To the north and west of the disturbed area is intact Klerksdorp Thornveld which is considered sensitive on account of the high level of transformation this vegetation type has experienced as well as the presence of several protected species such as <i>Acacia erioloba</i> and <i>Boscia albitrunca</i>. Within the intact Klerksdorp Thornveld, the density of woody species varies and increases towards the south-western corner of the site. In the northern section of the site, it appears that some of the area mapped as intact Klerksdorp Thornveld may also have been ploughed in the past, but plant cover has recovered to the extent that it is no longer easily possible to discern these areas from previously undisturbed ground (refer to Figure 10).</p>
<p>Degraded (includes areas heavily invaded by alien plants)</p>	<p>65% (Disturbed Thornveld)</p>	<p>A large proportion of Site Alternative 1 lies within an area that has been highly disturbed in the past apparently from being used as a borrow pit site and a dump. The areas where the topsoil has been removed contain low diversity with few indigenous species present. Alien species present in this area include <i>Cylindropuntia imbricata</i>, <i>Opuntia humifusa</i>, <i>Opuntia ficus-indica</i>, <i>Agave americana</i>, <i>Melia azedarach</i>, <i>Parkinsonia aculeata</i>, <i>Tagetes minuta</i> and <i>Solanum elaeagnifolium</i>. The disturbance in this area has had a significant impact on diversity and this area is not considered highly sensitive. A large proportion of the site outside of the development options consists of old croplands, that have been ploughed in the past, but which show various degrees of recovery. Diversity within these areas is however likely to have significantly affected and some groups such as geophytes are likely to be conspicuously absent from these areas – refer to Figure 10.</p>
<p>Transformed (includes cultivation, dams, urban, plantation, roads, etc)</p>	<p>0%</p>	

Site Alternative S2

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	0%	
Near Natural (includes areas with low to moderate level of alien invasive plants)	70% (Intact Klerksdorp Thornveld)	A number of different habitats were identified to occur within the farm portion by the specialist ecologist. In terms of the two development Site Alternatives (S1 and S2), there are however only two habitats of concern, being pans (located off site) and Klerksdorp Thornveld. The dominant indigenous species in this area are <i>Zizyphus mucronata</i> and <i>Acacia karoo</i> . To the north and west of the disturbed area is intact Klerksdorp Thornveld which is considered sensitive on account of the high level of transformation this vegetation type has experienced as well as the presence of several protected species such as <i>Acacia erioloba</i> and <i>Boscia albitrunca</i> . Within the intact Klerksdorp Thornveld, the density of woody species varies and increases towards the south-western corner of the site. In the northern section of the site, it appears that some of the area mapped as intact Klerksdorp Thornveld may also have been ploughed in the past, but plant cover has recovered to the extent that it is no longer easily possible to discern these areas from previously undisturbed ground (refer to Figure 10).
Degraded (includes areas heavily invaded by alien plants)	0%	
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	0%	

Site Alternative S3

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	0%	
Near Natural (includes areas with low to moderate level of alien invasive plants)	0%	
Degraded (includes areas heavily invaded by alien plants)	100%	Site Alternative 3 is situated on old croplands, that have been ploughed in the past, but which show various degrees of recovery. Signs of the past disturbance of the vegetation include the homogenous nature of the grass layer and the presence of <i>Acacia karoo</i> as the only tree in this area compared to the diverse woody element of the intact thornveld. Diversity within these areas is however likely to have significantly affected and some groups such as geophytes are likely to be conspicuously absent from these areas.
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	0%	

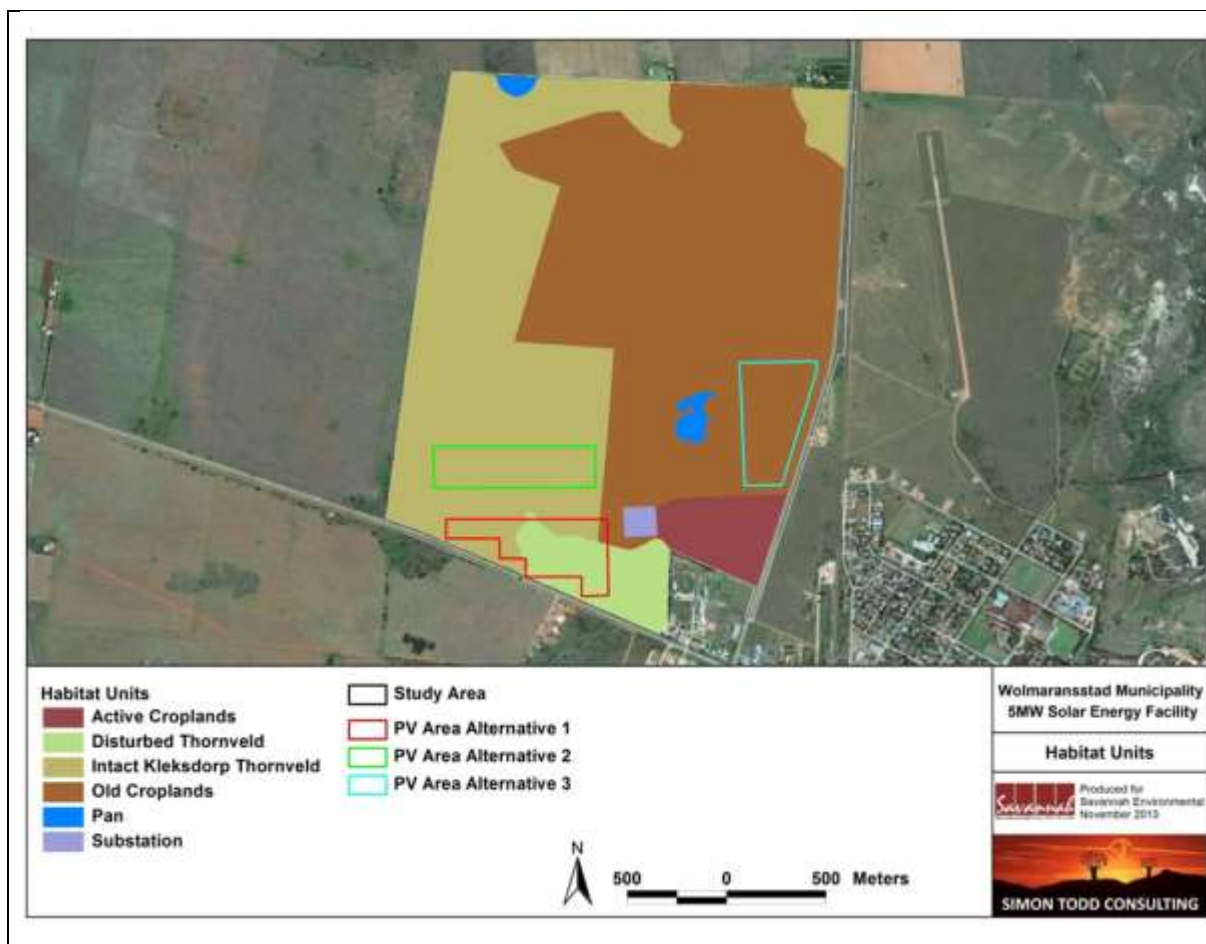


Figure 10: Habitat units mapped over the greater farm portion indicating all three Site Alternatives

c) Complete the table to indicate:

- (i) the type of vegetation, including its ecosystem status, present on the site; and
- (ii) whether an aquatic ecosystem is present on site.

Site alternatives S1 and S2

Terrestrial Ecosystems		Aquatic Ecosystems			
Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	Critical	Wetland (including rivers, depressions, channelled and unchannelled wetlands, flats, seeps pans, and artificial wetlands)		Estuary	Coastline
	Endangered				
	Vulnerable				
	Least Threatened				

d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

Site alternatives S1, S2 and S3

Regional perspective: According to the national vegetation map (Mucina & Rutherford 2006), the entire site falls within the Klerksdorp Thornveld vegetation type. This vegetation type is 3928 km² in extent and belongs to the Grassland Biome and occurs in two regions, the first in the Wolmaransstad, Ottosdal and Hartebeestfontein region and the other from the Botsolano Game Park north of Mafikeng to the vicinity of Madibogo in the south. Mucina & Rutherford describe the vegetation type as consisting of plains or slightly undulating plains with open to dense *Acacia* karoo bush clumps in dry grassland. However, this description does not fit the site especially well, which can rather be characterised as a savannah-type landscape with scattered *Acacia erioloba*, *Acacia caffra*, *Acacia hebeclada*, *Zizyphus mucronata* and *Searsia lancea* trees with an understory of perennial grasses and low forbs. The Klerksdorp Thornveld vegetation type occurs on a variety of soils associated mainly with the Fb and Bc land types.

