

AGRICULTURAL IMPACT ASSESSMENT

400MW PHOTOVOLTAIC ELECTRICITY GENERATION FACILITY

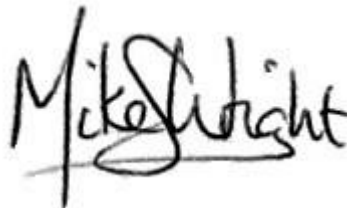
on

PORTIONS 7 AND 3 OF FARM 187 OLYVENKOLK, KENHARDT DISTRICT

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A handwritten signature in black ink that reads "Mike Wright". The signature is written in a cursive, slightly slanted style.

AUGUST 2018

COMPLINACE WITH THE APPENDIX 6 OF THE AMENDED 2014 EIA REGULATIONS

REQUIREMENTS OF APPENDIX 6 – GN 326	ADRESSED IN SPECIALIST REPORT
1. (1) A specialist report prepared in terms of these Regulations must contain - a) details of: i) the specialist who prepared the report; and ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	Section 1.1
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Original attached to formal application to DEA. Included in beginning of report
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 2 & 3
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 2.1
e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	Section 2.2 & 2.3
f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 4
g) an identification of any areas to be avoided, including buffers;	Section 6 & 7
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	SDP in EIR report
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 7
j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	Section 7
k) any mitigation measures for inclusion in the EMPr;	Section 6 & 7
l) any conditions for inclusion in the environmental authorisation;	Section 7
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 6
n) a reasoned opinion - i) as to whether the proposed activity or portions thereof should be authorised; and ii) if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Section 7
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	EIR Comments and Response Report
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	EIR Comments and Response Report

q) any other information requested by the competent authority.	N/A
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I **Nicolaas Willem Hanekom**, as the appointed Specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I:

- in terms of the general requirement to be independent:
 - other than fair remuneration for work performed in terms of this application, have no business, financial, personal or other interest in the development proposal or application and that there are no circumstances that may compromise my objectivity; or
 - am not independent, but another specialist (the “Review Specialist”) that meets the general requirements set out in Regulation 13 has been appointed to review my work (Note: a declaration by the review specialist must be submitted);
- in terms of the remainder of the general requirements for a specialist, have throughout this EIA process met all of the requirements;
- have disclosed to the applicant, the EAP, the Review EAP (if applicable), the Department and I&APs all material information that has or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application; and
- am aware that a false declaration is an offence in terms of Regulation 48 of the EIA Regulations, 2014 (as amended).

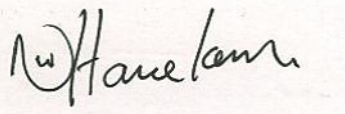
	 Nicolaas Hanekom Pri.Sci.Nat (Ecology) 400274/11
Signature of the Specialist:	
Date:	12 August 2018

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1. Introduction

Nicolaas Hanekom has been appointed by Wine Estate Management Capital as the independent agricultural assessment specialist for this project. Hanekom are independent, have no interest in the business nor receive any reward other than fair remuneration for services delivered as contracted.

This report has been prepared by Nicolaas Hanekom, engaged in providing professional services in the field of environmental planning, environmental systems, environmental plans, environmental auditing, agricultural impact assessments and ecological assessment and management.

Hanekom was born and grew up on an Overberg farm, studied at Grootfontein Agricultural College with subjects such as Soil Science, Botany, Crop Production, Agricultural Engineering, Animal Breeding, Animal Nutrition, Small Stock Production, Animal Health, Large Stock Production and Agricultural Management. He compiled his first Agricultural Impact assessment report in 2007 and ever since conducted several Agricultural Impact assessments as well as reviewing other Agricultural Impact Assessment reports.

RELEVANT PUBLICATIONS / SPECIALIST ASSESSMENT REPORTS

- Hanekom is a registered Professional Natural Scientist: SACNASP Pri.Sci.Nat. (Ecological Science) 400274/11.Hanekom, N. March 2011. Portion 7 of Farm 187 Kenhardt District. Green Continent Partners 10 MW Photovoltaic Electricity Generation Facility. Agricultural Impact Assessment.
- Hanekom, N. November 2012. Portion 8 of Farm 187 Kenhardt District. Green Continent Partners 75 MW Photovoltaic Electricity Generation Facility. Agricultural Impact Assessment. Hanekom, N. January 2011. Portion 3&13 of Farm 187 Kenhardt District. Solar Land Photovoltaic Electricity Generation Facility. Agricultural Impact Assessment.
- Hanekom, N. November 2012. Portion 12 of Farm 187 Kenhardt District. Wine Estate Capital Management 75 MW Photovoltaic Electricity Generation Facility. Agricultural Impact Assessment.
- Hanekom, N. September 2011. Carmelo Investments 416 Solar Park Farm Diepkuil No 531, Malmesbury. Agricultural Impact Assessment.
- Hanekom, N. April 2010. Swartland Solar Park Farm 532/2, Malmesbury. Agricultural Impact Assessment.
- Hanekom, N. July 2011. Prieska Photovoltaic Power Generation Project. Agricultural Impact Assessment.
- Wright, M & Hanekom, N. March 2018. AGRICULTURAL POTENTIAL SPECIALIST COMMENT FOR the proposed Droogfontein II 132kV Power Line, Switching Station and associated infrastructure on the Farm Droogfontein near Kimberly in the Northern Cape Province: APPLICATION FOR AMENDMENT OF THE ENVIRONMENTAL AUTHORISATION (DEA REF NO.: 14/12/16/3/3/2/508/AM3)
- Barichiev, B; Wright, M; Kinvig, R & Hanekom, N. December 2017. LONGYUAN MULILO DE AAR 2 North (RF) (PTY) LTD. Proposed De Aar 2 North Wind Energy Facilities on the Eastern Plateau Near De Aar, Northern Cape (DEA Ref No.: 12/12/20/2463/2). Soil and Agricultural Assessment Addendum Report
- Wright, M & Hanekom, N. June 2017. AGRICULTURAL POTENTIAL AND SOILS IMPACT SPECIALIST COMMENT FOR 75-150MW PV2 PHOTOVOLTAIC SOLAR ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE ON THE REMAINDER OF PORTION 2 THE FARM PAARDE VALLEY NO. 145, NEAR DE AAR, NORTHERN CAPE PROVINCE: APPLICATION FOR AMENDMENT OF THE ENVIRONMENTAL AUTHORISATION (DEA REF NO.: 12/12/20/2500/AM3)

2. Background and Brief

The aim of this agricultural study is to assess the potential impacts of the solar electricity generation facility and its associated infrastructure on the agricultural environment both during the construction and operational phases, and to recommend mitigation measures to be implemented to minimise or enhance identified impacts. Solar Photovoltaic Panels make use of the semi-conductor characteristics of Silicon to convert Solar Irradiation (sunlight) directly into electricity.

