SCOPING REPORT

APPLICATION FOR ENVIRONMENTAL AUTHORIZATION GOVERNMENT NOTICE REGULATIONS 982, GNR 983, GNR 984 AND GNR 985 AS AMENDED, NATIONAL ENVIRONMENT MANAGEMENT ACT 1998

400MW PHOTOVOLTAIC ELECTRICITY GENERATION FACILITY

on

PORTIONS 7 AND 3 OF FARM 187 OLYVENKOLK, KENHARDT DISTRICT

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PROJECT DETAILS

Title: Wine Estate Capital Management SA (Pty) Ltd Scoping Report.		
Eco Impact No: 1 - 04/2018	**Date: July 2018**	**Report Status: Draft**
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Verification	Capacity	Name	Signature	Date
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1. Introduction

This report has been prepared in compliance with the requirements of Regulations contained in

Government Notices No's GNR 982, GNR 983, GNR 984 and GNR 985 as amended as promulgated in terms of the National Environmental Management Act 107 of 1998, known as the Environmental Impact Assessment **(EIA)** Regulations.

The purpose of these Regulations is to regulate procedures and set criteria as contemplated in Chapter 5 of the Act to enable the submission, processing, consideration and decision making regarding applications for environmental authorization of activities and matters pertaining thereto.

1.1. Background and Purpose of the Scoping Report

Wine Estate Capital Management is proposing the establishment of commercial solar electricity generating facilities and associated infrastructure on Portions 7 and 3 of Farm 187 Olyvenkolk, Kenhardt, Northern Cape.

The solar facility intends to accommodate a photovoltaic component and associated infrastructure on the proposed site. The proposed site for the photovoltaic electricity generation facility was identified through an extensive site selection process which took several conditions such as climatic conditions, topography and grid connection into consideration.

ECO IMPACT LEGAL CONSULTING (PTY) LTD (**Eco Impact**) has been appointed by Wine Estate Capital Management SA as the independent environmental assessment practitioner **(EAP)** for this project as required in terms of the regulations. Eco Impact will be managing the application for authorization, having already submitted an Application form to the Department of Environmental Affairs **(DEA)**, and will be preparing an EIA process application for submission to DEA.

The EIA will be evaluated by DEA who will either issue an Environmental Authorization (usually with conditions), or alternatively, refuse the application for authorization.

The nature and extent of this facility, as well as potential environmental impacts associated with the construction, operation and decommissioning phases are explored in more detail in this Draft Scoping Report.

1.2. Environmental Assessment Practitioner (EAP)

Jessica has a BSc (Honours) in Environmental and Geographical Science in 2011 from the University of Cape Town and subsequently obtained her MSc in Zoology in 2013.

Jessica has trained as an Environmental Assessment Practitioner since August 2013 and is now a Senior EAP. She has been involved in the compilation, coordination and management of Basic Assessment Reports, Environmental Impact Assessments, Environmental Management Programmes, Waste Licence Applications, Water Use Licence Applications and Baseline Biodiversity Surveys for numerous clients.

1.2.1 Role and Competence of the EAP

The role of the EAP is to manage the application for an environmental authorization on behalf of the applicant. The EAP must adhere to all relevant legislation and guidelines,

ensuring that the reports contain all the necessary and relevant information required by the competent authority to make a decision. It is the responsibility of the EAP to perform all work relating to the application in an objective, appropriate and responsible manner.

1.2.2. Terms of Reference

Eco Impact is appointed as environmental consultant with the following Terms of Reference:

- Undertake an environmental evaluation of the applicable options and sites, to obtain an understanding of biophysical characteristics and natural processes prevailing, and to assess the proposed development proposals in terms of environmental characteristics by assessing the constraints and opportunities of the situation;
- Identify any anticipated impacts that might be considered at this early stage of the EIA process, to suggest any specialist studies that may be required to provide additional information on the significance of these impacts and mitigation that may be necessary to reduce negative impacts and enhance positive impacts of the proposed development;
- Co-ordinate the early start of the recommended specialist studies with the view to informing the compilation of the initial Environmental Opportunities and Constraints;
- In association with the specialist consultants, assist the appointed consulting Engineers with the development of the optimum Site Development that will have the least impact on the both the biophysical and social environments. It is understood that as more detailed information is provided by the various specialist studies and Interested and Affected Parties (I&APs), that the Environmental Opportunities and Constraints may need revision, and similarly, the Spatial Development Framework (SDP) may need to be adapted;
- Undertake the applicable Scoping and EIA Process in terms of the Regulations of the NEMA and the NEMWA to provide the relevant information for the DEA and the Northern Cape Department of Tourism, Environmental Affairs & Nature Conservation and any other government officials, to be able to make informed decisions and to issue an Environmental Authorisation for the proposed development;
- As part of the Scoping and EIA Process, a comprehensive public participation process must be entered into. This process is to provide all the relevant information to the public, NGO's, CBO's and government officials, and to allow for adequate time for the public to respond to such information. The issues as raised by I&AP's must be taken into consideration in assessing the impacts of the proposed development and, making amendments to the proposed development;
- In terms of the Scoping and EIA Process, it will be necessary to assess alternative development options for the property in order to reduce any significant impacts that may arise. Prescribe the necessary mitigation to enhance any positive impacts and reduce any negative impacts that may arise as a result of the proposed development must be suggested;
- Facilitate any additional specialist studies that may be required to assist with the planning and future management of the proposed development; and
- Make the necessary environmental management recommendations (mitigation/ enhancement) for the construction and the operational phases of the proposed development, to ensure a sustainable development in the future.

1.3. Assumptions and Limitations

The assumption is that the information on which the report is based (viz base line studies and project information, as well as existing information) is correct. The baseline information provided is preliminary and may need more detailed investigation, which will form part of the subsequent stages of this EIA. Statements or indicators of significance must be considered in the light of uncertainty regarding the extent and significance of such resources on the site.

1.4. Professional Team

The following are the project team:

1. Jessica Hansen – Eco Impact - Environmental Assessment Practitioner as EAP
2. Nicolaas Hanekom – Cape Lowlands Environmental Services cc - Biodiversity and Ecological Specialist and Agricultural Specialist.
3. Johann Strauss – Electrical Engineer – Stellenbosch University – Grid Connections and DNA studies.
4. Jonathan Kaplan – Agency for Cultural Resource Management – Archaeological Impact Assessment.
4. SKCM Engineers - Geo Technical and Flood Line Assessments
5. Martin Langenhoven – Visual Impact Assessment

1.5. Rationale for the Development

The South African Government has recognised the country's high potential for renewable energy and coupled with the electricity shortages, there is a need to develop supplementary, environmentally friendly and sustainable sources of energy.

The predominant rationale for the proposed Wine Estate Capital Management SA Photovoltaic Electricity Generation Facility is to provide much needed renewable energy to the South African electricity supplies.

Anthropogenic climate change is a reality. Increased human activities over the last 200 years, particularly the burning of fossil fuels (oil, coal, natural gas) and the clearing of forests, have increased the concentration of greenhouse gases in the atmosphere. This is likely to lead to more solar radiation being trapped, which in turn will lead to the earth's surface warming up - called the **enhanced** greenhouse effect.

The IPCC (Intergovernmental Panel on Climate Change) came to this conclusion as early as 1990, but international response to the declared problem was relatively lethargic until the Kyoto Protocol was signed in 1997. Amongst other aspects, this agreement set out various Carbon Dioxide emission reduction targets for signatory countries, which has had mixed success over the last 12 years. The effectiveness of the Kyoto Protocol was somewhat undermined by the U.S. refusal to become a signatory nation.

The Kyoto Protocol runs out in 2012. It will however be succeeded by a new agreement, to be defined during the Global Climate Conference held in Copenhagen in December 2009. The UNFCCC meet for the last time on government level before the climate agreement needs to be renewed. With U.S. commitment far more likely, it is anticipated that a more stringent accord will be adopted, placing a more urgent emphasis on Carbon Dioxide reductions around the world.
South Africa was a signatory to the Kyoto Protocol, and is expected to follow suit in Copenhagen. Like most developing countries, it has been difficult for South Africa to prioritise

climate change initiatives within a myriad of other national challenges. An unique challenge however exists in South Africa, which although not directly related to climate change, may in fact result in the most dramatic action towards reduction in GHG (Greenhouse Gas) emissions, yet seen in this country.

Eskom is the sole provider of electricity in South Africa. For many years it has provided the country with abundant electricity at very affordable levels. This could be achieved by a surplus of generation capacity, mostly fed by low cost coal. During the last several years, it has however become increasingly clear that this situation was not sustainable. Years of solid economic growth, combined with insufficient investment in new infrastructure, has resulted in Eskom facing both a short and longer term supply crisis. This crisis became vividly apparent during 2008; with wide spread electricity interruptions experienced throughout the country. Although the global financial crisis provided some short term relief through reduced demand, it is expected that supply interruptions will become more prevalent as the economy recovers.

With electricity generation almost exclusively based on coal, Eskom faces the additional challenge of being one of the world's largest single polluters as far as GHG emissions are concerned.

To their credit, both the South African Government as well as Eskom has come to the realisation that any sustainable longer term solution to both of these problems cannot be achieved by Eskom alone. Deregulation of the industry and the support of more sustainable forms of electricity generation have been accepted by both as a key element in the future power supply landscape. Various initiatives have been developed by Government to address the future challenges facing the electricity industry in this country, but it is the field of renewable energy which is of specific relevance to this business plan. In 2003, the Government released a White paper on renewable energy with a stated contribution target of 10 000 GWhr by 2013. Lack of a practical framework to support and incentivise private sector investment in renewable energy has however been lacking since, resulting in very little private sector investment in this field to date. The same viability dilemma has been faced by many other countries seeking to stimulate investment in renewable energy. The problem is centred on the current cost associated with renewable energy production, (especially electricity generation), which has proven significantly higher than conventional (fossil fuel based) alternatives. Several countries, (Germany and Spain being the best examples), have adopted novel legislation which has proven hugely successful in stimulating the private renewable energy sector.

Although these programmes have national nuances, they share the same common principle based on so called **feed in tariffs (FIT)**. These FIT schemes provide the investor with guaranteed revenue for an extended period (often 20 years), consummate with the technology adopted. This is normally implemented through a **Power Purchase Agreement (PPA),** which provides the investor with a bankable project, facilitating access to funding and guaranteeing an acceptable level of project viability.

The adoption of a similar scheme by the South African government through the energy regulator **NERSA (National Energy Regulator of South Africa)** earlier this year has dramatically changed the landscape for renewable energy investments in this country. Initially limited to a few technologies, this scheme has recently been expanded to include several other technologies. This second generation scheme dubbed the **Renewable Energy Feed in Tariff Scheme II (REFIT II)** forms the critical enabling backbone to the project under review here. Several key considerations favour the selection of the Northern Cape for a Solar PV project.

South Africa is blessed with sunshine, with the vast majority of the country receiving solar irradiance levels high enough (>4.5kW/m2/day) to make Solar PV a viable proposition.

The Northern Cape has the highest levels of Solar Irradiance (~6kW/m2/day), which makes the location of the proposed development ideal for solar electricity generation.

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 must now be gazetted to allow them to be implemented.

1.6. Application for Environmental Authorization

An application for Environmental Authorization was submitted to the competent authority, DEA, in compliance with the provisions in the Regulations of GNR 982 as amended.

Those listed activities as given in the schedules to GNR 983, GNR 984 and GNR 985 as amended, which may potentially be associated with the proposed development, are indicated in Table 1 below:

Table 1: Listed Activities associated with the proposed development for which Environmental Authorization as were **reflected in the lodged application form.**

Detailed description of listed activities associated with the project	
Listed activity as described in GN R 983, 984 and 985 as amended	Description of project activity that triggers listed activity
Provide the relevant Listed Activities as set out in Listing Notice 1 (GN No. R. 983 as amended by GN 327)	
Activity 11 (i) *The development of facilities or infrastructure for the transmission and distribution of electricity(i)outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;*	*A 132 kV power line (mono pole structures) of approximately 7 km over Portions 7 and 3 of Farm 187 to feed the electricity generated into the existing Aries substation.*
Activity 19 *The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.*	*The proposed development will be constructed closer than 32 meters from watercourses. The electricity cable connecting the panels to each other, the distribution network will be laid underground and access roads will be constructed through some of the drainage lines.*
Activity 28 (ii) *Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.*	*The proposed solar PV facility will be constructed on a portion of Portion 7 of Farm 187, Olyvenkolk. It is understood that the land is currently used for agricultural purposes (mainly grazing). The proposed 400 MW PV facility, which is considered to be a commercial/industrial development, will have an estimated footprint of approximately 800 ha.*
Provide the relevant Listed Activities as set out in Listing Notice 2 (GN No. R. 984 as amended by GN 325)	
Activity 1 *The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs within an urban area.*	*The proposed PV facility will generate approximately 400MW.*
Activity 15 *The clearance of an area of 20 hectares or more of indigenous vegetation,*	*The proposed solar PV facility will be constructed on a portion of Portion 7 of Farm 187, Olyvenkolk. The proposed development area consists of indigenous vegetation that will be cleared on an estimated footprint of approximately 800 ha.*
Provide the relevant Listed Activities as set out in Listing Notice 3 (GN No. R. 985 as amended by GN 324)	
The development of - *(ii) infrastructure or structures with a physical footprint of 10 square metres or more;* *(a) within a watercourse; or (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;*	*The proposed development will be constructed closer than 32 meters from watercourses. The electricity cable connecting the panels to each other, the distribution network will be laid underground and access roads will be constructed through some of the drainage lines.*

In accordance with the requirements of Regulation the EAP has determined that a scoping

process must be completed prior to any EIA application for Environmental Authorization.