No endemic species are known from this vegetation type. Approximately 70.8% of Klerksdorp Thornveld is considered intact according to Mucina & Rutherford (2006), with cultivation and urban sprawl being the primary causes of transformation. Despite the relatively high level of transformation Klerksdorp Thornveld is not considered threatened under the National List of Threatened Ecosystems (2011), despite being listed as Vulnerable by Mucina & Rutherford.

Site level (Site Alternative 1 and 2): Although both alternatives are within a CBA, there are several fundamental differences between the two areas that make Site Alternative 1 the preferred option for development. Most importantly, a large proportion of Site Alternative 1 has been disturbed in the past which has significantly reduced the biodiversity value of this area as well as encouraged the invasion of a wide variety of declared alien plants. While there are some parts of Alternative 1 that are less disturbed, the abundance of listed species in these areas is low. In contrast, Alternative 2 is within intact Klerksdorp Thornveld and there is a high abundance of *Acacia erioloba* as well as a few *Boscia albitrunca* trees within the proposed development area. Furthermore, the potential disruption of landscape connectivity and negative impact on CBAs are significantly lower with Site Alternative 1. No aquatic ecosystems or watercourses have been identified to occur on the site.

Site level (Site Alternative 3): Site Alternative 3 is situated on old croplands, that have been ploughed in the past, but which show various degrees of recovery to a more natural status. It is not likely that there are any listed species present within Site Alternative 3. No aquatic ecosystems or watercourses have been identified to occur on

the site. The outer edge of a pan is situated approximately 150m west of Site Alternative 3.

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT AND NOTICES

Publication name	Stellalander and Overvaal	
Date published	Announce project: 20 November 2013 and 22 November 2013 respectively	
Date published	Notification of draft BAR review period: 6 December 2013	
Site notice position	Latitude	Longitude
	27° 11' 13.48" S	25° 57' 26.26" E
	27° 11' 19.58" S	25° 57' 39.87" E
Date placed	20 November 2013 and 22 November 2013	

Include proof of the placement of the relevant advertisements and notices in **Appendix E1**.

2. DETERMINATION OF APPROPRIATE MEASURES

Provide details of the measures taken to include all potential I&APs as required by Regulation 54(2)(e) and 54(7) of GN R.543.

Key stakeholders (other than organs of state) identified in terms of Regulation 54(2)(b) of GN R.543:

- » Site notices (English and Afrikaans) were placed at two locations on the farm boundary along the R504
- » Adverts were placed in the Stellalander and Overvaal (regional and local newspapers) to notify the public of the proposed project, request registration of Interested and Affected Parties and advertise the comment period of the Draft Basic Assessment Report.
- » A Background Information Document (BID) was distributed to key stakeholders and surrounding landowners and placed on the website: www.savannahsa.com.

Include proof that the key stakeholder received written notification of the proposed activities as **Appendix E2**. This proof may include any of the following:

- » e-mail delivery reports;
- » registered mail receipts;
- » courier waybills;

- » signed acknowledgements of receipt; and/or
- » or any other proof as agreed upon by the competent authority.

Refer to attached email delivery reports, registered mail receipts and courier waybills.

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP
No written comments have been received to date.	

4. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR 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 the Final BAR as **Appendix E3**.

Note: No comments have been received to date. All comments received during the public review period will be included within a Comments and Responses Report within the Final BAR.

5. AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

- North West - Department of Economic Development, Environment, Conservation and Tourism
- North West Province Department of Agriculture and Rural Development
- North West Province Department of Local Government and Traditional Affairs
- North West Province Department of Public Works, Roads and Transport
- North West Provincial Heritage Resources Authority (NWPHRA)
- South African Heritage Resources Agency (SAHRA)
- Maquassi Hills Local Municipality
- Dr Kenneth Kaunda District Municipality
- SANRAL
- SKA Project Office
- Eskom
- Department of Energy
- National Department of Agriculture, Forestry and Fisheries
- Department of Water Affairs
- Civil Aviation Authority

Include proof that the Authorities and Organs of State received written notification of the proposed activities as **Appendix E4**.

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

6. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for any activities (linear or other) 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. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

A list of registered I&APs is included as **Appendix E5**.

Copies of any correspondence and minutes of any meetings held must be included in **Appendix E6**.

No comments have been received to date. Comments to be included following review of the draft Basic Assessment Report.

SECTION D: IMPACT ASSESSMENT

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

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

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts 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. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A (2) of this report.

A summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase and decommissioning phases of the proposed Wolmaransstad Municipality Solar Energy Facility is provided in the table overleaf.

Activity	Impact summary	Significance	Proposed mitigation
CONSTRUCTION			
Site Alternative 1			
<u>Ecological impacts</u>			
<i>A large proportion of Alternative 1 has been disturbed in the past which has significantly reduced the biodiversity value of this area as well as encouraged the invasion of a wide variety of declared alien plants. Although there are some parts of Alternative 1 which are less disturbed, the abundance of listed species in these areas is low.</i>			
Vegetation clearing and construction activity	<p>Direct impacts:</p> <ul style="list-style-type: none"> » Impacts on vegetation and listed plant species may occur due to vegetation clearing and disturbance associated with construction activities. » The proposed facility is situated within a CBA Tier 2 - Development within CBAs may negatively impact biodiversity and the ecological functioning of the CBA 	Low	<ul style="list-style-type: none"> » Avoid temporary activities in sensitive areas such as intact areas of Klerksdorp Thornveld » Vegetation clearing to commence only after walk through has been conducted and necessary permits obtained. » Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared. » All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed. » Temporary laydown areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use.
	<p>Indirect impacts:</p> <ul style="list-style-type: none"> » Some loss of vegetation is inevitable and cannot be avoided » The loss of intact vegetation would persist for at least the lifetime of the facility and probably longer as the full biodiversity value is unlikely to be restored. 	Low	N/A
	<p>Cumulative impacts:</p> <ul style="list-style-type: none"> » The potential for cumulative impacts is moderate for Alternative 1 to high for Alternative 2 especially due to the extent of intact vegetation and high density of listed plant species. » Reduced ability to meet conservation obligations & targets - The development would contribute a small 	Low	<ul style="list-style-type: none"> » The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas. » An open space management plan should be developed for the site, which should include management of biodiversity within the fenced area, as well as that in the adjacent rangeland.

Activity	Impact summary	Significance	Proposed mitigation
	amount to the cumulative loss of the Klerksdorp Thornveld vegetation type. » The development would contribute to habitat loss within the CBA and ultimately the loss of landscape connectivity and ecosystem function.		
Construction of PV array, access roads, power line and associated infrastructure.	<p>Direct impacts:</p> » Faunal impacts due to construction activities - disturbance, transformation and loss of habitat will have a negative effect on resident fauna during construction.	Medium	<ul style="list-style-type: none"> » Site access should be controlled and no unauthorized persons should be allowed onto the site. » Any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person. » The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the demarcated construction site. » Fires should not be allowed on site. » No fuel wood collection should be allowed on-site. » No dogs should be allowed on site. » If the site must be lit at night for security purposes, this should be done with low-UV type lights (such as most LEDs), which do not attract insects. » All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. » All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises. » Faunal sweeps within habitats such as bush clumps should take place before clearing and any fauna located should form part of a search and rescue and relocated to safety. » During the construction phase the activity would contribute to cumulative fauna disturbance and disruption in the area.

Activity	Impact summary	Significance	Proposed mitigation
	<p>Indirect impacts:</p> <ul style="list-style-type: none"> » Some displacement for fauna is an inevitable consequence of the development and cannot be fully mitigated. Noise and disturbance are typical of construction activities and cannot be avoided to a significant degree. The impact is however transient and confined to the construction period. 	Low	None required
	<p>Cumulative impacts:</p> <ul style="list-style-type: none"> » During the construction phase the activity would contribute to cumulative fauna disturbance and disruption in the area. 	Low	-
<u>Visual Impacts</u>			
Construction of the PV array, access roads and associated infrastructure.	<p>Direct impacts:</p> <p>Visual Impacts</p> <ul style="list-style-type: none"> » Impact of initial site works, construction camp, site set up, setting out, laying services, ground works » Impact of the hauling and delivery of all construction materials on local roads and during the contract period, construction of access junction, site roads. » Impact of the building construction works to completion 	Medium-Low	<ul style="list-style-type: none"> » Establish screening structures to shield construction works from sensitive receptors; good traffic and site management and keeping local people informed. Minimise construction period. » Good traffic management at access junction, good site management, and keeping local people and road users informed » Laydown areas and construction camp screened where required. Operate site within construction industry management guidelines, time limit on contract period.
	<p>Indirect impacts:</p> <ul style="list-style-type: none"> » There could some limited ground contamination » Disturbed ground which may be kept clear; the Solar Energy Facility, associated buildings and power evacuation infrastructure 	Low	» None.
	<p>Cumulative impacts:</p> <ul style="list-style-type: none"> » None 	N/A	» None
<u>Soil & Agricultural Impacts</u>			