This technology is proven and has been used both in photovoltaic applications as well as the electronic industry for the last 48 years, with recent major improvements in both reliability and cost, resulting from large scale applications, especially in the computer industry, over the last 27 years. The Silicon is typically deposited in thin layers and sandwiched between two protective safety plate glass sheets. For large scale installations, these panels are typically placed in arrays arranged in a grid formation in an open field where maximum sunlight can be harvested.

The proposed thin-film PV modules are 1.9m² (0.99m x 1.96m) in size and comprise four panels. Each module is mounted on a metal supporting structure, no more than 1.8m off the ground, and has a potential output of 380W. There are a number of options regarding the structures and their anchoring to the ground. Typically, this is done by means of a small concrete “foot” at the base of the pole supporting the structure. This facility however will make use of a specially designed metal ground screw that will be screwed into the ground and the support structure will then be bolted onto it.

Cabinet has approved the gazetting of eight Renewable Energy Development Zones (REDZ) and five Power Corridors, which will assist South Africa with its electricity challenges. The site is situated in the Western Power Corridor. “These Renewable Energy Development Zones and Power Corridors are geographical areas where wind and solar photovoltaic technologies can be incentivized and where ‘deep’ grid expansion can be directed and where regulatory processes will be streamlined. The REDZs act as energy generation hubs and provide anchor points for grid expansion, thereby allowing for strategic and proactive expansion of grid into these areas. This will ensure that the grid expansion does not hamper the progress of the renewable energy power purchase agreement process.

“The REDZs and Power Corridors support two of the 18 Strategic Integrated Projects (SIPs) that were identified in the Infrastructure Development Plan, which is aimed at promoting catalytic infrastructure development to stimulate economic growth and job creation,” the department said. The department has embarked on a programme of Strategic Environmental Assessments (SEAs) for large-scale developments to support the SIPs.

This will ensure that when required, environmental authorisations are not a cause for delay. “The intention of undertaking Strategic Environmental Assessments is to pre-assess environmental sensitivities within the proposed development areas at a regional scale to simplify the site-specific environmental impact assessments (EIA) when they are undertaken, and to focus the assessment requirements to addressing the specific sensitivity of the site,” the department said.

The REDZs and Power Corridors were identified through the development of three Strategic Environmental Assessments as part of the department’s Strategic Environmental Assessment programme. According to the department, the outputs of the three SEAs were gazette in February 2018 to allow them to be implemented.

The facility will be constructed east of the Aries ESKOM Substation southwest of the town Kenhardt, Northern Cape (See Figure 1) on Portions 7 and 3 of Farm 187 Olyvenkolk. The property where the facility is proposed cover a total area of approximately 2020 ha, the extent of which is larger than the space required for the facility's developmental footprint. The site falls within the quarter degree grid 2920BD. GPS readings as per Google - 29° 26'32"S and 20° 50'36"E.

The study site is situated approximately 39km southwest of Kenhardt, east of the Aries Eskom substation. The study area is north of the gravel road from Kenhardt to Pofadder. The gravel road turns west off the R27 south of the town Kenhardt.

2.1. Study Approach

In order to develop an understanding of the proposed development, several site visits were undertaken and 'on site' evaluations made. This biophysical evaluation of the land upon which the PV facility is proposed to be established was undertaken during different periods over the last couple of years. The first site survey was conducted on 19 January 2011 from 17H00 to 21 January 2011 8H00. Nicolaas Hanekom stayed over on the farm at the yard for the two nights. Site specific field surveys were conducted on the 19 January 2011, on the 20 January 2011 from and on the 21 January 2011. The area was visited again and March 2011 (one day), October 2011 (one day), August 2012 (one day), October 2013 (two days), 11 to 13 April 2017 and end August (one day) 2018. In addition, pertinent literature has been reviewed and assessed.

2.2. ToR for Specialist Studies

The following general ToR applies to this specialist study:

- Describe the baseline conditions that exist and identify any sensitive areas that would need special consideration, taking into account the cumulative impacts of the operations on the areas most likely to be affected.
- Review the Comments and Responses Report to ensure that all relevant issues or concerns relevant to the specialist's field of expertise are addressed.
- Identify and assess potential impacts of activities during baseline, construction, operational and decommissioning phases relative to the various alternatives identified above.
- Identify applicable national, provincial and local authority legislation, international policies and relevant guidelines and plans relevant to the specialist's area(s) of expertise. The purpose here is to provide an indication of potential opportunities for and constraints to the development (including potential "fatal flaws") that may determine the level of environmental assessment required.
- Identify areas where issues could combine or interact with issues likely to be covered by other specialists, resulting in aggravated or enhanced impacts.
- Indicate the reliability of information utilised in the assessment of impacts as well as any constraints to which the assessment is subject (e.g. any areas of insufficient information or uncertainty).
- Consider the precautionary principle first in the assessment of impacts.
- Identify feasible ways in which impacts could be mitigated and benefits enhanced giving an indication of the likely effectiveness of such mitigation and how these could be implemented in the construction and management of the proposed development.
- Comply with Department of Environmental Affairs ("DEA") guidelines on specialist study requirements for EIA.

- Identify feasible ways in which impacts could be mitigated and benefits enhanced giving an indication of the likely effectiveness of such mitigation and how these could be implemented in the construction and management of the proposed development.
- Detailed soil assessment of the site in question, incorporating a radius of 50 m surrounding the site, on
- a scale of 1 : 10 000 or finer. The soil assessment should include the following: *
 - Identification of the soil forms present on site
 - The size of the area where a particular soil form is found
 - GPS readings of soil survey points
 - The depth of the soil at each survey point
 - Soil colour
 - Limiting factors
 - Clay content
 - Slope of the site
 - A detailed map indicating the locality of the soil forms within the specified area,
 - Size of the site
- Exact locality of the site
- Current activities on the site, developments, buildings
- Surrounding developments / land uses and activities in a radius of 500 m of the site
- Access routes and the condition thereof
- Current status of the land (including erosion, vegetation and a degradation assessment)
- Possible land use options for the site
- Water availability, source and quality (if available)
- Detailed descriptions of why agriculture should or should not be the land use of choice
- Impact of the change of land use on the surrounding area

2.3. Specific ToR

The application as considered intends to develop a footprint on land that is currently regarded as agricultural land. From an agricultural perspective the loss of high value farm land and / or food security production, as a result of the proposed activities, is the primary concern of this assessment. In South Africa there is a scarcity of high potential agricultural land, with less than 14% of the total area being suitable for dry land crop production (**Smith, 2006**). Consequently areas which can sustainably accommodate dry land production need to be protected from non-agricultural land uses. The proposed development may also have impacts on the agricultural sustainability on the balance of the farm and on the surrounding agricultural units, depending on any potential contamination of especially water resources via water runoff.

The Agricultural Impact Assessment also assesses possible impacts on the agricultural activities of the surrounding agricultural properties, particularly during the two key phases of construction and operation.

3. Identification of Risk Sources

Both the construction, operational and decommissioning phases of the proposed solar electricity generation facility are relevant to the agricultural impacts which may arise.