1.7. Content: Scoping Report

A scoping report must contain the information that is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process to be undertaken through the environmental impact assessment process.

1.8. Need and Desirability

The proposed project will be beneficial for the following reasons:-

Electricity supply
Over the last few years, South Africa has been adversely impacted by interruptions in the supply of electricity. The creation of a 'decentralised' power generation facility (i.e. not located in the traditionally centralised power producing regions of the Republic of South Africa) next to Aries Eskom Substation proposes to supply and strengthen the Northern Cape and National electricity grid, will secure a supplementary energy source for South Africa.

Green energy
Growing concerns such as climate change and the on going exploitation of non-renewable resources have prompted increased international pressure on countries to increase their share of renewable energy generation. The South African government has recognized the country's high level of renewable energy potential and has placed targets of 10 000 GWh of renewable energy by 2013.

Climate change
The electricity generated by the photovoltaic facility will displace some fossil fuel based forms of electricity generation. The photovoltaic facility, over its lifetime, will therefore avoid the production of a sizeable amount of CO^2, SO^2 and NO^2 that would otherwise be emitted to the atmosphere.

1. Is the activity permitted in terms of the property's existing land use rights?		**NO**	**Please explain**
Currently zoned Agriculture 1 where the facility is proposed. A special consent zoning application for green energy production on agricultural land will be submitted to the Local Authority for a decision as part of this application process.			
2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	**YES**		**Please explain**
The proposed activity is in line with the NSDP. All three spheres of government have common objectives in so far as the achievement of economic growth and poverty alleviation through social development are concerned. It follows that all infrastructure and development spending programmes should therefore support the attainment of these objectives. The **NSDP** proposes that decisions by the different spheres of government on infrastructure and development spending should be guided by the following set of normative principles: • Economic growth is a prerequisite for the achievement of other policy objectives, key			

among which would be poverty alleviation;

- Government spending on fixed investment, beyond the constitutional obligation to provide basic services to all citizens, should therefore be focused on localities of economic growth or economic potential in order to attract private sector investment, stimulate sustainable economic activities and create long-term employment opportunities;
- Efforts to address past and current social inequalities should focus on people not places. In localities where there are both high levels of poverty and development potential this could include fixed capital investment beyond basic services to exploit the potential of those localities. In localities with low development potential, government spending, beyond basic services, should focus on providing social transfers, human resource development and labour market intelligence. This will enable people to become more mobile and migrate, if they choose to, to localities that are more likely to provide sustainable employment of other economic opportunities; and
- In order to overcome the spatial distortions of apartheid, future settlement and economic development opportunities should be channelled into corridors and nodes that are adjacent to or link the main economic growth centres. Infrastructure investment and development spending should primarily support localities that will become major growth nodes in South Africa.

Furthermore, the Land-Use Management Bill referred to above propose a set of Directive Principles that should guide the formulation, determination, development and implementation of all policies and legislation regulating spatial planning. These are: equality; efficiency; integration; sustainability; and fair and good governance.

(b) Urban edge / Edge of Built environment for the area	[redacted]	**NO**	**Please explain**
The proposed development will not affect the urban edge of Kenhardt. Situated far from the urban area.			
(c) Integrated Development Plan and Spatial Development Framework 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**	[redacted]	**Please explain**
The proposed land use is in line with the Existing Spatial Development Framework, and IDP. Activity will promoted job creation.			
(d) Approved Structure Plan of the Municipality	**YES**	[redacted]	**Please explain**
Will create much needed jobs and a local economy.			
(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?)	[redacted]	**NO**	**Please explain**
No EMF conducted for area.			
(f) Any other Plans (e.g. Guide Plan)	**YES**	[redacted]	**Please explain**

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 must now be gazetted to allow them to be implemented. "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.			
3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved Spatial Development Framework (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)?	**YES**	■	**Please explain**
The new development will make a positive contribution to the area, and will give practical effect to planning guidelines and plans in the area.			
4. Should development, or if applicable, expansion of the town/area concerned in terms of this land use (associated with the activity being applied for) occur here at this point in time?	**YES**	■	**Please explain**
The problem regarding the South African network in the Northern Cape is that the 132 kV lines are long lines. As a rule of thumb, when lines are longer than about 80 km (and this is a rough estimate), it is not the thermal limit of the line, i.e. the maximum current capability, that determines the maximum power transfer capability anymore, but rather the phase shift between the sending end and receiving end of line (known as the power angle) that reaches a certain maximum. From here on, the longer the line, the less power can be transferred when that limit is reached. Aries Eskom substation is a strategic substation and a good location for a solar power plant. The necessary infrastructure is in place to connect the electricity generating facility to the ESKOM grid. In fact, connection to the grid will be fairly straight forward. A 132 kV line that will feed into the ARIES substation will be constructed to transport the 400 MW energy to be generated into the ESKOM distribution network. The facility will strengthen transmission capacity in the Northern Cape.			
5. 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.)	**YES**	■	**Please explain**
This is not a societal priority. However it will create much needed jobs and help to create so called renewable electricity generation through solar for the Northern Cape. Within the REFIT program.			
6. 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	**YES**	■	**Please explain**

final EIA Report.)			
In close proximity to Aries substation. Connecting to the substation will be fairly easy.			
7. 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 EIA Report.)		**NO**	**Please explain**
No municipal services needed.			
8. Is this project part of a national programme to address an issue of national concern or importance?	**YES**		**Please explain**
Both principles of energy security and diversification can only be possible if we bring on board Independent Power Producers (IPPs) to contribute to the energy balance. This commitment is enshrined in our White Paper on Renewable Energy Policy which is under review and the Integrated Resources Plan. The Northern Cape has been selected for this project after a careful consideration and the realization that the province meets many of the key criteria as confirmed by independent analysis. Some of the findings include: • excellent and consistent sun, • flat and sparsely-populated land, • the ability to connect to the electricity grid at multiple points,			
9. 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.)	**YES**		**Please explain**
Can fairly easily be connected to the Aries Eskom Substation. Refer to rest of Scoping report for all criteria considered which further motivates why the location factors favour this activity on this site in this time and place.			
10. How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?	**Please explain**		
The sensitive natural and cultural land uses were identified and respected during the EIA process and the development layout is designed according to such parameters. No sensitive natural and cultural areas occur on the site.			
11. How will the development impact on people's health and wellbeing (e.g. in terms of noise, odours, visual character and sense of place, etc)?	**Please explain**		
Solar electricity health risks from PV panels are very slight once the panels are produced and installed. This type of solar electricity is known for reliability and low maintenance. The facility has no movable part. The noise impact is therefore limited mainly to vehicles.			
12. Will the proposed activity or the land use associated with the activity applied for, result in unacceptable opportunity costs?		**NO**	**Please explain**
The construction of such a facility is expensive. The cost of this development will be for the applicant or outside investors. The REFIT tariff (price of electricity sold to ESKOM) enables a reasonable return on investment. This tariff is the same for all solar electricity generation facilities and is controlled by National Government within their legal and policy frameworks.			

13. What will the cumulative impacts (positive and negative) of the proposed land use associated with the activity applied for, be?	**Please explain**		
Refer to scoping report for more detail.			
14. Is the development the best practicable environmental option for this land/site?	**YES**	■	**Please explain**
Generation of renewable electricity. All environmental factors have been identified in this report and will be assessed in the EIR report in the second phase.			
15. What will the benefits be to society in general and to the local communities?			**Please explain**
Electricity generation making use of renewable sources. Job creation. Refer to Socio-Economic study for more details. Will be assessed in more detail in the EIR phase.			
16. Any other need and desirability considerations related to the proposed activity?			**Please explain**
N/A			

1.9. Scoping Phase

The scoping phase is designed to determine the "scope" of the subsequent Environmental Impact Assessment (EIA), conducted in fulfilment of the application for authorisation.

The scoping procedure identifies potential:
1. Issues
2. Impacts
3. Alternatives

An integral part of the scoping phase is the initial public participation process (PPP). This process ensures that all possible interested and affected parties (I&APs) are informed of the proposed activity and are provided with an opportunity to comment.

1.10. Nature and Structure of this Report

This report fulfils the requirement of the EIA Regulations (2014) for the documentation of the scoping phase. The structure of this report is based on the Environmental Impact Assessment Regulations which clearly specifies the required content of a scoping report.

1.11. Assumptions and Limitations

This report is based on currently available information and, as a result, the following limitations and assumptions are implicit:

- The report is based on a project description taken from design specifications for the proposed photovoltaic facility that have not yet been finalised, and which are likely to undergo a number of iterations and refinements before they can be regarded as definitive. A project description based on the final design will be provided in the EIA Phase;
- Descriptions of the natural and social environments are based on limited fieldwork and available literature. More information will be provided in the EIA phase based on the outcomes of the specialist studies.

2. Description of the Property

2.1. Property Description and Location

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 1300 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 - 29º 26‘ 32“S and 20º 50‘ 36“E.

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 off the R27 south of the town Kenhardt.