Activity	Impact summary	Significance	Proposed mitigation
Direct occupation of land by footprint of energy facility infrastructure	Direct impacts: » Loss of agricultural land use	Low	» No mitigation possible
	» Soil erosion caused by alteration of run-off characteristics due to panel surfaces and access roads and having the effect of loss and deterioration of soil resources.	Low	Implement an effective system of run-off control which collects and disseminates run-off water from hardened surfaces and prevents potential down slope erosion. This should be in place and maintained during all phases of the development.
	» Loss of topsoil caused by poor topsoil management (burial, erosion, etc) during construction related soil profile disturbance (levelling, excavations, disposal of spoils from excavations etc.)	Low	» Strip and stockpile topsoil from all areas where soil will be disturbed. » After cessation of disturbance, re-spread topsoil over the surface. » Dispose of any sub-surface spoils from excavations where they will not impact on agricultural land, or where they can be effectively covered with topsoil.
	Indirect impacts: » None	N/A	
	Cumulative impacts: » The overall loss of agricultural land in the region due to other developments. The significance is low due to the limited agricultural potential of the development sites in the area, and the small extent of this proposed development.	Low	» No mitigation required
Social impacts			
Construction phase (Including all related infrastructure such as power lines, access roads, office and warehouse components)	Direct impacts: Positive social impacts: » Creation of employment and business opportunities. Potential negative impacts: » Influx of construction workers employed on the project to the area and impact on hospitality sector; » Increased risk of stock theft, poaching and damage to farm infrastructure associated with construction	Medium - Low	» Where possible, the applicant should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically semi and low-skilled job categories. This will reduce the potential impact that this category of worker could have on local family and social networks; » Maximise the use of local labour for low – semi skilled jobs far as possible.

Activity	Impact summary	Significance	Proposed mitigation
	<p>workers;</p> <ul style="list-style-type: none"> » Increased risk of veld fires associated with construction related activities; » Impact of heavy vehicles, including damage to roads, safety, noise and dust; » Loss of agricultural land associated with construction related activities. <p>Indirect impacts:</p> <ul style="list-style-type: none"> » Local employed people during the construction phase may learn new skills thereby making them more employable in the future. <p>Cumulative impacts:</p> <ul style="list-style-type: none"> » Impacts on family and community relations » In cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community. 	<p style="background-color: #92d050;"> </p> <p>Low (+)</p> <p style="background-color: #ffc107;"> </p>	<p> </p> <ul style="list-style-type: none"> » The developer should implement a training and skills development enhancement programme for locals during 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. » Attention should be given to the extension and improvement of the existing HIV/Aids awareness programmes in the area.
<u>Heritage impacts</u>			
<p>Construction and operation of the PV array, access roads and associated infrastructure.</p>	<p>Direct impacts:</p> <ul style="list-style-type: none"> » Impacts on archaeological sites not evident on the site and which could be unearthed during construction. <p>Indirect impacts:</p> <p>None</p> <p>Cumulative impacts:</p> <ul style="list-style-type: none"> » The loss of a number of archaeological sites as a result of numerous developments in the area. 	<p style="background-color: #ffc107;"> </p> <p>N/A</p> <p style="background-color: #ffc107;"> </p>	<ul style="list-style-type: none"> » If during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find. » None » None
<u>Palaeontology impacts</u>			
<p>Construction and operation of the PV array,</p>	<p>Direct impacts:</p> <ul style="list-style-type: none"> » Any damage that occurs to fossil material during 	<p style="background-color: #ffc107;"> </p>	<ul style="list-style-type: none"> » Any substantial fossil remains (e.g. stromatolites, fossil shells, petrified wood or plant remains, vertebrate bones,

Activity	Impact summary	Significance	Proposed mitigation
access roads and associated infrastructure.	the excavation and construction phase of the project would be permanent and irreversible.		teeth) encountered during excavation should be reported to SAHRA.
	Indirect impacts: None		» None
	Cumulative impacts: » The loss of a number of palaeontological findings as a result of numerous developments in the area.	Very low	» None
Site Alternative 2			
<u>Ecological impacts</u>			
Alternative 2 is within intact Klerksdorp Thornveld and there is a high abundance of <i>Acacia erioloba</i> as well as a few <i>Boscia albitrunca</i> . The potential for the disruption of landscape connectivity and negative impact on CBAs is highest for Alternative 2. As such Alternative 2 offers habitat for some fauna and is important in maintaining the connectivity of the landscape.			
Vegetation clearing and construction activity	Direct impacts: » Impacts on vegetation and listed plant species may occur due to vegetation clearing and disturbance associated with construction activities. » The proposed facility is situated within a CBA Tier 2 - Development within CBAs may negatively impact biodiversity and the ecological functioning of the CBA.	Medium	» Avoid temporary activities in sensitive areas such as intact areas of Klerksdorp Thornveld vegetation type. » Vegetation clearing to commence only after walk through has been conducted and necessary permits obtained. » Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared. » All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed. » Temporary lay-down areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use.
	Indirect impacts: » Some loss of vegetation is inevitable and cannot be avoided » The loss of intact vegetation would persist for at least the lifetime of the facility and probably longer as the full biodiversity value is unlikely to be restored.	Low	N/A

Activity	Impact summary	Significance	Proposed mitigation
	<p>Cumulative impacts:</p> <ul style="list-style-type: none"> » The potential for cumulative impacts is moderate to high especially under Alternative 2 which consists of intact vegetation and has a high density of listed plant species. » Reduced ability to meet conservation obligations & targets - The development would contribute a small amount to the cumulative loss of the Klerksdorp Thornveld vegetation type. » The development would contribute to habitat loss within the CBA and ultimately the loss of landscape connectivity and ecosystem function. 	Medium	<ul style="list-style-type: none"> » The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas. » An open space management plan should be developed for the site, which should include management of biodiversity within the fenced area, as well as that in the adjacent rangeland.
<p>Construction of PV array, access roads, power line and associated infrastructure.</p>	<p>Direct impacts:</p> <ul style="list-style-type: none"> » Faunal impacts due to construction activities - disturbance, transformation and loss of habitat will have a negative effect on resident fauna during construction. 	Medium	<ul style="list-style-type: none"> » Site access should be controlled and no unauthorized persons should be allowed onto the site. » Any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person. » The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the demarcated construction site. » Fires should not be allowed on site. » No fuel wood collection should be allowed on-site. » No dogs should be allowed on site. » If the site must be lit at night for security purposes, this should be done with low-UV type lights (such as most LEDs), which do not attract insects. » All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. » All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes

Activity	Impact summary	Significance	Proposed mitigation
			and tortoises. » Faunal sweeps within habitats such as bush clumps should take place before clearing and any fauna located should form part of a search and rescue and relocated to safety. » During the construction phase the activity would contribute to cumulative fauna disturbance and disruption in the area.
	Indirect impacts: » Some habitat loss for fauna is an inevitable consequence of the development and cannot be fully mitigated. Noise and disturbance are typical of construction activities and cannot be avoided to a significant degree. The impact is however transient and confined to the construction period.	Low	N/A
	Cumulative impacts: » During the construction phase the activity would contribute to cumulative fauna disturbance and disruption in the area.	Low	-
<u>Visual impacts</u>			
Construction of the PV array, access roads and associated infrastructure.	Direct impacts: Visual Impacts » Impact of initial site works, construction camp, site set up, setting out, laying services, ground works » Impact of the hauling and delivery of all construction materials on local roads and during the contract period, construction of access junction, site roads. » Impact of the building construction works to completion	Medium-Low	» Establish screening structures to shield construction works from sensitive receptors; good traffic and site management and keeping local people informed. Minimise construction period. » Good traffic management at access junction, good site management, and keeping local people and road users informed » Laydown areas and construction camp screened where required. Operate site within construction industry management guidelines, time limit on contract period.
	Indirect impacts: » There could some limited ground contamination » Disturbed ground which may be kept clear; the SEF, associated buildings and power evacuation		» None.