3.1. Construction Phase

Agriculture could be affected by the construction of the solar electricity generation facility. The possible risk sources associated with the construction phase are:

- Theft of livestock inter alia

- Illegal hunting/snaring
- increased soil loss and loss of arable land area.
- Construction and Operational Phases:
- Impacts on indigenous natural vegetation - degradation of grazing and browsing;
- Impacts on water features, such as drainage lines - affects livestock drinking.
- Potential influx and proliferation of invasive alien species and weeds caused by disturbance.
- Disturbance from access roads used for construction
- Establishment of workers camps, etc.
- Fire hazards
- Land potentially removed from future Land Reform applications
- Disturbances of and impacts on ESKOM power supply

3.2 Operational Phase

The operational phase of the expansion is also likely to affect the agricultural environment with the possible risk sources being:

- Effect of zero sunlight on specific areas
- Water runoff from panels and site into the adjacent environment
- Fire
- Sense of place
- Impact on existing agricultural activities
- Disturbances of and impacts on ESKOM power supply
- Impacts on indigenous natural vegetation - degradation of grazing and browsing;
- Impacts on water features, such as drainage lines - affects livestock drinking.

3.3 Decommissioning Phase

The decommissioning phase of the expansion is also likely to affect the agricultural environment with the possible risk sources being:

- Removal of equipment and rehabilitation needs of the impacted area
- Waste removal and waste management of panels, electrical wires, concrete and metal

4. Study Area

Location of expansion

The facility will be constructed close to the Aries ESKOM substation south of the town Kenhardt, Northern Cape (See Figure 1 below) on a portion of Farm Olyvenkolk 187/7. The property where the facility is being considered covers an area of approximately 2020ha, the extent of which is larger than the footprint required for the facility's developmental footprint. The site falls within the quarter degree grid 2920BD. The study site is situated approximately 37km southwest of Kenhardt, east of the Aries Eskom substation. The study area is north of the gravel road from Kenhardt to Pofadder. The gravel road turns west of the R27 south of the town Kenhardt.

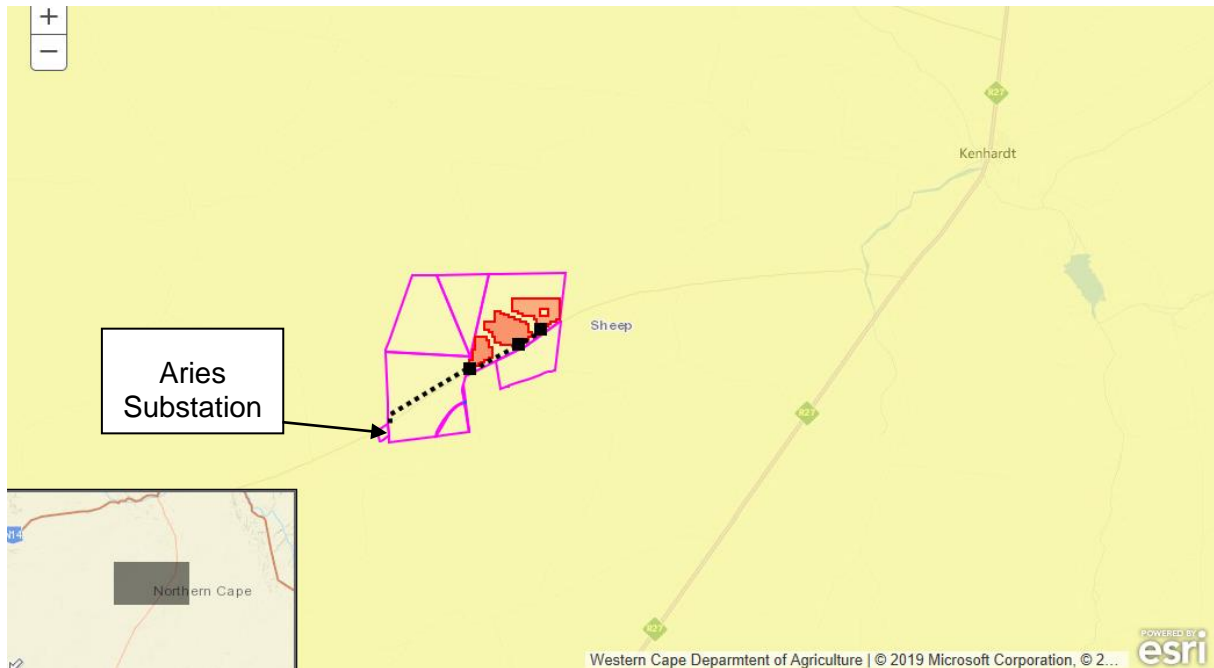


Figure 1: Locality Map

Topography

The study site is located mostly on flats plains which slope gently by a 20m drop over 2km towards the south and west. This landscape is typical of the broader region within which the study area is located and the pattern repeats itself up 30km in any direction. The plains are situated at an elevation of 960 above msl. The highest point on the plains within the study site is on the southern side of the site and it drains down to a flat area in the north. The site is situated in a very arid part of South Africa. Several drainage lines drain the water collected on the site towards the north, which eventually feed into the upper catchment of the Graafwatersrivier, a non-perennial river to the north of the study area.

Geology and soils

The soils can be classified as shallow, red soils with high base status, occasionally calcareous. The dominant soil is classified as quaternary to recent sands and sandy soil of the Gordonia Formation (Kalahari Group) and Mbizane Formation (Permo-Carboniferous Dwyka Group, Karoo Supergroup) which is often stony/rocky. It is a low potential soil, supporting only grazing due to the shallow soils.

A detailed soil assessment of the site in question, incorporating a radius of 50 m surrounding the site, was conducted by SKCM, Engineers (geotechnical study) which is included as a separate specialist studies in the Environmental Impact Report.

Agriculture characteristics and potential

The agricultural sector in the area is the main economic sector with the largest potential for economic growth. The area is also ideal for small stock farming and the area around Kenhardt is known as the capital of Dorper sheep farming. The area has a carrying capacity to the order of 1 small stock unit per 6 ha. The area was impacted by a severe drought when the site visit was conducted and the number of sheep farmed with on the property was drastically reduced.

The study area has been impacted upon to some degree by livestock farming, although the vegetation is in relatively good condition and natural. The drought of recent months is visible in the veld. The veld is open with sparse grass cover. Grass seedlings are visible in some areas of the study site after the recent rains. The vegetation of the study area is dominated by *Salsola tuberculata*, *Erioccephalus ericoides* and *Rhigozum trichotomum*. Dominant grasses include *Stipagrostis ciliata var. capensis*, *Stipagrostis obtusa*, *Stipagrostis uniplumis var. uniplumis*, and *Eragrostis curvula*.