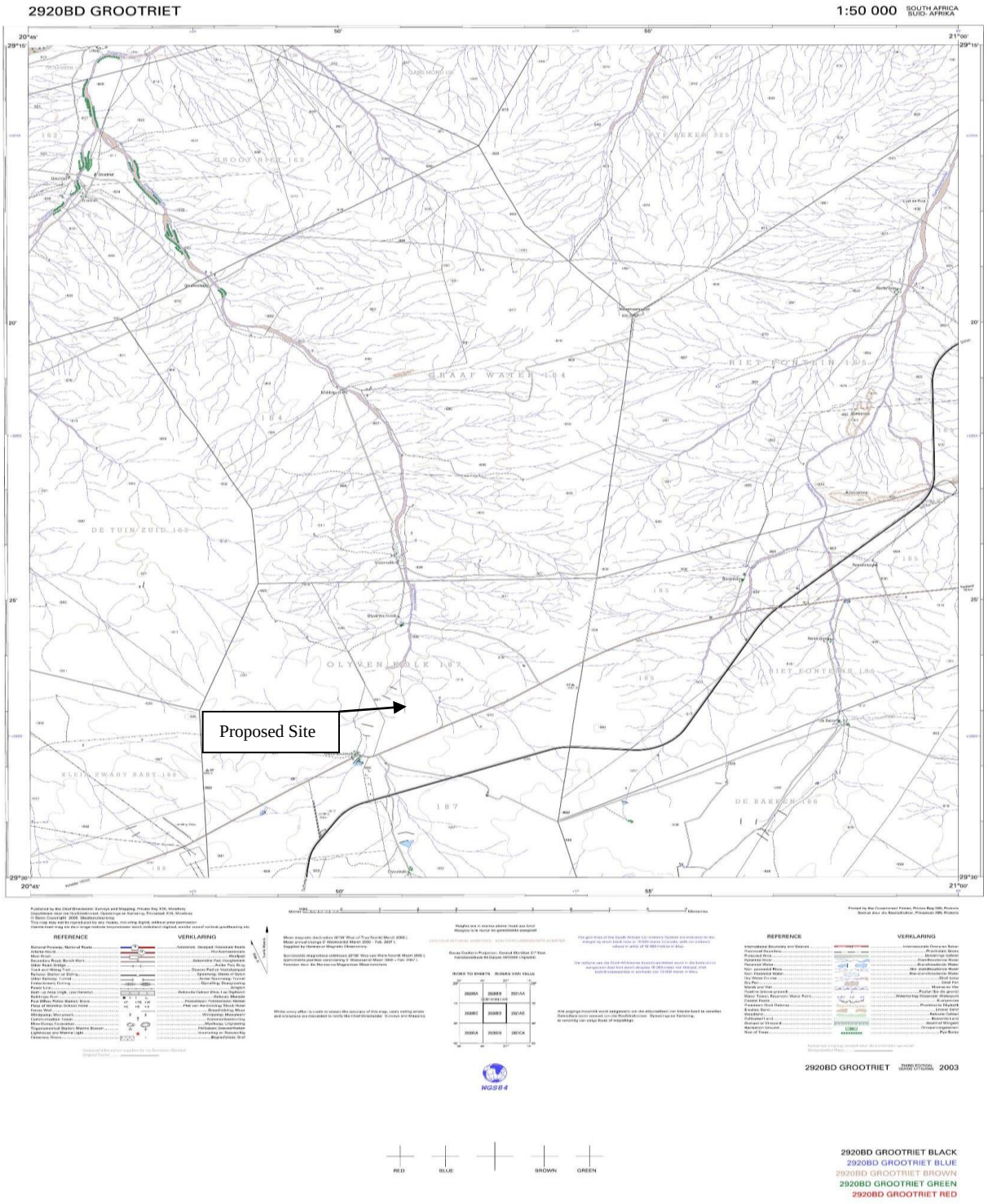


Figure 1. Locality Map

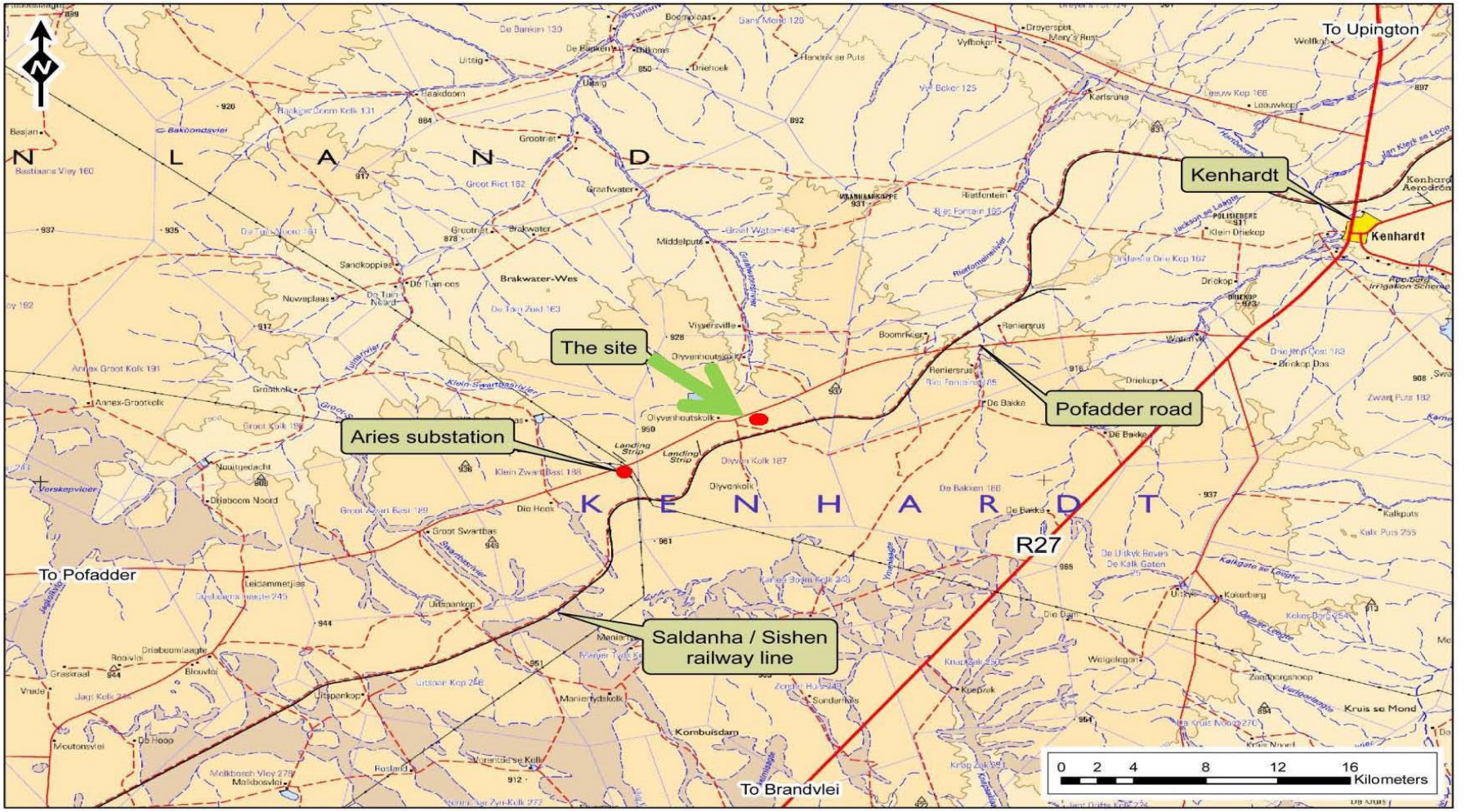


Figure 2: Locality Map

2.2. General Characteristics

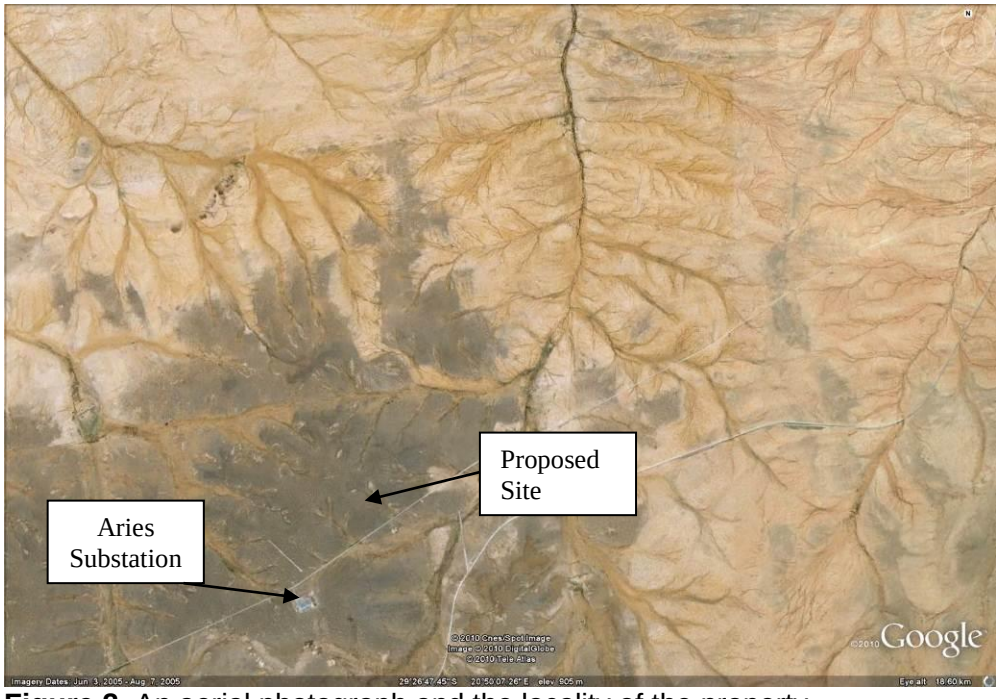


Figure 2. An aerial photograph and the locality of the property

Activities on adjacent properties to the site comprise agricultural activities. The site is currently being used for agricultural activities (sheep grazing). The Aries Eskom substation is situated west of the site.

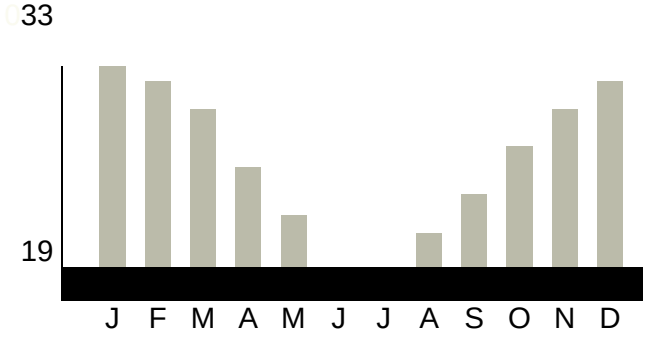
2.3. Specific Characteristics

2.3.1. Climate

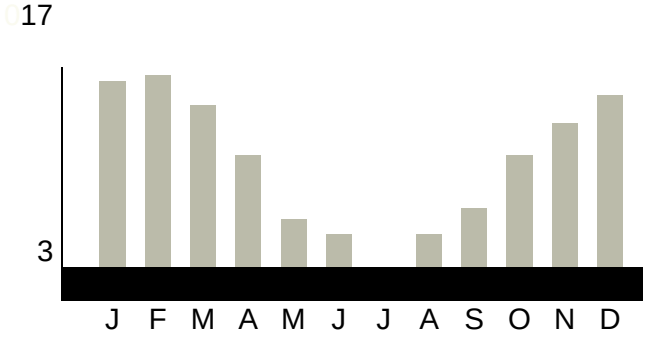
The study area is characterised by an arid climate. Kenhardt normally receives about 70mm of rain per year, with most rainfall occurring mainly during autumn. The chart below shows the average rainfall values for Kenhardt per month. It receives the lowest rainfall (0mm) in June and the highest (23mm) 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. Consult the chart below for an indication of the monthly variation of average minimum daily temperatures.

Average rainfall (mm)

Average midday temperature (°C)



Average night-time temperature (°C)



2.3.2. Topography

The study site is located mostly on flats plains which slope gently (20m drop in 2 km) towards the north. This landscape is typical of the broader region within which the study area is located and the pattern repeats itself up 30 km in any direction. The plains are situated at an elevation of 927 m. The highest point on the plains within the study site is at the southern side of the site and it drains down to the north. The site is situated in a very arid part of South Africa. Several drainage lines drain the water collected on the site, which eventually feed into the upper catchment of the Graafwatersrivier, a non-perennial river north of the study area.

2.3.3. Geology and Soil

The geology according to Almond (2011) is outlined on the 1: 250 000 geology map 2920 Kenhardt (Council for Geoscience, Pretoria; Fig. 3 herein). An explanation to the Kenhardt geological map has been published by Slabbert *et al.* (1999). Several of the relevant rock units are also treated in the explanations for the adjacent 1: 250 000 sheets such as the Britstown sheet to the southeast (Prinsloo 1989), the Pofadder sheet to the west (Agenbacht 2007) and the Sakrivier sheet to the south (Siebrits 1989).

According to the Kenhardt 1: 250 000 geology map (Fig. 3) the construction site of the proposed Wine Estate Capital Management PV power station is underlain by the Permocarboniferous **Dwyka Group** (Karoo Supergroup, **C-Pd**). Dwyka sediments underlie most of the western portion of farm Olyven Kolk 187, with Quaternary alluvium lining the major water courses. Both these rock units are present in the vicinity of the Olyvenhoutskolk farmstead (black circle in Fig. 3) where most of the proposed construction will take place. Small exposures of Mokolian (Mid Proterozoic) basement rocks of the **Namaqua-Natal Province** (De Bakken Granite, **Mdk**, and the Kokerberg Formation, **Mko**) occur in the northeastern portion of farm Olyven Kolk 187. These two billion year old granitoid intrusions and highly metamorphosed sediments (*cf* Cornell *et al.* 2006) are largely mantled by Quaternary wind-blown sands and associated fluvial sediments and pedocretes of the **Gordonia Formation** (Kalahari Group, **Q**). Since the Mokolian basement rocks are unfossiliferous and will not be directly affected by the proposed development, they will not be considered further here. Satellite images (Fig. 2) show that the landscape in the study area is extensively dissected by distal tributaries of the Orange River, notably the Graafwatersriver that flows northwards into the Hartbeesrivier and thence into the Orange.

Dwyka Group
Permocarboniferous glacially-related sediments of the **Dwyka Group** (**C-Pd** in Fig. 3) underlie the thin, superficial cover of Gordonia sands, calcrete and Late Caenozoic alluvium both north and south of the Orange River and crop out at surface within the study area southwest of Kenhardt. The geology of the Dwyka Group has been summarized by Visser (1989), Visser *et al.* (1990) and Johnson *et al.* (2006), among others. The geology of the Dwyka Group along the north-western margin of the Main Karoo Basin as far east as Prieska has been reviewed by Visser (1985). Other studies on the Dwyka in or near the Prieska Basin include those by Visser *et al.* (1977-78; summarized by Zawada 1992) and Visser (1982). Fairly detailed observations by Prinsloo (1989) on the Dwyka beds on the northern edge of the Britstown 1: 250 000 geology sheet are in part relevant to the more proximal (near-source) outcrops at Kenhardt. Massive tillites at the base of the Dwyka succession (**Elandsvlei Formation**) were deposited by dry-based ice sheets in deeper basement valleys. Later climatic amelioration led to melting, marine transgression and the retreat of the icesheets onto the continental highlands in the north. The valleys were then occupied by marine inlets within which drifting glaciers deposited dropstones onto the muddy sea bed ("boulder shales"). The upper Dwyka beds (**Mbizane Formation**) are typically heterolithic, with shales, siltstones and fine-grained sandstones of deltaic and / or turbiditic origin. These upper successions are typically upwards-coarsening and show extensive soft-sediment deformation (loading and slumping). Varved (rhythmically laminated) mudrocks with gritty to fine gravely drop stones indicate the onset of highly seasonal climates, with warmer intervals leading occasionally even to limestone precipitation.

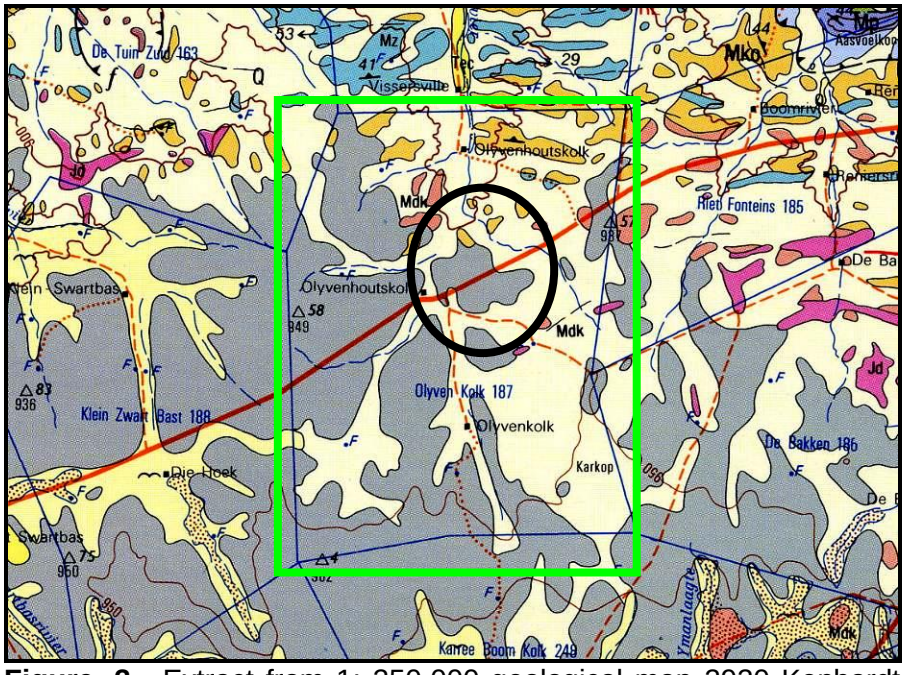


Figure. 3. Extract from 1: 250 000 geological map 2920 Kenhardt (Council for Geoscience, Pretoria) showing the approximate location of proposed Wine Estate Capital Management study area on the northern part of farm Olyven Kolk 187 (Green rectangle). Construction will largely take place in the vicinity of the Olyvenhoutskolk farmstead (small black ellipse), in an area that is underlain by Quaternary alluvium (pale yellow) and Dwyka glacial deposits at depth (grey).