Activity	Impact summary	Significance	Proposed mitigation
	infrastructure		
	Cumulative impacts: » None		» None
<u>Heritage impacts</u>			
Construction of the PV array, access roads and associated infrastructure.	Direct impacts: » Impacts on archaeological sites not evident on the site and which could be unearthed during construction.	Low	» If during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find.
	Indirect impacts: None	N/A	» None
	Cumulative impacts: » The loss of a number of archaeological sites	Low	» None
<u>Palaeontology impacts</u>			
Construction of the PV arrays, access roads and associated infrastructure.	Direct impacts: » Any damage that occurs to fossil material during the excavation and construction phase of the project would be permanent and irreversible.	Very low	» Any substantial fossil remains (e.g. stromatolites, fossil shells, petrified wood or plant remains, vertebrate bones, teeth) encountered during excavation should be reported to SAHRA
	Indirect impacts: None		» None
	Cumulative impacts: » The loss of a number of palaeontological findings.	Very low	» None
Site Alternative 3			
<u>Ecological impacts</u>			
Alternative 3 is within a previously transformed area that has recovered in terms of structure, but not in terms of plant diversity.			

Activity	Impact summary	Significance	Proposed mitigation
Vegetation clearing and construction activity	<p>Direct impacts:</p> <ul style="list-style-type: none"> » Impacts on vegetation and listed plant species may occur due to vegetation clearing and disturbance associated with construction activities. 	Low	<ul style="list-style-type: none"> » Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared. » All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed. » Temporary lay-down areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use.
	<p>Indirect impacts:</p> <ul style="list-style-type: none"> » Some loss of vegetation is inevitable and cannot be avoided » The loss of intact vegetation would persist for at least the lifetime of the facility and probably longer as the full biodiversity value is unlikely to be restored. 	Low	N/A
	<p>Cumulative impacts:</p> <ul style="list-style-type: none"> » The development would contribute a small amount to the cumulative loss of the Klerksdorp Thornveld vegetation type. 	Medium	<ul style="list-style-type: none"> » The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas. » An open space management plan should be developed for the site, which should include management of biodiversity within the fenced area, as well as that in the adjacent rangeland.
Construction of PV array, access roads, power line and associated infrastructure.	<p>Direct impacts:</p> <ul style="list-style-type: none"> » Faunal impacts due to construction activities - disturbance, transformation and loss of habitat will have a negative effect on resident fauna during construction. 	Medium	<ul style="list-style-type: none"> » Site access should be controlled and no unauthorized persons should be allowed onto the site. » Any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person. » The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel

Activity	Impact summary	Significance	Proposed mitigation
			should not be allowed to wander off the demarcated construction site. » Fires should not be allowed on site. » No fuel wood collection should be allowed on-site. » No dogs should be allowed on site. » If the site must be lit at night for security purposes, this should be done with low-UV type lights (such as most LEDs), which do not attract insects. » All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. » All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises. » Faunal sweeps within habitats such as bush clumps should take place before clearing and any fauna located should form part of a search and rescue and relocated to safety. » During the construction phase the activity would contribute to cumulative fauna disturbance and disruption in the area.
	Indirect impacts: » Some habitat loss for fauna is an inevitable consequence of the development and cannot be fully mitigated. Noise and disturbance are typical of construction activities and cannot be avoided to a significant degree. The impact is however transient and confined to the construction period.	Low	N/A
	Cumulative impacts: » During the construction phase the activity would contribute to cumulative fauna disturbance and disruption in the area.	Low	-
<u>Visual impacts</u>			

Activity	Impact summary	Significance	Proposed mitigation
Construction of the PV array, access roads and associated infrastructure.	Direct impacts: » Impact of initial site works, construction camp, site set up, setting out, laying services, ground works » Impact of the hauling and delivery of all construction materials on local roads and during the contract period, construction of access junction, site roads. » Impact of the building construction works to completion	Medium	» Establish screening structures to shield construction works from sensitive receptors; good traffic and site management and keeping local people informed. Minimise construction period. Note proximity to R505.
	Indirect impacts: » There could some limited ground contamination » Disturbed ground which may be kept clear; the SEF, associated buildings and power evacuation infrastructure		» None.
	Cumulative impacts: » None		» None
<u>Heritage impacts</u>			
Construction of the PV array, access roads and associated infrastructure.	Direct impacts: » Impacts on archaeological sites not evident on the site and which could be unearthed during construction.	Low	» If during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find.
	Indirect impacts: None	N/A	» None
	Cumulative impacts: » The loss of a number of archaeological sites	Low	» None
<u>Palaeontology impacts</u>			
Construction of the PV arrays, access roads and associated infrastructure.	Direct impacts: » Any damage that occurs to fossil material during the excavation and construction phase of the project would be permanent and irreversible.	Very low	» Any substantial fossil remains (e.g. stromatolites, fossil shells, petrified wood or plant remains, vertebrate bones, teeth) encountered during excavation should be reported to SAHRA
	Indirect impacts: None		» None

Activity	Impact summary	Significance	Proposed mitigation
	Cumulative impacts: » The loss of a number of palaeontological findings.	Very low	» None

Activity	Impact summary	Significance	Proposed mitigation
OPERATION			
Site Alternative 1			
<i>Ecological impacts</i>			
Presence and operation of the facility	<i>Direct impacts:</i> » Increased alien plant invasion during operation.	Low	» Due to the disturbance at the site as well as the increased runoff generated by the hard infrastructure, alien plant species are likely to be a long-term problem at the site and a long-term control plan will need to be implemented. » Regular monitoring for alien plants within the development footprint. » Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.
	<i>Indirect impacts:</i> » If alien species at the site are controlled, then there will be very little indirect impact		» None
	<i>Cumulative impacts:</i> » Alien invasion would contribute to cumulative habitat degradation in the area, but if alien species are controlled, then cumulative impact from alien species would not be significant.	Low	» The natural vegetation at the site is naturally low and is compatible with a PV facility and should be encouraged to return following construction. » Fauna within the site which do not pose a danger to humans or the operation of the facility should be tolerated.
Operation of PV arrays, access roads and associated infrastructure on fauna.	<i>Direct impacts:</i> » Negative faunal impacts due to operation - The operation and presence of the facility may lead to disturbance or persecution of fauna.	Low	» No unauthorized persons should be allowed onto the site. » Any fauna considered dangerous to site workers, such as snakes; or fauna threatened by the maintenance and operational activities should be removed to a safe location. » The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. » No fires should only be allowed at the site. » No fuel wood collection should be allowed on-site.

Activity	Impact summary	Significance	Proposed mitigation
			<ul style="list-style-type: none"> » No dogs should be allowed on site. » If the site must be lit at night for security purposes, this should be done with low-UV type lights (such as most LEDs), which do not attract insects. » All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. » All vehicles accessing the site should adhere to a low speed limit (30km/h max) to avoid collisions with susceptible species such as snakes and tortoises.
	<p>Indirect impacts: Some habitat loss is an inevitable consequence of the development and cannot be fully mitigated.</p>	Low	» None
	<p>Cumulative impacts: » The development would contribute to cumulative habitat loss for fauna, but the contribution would be very small and is not considered significant.</p>	Low	» None
Operation of PV arrays and power lines on avifauna	<p>Direct impacts: » Avifaunal impacts due to operation/presence of the facility - The operation and presence of the facility may lead to negative impacts on avifauna as a result of electrocution or collisions with the associated power line infrastructure.</p>	Low	<ul style="list-style-type: none"> » All new power line infrastructure should be bird-friendly in configuration and adequately insulated (Lehman et al. 2007). These installation of these measures should be supervised by someone with experience in this field. » Any electrocution and collision events that occur should be recorded, including the species affected and the date. If repeated collisions occur within the same area, then further mitigation and avoidance measures may need to be implemented.
	<p>Indirect impacts: » Some habitat loss for avifauna is an inevitable consequence of the development and cannot be fully mitigated.</p>	Low	» None
	<p>Cumulative impacts: » The development would contribute to cumulative</p>	Low	» None

Activity	Impact summary	Significance	Proposed mitigation
	<p>avifaunal impacts in the area, but the contribution would be very small and is not considered significant.</p>		
<p>Operation of PV arrays, access roads and associated infrastructure on erosion potential.</p>	<p>Direct impacts:</p> <ul style="list-style-type: none"> » Increased erosion risk during operation - Increased erosion risk as a result of soil disturbance and loss of vegetation cover as well as increased runoff generated by the panels and access roads. 	<p>Low</p>	<ul style="list-style-type: none"> » All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. » Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance. » All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. <p>All cleared areas should be revegetated with indigenous perennial grasses.</p>
	<p>Indirect impacts:</p> <ul style="list-style-type: none"> » If erosion at the site is controlled, then there will be no indirect impact 		<ul style="list-style-type: none"> » None
	<p>Cumulative impacts:</p> <ul style="list-style-type: none"> » Large amounts of soil and silt leaving the construction site will impact local riparian and wetland ecosystems. 	<p>Low</p>	<ul style="list-style-type: none"> » -None
<p><u>Visual impacts</u></p>			
<p>For Alternative 1, the following is relevant:</p> <ul style="list-style-type: none"> » Wolmaransstad is shielded by built form; there is some impact on the township to the south » R504, direction west, is exposed » R505, direction north is less exposed » There is no impact on the N12 » Impact on farmsteads within 3.5km is evident. 			
<p>Maintenance and operation of proposed PV plant</p>	<p>Direct impacts:</p> <ul style="list-style-type: none"> » Effect on people living and working locally, change of local site character from agriculture to industrial » Impact from regular but not frequent, maintenance visits to clean the panels etc. » Impact on the colours, finishes, heights of the 	<p>Medium-low</p>	<ul style="list-style-type: none"> » Use of appropriate materials and colours for maintenance of buildings. » All built form should be erected in locations with minimal visual impact; i.e. buildings and inverters, etc should be grouped together as far as practicable.