- *Salsola tuberculata* grows in plains, depressions and brackish veld. It is palatable and highly resistant to grazing and drought.
- *Erioccephalus ericoides* grows almost everywhere though the palatability varies greatly in the different regions, habitats and seasons.
- *Rhigozum trichotomum* grows on hills, apron veld and plains, but it prefers sandy soils. It is unpalatable but the flowers and pods can be grazed. It displaces more valuable plants and sometimes forms impenetrable thickets.
- *Stipagrostis ciliata var. capensis* grows in the gravel on plains and sandy areas, especially in river beds. Palatable and valuable grass. Is drought resistant with a high grazing value.
- *Stipagrostis obtusa* grows mostly in dry sandy soils. It is a palatable and valuable grass. Is drought resistant with a high grazing value.
- *Stipagrostis uniplumis var. uniplumis* grows on undisturbed sandy soils and flood plains. It is palatable with a medium grazing value.
- *Eragrostis curvula* grows mostly on disturbed areas. It is palatable with a medium grazing value.

Rain water will run off the solar panels and naturally drain towards the drainage lines in between the solar panels. In essence none to minimal concentrated water runoff will be evident.

The farming unit consists of 6 cadastral units with a total of 7011ha. The current farmer stocks 600 ewes on the 7011 ha. This is a small stock carrying capacity of 12ha per small stock unit. The solar electricity generation facility will impact on 4 (K14, K08, K09 and K6) camps. Refer to figure 2 below. The camp fence will have to be realigned.

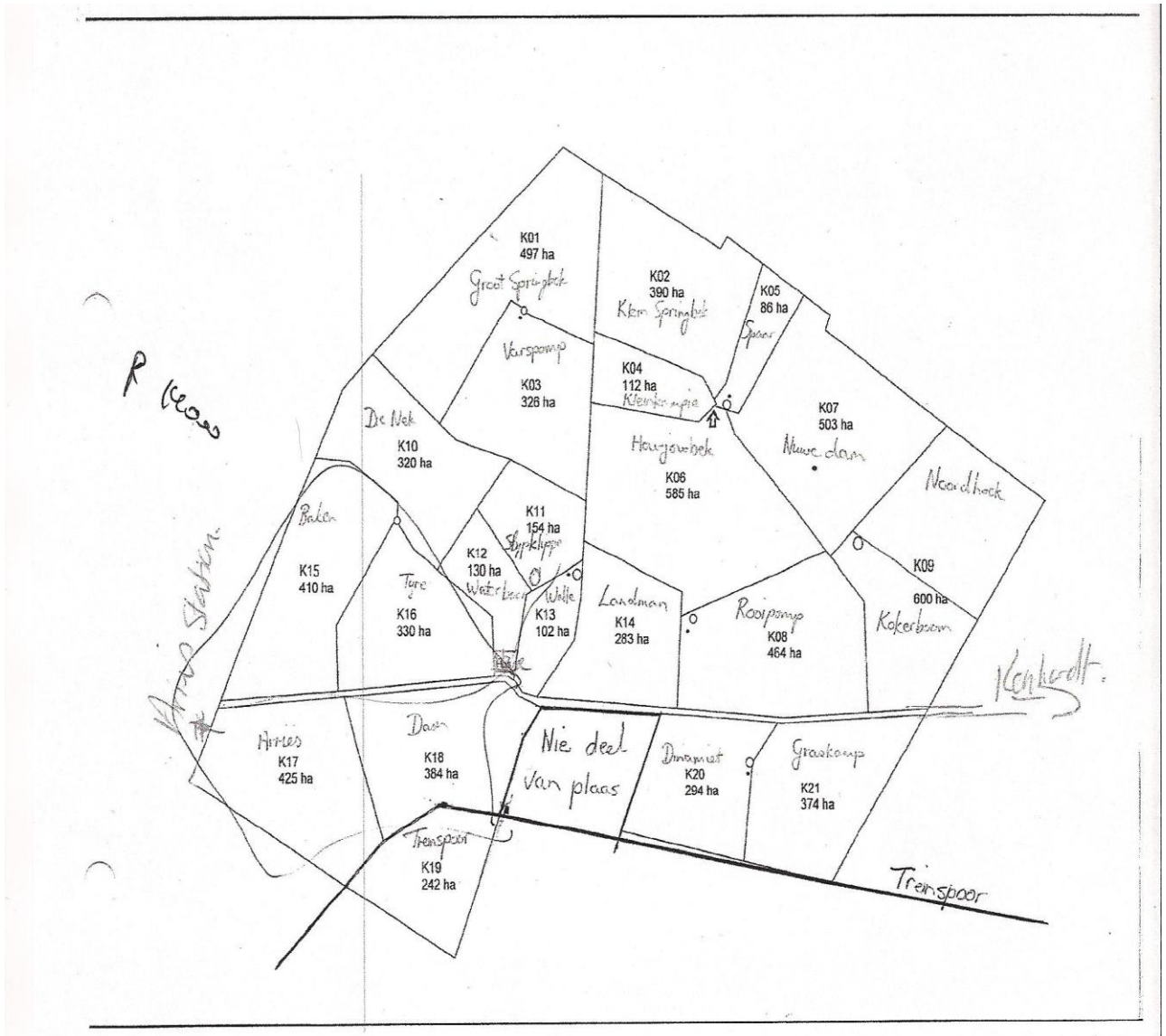


Figure 2: Farm camp layout

The cadastral unit that the electricity generation facility will impact upon is 2020ha in extent. Of this 800ha will be impacted upon. The farmer will not be able to use 39% of the property for permanent grazing. Grazing will only be on an ad hoc bases in order to shorten the vegetation component inside the PV facility blocks. The farmer currently stocks 168 ewes on this cadastre. The sterilization of the 800ha area will allow the farmer to stock 66 less ewes on this section of the farm.