MAIN GEOLOGICAL UNITS:
Orange (Mdk) = De Bakken Granite (Mokolian Basement, De Kruis Fragment)
Dark yellow (Mko) = Kokerberg Formation (De Kruis Group, De Kruis Fragment of Mokolian Basement)
Grey (C-Pd) = Mbizane Formation (Permo-Carboniferous Dwyka Group, Karoo Supergroup)
Pale yellow (Q) = Quaternary to Recent sands and sandy soil of the Gordonia Formation (Kalahari Group).

According to maps in Visser *et al.* (1990) and Von Brunn and Visser (1999; Fig. 4 herein) the Dwyka rocks in the Kenhardt area close to the northern edge of the Main Karoo Basin belong to the **Mbizane Formation**. This is equivalent to the "Northern (valley and inlet) Facies" of Visser *et al*. (1990). The Mbizane Formation, up to 190m thick, is recognized across the entire northern margin of the Main Karoo Basin where it may variously form the whole or only the *upper* part of the Dwyka succession. It is characterized by its extremely heterolithic nature, with marked vertical and horizontal facies variation (Von Brunn & Visser 1999). The proportion of diamictite and mudrock is often low, the former often confined to basement depressions. Orange-tinted sandstones (often structureless or displaying extensive soft-sediment deformation, amalgamation and mass flow processes) may dominate the succession. The Mbizane-type heterolithic successions characterize the thicker Dwyka of the ancient palaeovalleys cutting back into the northern basement rocks. The key Reference Stratotype C section for the valley fill facies of the Mbizane Formation is located a few kilometres west of Douglas on the northern side of the Vaal River (Von Brunn & Visser 1999). The composite section, which overlies glacially-striated Precambrian bedrock, is some 25-30m thick. The lower part of the section consists of massive diamictites with subordinate conglomerates and

siltstones. The upper half is dominated by laminated mudrocks with thin diamictites, lonestones (dropstones) and calcareous concretions. The section is conformably overlain by mudrocks of the Prince Albert Formation (Ecca Group) which is not represented in the study area.

For details of the Dwyka Group rocks in the Kenhardt area the reader is referred to the accounts of Visser (1985) and Slabbert *et al.* (1999). The study area *c*. 35km southwest of Kenhardt lies close to the eastern edge of the Sout River palaeovalley identified by Visser (1985, fig. 12 therein). The Dwyka succession in this area comprises both massive, muddy diamictites ("boulder shales") as well as heterolithic intervals dominated by interbedded reddish-brown, pebbly sandstones, conglomerates, and diamictite (ibid., figs. 2, 4). Slabbert *et al.* (1999, p. 107) report that the uppermost Dwyka beds contain stromatolites, oolites and calcareous concretions.

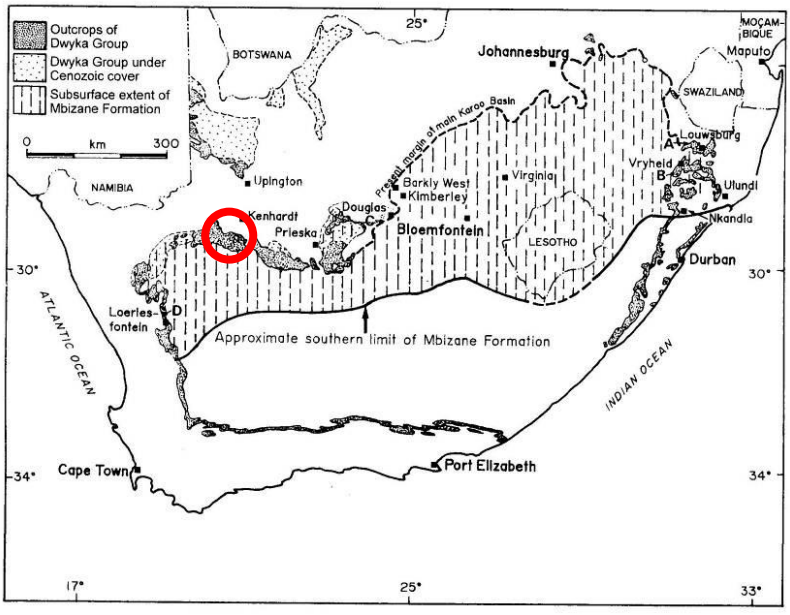


Figure. 4. Outcrop map of the Dwyka Group within the Main Karoo Basin of South Africa. Exposures in the study area southwest of Kenhardt (red circle) are assigned to the outcrop area of the Mbizane Formation (From Von Brunn & Visser 1999).

Superficial deposits: Kalahari Group sands, calcretes, alluvial gravels

Unconsolidated, reddish-brown aeolian (*i.e.* wind-blown) sands of the Quaternary **Gordonia Formation** (**Kalahari Group**) (**Q** in Fig. 3) blanket large areas of the landscape in the Kenhardt area (Slabbert *et al.* 1999). The geology of the Late Cretaceous to Recent Kalahari Group is reviewed by Thomas (1981), Dingle *et al.* (1983), Thomas *et al.* (1988), Thomas & Shaw 1991, Haddon (2000) and Partridge *et al.* (2006). The Gordonia dune sands are considered to range in age from the Late Pliocene / Early Pleistocene to Recent, dated in part from enclosed Middle to Later Stone Age stone tools (Dingle *et al*., 1983, p. 291). Note that the recent extension of the Pliocene - Pleistocene boundary from 1.8Ma back to 2.588 Ma would place the Gordonia Formation almost entirely within the Pleistocene Epoch.

According to Slabbert *et al.* (1999, p. 109) Gordonia wind-blown sands in the Kenhardt area, far to the south of the main Kalahari Basin, are thin, rarely preserve longitudinal dune bedforms (these are seen along the Hartbeesrivier near Kenhardt but not further west), and are probably of Holocene age. In the study area the thin superficial blanket of sandy sediments is admixed

with local weathering products of the Karoo and other bedrocks. According to these geological survey authors, the sands capping the plains west of the Hartbeesrivier might not in fact be correlated with the Gordonia Formation proper, although they are at least in part derived from the Kalahari Basin.

Late Caenozoic **alluvial deposits** of the Hartbeesrivier tributaries are not described or discussed in detail by Slabbert *et al.* (1999). In addition to finer-grained silts and sands, in the study area they probably include an admixture of coarser gravels derived from weathering of the Karoo rocks (*e.g.* polymict, bouldery erratics and pebbles from diamictites and conglomerates of the Dwyka Group). De Wit (1999) discusses the post-Gondwana evolution of the drainage systems in the Bushmanland region, including pans between Kenhardt and Brandvlei that fed floodwaters from the region *via* the Sakrivier and Hartbees Rivers into the Orange from at least the Plio-Pleistocene times (Ibid., fig. 13. See also De Wit *et al.* 2000).

3.4. Historical and Archaeological Characteristics

The site of the proposed Solar PV power station site is directly underlain according to Almond (2011) by Permocarboniferous glacial-related sediments of the Dwyka Group (Mzibane Formation) that are generally of low palaeontological sensitivity. Quaternary aeolian sediments of the Gordonia Formation (Kalahari Group) as well as alluvial gravels and calcretes, both of low palaeontological sensitivity, may also be encountered near-surface in the study area.

The archaeology of the Northern Cape is rich and varied covering long spans of human history. Work done by Kiberd (2002, 2006) near Copperton (in eastern Bushmanland) recovered archaeological material that included large numbers of Later Stone Age tools, Middle Stone Age lithics with fauna and Early Stone Age tools and fauna in a stratigraphic context, including a possible hearth, which may be older than 300 000 years.

2.3.5. Biophysical Elements

The study area lies within the Orange River Broken Veld vegetation type of the Northern Cape. The site is not isolated as it forms part of an extended natural veld area used as extensive grazing for sheep and cattle farming. There are an estimated 5400 plant species in the Northern Cape Province. These plants occur in six large vegetation units known as biomes. Each biome is a broad ecological unit that represents major life zones of large natural areas, defined mainly by vegetation structure and climate. There are six biomes in the Northern Cape, namely the Savanna Biome, Nama Karoo Biome, Succulent Karoo Biome, Fynbos Biome, Grassland Biome & Desert. The proposed site falls within the Nama Karoo biome. Each biome is subdivided into vegetation types, which are groups of plant communities that share similar ecosystem processes, and have similar climatic and geological requirements. There are many vegetation types in the Northern Cape. The Orange River Nama Karoo is an example of one of these vegetation types, within the Nama Karoo Biome. It is found along most of the Orange River from its confluence with the Vaal River near Kimberley to the Richtersveld in the far northwestern corner of the Northern Cape. A common plant of this vegetation type is the Quiver Tree (Kokerboom) *Aloe dichotoma* that grows on the broken, rocky terrain.

The study area has been impacted upon to some degree by livestock farming, although the vegetation is in relatively good condition and mostly natural. The drought of the resent 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*, *Eriocephalus ericoides*, *Rhigozum trichotomum*, etc.

The property lies in the general area that supports Bushmanland Basin Shrubland, according to the new vegetation map of South Africa (Mucina & Rutherford 2003). This vegetation type is listed as Not Threatened in the South African National Spatial Biodiversity Assessment (Rouget et al 2004). Some of the vegetation species identified on site during the survey included *Prosopis Africana, Acacia karoo, Agave rigida var. Sisalana, Eriocepthalus ericoides* (kappokbos), *Chrysocoma ciliate, Rhigozum trichotumum, Pterthrix spinescens, Aloe dichotoma* (Quiver Tree), *Phaeoptilum sponsum, Zygophyllum gilfillanii, Salsola tuberculata, Limeum aethipicum, Thesium lineatum, Cenchurs ciliaris, Schmidtia kalihariensis, Stipagrostis ciliate var. capensis, Stipagrostis obtuse, Stipgrostis uniplumis var. Uniplumis, Fingerhthia Africana, Eragrostis curvula* and *Pelargonium sp.*

Several mammal species is supported in the Nama Karoo. The big mammal species however were replaced with sheep. Springbok is the largest mammal occurring on the property. Some 36 species are known to occur in the bigger area (Smithers 1983). Some of the species identified on site during the survey included *Proteles cristatus* (Aardwolf spoor), *Ictonys strtiatus* (Striped polecat), *Xerus inauris* (Ground squirrel), *Hystrix africaeaustralis* (Porcupine), *Otocyon megalotis* (Bat Eared Fox) and *Raphicerus campestris* (Steenbok)

As reported in Branch (1988) 26 reptile species are likely to inhabit the area. Some of the species identified on site during the survey included *Agama hispida* (Spiny agama), *Chondrodactylus turneri, Mabaya capensis* (Cape Skink) and *Stigmachelys pardalis* (Leopard Tortoise). No Red Listed amphibian or reptiles species are known to occur in the area of the development site.

As reported in (Hockey et al 2006) 62 avifauna species are known to occur in the bigger area. Some of the species identified on site during the survey included *Alopochen aegyptiaca, Bubo africanus, Coluba guinea, Neotis ludwigii, Eupodotis vigorsii, Pterolcles namqua, Charadrius tricollaris, Melicras canorus, Polemaetus bellicousus, Falco biarmicus, Telophorus zeylonus, Corvus albus, Lanius collaris, Hirundo fuligula, Prinia maculosa, Chersomanus albosfasciata var. garrula, Chrthilauda sub coronate, Erythoropygia coryphaeus, Myrmecochchla formicrivora, Philetarious socius* and *Motacilla capensis.*
The alien plants recorded on site include *Prosopis Africana, Opuntia sp* and *Agave rigida var. sisalana.* The *Prosopis africana* is mostly restricted to the drainage lines. The *Opuntia sp and Agave rigida var. sisalana* is restricted to the disturbed areas next to the farm yard. Environmental gradients (e.g. upland-lowland), biome boundaries, soil interfaces or sand movement corridors on the site or in its vicinity are not present on site. The ecology of the area is not a fire driven system, e.g. fire is not require to maintain ecological functioning. The likelihood of any fire occurring on site is also almost zero.

The proposed development site and its associated infrastructure will not impact on any tree species, or any threatened or protected species as per the TOPS regulations.