Activity	Impact summary	Significance	Proposed mitigation
	building, perimeter treatments		
	Indirect impacts: » The residual impacts would be mitigated by habituation of the local population to the visual impact. There are semi-industrial uses locally.	Low	» Rehabilitate the site to its current state as far as practicable.
	Cumulative impacts: » Visual impacts arising from the development of other similar proposed facilities or existence of other similar existing developments	Low	» Identify measures to ensure that the visual context is not altered to the extent that PV facilities become part of the accepted visual framework.
<u>Soil and agricultural impacts</u>			
Direct occupation of land by footprint of energy facility infrastructure	Direct impacts: » Loss of agricultural land use	Low	» None – No defined agricultural land use are applicable to this site alternative
	» Soil erosion by wind and water » There is low risk of wind erosion but higher risk of water erosion.	Low	» Implement an effective system of run-off control which collects and disseminates run-off water from hardened surfaces and prevents potential down slope erosion. This should be in place and maintained during all phases of the development. » Encourage and maintain vegetation growth throughout the site to stabilise the soil against wind erosion.
<u>Social impacts</u>			
Operation of the PV facility and all related infrastructure such as power lines, access roads etc.	Direct impacts: » Creation of employment during operations	Medium – Low (+)	» Where possible, the applicant should employ locals to form part of the operation phase team. » Develop a programme to maximise the number of South African's and locals employed during the operational phase of the project.
	» Competing land uses arising in social conflicts	Low	» Ensure that the Municipality is consulted regarding use of the site for informal grazing purposes
	Cumulative impacts: » The cumulative impact on the social environment of	Medium to Low	The developer should be aware of the other projects in the area and work closely with the local municipality for the

Activity	Impact summary	Significance	Proposed mitigation
	other developments in the area would increase the positive and negative social impacts.		identification of employees.
Site Alternative 2			
<u>Ecological impacts</u>			
Presence and operation of the facility	Direct impacts: » Increased alien plant invasion during operation.	Low	» Due to the disturbance at the site as well as the increased runoff generated by the hard infrastructure, alien plant species are likely to be a long-term problem at the site and a long-term control plan will need to be implemented. » Regular monitoring for alien plants within the development footprint. » Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.
	Indirect impacts: » If alien species at the site are controlled, then there will be very little indirect impact		» None
	Cumulative impacts: » Alien invasion would contribute to cumulative habitat degradation in the area, but if alien species are controlled, then cumulative impact from alien species would not be significant.	Low	» The natural vegetation at the site is naturally low and is compatible with a PV facility and should be encouraged to return following construction. » Fauna within the site which do not pose a danger to humans or the operation of the facility should be tolerated.
Operation of PV arrays, access roads and associated infrastructure on fauna.	Direct impacts: » Negative faunal impacts due to operation - The operation and presence of the facility may lead to disturbance or persecution of fauna.	Low	» No unauthorized persons should be allowed onto the site. » Any fauna considered dangerous to site workers, such snakes; or fauna threatened by the maintenance and operational activities should be removed to a safe location. » The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. » No fires should only be allowed at the site. » No fuel wood collection should be allowed on-site. » No dogs should be allowed on site. » If the site must be lit at night for security purposes, this

Activity	Impact summary	Significance	Proposed mitigation
			<p>should be done with low-UV type lights (such as most LEDs), which do not attract insects.</p> <ul style="list-style-type: none"> » All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. » All vehicles accessing the site should adhere to a low speed limit (30km/h max) to avoid collisions with susceptible species such as snakes and tortoises.
	<p>Indirect impacts: Some habitat loss is an inevitable consequence of the development and cannot be fully mitigated.</p>	Low	» None
	<p>Cumulative impacts: » The development would contribute to cumulative habitat loss for fauna, but the contribution would be very small and is not considered significant.</p>	Low	» None
Operation of PV arrays and power lines on avifauna	<p>Direct impacts: » Avifaunal impacts due to operation/presence of the facility - The operation and presence of the facility may lead to negative impacts on avifauna as a result of electrocution or collisions with the associated power line infrastructure.</p>	Low	<ul style="list-style-type: none"> » All new power line infrastructure should be bird-friendly in configuration and adequately insulated (Lehman et al. 2007). These installation of these measures should be supervised by someone with experience in this field. » Any electrocution and collision events that occur should be recorded, including the species affected and the date. If repeated collisions occur within the same area, then further mitigation and avoidance measures may need to be implemented.
	<p>Indirect impacts: » Some habitat loss for avifauna is an inevitable consequence of the development and cannot be fully mitigated.</p>	Low	» None
	<p>Cumulative impacts: » The development would contribute to cumulative avifaunal impacts in the area, but the contribution would be very small and is not considered</p>	Low	» None

Activity	Impact summary	Significance	Proposed mitigation
	significant.		
Operation of PV arrays, access roads and associated infrastructure on erosion potential.	<p>Direct impacts:</p> <ul style="list-style-type: none"> » Increased erosion risk during operation - Increased erosion risk as a result of soil disturbance and loss of vegetation cover as well as increased runoff generated by the panels and access roads. 	Low	<ul style="list-style-type: none"> » All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. » Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance. » All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. All cleared areas should be revegetated with indigenous perennial grasses.
	<p>Indirect impacts:</p> <ul style="list-style-type: none"> » If erosion at the site is controlled, then there will be no indirect impact 		<ul style="list-style-type: none"> » None
	<p>Cumulative impacts:</p> <ul style="list-style-type: none"> » Large amounts of soil and silt leaving the construction site will impact local riparian and wetland ecosystems. 	Low	<ul style="list-style-type: none"> » -None
<p><u>Visual impacts</u></p> <p>For Alternative 2, the following is relevant:</p> <ul style="list-style-type: none"> » Wolmaransstad is shielded by built form; there is some impact on the township to the south » R504, direction west, is exposed » R505, direction north is exposed, over a lesser distance » There is no impact on the N12 » Impact on farmsteads within 3.5km is evident. 			
Maintenance and operation of proposed PV plant	<p>Direct impacts:</p> <ul style="list-style-type: none"> » Effect on people living and working locally, change of local site character from agriculture to industrial » Impact from regular but not frequent, maintenance visits to clean the panels etc. » Impact on the colours, finishes, heights of the building, perimeter treatments 	Medium-low	<ul style="list-style-type: none"> » Use of appropriate materials and colours for maintenance of buildings. » All built form should be erected in locations with minimal visual impact; i.e. buildings and inverters, etc should be grouped together as far as practicable.

Activity	Impact summary	Significance	Proposed mitigation
	<p>Indirect impacts:</p> <ul style="list-style-type: none"> » The residual impacts would be mitigated by habituation of the local population to the visual impact. There are semi-industrial uses locally. <p>Cumulative impacts:</p> <ul style="list-style-type: none"> » Visual impacts arising from the development of other similar proposed facilities or existence of other similar existing developments 	<p>Low</p> <p>Low</p>	<ul style="list-style-type: none"> » Rehabilitate the site to its current state as far as practicable. » Identify measures to ensure that the visual context is not altered to the extent that PV facilities become part of the accepted visual framework.
<u>Soil and agricultural impacts</u>			
Direct occupation of land by footprint of energy facility infrastructure	<p>Direct impacts:</p> <ul style="list-style-type: none"> » Loss of agricultural land use 	Low	<ul style="list-style-type: none"> » None – No defined agricultural land use are applicable to this site alternative
	<ul style="list-style-type: none"> » Soil erosion by wind and water » There is low risk of wind erosion but higher risk of water erosion. 	Low	<ul style="list-style-type: none"> » Implement an effective system of run-off control which collects and disseminates run-off water from hardened surfaces and prevents potential down slope erosion. This should be in place and maintained during all phases of the development. » Encourage and maintain vegetation growth throughout the site to stabilise the soil against wind erosion.
<u>Social impacts</u>			
Operation of the PV facility and all related infrastructure such as power lines, access roads etc.	<p>Direct impacts:</p> <ul style="list-style-type: none"> » Creation of employment during operations 	Medium – Low (+)	<ul style="list-style-type: none"> » Where possible, the applicant should employ locals to form part of the operation phase team. » Develop a programme to maximise the number of South African's and locals employed during the operational phase of the project.
	<ul style="list-style-type: none"> » Competing land uses arising in social conflicts 	Low	<ul style="list-style-type: none"> » Ensure that the Municipality is consulted regarding use of the site for informal grazing purposes
	<p>Cumulative impacts:</p> <ul style="list-style-type: none"> » The cumulative impact on the social environment of other developments in the area would increase the 	Medium to Low	The developer should be aware of the other projects in the area and work closely with the local municipality for the identification of employees.