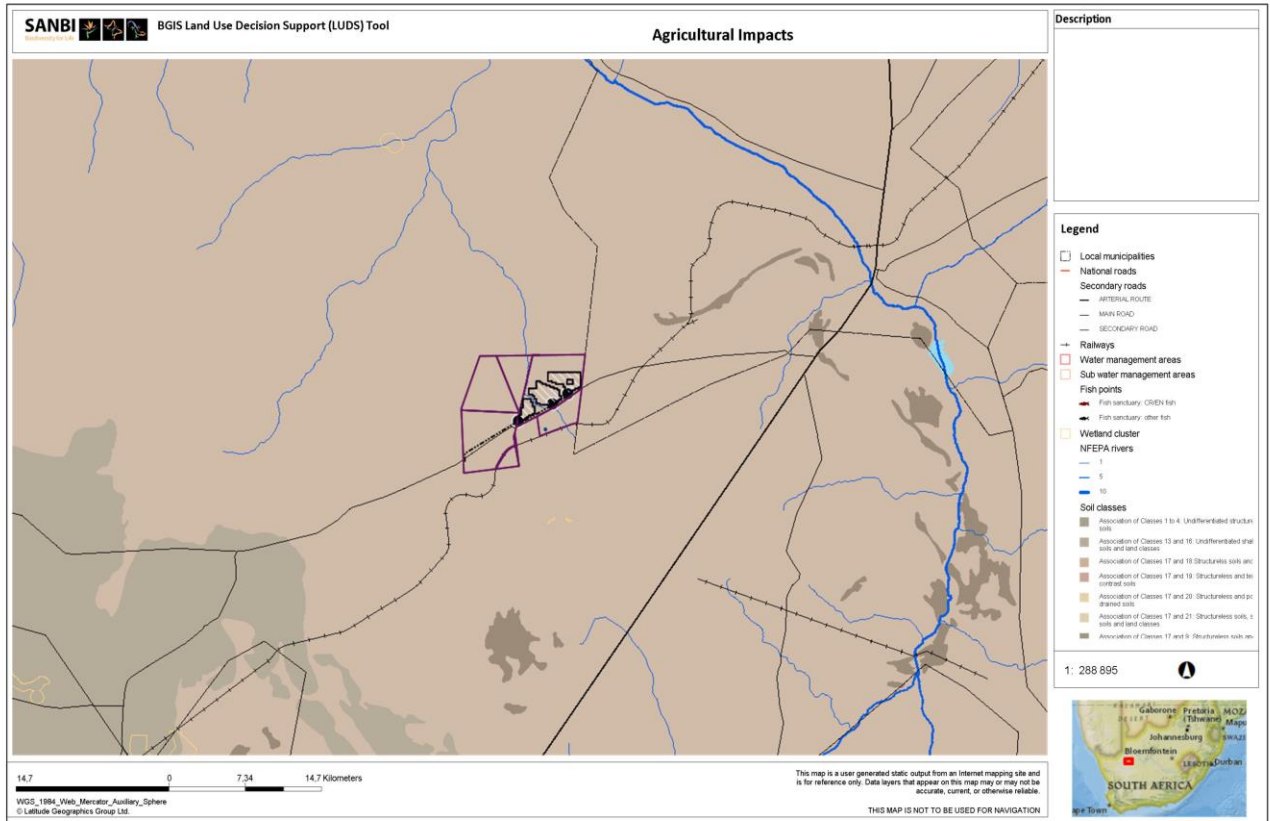


Figure 3: Proposed Development Infrastructure and farming practices.

The livestock water supply is from several boreholes on the property. The proposed development and infrastructure will not impact on any of the boreholes and will not restrict water provision and supply to livestock farming on the remainder of the property.

The construction of the 132 kV Powerline over portion 3 will not have a significant impact on the agricultural viability of the property. The impacts of the powerline during construction and operation will be minimal if the management and mitigation measures are adhered to in the EMPr.

Rainfall and Climate

The study area is characterised by an arid climate. Kenhardt normally receives about 70mm of rain per year, with most rainfall occurring mainly during autumn. It receives the lowest rainfall (0mm) in June and the highest (23mm) in March. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Kenhardt range from 19°C in June to 33°C in January. The region is the coldest during July when the mercury drops to 2.6°C on average during the night.

5. Applicable Legislation and Policies

5.1. Legislation

The Conservation of Agricultural Resources Act 43 of 1983

- Section 8: Schemes.

The Minister may, in concurrence with the Minister of Finance, publish a notice in the Gazette to establish a scheme in terms of which assistance may be granted to land users in the form of subsidies in respect of, inter alia, construction of soil conservation works and combating of weeds or invader plants.

- Section 9: Provisions of schemes.

In the notice in which a scheme is established, the Minister may set out, inter alia, objectives of the scheme, areas and the periods during which the scheme will apply, requirements which have to be complied with in order to qualify for assistance under the scheme. He may also require that reports with regard to the progress and completion of the act concerned be submitted at specified times.

- Section 12: Maintenance of soil conservation works.

This section relates to, inter alia, preventing the silting of dams and polluting of water. The soil conservation works must be maintained by every land user and any successor in title at his own expense and in a manner which, in the opinion of the executive officer, will ensure the continued efficiency thereof.

Spatial Planning and Land Use Management Act 16 of 2013

An owner of land may apply in writing to the town clerk or secretary concerned, as the case may be for a rezoning of the land under the act.

Fencing Act 31 of 1963

- Section 5: Boundary fencing in an area where contributions are not obligatory.

If the owner of such an area has lawfully erected a boundary fence in respect of that holding, and the owner of an adjoining holding uses the fence for his benefit, either owner may, in default of agreement, claim that the value of the fence to each owner be determined in accordance with the provisions of the Second Schedule of the Act.

- Section 6: Boundary fencing where holding adjoins an area in which contributions are obligatory.

The owner of a holding situated outside any area in which contributions are obligatory, will only be liable to contribute to the cost of a boundary fence between that holding and any holding situated in any contributing area, where the former owner uses the fence for some benefit to himself.

- Section 15: Rights pertaining to boundary fencing where holding is subject to certain servitudes.

The holder of servitude of grazing shall be liable to pay to the owner of the holding, a fair share of the cost of erection, maintenance and repair of the fence proportionate to servitude holder's interest in grazing rights over the holding.

National Veld and Forest Fire Act 101 of 1998

- Section 12: Duty to prepare and maintain firebreaks.

A duty to prepare and maintain firebreaks is placed on all owners on whose land a veld fire may start. The firebreak must be prepared and maintained on the owner's side of the boundary between his land and any adjoining land.

- Section 13: Requirements for firebreaks.

These requirements include, inter alia, that the firebreak must be wide enough and long enough to have a reasonable chance of preventing a veld fire from spreading to or from neighbouring land.

- Section 15: Exemption from duty to prepare and maintain firebreaks.

This section provides for the Minister, for good reason, to exempt any owner or group of owners from the duty to prepare and maintain a firebreak or firebreaks.

- Section 17: Readiness for fire fighting.

All owners on whose land a veld fire may start must have such equipment, protective clothing and trained personnel for extinguishing fires as are prescribed or reasonably required in circumstances where these are not prescribed.

- Section 18: Actions to fight fires.

Any owner who has reason to believe that a fire on his land or an adjoining land may endanger life, property or the environment must immediately notify the fire protection officer or, failing him, any member of the executive committee of the fire protection association in the area and must do everything in his power to stop the spread of the fire. Owners of the adjoining land must also be notified.

If it is necessary for the protection of life, property and the environment or to prevent a fire from spreading a person may, inter alia, enter upon any land, destroy trees, grass or other vegetation, break and enter any premises or forcibly remove from the scene any person who is in danger or who obstructs him in the performance of his duties.

National Environmental Management: Waste Act 59 of 2008

- Section 16: General duty in respect of waste management.

This section provides that the holder of waste must take all reasonable steps to, amongst others, avoid the generation of waste or minimize the toxicity and amounts of waste generated where generation cannot be avoided, and to reduce, re-use, recycle and recover waste. It also imposes a duty to prevent any employee from contravening the Act. There is a further duty on any person who sells a product that may be used by the public and that is likely to result in the generation of hazardous waste to take reasonable steps to inform the public of the impact of that waste on health and the environment.

- Section 17: Reduction, re-use, recycling and recovery of waste.

When reducing, re-using, recycling or recovering waste, care should be taken to ensure that fewer natural resources are used and less harm comes to the environment, than the disposal of the waste.