2.3.6. Noise

The study area has a rural character in terms of background noise levels. The only potential receptors are located at the existing farm yards and houses, which is situated far from the site. The only noise associated with this activity will be during construction and decommissioning of

the facilities and vehicles during the operational phase. The electricity generation facility does not have moveable parts which can generate noise.

2.3.7. Socio-Economic Elements

The demographics and municipal services of the Kai !Garib Municipality according to Coetzee and Oppelt (March 2011) can be summarized as follows.

Employability:

- Kai !Garib has a relatively young population with a 2:1 employable dependent ratio.
- The unemployment rate in the Kai !Garib is 15%; The unemployment rate in Kenhardt is 59%.
- The majority (96%) of the workforce is employed in unskilled and semi-skilled positions.
- The population has a low level of education with 28% having had 9 years of schooling. Fifty seven percent (57%) of the population has a qualification equal to matric or higher.
- The majority of people work in agriculture, fishing and forestry, followed by community services.
- Proper construction/building/transport and tourism related skills are limited.

Demographics:

- There are 5 360 people living in Kenhardt constituting ten percent (9.6%) of the population of the Kai !Garib.
- 55% of the Kenhardt population is male whilst 45% of the population is female.
- 69% of the Kai !Garib population is coloured, 23% African and 8% white.
- More than 80% of the Kai !Garib population is Afrikaans speaking.
- 70% of the Kai !Garib population had < 12 years of schooling, of which 15% has no schooling and 15% had 12 and more years of schooling.
- 4% of the employable Kai !Garib population is highly skilled, whilst 57% is unskilled and thirty nine percent 39 % are semi-skilled i.e. tradesmen and crafts.
- 67% of the Kai ! Garib population is of employable age whilst ± 28% can be defined as children and youth at school. 5% is retired. 57% of the Kenhardt population is employable.

Economics:

- Northern Cape contributes 2 % of the national GDP.
- The economy of the Kai !Garib is dominated by Mining and quarrying (23.7%) followed by Finance, real estate and business services (13.7%) and Transport, storage, communications (12.8%), Wholesale, retail, trade (11%), Community Service (8.2%) and Agriculture (7.3%).
- The highest number of persons (28.4%, 2001) are employed in Agriculture, Forestry and Fishing (ranked as the sixth biggest economic contributor in the Kai !Garib) followed by 19.8% (2001) in Community Services (ranked as the fifth biggest economic contributor in Kai !Garib), 12.7% in Whole Sale and Retail (ranked as the fourth biggest economic contributor in Kai !Garib) and 11.4% Private Households.
    - 88% of the all households earn R 3 500 or less.
    - The rate of job creation grows proportionally slower at 1.4% whilst the unemployment rate grows by 3.5% in the Kai !Garib.
    - 36% of the population travel on foot, 10% by car and 1% by public transport.

Housing and Infrastructure:

- Kai !Garib has an estimated backlog of 2 640 houses according to the IDP.

- 87% of the inhabitants of the Kai !Garib live in formal structures.
- 48% of the households in Kai !Garib have piped water.
- 64% of the households have flush toilets (Census 2001).
- 69% of the households have access to electricity or gas.
- 24% of the households have access to telephone or cell-phone.
- 41% of households' refuse are removed weekly.

2.3.8. Sensitive Landscapes

No natural or cultural sensitive landscape occurs in close proximity to the study area.

2.3.9. Visual Impact Elements

The "view shed" refers to the theoretical outer-most extent or area from which a site can be seen. It must, however, be remembered that visibility may be obscured in reality by objects within the view shed such as existing buildings, trees, lower ridges, outcrops and other geographical or natural features, and also by distance where an object can visually blend into its background or be completely lost to sight.

The proposed development lies in a rural landscape. The site is not visible from any of the surrounding farmyards, the R27 tar road or any tourism facility (scenic route). The R27 is the main tourism and access road between Upington and the Western Cape. The proposed site is on a fairly flat area, with the Aries substation visible on the horizon on a high point west of the site. The site is situated on the north of the Kenhardt to Pofadder gravel road. When traveling west from the R27 towards Pofadder, the Aries substation and proposed site first become visible when 10km from the site. The solar panels and associated infrastructures will however first become visible when closing the site. When traveling from Pofadder to Kenhardt in an easterly direction the site will first become visible when passing the Aries substation. The proposed development structures will not be visible above the horizon line. The solar panels and infrastructure is further cluster together which will result in the visual impact of the proposed development to be of no significance.

According to van der Stok (September 2011), the gently undulating farmland around the site results in an indeterminate view shed where the facility will be alternately visible and hidden from view depending on the location of the viewpoint in the landscape. No views of the facility will be possible beyond 12 km from the site but all significant views will be confined to a much smaller area.

The only area near the site accessible to the public is the gravel Kenhardt/Pofadder road which mainly carries local traffic and which passes the facility directly to its northern boundary. The only significant views of the facility will be from this road.

No tourist facilities or routes will be affected by the visual impact of the facility and neither will any local inhabited farmsteads.

The visual nature of the landscape in the overall area is rural and isolated, however in the vicinity of the proposed development it is dominated by the Aries Substation, which is constructed on a high point in the landscape, and the power lines that feed into it. This sets a visual precedent for large scale human intervention in the area and lowers the potential intensity of the visual impact considerably.

The sense of place within the surrounding area will be significantly altered; however, a new sense of place will be created which will represent South Africa's attempts to address the challenges of climate change in a responsible and sustainable manner. The visual impacts will therefore be experienced by many, including many who are sensitive to environmental issues, as being positive.

Mitigation measures have been included but the overriding concern is the management of potential incremental visual impacts over the life of the project and the ability for complete rehabilitation of the land should the facility be decommissioned.

This facility is one of several being contemplated in the same area. If all the projects were to be implemented the intensity of the visual impact would be higher in the local area, however all the facilities fall within the same view shed and therefore the area over which the visual impact will be experienced will not be significantly enlarged. It is also noted that, with the visual precedent of the Aries Substation, it would be preferable to locate all similar visual impacts within sight of the substation rather than affecting more distant areas within the landscape.

The overall significance of the visual impact is assessed at medium with full mitigation, and this is considered acceptable for a development of this nature. In terms of visual issues there is therefore no reason why the development cannot proceed provided that mitigation measures are implemented in full.

2.3.10. Water Features

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 west of the study area. Drainage lines occur in close proximity to the site.

2.3.11. Ground Water Use

Groundwater on the farm is the only water source. The borehole water on site is used for livestock and farming operations.

2.3.12. Agricultural 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 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*, *Eriocephalus 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.

- *Eriocephalus 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 eastwards towards the drainage lines in between the solar panels. In essence none to minimal concentrated water runoff will be evident.

The current farmer stocks 119 ewes on the 1300 ha. This is a small stock carrying capacity of 12 ha per small stock unit. Agricultural acticvities will however not be possible due to the size of the facility on the property and the property will be lost to agricultural activities while being used to generate electricity.

3. Legislation, Policies and Guidelines Relevant to the Application

3.1. Legislation

The following legislation is applicable to this project, and has been considered in the preparation of the Scoping Report:

Environmental Legislation	Description of Activity
Kai !Garib Municipality: Antenna By-law	Erection of antennae or satellite dishes
Kai !Garib Municipality: Construction of Buildings By-law	The construction of buildings
Kai !Garib Municipality: Fire Service By-law	Storage of combustible materials and gas filled devices
Kai !Garib Municipality: Electricity By-law	Electricity generation and consumption
Kai !Garib Municipality: Removal of Waste By-law	Generation, transportation, removal and disposal of waste
Kai !Garib Municipality: Water Supply By-law	Water supply, discharge of industrial effluent and storage and removal of sewage.
Kai !Garib Municipality: Advertising By-law	Commercial advertising which may have an environmental impact
ATMOSPHERIC POLLUTION PREVENTION ACT, 45 OF 1965 Regulations only	Activities that result in emissions of dust, vehicle emissions and noxious or offensive gasses.

CONSERVATION OF AGRICULTURAL RESOURCES ACT, 43 OF 1983	Weeds and the tolerance thereof, which applies in both urban and other areas.
FERTILIZERS, FARM FEEDS, AGRICULTURAL REMEDIES AND STOCK REMEDIES ACT, 36 OF 1947 and relevant regulations	Activities associated with pest control and the use of agricultural remedies.
NATIONAL HEALTH ACT, 61 OF 2003	Littering and causing a nuisance
HAZARDOUS SUBSTANCES ACT, 15 OF 1973 and relevant Regulations	The storage and/or use of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances, and for the control of certain electronic products and radioactive material.
NATIONAL BUILDING REGULATIONS AND BUILDING STANDARDS ACT, 103 OF 1977 and relevant regulations	The erection of new buildings.
NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 107 OF 1998 and relevant regulations	Various general activities, too numerous to list, including but not limited to the control of emergency incidents and the care and remediation of environmental damage. Listed activities that trigger the requirement for an environmental authorization
NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 59 OF 2008 and relevant regulations	Listed waste management activities and the requirements for a license, waste removal and transportation, waste disposal, littering and the requirements for an integrated waste management plan
NATIONAL ROAD TRAFFIC ACT, 93 OF 1996 and relevant regulations	Driving on public roads and in particular, the transportation of certain dangerous goods.
NATIONAL WATER ACT, 36 OF 1998 and relevant regulations	The use of water, including any water purification and effluent treatment facilities, dams and irrigation systems.
NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT, 39 OF 2004 and relevant regulations	Activities that may affect the air quality on site and the environment surrounding it.
WATER SERVICES ACT, 108 OF 1997 and relevant regulations	The use of water and sanitation services of a water services provider.

3.2. Policies

National Spatial Development Framework

3.3. Guidelines

The following guidelines are applicable to this project, and have been considered in the preparation of the Scoping Report:

- Guideline on Public Participation
- Guidelines on Alternatives
- Guideline for Determining the Scope of Specialist Involvement in EIA Processes
- Guideline for Involving Biodiversity Specialists in EIA Processes
- Guideline for the Review of Specialist Input in EIA Processes
- Guideline for Involving Heritage Specialists in EIA Processes
- Guideline for Environmental Management Plans (EMP's)
- South African National Standards (SANS) 10328, Methods for environmental noise impact assessments in term of NEMA

4. Specific Information Required by Competent Authority

To date, no such information has been requested.

5. Description of the Proposed Development

The construction of the Wine Estate Capital Management (Pty) Ltd 400 MW Photovoltaic Electricity Generation and 132 kV power line on Portions 7 and 3 of Farm Olyvenkolk, located approximately 37km southwest of the town of Kenhardt in the Northern Cape Province. The infrastructure associated with this facility includes:

- Solar panels arranged in units with a generating capacity of approximately 400 MW and a total footprint of approximately 800ha.
- A 132 kV power line (mono pole structures) of approximately 7 km over Portions 7 and 3 of Farm 187 to feed the electricity generated into the existing Aries substation.
- Expansion of the Aries substation to receive the generated electricity into the ESKOM grid; and
- Ancillary infrastructure such as inverters and transformers, conductors (cables), a central bushbar, isolators, switch gear, protection infrastructure, measurement devices and maintenance facility and security and control room.

The proposed development will be constructed closer than 32 meters from watercourses. The electricity cable connecting the panels to each other, the distribution network will be laid underground and access roads will be constructed through some of the drainage lines.

The panels would be mounted on the ground using a ground screw. A concrete foot piece secured to a steel pen driven into the ground would be used where it is not feasible to use ground screws. The maximum height of the panels in operation would be approximately 5m and would allow some ground clearance for the free flow of surface water underneath the panels and for agricultural purposes where required. The solar panels may be equipped with sun-trackers.

The facility and associated infrastructure will be accessed on a 6m wide road with direct access off the Kenhardt to Pofadder gravel road. A combination of paving and or treated gravel may be utilised for this road. A 5m management track will surround each block of photovoltaic arrays, totalling approximately 9km of gravel road. These single track management roads will be used as access roads to service and maintain structures and to serve as fire breaks. On full commissioning of the facility, any access points to the site which are not required during operational phase will be closed and rehabilitated. Water will be sourced from existing boreholes, which will be registered under the National Water Act water use.

Background to Solar Electricity Generation Facilities

The Renewable Energy Feed-in Tariff Process (criteria not yet finalised by the National Energy Regulator of South Africa), selection process, IRP from government, and the economics of the solar plant will be key in determining the final technology combination and the schedule of implementation for the facility.

The overarching objective for the solar facility is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operational and maintenance costs, as well as social and environmental impacts. In order to try meeting these objectives local level environmental and planning issues will be assessed through a site-specific assessment during the EIA Phase in order to delineate areas of sensitivity within the broader site. This will serve to inform the design of the facility.

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 40 years, with major improvements in both reliability and cost, resulting from large scale application especially in the computer industry over the last 20 years.

The Silicon is typically deposited in thin layers and sandwiched between two protective plate safety glass sheets. This forms a typical Solar Photovoltaic panel as shown in figure below.

Figure 5. Close up of a Solar Photovoltaic Panel

For large scale installations, these panels are typically arranged in arrays arranged in a grid formation in an open field arrangement where maximum sunlight can be harvested.

Shown below in Figures 6 and 7 are two typical examples of solar arrays similar to that planned for this project. The panels are attached to mounting frames and located close to the ground at a fixed inclination angle to maximise daily sunlight

.