Activity	Impact summary	Significance	Proposed mitigation
	positive and negative social impacts.		
Site Alternative 3			
<u>Ecological impacts</u>			
Presence and operation of the facility	Direct impacts: » Increased alien plant invasion during operation.	Low	» Due to the disturbance at the site as well as the increased runoff generated by the hard infrastructure, alien plant species are likely to be a long-term problem at the site and a long-term control plan will need to be implemented. » Regular monitoring for alien plants within the development footprint. » Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.
	Indirect impacts: » If alien species at the site are controlled, then there will be very little indirect impact		» None
	Cumulative impacts: » Alien invasion would contribute to cumulative habitat degradation in the area, but if alien species are controlled, then cumulative impact from alien species would not be significant.	Low	» The natural vegetation at the site is naturally low and is compatible with a PV facility and should be encouraged to return following construction. » Fauna within the site which do not pose a danger to humans or the operation of the facility should be tolerated.
Operation of PV arrays, access roads and associated infrastructure on fauna.	Direct impacts: » Negative faunal impacts due to operation - The operation and presence of the facility may lead to disturbance or persecution of fauna.	Low	» No unauthorized persons should be allowed onto the site. » Any fauna considered dangerous to site workers, such as snakes; or fauna threatened by the maintenance and operational activities should be removed to a safe location. » The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. » No fires should only be allowed at the site. » No fuel wood collection should be allowed on-site. » No dogs should be allowed on site. » If the site must be lit at night for security purposes, this should be done with low-UV type lights (such as most

Activity	Impact summary	Significance	Proposed mitigation
			LEDs), which do not attract insects. » All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. » All vehicles accessing the site should adhere to a low speed limit (30km/h max) to avoid collisions with susceptible species such as snakes and tortoises.
	Indirect impacts: Some habitat loss is an inevitable consequence of the development and cannot be fully mitigated.	Low	» None
	Cumulative impacts: » The development would contribute to cumulative habitat loss for fauna, but the contribution would be very small and is not considered significant.	Low	» None
Operation of PV arrays and power lines on avifauna	Direct impacts: » Avifaunal impacts due to operation/presence of the facility - The operation and presence of the facility may lead to negative impacts on avifauna as a result of electrocution or collisions with the associated power line infrastructure.	Low	» All new power line infrastructure should be bird-friendly in configuration and adequately insulated (Lehman et al. 2007). These installation of these measures should be supervised by someone with experience in this field. » Any electrocution and collision events that occur should be recorded, including the species affected and the date. If repeated collisions occur within the same area, then further mitigation and avoidance measures may need to be implemented.
	Indirect impacts: » Some habitat loss for avifauna is an inevitable consequence of the development and cannot be fully mitigated.	Low	» None
	Cumulative impacts: » The development would contribute to cumulative avifaunal impacts in the area, but the contribution would be very small and is not considered significant.	Low	» None

Activity	Impact summary	Significance	Proposed mitigation
Operation of PV arrays, access roads and associated infrastructure on erosion potential.	Direct impacts: » Increased erosion risk during operation - Increased erosion risk as a result of soil disturbance and loss of vegetation cover as well as increased runoff generated by the panels and access roads.	Low	» All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. » Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance. » All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. All cleared areas should be revegetated with indigenous perennial grasses.
	Indirect impacts: » If erosion at the site is controlled, then there will be no indirect impact		» None
	Cumulative impacts: » Large amounts of soil and silt leaving the construction site will impact local riparian and wetland ecosystems.	Low	» -None
<u>Visual impacts</u>			
For Alternative 3, the following is relevant: » Wolmaransstad is shielded by built form » R504, direction west, is exposed over a short distance » R505, direction north is exposed » There is no impact on the N12 » Impact on farmsteads within 3.5km is evident			
Maintenance and operation of proposed PV plant	Direct impacts: » Effect on people living and working locally, change of local site character from agriculture to industrial » Impact from regular but not frequent, maintenance visits to clean the panels etc. » Impact on the colours, finishes, heights of the building, perimeter treatments	Medium	» Use of appropriate materials and colours for maintenance of buildings. » All built form should be erected in locations with minimal visual impact; i.e. buildings and inverters, etc should be grouped together as far as practicable. » Retain local shielding
	Indirect impacts:	Low	» Rehabilitate the site to its current state as far as

Activity	Impact summary	Significance	Proposed mitigation
	<ul style="list-style-type: none"> » The residual impacts would be mitigated by habituation of the local population to the visual impact. There are semi-industrial uses locally. 		<ul style="list-style-type: none"> practicable.
	<p>Cumulative impacts:</p> <ul style="list-style-type: none"> » Visual impacts arising from the development of other similar proposed facilities or existence of other similar existing developments 	Low	<ul style="list-style-type: none"> » Identify measures to ensure that the visual context is not altered to the extent that PV facilities become part of the accepted visual framework.
<u>Soil and agricultural impacts</u>			
Direct occupation of land by footprint of energy facility infrastructure	<p>Direct impacts:</p> <ul style="list-style-type: none"> » Loss of agricultural land use 	Low	<ul style="list-style-type: none"> » None – No defined agricultural land use are applicable to this site alternative
	<ul style="list-style-type: none"> » Soil erosion by wind and water » There is low risk of wind erosion but higher risk of water erosion. 	Low	<ul style="list-style-type: none"> » Implement an effective system of run-off control which collects and disseminates run-off water from hardened surfaces and prevents potential down slope erosion. This should be in place and maintained during all phases of the development. » Encourage and maintain vegetation growth throughout the site to stabilise the soil against wind erosion.
<u>Social impacts</u>			
Operation of the PV facility and all related infrastructure such as power lines, access roads etc.	<p>Direct impacts:</p> <ul style="list-style-type: none"> » Creation of employment during operations 	Medium – Low (+)	<ul style="list-style-type: none"> » Where possible, the applicant should employ locals to form part of the operation phase team. » Develop a programme to maximise the number of South African's and locals employed during the operational phase of the project.
	<ul style="list-style-type: none"> » Competing land uses arising in social conflicts 	Low	<ul style="list-style-type: none"> » Ensure that the Municipality is consulted regarding use of the site for informal grazing purposes
	<p>Cumulative impacts:</p> <ul style="list-style-type: none"> » The cumulative impact on the social environment of other developments in the area would increase the positive and negative social impacts. 	Medium to Low	<p>The developer should be aware of the other projects in the area and work closely with the local municipality for the identification of employees.</p>

Activity	Impact summary	Significance	Proposed mitigation
DECOMMISSIONING AND CLOSURE			
Alternative S1 and S2 and S3			
Decommissioning of Solar Energy Facility and associated infrastructure	<p>Direct impacts: Ecology: Negative faunal impacts due to decommissioning activities.</p>	Low	<ul style="list-style-type: none"> » Site access to be controlled and no unauthorized persons should be allowed onto the site. » The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. » No fires to be allowed on site. » No fuel wood collection should be allowed on-site. » No dogs should be allowed on site. » No hazardous materials should be stored on site. » No open excavations, holes or pits should be left at the site as fauna can fall in and become trapped.
	<p>Ecology: Increased alien plant invasion risk</p>	Low	<ul style="list-style-type: none"> » Due to the disturbance at the site during decommissioning, alien plant species are likely to invade the site and a long-term control plan will need to be implemented for several years after decommissioning » Regular monitoring for alien plants within the development footprint for 2-3 years after decommissioning. » Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible. » A cover of indigenous grass should be established to stabilise the soil.
	<p>Social: » A retrenchment and downscaling programme</p>	Medium - Low	<ul style="list-style-type: none"> » Bluewave Capital should also investigate the option of establishing an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas. The Trust Fund should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 20 year operational life of the facility. The rationale for the establishment of a Rehabilitation Trust Fund is linked to the experiences with

Activity	Impact summary	Significance	Proposed mitigation
			the mining sector in South Africa and failure of many mining companies to allocate sufficient funds during the operational phase to cover the costs of rehabilitation and closure.
	Visual: » The major visual impact associated with the decommissioning of the facility is the residual visual effects such as scarring of the landscape.	Low	» Ensure rehabilitation of the site to a pre-determined land use status
	» Soil erosion	Low	» Care should be taken to control and contain stormwater run-off and not to concentrate its runoff. » Rehabilitate the decommissioned area with species suitable to the desired land use
	» Dust production and dust pollution	Low	» Apply appropriate dust control measures, i.e. water for dust suppression.
	Indirect impacts: » Other beneficial land uses	Low (+)	Ensure rehabilitation of the site to an appropriate pre-determined land use status in line with the planning of the municipality
	Cumulative Impacts: Soil » Siltation of watercourses downstream	Low	» Stop soil erosion at the source

NO-GO OPTION			
Construction, operation and decommissioning phase of the solar energy facility	Direct impacts: » Ecological impacts: the no-go option would result in continued ecological degradation on Site Alternative 1 from unmanaged soil mining and grazing activities. The ecological status on Site Alternative 3 would continue to improve while Site Alternative 2 will remain sensitive. » Agricultural impacts: The 'do nothing' alternative will result in no impact on the current grazing use.	Low	» Unapproved activities and land uses potentially affecting the ecological integrity of the site must be managed by the municipality.