- Section 21: General requirements for storage of waste.

This section sets out the requirements for the storage of waste in order to prevent pollution of the environment or harm to health.

- Section 22: Storage of general waste.

This section sets out the obligations of the owner or occupier of premises where general waste is stored.

- Section 23: Waste collection services.

This section recognizes the need for an equitable allocation of services to all people in a municipal area and provides that those utilizing these services must pay any applicable charges. It further provides that the municipality has a duty to provide as far as is reasonably possible, containers for the collection of recyclable waste.

- Section 24: Collection of waste.

This section provides that no person may collect waste for removal from premises unless they are a municipal service provider, authorized by law if required, or not prohibited from collecting that waste.

- Section 25: Duties of persons transporting waste.

This section sets out the duties of any person who transports waste.

- Section 26: Prohibition of unauthorized disposal

This section prohibits the unauthorized disposal of waste or any disposal of waste that is likely to cause pollution of the environment or harm to health and well-being. Exceptions include where waste was generated as a result of normal household activities and where the waste was disposed of in order to protect human life or as a result of an emergency beyond that person's control.

- Section 27: Littering.

This section provides that the owner of privately-owned land must take reasonable steps to ensure that, in any place to which the public has access, there are sufficient receptacles to enable the public to dispose of litter. This section prohibits certain acts in regard to litter. It further provides that litter must be disposed of before it becomes a nuisance or causes a negative impact on the environment.

Land Reform Act 3 of 1996

This Act protects the rights of labour tenants who live, grow crops or graze livestock on farms. As such they cannot be evicted without an order of the court, nor if they are over 65 years.

Extension of Security of Tenure: Act 62 of 1997

This protects the tenure of farm workers and people living in rural areas, including their rights to live on the land and the guidelines for other rights such as receiving visitors, access to water, health, education and so forth. The Act also spells out the rights of owners, and protects farm workers against arbitrary evictions.

Prevention of Illegal Occupation of Land Act of 1998

This act puts in place procedures for the eviction of illegal occupants and prohibits illegal occupations.

Stock Theft Amendment Act Number 4 of 1991

Controls the management of livestock theft.

5.2. Government Policies and Guidelines

• Land Reform Policy

The government in 1994 opted for a three-pronged land reform policy to redress the historical injustice of land access by dispossession, denial of access to land and forced removals:

- Land Restitution to restore land or provide financial compensation for people dispossessed of the land after 1913.
- Land Redistribution
- Land Tenure reform

• Land Restitution

Under the Land Restitution Act of 1994 persons or communities who lost their property as a result of apartheid laws or practices after 1913 were invited to submit claims for restitution (return of land) or compensation (usually financial). By the cut-off date in March 1999, 67 531 claims by individuals or communities were lodged. 72% of the claims were urban and the remainder rural.

By the end of the decade 36 489 claims were settled, involving about 85 000 households. For urban claims there has been mainly financial compensation for victims of forced removal and the total compensation made by December 2002 was R1.2 billion. For rural claimants, the restitution mainly took the form of the return of land and by December 2002 about 571 232 hectares were restored and at a cost of about R442 million. Government aims to complete all the land claims by 2005.

• Land Redistribution

Land redistribution is about making land available for:

- agricultural production
- settlement and
- non-agricultural enterprises

During the first five years (1994-1999) the main emphasis of land redistribution was to provide the disadvantaged and the poor with land for housing and small-scale farming purposes.

• The Settlement Land Acquisition Grant (SLAG)

The Settlement Land Acquisition Grant (SLAG) was a R16 000 cash grant for which poor and landless black South Africans could form a group to apply to buy and develop farm land. The applications took the form of group settlement with some production, cooperative production and /or commonage schemes, or farm settlements of farm workers and farm worker equity.

The basic grant was supported by other grants, i.e.

- for planning
- for facilitation, and
- for dispute resolution.

In most cases, farms financed with land grants and settled by groups (up to 500 households) were far too small to support all of the beneficiaries as full-time farmers. By the end of 2000, the Ministry of Agriculture and Land Affairs had approved 484 projects under the SLAG

program, transferring 780,407 hectares to 55 383 people, with some 14% headed by women. Taken together, land restitution and redistribution has transferred about one million hectares (less than 1.2%) of the 86 million hectares of white-owned farms, to black South Africans over a period of six years.

- **Land Re-distribution for Agricultural Development (LRAD)**

The SLAG programme ended in 2000, and the Land Redistribution for Agricultural Development (LRAD) was introduced later that year. Its major difference from SLAG was that beneficiaries do not have to be poor to apply for the minimum of R20 000 land grant, and those who have more savings and can raise bigger loans to finance their farms qualify for larger grants.

- **Land Tenure Reform**

Laws were introduced after 1994 to give people, especially farm workers and labour tenants' security of tenure, over houses and land where they work and stay.

The following different kinds of tenure exist:

- **Private ownership:** when a person or business owns the land or house. You have to register a title deed to say that the property is legally yours, and you can sell the land or home at any time and recover monies invested in the property.
- **Communal ownership:** The law allows for people to own land or property as a group by forming a communal property association (CPA).
- **Renting:** you can rent your home or land from its owner, which could be a private landowner, a company, a local authority or other institution. There are laws that protect the rights of people who rent.

6. Impact Tables

The following sets of tables assess the impacts of the proposed development on agriculture.

Theme	Livestock Theft	
Nature of impact	Impact of the development on livestock theft on surrounding properties	
Legal requirements	Stock Theft Amendment Act, 1991.	
Stage	Construction and Decommissioning	Operation: NA
Extent of impact	Local	
Duration of impact	Permanent	
Intensity	Low	
Probability of occurrence	Probable	
Status of the impact	Negative	
Accumulative impact	Low	
Level of significance	No Significance	
Mitigation measures	ECO and security control measures to be put in place.	
Level of significance after Mitigation	No Significance	
EMP Requirements	Contractor contracts to specify and control via EMP and ECO with appropriate fines.	
Discussion	Theft of livestock is possible during the construction and decommissioning phases. Likelihood of occurrence is improbable if mitigation measures are fully implemented. Fine structures in the EMP should reflect livestock value to ensure replacement value should theft occur.	

IMPACT DESCRIPTION AND ASSESSMENT OF ISSUES IDENTIFIED ABOVE

Stock theft undermines the profitability and sustainability of the stock farmers and it interferes with the government's land reform process and the empowerment of emerging farmers. For each stock theft incident on a commercial farm, it is estimated that three similar incidents take place amongst emerging farmers. What makes it worse is that many emerging farmers suffer a total loss of stock as kraals are often literally emptied. Associated with the construction and decommissioning phases will be the potential theft of livestock by transient contractors and workers. In other words, unless working areas are demarcated, security and control measures are in place and enforced carefully, unnecessary disturbance to the livestock may occur during construction. To a large degree good management of personnel on construction sites can significantly reduce potential impacts to the agricultural environment. Construction personnel must be restricted by the EMP and site ECO to the site and immediate construction areas only.