Figure 6. Large scale Solar PV array

Figure 7. Aerial view of large scale Solar PV array

Solar Photovoltaic is the most reliable of all the renewable energy technologies available for producing electricity. It is the only solid state technology i.e. that directly converts sunlight into electricity. All other renewable technologies, including Wind, Biomass and other Solar technologies are indirect technologies which first have to convert sunlight to thermal or mechanical energy prior to producing electricity.

Solar PV is also the most environmental friendly of the renewable energy technologies.

Unobtrusive due to its close proximity to the ground, it also is completely quiet due to no moving parts within the system. It uses no water, produces no effluent and has no irreversible impact on soil utilisation after decommissioning.

Several disadvantages which are prevalent in all other forms of renewable energy generation are absent from a Solar PV installation.

Several other technologies exist for converting Solar Energy into electricity. Most are however in the very early stages of commercial exploitation and do not have the successful track record associated with Solar PV.

Photovoltaic Arrays

An individual PV module is made of layers of amorphous silicone, which acts as a semi-conductor. When light shines on the cell it creates an electric field across the layers, causing electricity to flow. Higher light intensity will increase the flow of electricity. This charge is discharged *via* the module's transparent conductive front layer and metallic rear layer. The direct current generated within the module is fed into the electrical grid *via* an inverter (Figure 8 and Figure 9).

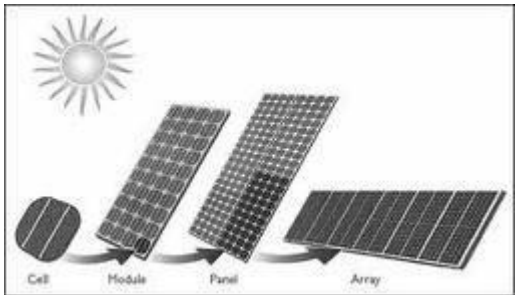


Figure 8. Solar Array

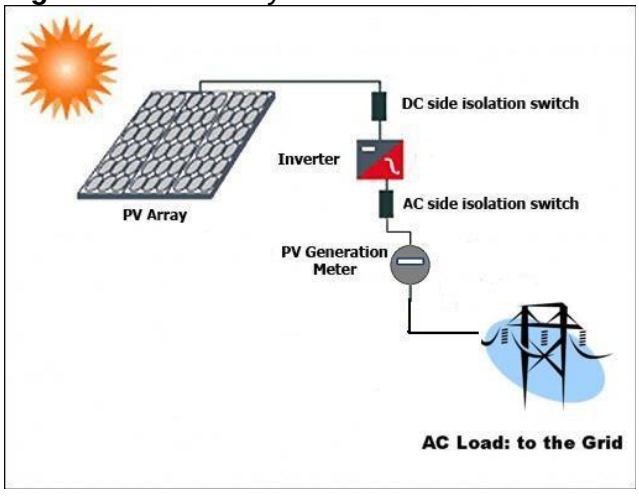


Figure 9: Schematic showing solar energy capture and electricity generation.

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 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.

Construction phase

(a) Conduct surveys

Prior to construction, surveys such as, but not limited to, geotechnical, site surveys and confirmation of PV array micro-siting, road servitudes, etc. must be conducted.

(b) Establish access roads

Access to site is via the Pofadder gravel road. Within the site itself, access will be required from the existing roads to the individual facility components for construction purposes (and later limited access for maintenance).

(c) Site preparation
This will include clearance of vegetation at all the roads and building footprints. These activities will require the stripping of topsoil which will need to be stockpiled, backfilled and/or spread on site.
(d) Establishment of laydown areas
Laydown and storage areas will be required for the construction equipment required on site.

(e) Establishment of ancillary infrastructure
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.

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

(g) Contouring
Natural contouring must be used when constructing the facility. This enables limited artificial contouring to be used.

Operation phase
The electricity that is generated from the PV modules will be stepped up through the onsite transformers. Thereafter the power will be fed to the Aries substation via a 132 kV overhead power line to be constructed. It is anticipated that a full-time security, maintenance and control room staff will be required on site. Each component within the solar energy facility will be operational except under circumstances of mechanical breakdown, unfavourable weather conditions or maintenance activities. Maintenance will consist mostly of panel replacement and other mechanical and electrical infrastructure repairs. Cleaning would be undertaken using wet cloth as required. New self cleaning technology is also investigated and will be implemented if feasible. Water usage is minimal. An onsite maintenance facility will be used as a repair base and storage of maintenance equipment. Grounds will be maintained. All waste generated will be transported weekly or when required to the Kenhardt waste managing facilities.

Decommissioning phase
The PV is expected to have a lifespan of approximately 30 years (with maintenance). The infrastructure would only be decommissioned once it has reached the end of its economic life. If economically feasible, the decommissioning activities would comprise the disassembly and replacement of the individual components with more appropriate technology/infrastructure available at the time. However, if not deemed so, then the facility would be completely decommissioned which would include the following decommissioning activities.

(a) Site preparation
Activities would include confirming the integrity of the access to the site to accommodate the required equipment and the mobilisation of decommissioning equipment.

(b) Disassemble and replace existing components
The components would be disassembled and reused and recycled or disposed of in accordance with regulatory requirements.

5.1. Consideration of Alternatives

Regulation 2 of GNR 982 as amended requires, in part, that scoping reports include a description of any feasible and reasonable alternatives that have been identified.

Regulation 1 of GNR 982 as amended defines alternatives as follows:

*"**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; and
(e) the operational aspects of the activity;

Table 3 below sets out the approach to the identification process to assess Alternatives

Table 3: Consideration of Alternatives

Regulatory Requirement i.r.o. Alternative Approach/ Alternatives Identified	
Alternatives in relation to: (a) the property on which or location where it is proposed to undertake the activity	Alternative properties on which the proposed development could take place were not considered, but alternative siting on the chosen property was considered.
Alternatives in relation to: (b) the type of activity to be undertaken	Alternative land uses are not considered.
Alternatives in relation to: (c) the design or layout of the activity	Alternatives in relation to layout and design were considered.
Alternatives in relation to: (d) the technology to be used in the activity	Alternative technologies are being considered at this stage of project planning.
Alternatives in relation to: (e) the operational aspects of the activity	Operational alternatives are to be considered at the EIA phase to include all specialist requirements and recommendations.

One of the objectives of an EIA is to investigate alternatives to the proposed project. There are two types of alternatives - Fundamental Alternatives and Incremental Alternatives.

(a) Property and location/site alternatives to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts, or detailed motivation if no reasonable or feasible alternatives exist:

The main determining factors for selecting the proposed location were:-

- Solar availability;
- Proximity to a grid connection point;
- The iclusion of the site in the Western Power Corridor during the Strategic Environmental Assessment
- Available land.

Preliminary investigations have identified that the proposed project site meets these specific criteria and so different locations for the current project will not be reasonable. The connectivity to the grid is a critical factor to the overall feasibility of the project; therefore alternative locations will not be assessed.

(b) Activity alternatives to avoid negative impacts mitigate unavoidable negative impacts and maximise positive impacts or detailed motivation if no reasonable or feasible alternatives exist:

The core business area of the project proponent, Solar Energy Land, is photovoltaic development for the generation of electricity. As such, the fundamental alternative of a development other than to construct and operate a solar energy facility is therefore not viable in this case, and will not be considered further in the EIA.

(b) Design or layout alternatives to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts, or detailed motivation if no reasonable or feasible alternatives exist:

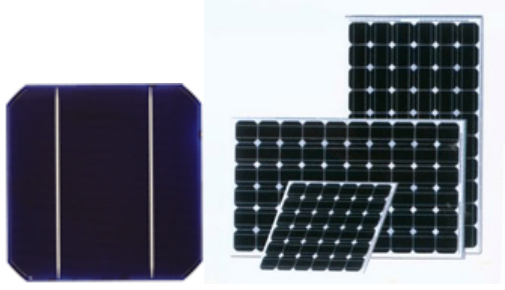
Environmental sensitive features were mapped and used to determine the development layout. An Archaeological and other specialist study assessments will further be conducted to ensure that issues are avoided. During this Scoping Phase, site-specific specialist studies are used to identified potentially environmental sensitive areas (which should be avoided by the proposed development as far as possible) for consideration in detail during the EIA phase. The information from these studies will be used to inform the layout alternatives for the proposed development site and inform recommendations regarding the preferred alternative. Specific design alternatives will include *inter alia* the layout of the PV panels, as well as the connections to the ESKOM grid and access roads. The aim of this planning process is to avoid environmentally sensitive area as far as possible.

(c) Technology alternatives (e.g. to reduce resource demand and resource use efficiency) to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts, or detailed motivation if no reasonable or feasible alternatives exist:

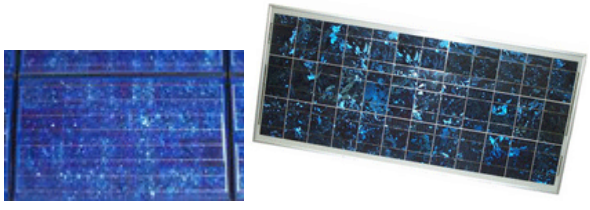
There are three general families of **photovoltaic (PV) modules** (solar panels) on the market

today. They are **monocrystalline silicon** also known as **single-crystal silicon**, **polycrystalline silicon**, and **thin film**.

Monocrystalline and Polycrystalline Solar panels represent the **"traditional"** technologies. They can be grouped into the category **"crystalline silicon." Monocrystalline** is the original **PV technology** invented in 1955, and never known to wear out. **Polycrystalline** entered the market in 1981. It is similar in performance and reliability. **Monocrystalline** modules are composed of cells cut from a piece of **continuous crystal**. The material forms a cylinder which is sliced into thin circular wafers. To minimize waste, the cells may be fully round or they may be trimmed into other shapes, retaining more or less of the original circle. Because each cell is cut from a **single crystal**, it has a uniform color which is dark blue. Below is a picture of the **monocrystalline cell** and some examples of **monocrystalline** solar panels.



Polycrystalline cells are made from similar **silicon material** except that instead of being grown into a **single crystal**, it is melted and poured into a mold. This forms a square block that can be cut into square wafers with less waste of space or material than round **single-crystal** or **monocrystalline** wafers. As the material cools it crystallizes in an imperfect manner, forming random **crystal boundaries**. The efficiency of **energy conversion** is slightly lower. This merely means that the size of the finished module is slightly greater per watt than most **Monocrystalline modules**. The cells look different from **Monocrystalline cells**. The **polycrystalline** surface has a jumbled look with many variations of blue color. In fact, they are quite beautiful like sheets of gemstone. Have a look below for some examples of polycrystalline solar panels.



In addition to the above processes, some companies have developed alternatives such as **ribbon growth** and growth of **crystalline film** on glass. Most **crystalline silicon technologies** yield similar results, with high durability. Twenty-year warranties are common for **crystalline silicon modules**. **Monocrystalline** tends to be slightly smaller in size per watt of power output, and slightly more expensive than **polycrystalline.**

The **silicon** used to produce **crystalline** solar modules is derived from sand. It is the second most common element on Earth, **so why is it so expensive?** The answer is that in order to produce the **photovoltaic effect**, it must be purified to an extremely high degree. Such pure **"semiconductor grade"** silicon is very expensive to produce. It is also in high demand in the electronics industry because it is the base material for computer chips and other devices. **Crystalline solar cells** are about the thickness of a human fingernail. They use a relatively

large amount of **silicon**.

Thin-Film or Amorphous Solar Panels
Imagine if a **PV cell** was made with a microscopically thin deposit of **silicon**, instead of a thick wafer. It would use very little of the precious material. Now, imagine if it was deposited on a sheet of metal or glass, without the wasteful work of slicing wafers with a saw. Imagine the individual cells deposited next to each other, instead of being mechanically assembled. That is the idea behind thin film technology. (It is also called **amorphous**, meaning **"not crystalline."**) The active material may be **silicon**, or it may be a more exotic material such as **cadmium telluride.**

Thin-film panels can be made **flexible and lightweight** by using plastic glazing. Some flexible panels can tolerate a bullet hole without failing. Some of them perform slightly better than **crystalline modules** under low light conditions. They are also less susceptible to power loss from partial shading of a module.

The **disadvantages** of **thin-film technology** are **lower efficiency** and **uncertain durability**. Lower efficiency means that more space and mounting hardware are required to produce the same power output. **Thin film materials** tend to be less stable than **crystalline**, causing degradation over time. PV experts generally agree that **crystalline silicon** will remain the "premium" technology for critical applications in remote areas. **Thin film** will be strong in the "consumer" market where price is a critical factor.

The three above technologies alternatives were considered. Polycrystalline panels technology will be used.

(e) Operational alternatives to avoid negative impacts mitigate unavoidable negative impacts and maximise positive impacts or detailed motivation if no reasonable or feasible alternatives exist:

Operational alternatives were not considered as it is not feasible or reasonable. Eskom have specific requirements when electricity generated is connected to the national grid.

(f) The option of not implementing the activity (the No-Go Option):

The No-Go option is the option of not constructing the facility. Should this alternative be selected there will be no potential environmental impacts. However, should the facility not be developed the benefits related to the generation of electricity from renewable energy resources will not be realised even though the generation of electricity from renewable energy resources offers a wide range of socio-economic and environmental benefits for South Africa.

6. Public Participation Process

This section of the report is included in compliance with the Regulations.