	<p>The resultant loss of income for informal pasturing is considered to be negligible due to the extent of the site and degraded areas of the site which are not conducive for grazing use. In terms of the site selection within the farm boundary, the farm is very uniform in terms of soil potential and the positioning of the solar development on any portion of the farm therefore has very little agricultural impact.</p> <ul style="list-style-type: none"> » Social impacts: The no-go option would result in job opportunities not being realised resulting in further unemployment in the area. » Visual impacts: The visual character of the area would remain unchanged. » Heritage impacts The do-nothing alternative would have no impact on the heritage environment as no development would be undertaken which could potentially impact upon heritage resources. 		
	<p>Indirect impacts:</p> <ul style="list-style-type: none"> » The No-Go option would represent a lost opportunity for South Africa to supplement is current energy needs with clean, renewable energy. Given South Africa’s position as one of the highest per capita producer of carbon emissions in the world, this would represent a high negative social cost. » The possibility that a different application to develop a PV facility may be made in respect of this site. 	Low	» Implementation of the proposed project
	<p>Cumulative impacts:</p> <ul style="list-style-type: none"> » Contributing to further unemployment and unsustainable ways to produce electricity 	Low	» Implementation of the proposed project

A complete impact assessment in terms of Regulation 22(2)(i) of GN R.543 must be included as **Appendix F**.

2. 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.

Site Alternative 1 (S1) and Site Alternative 2 (S2) and Site Alternative 3 (S3)

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

The following conclusions can be drawn from the studies undertaken within this Basic Assessment:

Ecological impacts

In terms of the two site alternatives assessed, Site Alternative 1 will result in fewer and less significant impacts than Site Alternative 2. The major difference between the two development areas is the previously disturbed nature of a large proportion of Site Alternative 1 as well as the position of Site Alternative 1 between the R504 and two power lines bordering the site. The abundance of listed species such as *Acacia erioloba* are far greater within Site Alternative 2 than within Site Alternative 1. In addition, the likely impact of development within Site Alternative 2 on landscape connectivity and ecological functioning with the CBA would also be significantly greater. Overall, the likely impact of development of a solar energy facility within Site Alternative 2 would be of a high magnitude and higher significance. The old croplands, which characterise Site Alternative 3 as well as the disturbed area within Site Alternative 1 are considered to be of low to medium sensitivity and within the context of the site, provide the best opportunity for development, although recovery of these croplands is evident. Based on the sensitivities mapped and identified on the farm, as well as the likely distribution of fauna within the site, Site Alternative 1 is the preferred development option, but it is not significantly different from Site Alternative 3. Either alternative are considered acceptable within the context of the site.

The summary of impacts for the construction, operation and decommissioning phases after mitigation for ecological impacts are provided in the table below, indicating Site Alternatives 1 and 3 will have a lower overall impact probability, likelihood and significance than Site Alternative 2:

	Site Alternative 1	Site Alternative 2	Site Alternative 3
Construction			
Loss of Vegetation and Listed Species	Low	Medium	Low
Faunal Impacts	Low	Medium	Medium
Operation			
Faunal Impacts	Low	Low	Low
Avifaunal Impacts	Low	Low	Low
Alien Plant Invasion Risk	Low	Low	Low
Increased Erosion Risk	Low	Low	Low
Decommissioning			
Faunal Impacts	Low	Low	Low
Alien Plant Invasion Risk	Low	Low	Low
Cumulative Impacts			
Reduced ability to meet conservation targets	Low	Medium	Medium
Impact on Critical Biodiversity Areas	Low	Medium	Low

Agricultural impacts

The most important factor that influences the significance of agricultural impacts is the fact that the site alternatives are situated on land of limited agricultural potential that is classified as non-arable, moderate potential grazing land. The proposed development is also small in relation to the extent of available land on the rest of the farm and makes up 3.2% of the overall farm portion. The duration, probability and significance of agricultural impacts are regarded to be low.

Heritage and palaeontological impact

The impacts to heritage resources by the proposed development (all three site alternatives) are considered to be low and no further mitigation is proposed. No archaeological sites were identified during the survey and desktop study. The study area is located outside of the known distribution of Iron Age sites in the North West province and no Iron Age or Stone Age sites were recorded. There are no buildings or other structures within the development footprint and therefore no impact on the built environment is expected. Furthermore the site has very low palaeontological potential, and exemption from a detailed palaeontological assessment is recommended. The duration, probability and significance of heritage and palaeontological impacts are regarded to be low to negligible.

Visual impact

The solar energy facility is a semi-industrial land use proposed to be located on municipal land already characterised by distribution power line infrastructure with light-industrial uses situated nearby. The terrain and existing tree planting both contribute to shielding this proposed development from Wolmaransstad town (Site Alternatives 1 and 2). The proposed facility (at Site Alternatives 1 and 2) would be visible to users of the R504, R505, and four farmsteads within 3.5km of the facility. While Site Alternative 2 was identified as having a lower overall visual impact due to Site Alternative 1 and 3 being situated nearer to roads, the visual exposure for all Site Alternatives is rated as medium. It can be concluded that the degree of impact between the Site Alternatives is not very significant with Alternative 3 having the least impact, though closer to visual receptors (Wolmaransstad) while Site Alternatives 1 and 2 would have a wider impact on a lesser number of receptors but to a reduced degree.

Social impact

The overall **social** and socio-economic impact (for both site alternatives) in terms of positive and negative impacts is anticipated to be of a **medium to low significance** during both the construction and operational phases with the implementation of enhancement/mitigation measures. The potential negative impacts associated with the construction phase are typical of construction-related activities and are expected to respond to the mitigation measures proposed. Issues identified include the influx of outside workers, whether locals would be employable during the construction phase of the project as on-site skills development and training would be imperative to ensure that the benefits of employment could be maximised, the intrusion impacts associated with construction, and impacts on the daily living and movement patterns of neighbouring landowners and road users.

The possible job creation and skills development, although limited in extent, are regarded as a significant positive injection into the area. The project would result in significant positive economic spin-offs for the local area and region.

Conclusion

Based on the findings of the studies undertaken, in terms of environmental constraints and opportunities identified through the Basic Assessment process, no environmental fatal flaws were identified to be associated with the establishment of the proposed Wolmaransstad Municipality Solar Energy facility and associated infrastructure. Based on the specialist studies undertaken the preferred site is Site Alternative 1 due to its overall lower ecological status (despite its overlap with a CBA and areas mapped as high sensitivity) and medium visual impact. Site Alternative 2 is the most preferred from a visual perspective but least preferred from an ecological perspective. Site Alternative 3 while situated on old croplands, presents the second most viable ecological option but

will be the most visible from the town of Wolmaransstad. There will be no significant difference in the impacts of the linear infrastructure relating to the site alternatives.

No Go Alternative (Compulsory)

Also referred to as the 'do nothing' option, this refers to Bluewave Capital not constructing the proposed solar energy facility on the identified site. In this scenario the potential positive and negative environmental and social impacts as described in this Basic Assessment Report will not occur and the status quo will be maintained.

The following is relevant:

- » The level of fragmentation and disturbance over Site Alternative 1 and 3 could potentially lead to additional soil erosion and colonisation by invasive plant species as the site is currently not managed in terms of a formal Environmental Management Plan.
- » The land use of the site would not be optimised for electrical infrastructure which dominates the land use in this section of the farm.
- » The do nothing option will not have impacts on the heritage environment.
- » The do nothing alternative will result in no visual impact.
- » The do nothing alternative could potentially result in negative social impacts.

The do nothing alternative is not regarded to be a sustainable option in light of the abovementioned aspects.