Theme	Erosion and Storm Water Management	
Nature of impact	Impact of the development on soil conservation, erosion and storm water management.	
Legal requirements	The Conservation of Agricultural Resources Act 43 of 1983	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local and surrounding areas	Local and surrounding areas
Duration of impact	Permanent	Permanent
Intensity	Potentially high	Potentially high
Probability of occurrence	Probable	Probable
Status of the impact	Negative	Negative
Accumulative impact	Medium	Medium
Level of significance	Moderate	Moderate
Mitigation measures	Erosion monitoring and maintenance. Rehabilitate site after use	Implement proper site management Rehabilitate site and erosion maintenance measures in place
Level of significance after Mitigation	Low	Low
EMP Requirements	Control measures to be put in place to manage erosion and storm water management	
Discussion	<p>The study site is located mostly on flats plains which slope gently (20m drop in 2km) towards the north. Small drainage areas will be impacted upon. Water runoff from panels will penetrate soil and runoff will be reduced by the vegetation cover. Areas disturbed during construction must be re-vegetated as soon as possible. Natural vegetated buffer areas in between solar panels must be maintained to reduce water runoff and to prevent erosion. All roads need to be maintained and monitored and visible signs of possible erosion immediately rehabilitated. Erosion potential is low due to the nature of the soil being dominated by quaternary to recent sands and sandy soil of the Gordonina Formation (Kalahari Group) and Mbizane Formation (Permo-Carboniferous Dwyka Group, Karoo Supergroup) which is stony/rocky.</p>	

IMPACT DESCRIPTION AND ASSESSMENT OF ISSUES IDENTIFIED ABOVE

Associated with the construction, operational and decommissioning phase will be disturbance to nearby areas during construction in the form of access roads for construction, workers camps, etc. This disturbance, unless carefully managed, could spread as a result of unnecessary construction of additional access roads where existing roads could be used. Workers camps if not fenced and restricted in size could result in unnecessarily large areas being disturbed. In other words, unless working areas are fenced and road access carefully considered, unnecessary disturbance to the agricultural land may occur during construction. To a large degree good management of personnel on construction sites can significantly reduce potential impacts on the agricultural environment. Personnel should be restricted to the camp site and immediate construction areas only. Prior to disturbance of a site, topsoil which will contain a seed bank of the local species should be stored for use during the rehabilitation process. There will be no impact of the proposed development on the pre-development storm water. Storm water runoff or siltation of the drainage lines and systems will not be affected.

Theme	Effect of Zero Sunlight on panel area.	
Nature of impact	Limited sunlight to shaded areas under the panel.	
Legal requirements	Conservation of Agricultural Resources Act	
Stage	Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	Long Term	Long Term
Intensity	Medium	Medium
Probability of occurrence	Probable	Probable
Status of the impact	Negative	Negative
Accumulative impact	Low	Low
Level of significance	Moderate	Moderate
Mitigation measures	Ensure that the panels are placed on structures and lifted off the ground so as to allow sunlight penetration.	Ensure that the panels are placed on structures and lifted off the ground to allow sunlight penetration.
Level of significance after Mitigation	Low	Low
EMP Requirements	Natural Vegetation that grows on site must be maintained.	
<p>Discussion</p> <p>The panels are fitted off the ground, approximately 1,8m above the ground. Sunlight will not be fully blocked out in the area. Areas under the panels will be in shade during periods of the day. The panels are fixed. Sunlight will be able to penetrate the shade areas during limited periods of the day. The blocking of sunlight will however not affect the productivity of the soil. An extreme example of the effect of zero sunlight on soil productivity and rehabilitation is the construction of a tar road. Some roads may be rehabilitated after 30 years. There is evidence recorded of tar roads which are rehabilitated and ploughed after years. These ploughed roads quickly recover and plant growth is evident at these areas. The area impacted upon by the solar panels will not be exposed to a zero-sunlight effect, and they will quickly recover after the panels are removed.</p>		

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Theme	Fire	
Nature of impact	Uncontrolled fires may cause significant damage to agricultural areas and infrastructure.	
Legal requirements	National Veld and Forest Fire Act 101 of 1998	
Stage	Construction and Decommission	Operation
Extent of impact	Local/Regional	Local/Regional
Duration of impact	Short term	Short term
Intensity	High	High
Probability of occurrence	Unlikely	Unlikely
Status of the impact	Negative	Negative
Accumulative impact	Moderate	Moderate
Level of significance	Low	Low
Mitigation measures	Ensure proper fire control measures on site and during hot periods Ensure staff is trained in fire drill.	Ensure proper fire control measures on site and during hot periods Ensure staff is trained in fire drill.
Level of significance after Mitigation	Very Low	Very Low
EMP Requirements	Fire management to be addressed in the EMP	
Discussion	Must ensure that the requirements of the National Veld and Forest Fire Act are met to ensure proper fire management and prevention. Especially veld fires that may spread from the property or enter and threaten infrastructure on site. This is however very unlikely and of very low significance since this is not a fire driven ecological system and no history of a veld fire on site has ever been recorded.	

IMPACT DESCRIPTION AND ASSESSMENT OF ISSUES IDENTIFIED ABOVE

In drier months the areas are more likely to burn. Any open fires on site present a risk of fire spreading into nearby areas which could significantly impact on the on-going agriculture in the surrounding areas. With a proper fire drills in place and as long as no fires are allowed in unauthorised areas and fire extinguishers are available during any hot period, the risk of veld fires can be significantly reduced. The vegetation is not a fire driven ecological system and no history of a veld fire on site has ever been recorded.

Theme	Land Reform	
Nature of impact	Impact of the loss of agricultural land for land reform purposes.	
Legal requirements	Land Reform Act 3 of 1996.	
Stage	Construction	Operation
Extent of impact	Local	Local
Duration of impact	Long Term (Permanent)	Long Term (Permanent)
Intensity	Low	Low
Probability of occurrence	Probable	Probable
Status of the impact	Negative	Negative
Accumulative impact	Low	Low
Level of significance	Low	Low
Mitigation measures	None	None
Level of significance after Mitigation	Low	Low
EMP Requirements	None	
<p>Discussion</p> <p>Land redistribution is about making land available for:</p> <ul style="list-style-type: none"> • agricultural production • settlement and • non-agricultural enterprises <p>During the first five years (1994-1999) the main emphasis of land redistribution was to provide the disadvantaged and the poor with land for housing and small-scale farming purposes. 20% of this solar electricity generation project will be owned by BEE certified partners who will lead to the redistribution of non-agricultural land.</p> <p>The proposed property is not identified nor in process of a land reform project to meet the targets set by District Assessment Committees to achieve the required transfer of agricultural land to historically disadvantaged individuals. As far as the author knows, no land claim for the restoration of land rights is in process or has been submitted.</p>		

IMPACT DESCRIPTION AND ASSESSMENT OF ISSUES IDENTIFIED ABOVE

Possible Impact of the Proposed Development on Land Reform

Land Reform in South Africa is a complex issue, with several dimensions, including the settlement and development of previously disadvantaged rural communities, as well as the restoration of land rights.