Public participation is an integral part of the EIA process, and affords potentially interested and potentially affected parties (I&APs) an opportunity to participate in the EIA process, or to comment on any aspect of the development proposals.

The public participation process being undertaken for this project complies with the requirements of the Regulations. The description of the public participation process as included in Section 6.1-6.5 below itemizes the steps and actions undertaken to date and as appropriate at this stage of the project.

6.1. Overview of Process toward Project Approval

The coordinated approval process being followed for this project, through which the necessary statutory approvals are being sought in terms of legislation, namely:

- Environmental Impact Assessment Regulations (Government Notices Nos GNR982, GNR983, GNR 984 and GNR985 as amended) promulgated in terms of the National Environmental Management Act 107 of 1998.

6.2. Steps Taken to Notify Potentially Interested and Affected Parties

Potential I&APs were notified about the project by:

- Fixing a notice board at the boundary of the farm where the access road enter the property towards the site.
- Giving written notice to adjacent property owners and dwellers on the site, the municipal councillor of the ward within which the site is located, the local municipality and organs of state having jurisdiction in respect of any aspect of the project.
- Placing an advertisement in a local newspaper.
- Additionally, this scoping report was prepared and is available to any I&AP upon request, as advised on the notice boards, notices and advertisements referred to in Section 6.3 below.
- The Scoping Report is included for statutory comment with the written notice as sent to the commenting organs of state.

6.3. Notice Boards, Notices and Advertisements

The following aspects are relevant:

- Photographs of the notice boards erected on site as indicated in Section 6.2 above and as required in terms of Regulation are included in **Addendum 2**.

  These notice boards satisfy the requirements of the Regulations in terms of both content and size.

- Copies of the written notice served upon specific parties as indicated in Section 6.2 above

and as required in terms of Regulations are included in **Addendum 3**.

- The list of parties on whom such written notification was served, inclusive proof thereto, is included in **Addendum 4**.

- Copies of the notices (advertisements) placed in a local newspaper as indicated in Section 6.2 above and as required in terms of Regulation are included in **Addendum 5**.

6.4. Lists of Identified and Registered Parties

The list of parties who were identified as potential I&APs as per the requirements of the Regulations is included as **Addendum 6.**

6.4.1. List of Potentially Interested and Affected Parties

The list of parties who were identified as potential I&APs as per the requirements of Regulation is included as **Addendum 6**

6.4.2. List of Registered Interested and Affected Parties

The list of parties who requested registration as an I&AP, and who are registered on the I&AP database for the project as required in terms of Regulation is to be included as **Addendum 6.**

6.5. List of Workshops Held

No workshops were held or is anticipated.

6.6. Summary of Issues Raised by Interested and Affected Parties

List of Issues and Concerns from Registered I&AP's and Key Departments

Issue Group	Issues or Concern

Any such comment received will be summarized, and included in the response schedule of the EAP to such comments as required by Regulation. See **Addendum 6**

7. Environmental Issues Identified to Date

The following potentially significant impacts associated with the proposed construction of the Wine Estate Capital Management SA Photovoltaic Electricity Generation Facility have been identified by the EAP and project team:

Construction phase impacts:

- Biodiversity impacts;
- Archaeological and Paleontological Impacts
- Agricultural Impacts
- Socio-Economic Impacts
- Fresh Water Ecosystems Impacts

Operational phase impacts:

- Biodiversity impacts;
- Fresh Water Impacts
- Agricultural Impacts
-

Closure and decommissioning phase impacts:

- Biodiversity impacts
- Archaeological and Paleontological Impacts
- Agricultural Impacts
- Socio-Economic Impacts
- Fresh Water Ecosystems Impacts

These aspects are addressed in the following sections.

7.1. Construction phase impacts

Construction activities in sensitive environments need to be carefully managed or they lead to significant environmental impacts. Construction activities, particularly site clearing and excavations, impact on existing infrastructure can lead to damage and/or destruction of Eskom electricity generation infrastructure, flora and displace fauna. Stone-age artefacts and fossils could be unearthed and damaged. Also associated with construction sites are nuisance impacts such as noise and dust.

A comprehensive Environmental Management Plan (EMP) which focuses on managing construction phase-related impacts should sufficiently manage the potential construction phase impacts under supervision of a competent ECO.

Impacts on Fauna, Flora and Ecology:		
Impact	**Nature of Impact**	**Extent of Impact**
Impacts on threatened plant species	Plant species are especially vulnerable within respect to infrastructure development because they cannot move out of the path of the construction activities. They are also affected by overall loss of habitat. In the case of threatened plant species, loss of a population or individuals could lead to a direct change in the conservation status of the species, possibly extinction. This may arise if the proposed infrastructure is located where it will affect such individuals or populations. The consequences may include fragmentation of populations of affected species, reduction in area of occupancy and loss of genetic variation. This may all lead to a negative change in conservation status of the affected species, which implies a reduction in the chance of survival of the species.	Local – Regional The impact will occur at the site of the proposed facility, but could have an impact at a regional level, since it potentially affects the conservation status of species.
Impacts of threatened	Threatened animal species are indirectly affected through habitat loss since direct construction impacts can often	Local – Regional

animal species	be avoided due to movement of individuals from the path of construction activities. Loss of a population or individual could lead to a direct change in the conservation status of the species. This may arise if the proposed facility infrastructure is located where it will affect the habitat that these populations or individuals depend on. Consequences of these impacts include fragmentation of populations of affected species, reduction in area of occupancy of affected species and loss of genetic variation. This may all lead to a negative change in conservation status of the affected species, which implies a reduction in the chances of the species overall survival.	The impact will occur at the site of the proposed facility, bur could have an effect at a regional level, since it could affect entire populations of affected species.
Impacts on indigenous natural vegetation	The construction of the facility and associated infrastructure will lead to a direct loss in natural vegetation. The occurrence of vegetation which has already been stressed due to degradation and transformation at a regional level may aggravate this potential impact. Consequences of the potential impact of loss of indigenous natural vegetation occurring may include: ▪ Negative change in conservation status of habitat ▪ Increased vulnerability of remaining potions to future disturbance ▪ General loss of habitat for sensitive species ▪ Loss in variation within sensitive habitats due to loss of portions of it ▪ General reduction in biodiversity ▪ Increased fragmentation ▪ Disturbance to processes maintaining biodiversity and ecosystem good and services ▪ Loss of ecosystem functioning	Local – Regional The impact will occur at the site of the proposed facility, but could have an impact at a regional level, since it could affect the conservation status of the entire vegetation type.
Impacts of water features such as drainage lines	Construction may lead to some direct/indirect damage to existing dry stream beds and drainage areas on site as well as on the catchments of these areas. This may affect the hydrology of the landscape or may lead to loss of habitat for species that depend on this habitat type. Dry river beds and drainage lines are an important habitat for a number of species in the study area, including those with a restricted distribution or species with an elevated conservation status.	Local – Regional The impact will occur at the site of the proposed facility, but could have downstream impact.
Impacts of protected species	Any of the species which have a geographical distribution within the study are most likely to occur on site.	Local
Establishment and spread of declared weeds and alien invader plants	Major factors contributing to invasion by alien invader plants includes high disturbance activities such as construction. Exotic species are often more prominent near infrastructural disturbances than further away. Consequences of the spreading of alien invasive species may include:	Local

	▪ Loss of indigenous vegetation ▪ Change in vegetation structure leading to change in various habitat characteristics ▪ Change in plant species composition ▪ Change in soil chemical properties ▪ Loss of sensitive habitats ▪ Loss or disturbance to individuals or rare, endangered, endemic and/or protected species and species that are listed as protected specially protected endangered, etc. in terms of other applicable legislation ▪ Fragmentation of sensitive habitats ▪ Change in flammability of vegetation, depending on alien species ▪ Hydrological impacts due to increased transpiration and runoff ▪ Impairment of water feature function	
Change in runoff and drainage patterns	Infrastructure and road crossing landscapes cause local hydrological and erosion effects resulting in major peak-flow and sediment impacts. This may occur around construction sites, but also in area where the infiltration rates of the landscape are changed due to an impermeable surface being constructed. Increased runoff associated with infrastructure may increase the rates and extent of erosion, reduce percolation and aquifer recharge rates, alter channel morphology, and increase stream discharge rates. Consequences may include: ▪ Increased soil loss ▪ Loss of or disturbance to individuals or rare, endangered, endemic and/or protected species ▪ Fragmentation of sensitive habitats ▪ Impairment of water feature function ▪ Change in channel morphology in downstream water features, potentially leading to loss of water feature vegetation ▪ Reduction in water quality in water features downstream of roads	Local – Regional The impact will occur at the site of the proposed facility, but could also affect downstream and down-slope areas.
Recommendations for further study during the EIA phase There are very few threatened species listed for the area surrounding the site, because this is an extremely under collected area floristically speaking and the local flora is not well documented. There may be a number of species that occur within this area, for which there are no records. The following activities was identified in the baseline Ecological and Biodiversity study attached as a specialist study: ▪ Establish the condition of the vegetation and the relative distribution of habitats in moderate to good condition. ▪ Confirm the presence and distribution of wetlands and drainage lines on site. ▪ Identify sensitive features that may occur on site. ▪ Evaluate presence of species of concern (Red Data Species)		

These impacts identified above will be assessed in the EIA and EIR report.

Impacts on Avifauna:		
Impact	**Nature of Impact**	**Extent of Impact**
Habitat loss	A certain amount of habitat will be lost during the establishment of the solar plant and the associated infrastructure. This may lead to a reduced carrying capacity so that populations decline. Whist affecting greatly on endangered bird species, habitat loss can have an impact on existing bird communities within the study area. Habitat loss can affect on local as well as, to a lesser degree, migratory species.	Local
Disturbance	Disturbance would occur through on-going maintenance which may affect shy and sensitive species especially during the breeding season.	Local

Recommendations for further study during the EIA phase

The following activities will be included as part of the Study during the EIA Phase:

- Impact of local bird communities due to habitat loss created by the facility
- Impact on local bird communities due to disturbance created by the construction and operation of the facility
- Impacts on birds attracted to the solar panels and especially specie of special concern
- Collision of birds with facilities associated with the development

Impacts on Agricultural Potential:		
Impact	**Nature of Impact**	**Extent of Impact**
Impact on potential agricultural resources	A loss of arable agricultural land may occur during the construction phase. Impact on the surrounding agricultural activities.	Local

Recommendations for further study during the EIA phase

Due mainly to the prevailing unfavourable climatic condition for arable agriculture, as well as the prevalence of soils with limited depth, it is not envisaged that further detailed soil investigation will be required. The impact of the activity on land reform and surrounding agricultural activities will however be assessed.

Impacts on Soils, Erosion Potential and Geomorphology:		
Impact	**Nature of Impact**	**Extent of Impact**
Soil degradation	Soil degradation may occur during the construction phase through the following activities: ▪ Excavations ▪ Wetting and compaction ▪ Pollution through spillage of hazardous chemicals such as fuel on construction sites ▪ Erosion of soil in areas of activity ▪ Siltation arising from accelerated erosion associated with construction activity	Local

Recommendations for further study during the EIA phase

The following activities will be included as part of the Agricultural and Ecological studies in the EIA phase:

- Assess the present state of erosion, identify critical areas in terms of erosion, and produce a map identifying these areas.

Impacts on Water Resources:		
Impact	**Nature of Impact**	**Extent of Impact**
Impacts of the physical environment	The establishment of the proposed solar facility may impact on the following physical characteristics of the environment: ▪ The water quality of the region ▪ Dry riverbeds and localised drainage systems ▪ Riparian system (form and function) ▪ Riverine and in stream habitats	Local – Regional
Impacts on the social environment	The establishment of the proposed solar facility may affect the social environment in term of human needs (i.e. by affecting quality of the water)	Local - Regional
Impacts on dry river beds	These systems are unique to the region and due to their locality within the landscape will pose a flood risk to the development	Local
Recommendations for further study during the EIA phase ▪ A Water Quality Management Report will be submitted as part of the EIA phase for approval to DWA for all water uses identified under the National Water Act.		

Impacts on Heritage Resources:		
Impact	**Nature of Impact**	**Extent of Impact**
Impacts on archaeological materials	Physical disturbance of the material would alter or destroy its context. The excavations for foundations will potentially affect buried archaeological material, similarly excavation of cable trenches and clearing of access roads could affect material that lies buried in the surface sand.	Local
Impacts on colonial period heritage sites	Historic structures are sensitive to physical damage as well as neglect. They are also context sensitive, in that changes to the surrounding landscape will affect their significance. It is not expected that the it will be directly impacted on by the proposed development. None of this occur on site or in close proximity to the site.	Local
Impacts on cultural landscape and sense of place	Cultural landscapes are highly sensitive to cumulative impacts and development activities that change the character and public memory of a place. Conspicuous changers alter the feel and atmosphere of a place irrevocably. The degree and nature of the impact will depend on how the solar plant and its associated infrastructure are arranged within the broader site. It is not expected that it will be directly impacted on by the	Local – Regional

	proposed development. None of this occurs on site or in close proximity to the site.	
Impacts on the built environment	It is not expected that the built environment will be directly impacted on by the proposed development	-
Impacts on palaeontology	Physical disturbance of the material itself and its context may occur during the construction phase which may affect its significance.	Local - Regional

Recommendations for further study during the EIA phase

The EIA Process needs to fulfil the requirements of a Heritage Impact Assessment as defined in section 38 of the National Resources Act (Act No 25 of 1999). In order to do so, the following will be required during the EIA phase:

- A Heritage Impact Assessment (HIA) is done as per section 38(3) and 38(8) of the NHRA. The HIA must assess all heritage resources as defined in section 1 and 3 of the NHRA.
- Phase 1 Archaeological Impact Assessment Report. The Phase 1 Impact Assessment Report will identify the archaeological sites and assess their significance. It should also make recommendations (as indicated in section 38) about the process to be followed.
- The proposed development area is underlain by areas of moderate sensitivity in terms of Palaeotological Resources. A Palaeontological Desk Top study must be undertaken to assess whether or not the development will impact upon palaeontological resources.