Furthermore, should the project not proceed, the contribution of approximately 5 MW from this project towards the Government target for renewable energy will not be realised. As a result the potential local and regional socio-economic and environmental benefits expected to be associated with the proposed project would not be realised. These 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.
- » **Exploitation of South Africa's 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.

- * 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.
- * Support to a new industry sector: The development of renewable energy offers the opportunity to establish a new industry within the South African economy.
- * Support to local community: Since the local community will acquire some ownership in the facility, some of the revenue generated by the facility will be utilised for upliftment of the local community.

Within a policy framework, the development of renewable energy in South Africa is supported by the White Paper on Renewable Energy (November 2003), which has set a target of 17GW renewable energy contributions to final energy generation mix by 2030. The target is to be achieved primarily through the development of solar, biomass, solar and small-scale hydro.

The do nothing alternative would represent a lost opportunity for South Africa to supplement its current energy needs with clean, renewable energy. Given South Africa's position as one of the highest per capita producer of carbon emissions in the world, this would represent a High negative social cost.

The no-development option also represents a lost opportunity in terms of the employment and business opportunities (construction and operational phase) associated. The study area is not suitable for cultivation and therefore the landowner will not be able to benefit agriculturally. The no-development option will therefore not be beneficial to the municipality or the broader community from the perspective of job creation and provision of economic opportunities.

The 'Do nothing' alternative is, therefore, not a preferred alternative.

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.

Preferred site alternative:

Site Alternative 1 is both the technically and environmentally suitable alternative and should be selected as the preferred alternative for the siting of the proposed 5MW facility. Should there be any technical reason why Site Alternative 1 cannot be developed, Site Alternative 3 has been selected as a suitable site alternative. No development on Site Alternative 2 may be undertaken.

Mitigation - Pre-construction:

- » An open space management plan should be developed for the site, which should include management of biodiversity within the fenced area, as well as that in the adjacent natural areas.
- » No unauthorised site clearing or disturbance is to be undertaken at the site prior to a walk-through of the development footprint by a suitably qualified ecologist.
- » An application for all other relevant permits (e.g. those with respect to protected tree species or protected plant species as identified during a walkthrough to be undertaken by a qualified ecologist) must be obtained from the relevant authority prior to the commencement of clearing and construction activities.

Mitigation - Design, Construction, and Decommissioning Phases:

- » An application for all other relevant permits (e.g. those with respect to protected tree species or protected plant species as identified during a walkthrough to be undertaken by a qualified ecologist) must be obtained from the relevant authority prior to the commencement of clearing and construction activities.
- » All relevant practical and reasonable mitigation measures detailed within this report and the specialist reports contained within Appendix D must be implemented.
- » The draft Environmental Management Programme (EMPr) as contained within Appendix G of this report should form part of the contract with the Contractors appointed to construct and maintain the proposed solar energy facility, and will be used to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the proposed project is considered to be key in achieving the appropriate environmental management standards as detailed for this project.
- » The development footprint should be kept to a minimum, and not exceed 19.5ha.
- » Temporary laydown areas should be located within identified previously transformed areas or disturbed areas. These areas should be rehabilitated after use.

- » Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust pollution becomes apparent).
- » Rehabilitate all adjacent or peripheral disturbed areas, laydown areas, access roads, etc. immediately after the completion of construction works not lost to the final development footprint in terms of the re-vegetation and habitat rehabilitation plan included in the EMPr. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.
- » Roads must be maintained to forego erosion and to suppress dust, and rehabilitated areas must be monitored for rehabilitation failure. Remedial actions must be implemented as a when required.
- » All declared alien plants must be identified and managed in accordance with the Conservation of Agricultural Resources Act (Act No. 43 of 1983), the implementation of a monitoring programme in this regard is recommended.
- » Training, skills development and the use of local labour.

Mitigation - Operation Phase:

The mitigation and management measures previously listed in this Basic Assessment Report should be implemented in order to minimise potential environmental impacts. The following mitigation measures should also be implemented.

- » Maintenance of erosion control measures
- » Development and implementation of a stormwater management plan.
- » On-going maintenance of the facility to minimise the potential for visual impacts.
- » On-going monitoring of the site to detect and restrict the spread of alien plant species.
- » Training, skills development and the use of local labour.

Is an EMPr attached?

YES ✓

The EMPr must be attached as **Appendix G**.

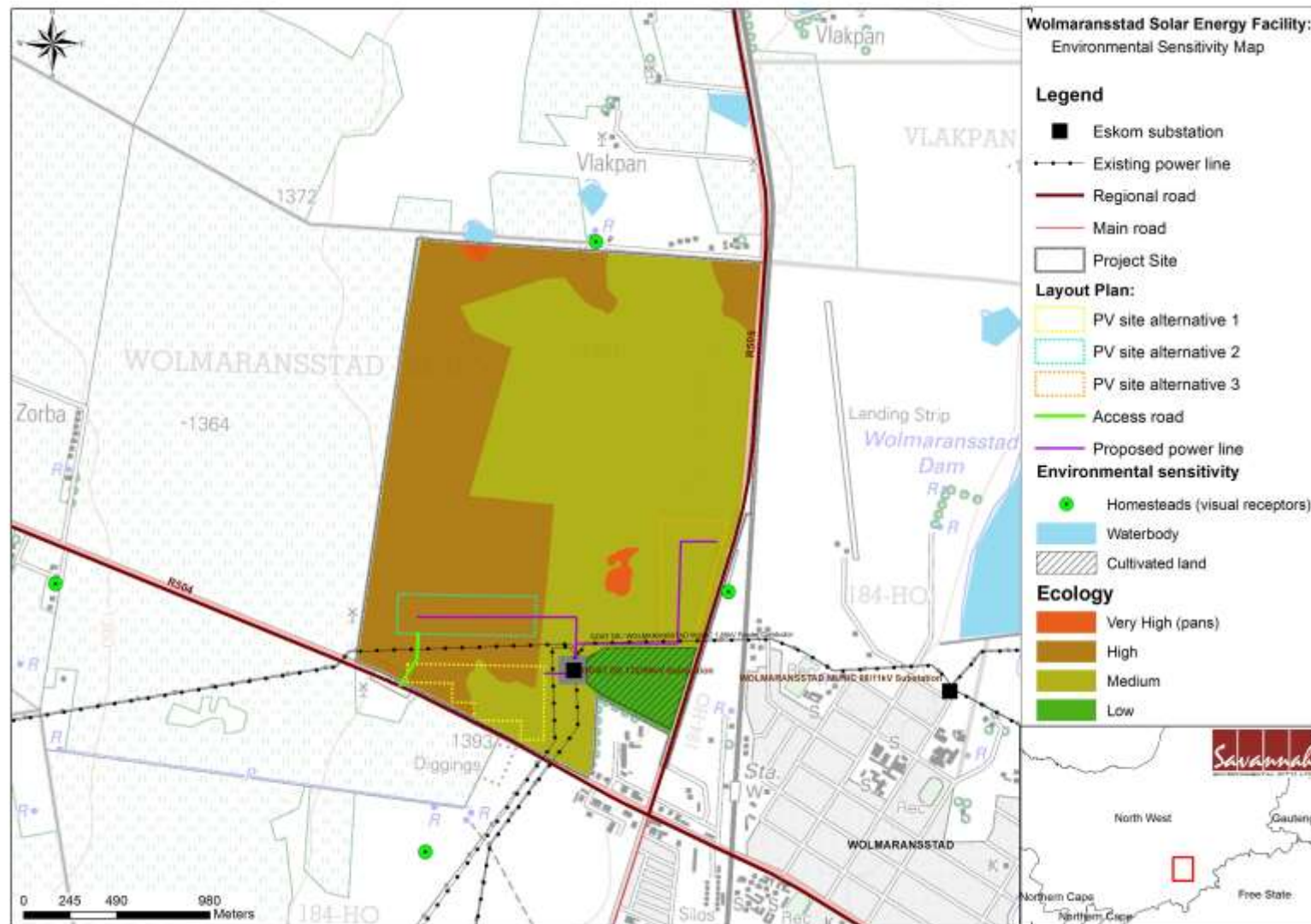


Figure 8: Sensitivity map of the proposed Wolmaransstad Municipality Solar Energy Facility (Site Alternative 1 and 3 being viable development options)

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as **Appendix H**.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in **Appendix I**.

Any other information relevant to this application and not previously included must be attached in **Appendix J**.

NAME OF EAP

SIGNATURE OF EAP

DATE

SECTION F: APPENDICES

The following appendixes must be attached:

Appendix A: Maps

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports

Appendix E: Public Participation

Appendix F: Impact Assessment

Appendix G: Environmental Management Programme (EMPr)

Appendix H: Details of EAP and expertise

Appendix I: Specialist's declaration of interest

Appendix J:CVs