Integral to this is the quantification and qualification of the agricultural land transfer target in order to determine the scale and nature of land reform to be implemented. Included in such quantification and qualification is also the consideration of other targets as set by the Concept Black Economic Empowerment Framework for Agriculture (2004) for employment, enterprise equity, procurement, etc. in the agricultural sector.

Should land reform take place on this site, the nature of land use will be unknown. Should the land continue to be farmed as sheep and/or other livestock grazing area, the effect, whether positive or negative, will be relative to the stocking rates applied. Should the land be used for other purposes, then the negative effect will increase.

Theme	Existing and future agricultural activities	
Nature of impact	Impact of the solar panels on the existing and future surrounding agricultural activities.	
Legal requirements		
Stage		Operation
Extent of impact		Local
Duration of impact		Long Term
Intensity		Low
Probability of occurrence		Probable
Status of the impact		Negative
Accumulative impact		Low
Level of significance		Low
Mitigation measures		Good communications. That the proposed development is aware of these possible impacts before approval.
Level of significance after Mitigation	Low	Low
EMP Requirements	Communication procedures included in EMP	
Discussion	The proposed solar electricity facility will utilize less productive agricultural land and will not impact on the economic viability of the agricultural unit. Hence, it will have a positive impact. It will increase the economic viability of the property.	

IMPACT DESCRIPTION AND ASSESSMENT OF ISSUES IDENTIFIED ABOVE

The farming unit consists of 6 cadastral units with a total of 7011ha. The current farmer stocks 600 ewes on the 7011 ha. This is a small stock carrying capacity of 12ha per small stock unit. The cadastral unit that the electricity generation facility will impact upon is 2020ha in extent. Of this 800ha will be impacted upon. The farmer currently stocks 168 ewes on this cadastre. The sterilization of the 800ha area will allow the farmer to stock 66 less ewes on this section of the farm.

The loss of the 800ha for this small stock farming will have a low significance.

Theme	Disturbance and Impact on ESKOM power supply.	
Nature of impact	Impact of the solar panels on the existing and future surrounding agricultural activities as a result of electricity supply.	
Legal requirements		
Stage		Operation
Extent of impact		Local
Duration of impact		Long Term
Intensity		Medium
Probability of occurrence		Probable
Status of the impact		Negative
Accumulative impact		Low
Level of significance		Medium
Mitigation measures		Good communications. That the proposed development is aware of these possible impacts before approval.
Level of significance after Mitigation		Low
EMP Requirements	Communication procedures included in EMP	
Discussion	The proposed solar electricity facility will feed directly into the ESKOM grid. Connection to the ESKOM network and maintenance will result in power outages. Must be communicated to the ESKOM network users.	

IMPACT DESCRIPTION AND ASSESSMENT OF ISSUES IDENTIFIED ABOVE

The electricity will be fed directly into the Eskom medium voltage distribution line, from where it will be distributed to wherever it is required. Maintenance and connection to the ESKOM network will result in short term power outages.

Theme	Removal of waste and rehabilitation	
Nature of impact	Impact of the development on agriculture and land value.	
Legal requirements	The Conservation of Agricultural Resources Act 43 of 1983	
Stage	Decommissioning	Operation NA
Extent of impact	Local and surrounding areas	
Duration of impact	Permanent	
Intensity	Potentially high	
Probability of occurrence	Probable	
Status of the impact	Negative	
Accumulative impact	Medium	
Level of significance	Moderate	
Mitigation measures	Removal, clearing and rehabilitation of infrastructure	
Level of significance after Mitigation	Low	
EMP Requirements	Removal and rehabilitation measures.	
<p>Discussion</p> <p>Potential waste as contained in the panels could be glass and silicon. The silicon is however in a sealed unit and will not leach out and both must be removed and be recycled. All infrastructures must be removed and the site fully cleared and rehabilitated at the decommissioning phase.</p>		

IMPACT DESCRIPTION AND ASSESSMENT OF ISSUES IDENTIFIED ABOVE

All infrastructures must be removed and the site rehabilitated at the decommissioning phase and the end of the life cycle of the project. The impact on agriculture and the value of the property will be high should such infrastructure not be removed and the site not be rehabilitated.

7. Discussion and Conclusion

The proposed developments are located on land zoned and used for agriculture. South Africa has very limited arable land and it is therefore critical to ensure that development does not lead to an inappropriate loss of land that may be valuable and important for agricultural production. The proposed site is however on land which has very low agricultural potential and is only suitable for low intensity grazing.

In general, the proposed infrastructure is unlikely to have a low significant agricultural impact on the area. The impacted area is not suitable for dry land crop production. However, 800ha of the 2020ha on the property will be lost to sheep farming.

Cumalitive Impact

The full farming unit consists of 6 cadastral units with a total of 7011ha. The current farmer stocks 600 ewes on the 7011 ha. This is a small stock carrying capacity of 12ha per small stock unit. On these cadastral units, 4 will eventually have PV electricity generation facilities should all of them be constructed. In total, 2000ha will be lost to agriculture and sheep farming should all the PV facilities be constructed. The remaining farming unit will still consist of 5 011 ha and will be able to stock 417 ewes. The income generated from the PV facility will however be much more that the income that will be generated from the ewes that will be lost and the farming unit will still be financially viable.

Because the undisturbed site already has extremely limited agricultural potential, it means that the consequence of any impact for agricultural production is limited with the result that the consequence and significance of agricultural impacts is low. Furthermore, the poor, very shallow soil conditions reduce the significance of loss of topsoil and the low slope gradients reduce the significance of potential erosion impacts. Irreplaceability of resources is considered low because the resource that is being impacted is non-arable, low potential grazing land which is not a scarce resource in the country. The confidence level of the assessment is considered high because there is certainty about the low agricultural potential of the land and the impacts are fairly easy to understand and predict. However, despite this cumulative impact, it is still agriculturally strategic from a national perspective to steer as much of the country's renewable energy development as possible to regions such as this one, with very low agricultural potential. It is preferable to incur a higher cumulative loss in such a region, than to lose agricultural land with a higher production potential elsewhere in the country.

This report has identified a number of issues of importance many of which, if effectively mitigated, are however unlikely to result in significant agricultural and environmental impacts.

The actual infrastructure is unlikely to have any significant impact on the viable agricultural activities in the area with the majority of impacts being related to the management of the activity. The development will not impact or lead to the loss of dry croplands.

In order to effectively deal with potential impacts, the management plan must deal with the mitigation measures described in this report.

The most critical issue with respect to potential impact is the non-removal and rehabilitation of the area at the decommissioning phase.

It can be concluded that the proposed solar electricity generation facility will not have significant impact on agriculture and that no further specialist agricultural assessment will be required. The author did not make any assumptions nor are there any uncertainties or gaps in knowledge. The appointment of an Environmental Control Officer to monitor the EMP and

its monitoring and mitigation measures must be included as an EA condition. The mitigation and monitoring requirements included in the table 6 must be included in the EMP.

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