Noise Related Impacts:		
Impact	**Nature of Impact**	**Extent of Impact**
Site establishment	The establishment of the construction site may affect the ambient noise environment for a limited time.	Local
Excavation operations	Excavation activities for foundations for building and other infrastructure, trenches for cabling and piping may affect the ambient noise environment for a limited time.	Local
General construction activities	Construction activities such as concrete mixing, building, steel work, concrete vibration, services installation etc may affect the ambient noise environment for a limited time during the construction phase.	Local
General vehicle movement and traffic noise	On-site vehicle movement, delivery of materials and construction equipment as well as additional traffic to and from the site may affect the ambient noise environment during the construction phase.	Local

Recommendations for further study during the EIA phase

Due to the limited period of and the localised nature of potential impacts, the noise potential noise impacts on the surrounding environment during the construction phase will be of low significance.

Visual Impacts:		
Impact	**Nature of Impact**	**Extent of Impact**
Visual impact	The potential visual impact of the construction of the proposed development on observers in close proximity to the facility. The potential impact of safety and	Local

	security lighting of the facility at night on observers within close proximity of the facilities.	

Recommendations for further study during the EIA phase

No Visual Impact Assessment is envisage to be conducted during the EIA phase. The visual impacts is of very low significance.

Impacts on the Social Environment:		
Impact	**Nature of Impact**	**Extent of Impact**
Impacts on the social environment	An influx of job seekers into the area may result in an increase in crime and creation of tension and conflict in local communities.	Local - Regional

Recommendations for further study during the EIA phase

A Socio-economic Impact Assessment to be conducted in the area must include but not be limited to the following:

- Impact on property prices
- Influx of job seekers into the area which may result in an increase in crime, drug abuse, community conflict etc
- Creation of employment and business opportunities
- Creation of potential training skills development opportunities
- Potential threat for farm safety due to increased number of people in the area
- Potential stock losses due to theft
- Potential damage to water and other farm infrastructure
- Potential damage to roads through heavy equipment and increase traffic volumes
- Potential impact on farming operations die to the loss of productive land

7.2. Operational phase impacts

Some of the potentially significant impacts have been identified as being associated with the operational phase includes:

- Fresh Water Ecology Impacts
- Biodiversity impacts;
- Archaeological and Paleontological Impacts
- Agricultural impacts

Generally speaking, the potential effect of Solar PV installations on avifauna is not considered an issue of relevance in a comparative assessment done of Solar PV installations around the world.

Impacts on Fauna, Flora and Ecology:		
Impact	**Nature of Impact**	**Extent of Impact**
Impacts on protected species	Any of the species which have a geographical distribution within the study are most likely to occur on site and may be disturbed during operational maintenance activities.	Local
Establishment and spread of	Lack of control mechanisms contribute to the continued spread of alien invader plants following high disturbance	Local

declared weeds and alien invader plants	activities. Exotic species are often more prominent near infrastructural disturbances than further away.	

Recommendations for further study during the EIA phase

Activities will be assessed in the EIA phase and management recommendations included in the EMP.

Impacts on Avifauna:

Impact	Nature of Impact	Extent of Impact
Attractions to the solar panels	The solar panels will reflect sunlight which may attract birds as they may mistake these features for water bodies, therefore causing negative interactions between themselves and the panels.	Local
Disturbance	Disturbance would occur through ongoing maintenance which may affect shy and sensitive species especially during the breeding season.	Local
Collisions	Collisions may occur with the solar facilities.	Local - Regional
Electrocution	Power lines have a range of bird related impacts one of which is electrocution events whereby a bird perches on an electrical structure and causes an electrical short circuit by bridging the gap between live components and or live and earthed components.	Local - Regional

Recommendations for further study during the EIA phase

Activities will be assessed in the EIA phase and management recommendations included in the EMP.

A study **"Development and Application of a Multi-Criteria Decision Analysis Software Tool for Renewable Energy Sources"**, conducted by several universities on behalf of the European Commission. This study highlights several potential effects on avifauna from other renewable technologies i.e. wind and related infrastructure, but clearly concludes that the solar pv installations do not affect avifauna in any negative way and the impact is considered as zero.

Photovoltaic solar panels are designed to absorb sunlight in order to convert solar energy into electricity. The more sunlight that is absorbed, the more electricity can be produced. A mono-crystalline silicon solar cell, similar to those proposed at the site, absorbs two-thirds of the sunlight reaching the panel's surface. This means that only one-third of the sunlight reaching the surface of a solar panel can be reflected.

An anti-reflective coating or glass can reduce the sunlight that is reflected and increase the amount of sunlight that is absorbed. The solar panels proposed are designed with at least one anti-reflective layer. Such measures will further reduce reflectivity.

The potential reflectivity of a surface, or albedo, varies with the type of material used to cover it. Solar panels have a netto reflectivity of around 4%. The reflectivity of the current on site

surface materials such as dry sand will have a reflectivity of around 45%, or grass-type vegetation with around 25% and broadleaf deciduous trees with around a 10% reflectivity index. The solar panels installation therefore does not noticeably alter negatively the site's current reflected or indirect sunlight capacity.

A recent report assessing the impact of Solar PV installations close to some USA airports. The conclusion is that the reflectivity emanating from solar pv panels (@4%) is significantly less than the reflectivity from the windows of parked cars (@7%).

The index of refraction of the proposed solar pv panels is approx **1.4**. This is very similar to water which has an index of refraction of **1.33**. Open bodies of water thus reflect a similar percentage of light at around 4%.

With regard to the installation, the impact of the potential "glare" from the solar array will approximate that which would result from any open body of water i.e. dams or lakes of similar extent. Avifauna is not negatively affected by the numerous water surfaces that prevail in their normal habitat.

Due to the path of the sun, sunlight would reach the solar panels at varying angles to be absorbed or reflected over the course of any day. Based on the orientation of the north-facing the solar energy harvesting system and the known sun path, summertime at noon would present the highest potential for any impact onto the surrounding area.

Taking in consideration all of the above factors the proposed impact of potential glare from the solar panels on avi-fauna will be low or not significant.

- Glare from the proposed solar panels will not have a significant impact on any avi-fauna species of conservation significance.
- Potential glare will further also not affect the birds of prey hunting patterns.
- No bird flight paths will be affected.

Should there be any glare from the panels birds flying over the site will simply follow an alternative route until they are familiar with or used to the new site phenomena.

Impacts on Agricultural Potential:		
Impact	**Nature of Impact**	**Extent of Impact**
Impact on potential agricultural resources	Impact of activity operation on surrounding agricultural activities	Local
Recommendations for further study during the EIA phase Will be assessed in the Agricultural Impact Assessment in the EIA phase.		

Impacts on Soils, Erosion Potential and Geomorphology:		
Impact	**Nature of Impact**	**Extent of Impact**
Soil degradation due to	Soil degradation may occur during the operational phase through erosion and/or siltation. The loss of soil and damage to associated ecosystem may occur due to	Local – Regional

accelerated erosion (wind or water)	erosion of soil in area of activity. Furthermore, damage of soil and associated ecosystems due to siltation arising from accelerated erosion may occur.	
Recommendations for further study during the EIA phase The following activities will be included as part of the Agricultural and Ecological Studies during the EIA phase.		

Impacts on Water Resources:		
Impact	**Nature of Impact**	**Extent of Impact**
Impacts on the physical environment	The proposed solar facility may impact on the following physical characteristics of the environment during the operational phase: ▪ Dry riverbeds and localised drainage systems ▪ Riparian system (form and function) ▪ Riverine and in stream habitats ▪ Ground water resources	Local – Regional
Impacts on dry river beds	These systems are unique to the region and due to their locality within the landscape will pose a flood risk to the development	Local –Regional
Recommendations for further study during the EIA phase The following activities will be included as part of the Water Quality Management report to be submitted to DWA for water use licensing during the EIA phase: ▪ Determine and indicate all river tributaries that are located on the study site and design the proposed development in such a way as to minimise any impacts on the present water resources. Determine ground water use requirements.		

Noise Related Impacts:		
Impact	**Nature of Impact**	**Extent of Impact**
Noise associated with the operational phase	Noise associated with the facility is associated with vehicle movements.	Local
Recommendations for further study during the EIA phase Will be assessed in the EIR report.		

Visual Impacts:		
Impact	**Nature of Impact**	**Extent of Impact**
Visual impact	The potential visual impacts may result form the establishment of all associated infrastructure for the solar facility on observers in close proximity. Furthermore the potential visual impact of operational, safety and security lighting of the facility at night.	Local
Recommendations for further study during the EIA phase		

Will be assessed in the EIR report.

Impacts on the Social Environment:		
Impact	**Nature of Impact**	**Extent of Impact**
Impacts on the social environment	An influx of job seekers into the area may result in an increase in crime and creation of tension and conflict in local communities. Should workers be house on site during the operational phase, this may lead to impacts on people residing in close proximity to the site. A threat to farm safety may occur due to increased number of people in the area.	Local – Regional
Recommendations for further study during the EIA phase A Socio-economic Impact Assessment to be conducted in the area must include but not be limited to the following: ▪ Impact on rural sense of place ▪ Impact of local and regional tourism ▪ Impact on farming activities ▪ Impact on property prices ▪ Provision of clean, renewable electricity source for the national grid		

7.3. Closure and decommissioning phase impacts

Closure and decommissioning impacts are likely to be similar to the construction phase impacts and therefore should also be satisfactorily accommodated in the EMP.

8. Plan of Study for Environmental Impact Assessment

8.1. Tasks to be undertaken

The EIA report stage effectively is informed by the scoping phase, to which a number of specialists have or will provide input and comments re archaeological, socio-economic, etc.

The specialists will identify opportunities and constraints as associated with the site and the proposed development and provide their input to the Concept Development design.

The specialists will continue to be involved throughout the EIR assessment phase of the project.

The following steps are to be undertaken as part of the EIR assessment phase:

- Alternatives to optimize the development proposal will be investigated, in a re iterative manner, so as to avoid or minimize negative impacts and maximize potential benefits.

- The entire project team, including the specialist consultants, will be involved in the re iterative evaluation of alternatives.

- The specialist consultants will be asked, where appropriate, to provide an explicit statement regarding the potential significance of residual impacts, taking into account proposed mitigation measures as to be developed and tabled.

- An Environmental Management Plan (EMP) covering construction, operational and decommissioning phases of the proposed development will be prepared after input from specialists, incorporating recommendations for mitigation, monitoring and evaluation are received.

8.2. Consultation with Competent Authority

It is anticipated that consultation with the competent authority will take place:

- At the stage of the EIA Scoping phase of the project.

- At the stage of the Draft Environmental Impact Report

- On an ad hoc basis as need may dictate, to address issues that require input from the competent authority as may arise during the project.

8.3. Assessment of Environmental Issues and Alternatives

The objective of an EIA is to find the alternative having the least negative environmental impact, and which best benefits society.

The assessment and evaluation of potential impacts associated with the proposed development would thus be undertaken in a re iterative manner, to inform pro-actively the 'shaping' of the optimum development proposal.

Specialists involved in the EIA will be asked to assess impacts, especially the direct footprint as well as indirect and potential cumulative impacts of the development.

Specialists will also be asked to take into account the context of the impact (i.e. any relevant legal, policy and planning informants) and the intensity (magnitude, duration, extent) as impacting on their specific field of specialist expertise. Specialists would be asked to highlight any impacts that could be irreversible or result in an irreplaceable loss of resource.

Specialists will be asked to evaluate the significance of residual impacts associated with the proposed development, taking into account scientific information, local community and societal values attached to the environment as being impacted upon.

Specialists will be asked to use accepted or formal standards, thresholds or targets for environmental quality, where available, as a key indicator of potential significance, since these measures reflect societal values. Where these benchmarks are absent, specialists would draw on a combination of criteria used to assess potential impacts, to indicate their potential significance, as well as feedback from key stakeholders.

Specialist will be asked to assess and respond to all comments made by Key Departments and Registered Interested and Affected Parties.

The option of not proceeding with the activity (i.e. closure) will provide a reliable baseline

alternative against which to compare and evaluate feasible and reasonable development alternatives.

8.4. Public Participation Process

Public participation processes will be undertaken during Scoping *and* EIR phases, as follows:

1. The public and near neighbours were advised and given notice of the intention to commence an environmental assessment process.
2. Responding members of the public and neighbours (I&APs) are registered to the application data base and will participate in the scoping EIA process.
3. Registered I&APs will be appraised of the Final Scoping Report and Plan of Study for EIA.
4. When the EIR assessment and report phase is completed the draft EIR will be advertised for comment and input from I&APs and others prior to submission of the application.

The project team will evaluate any comment and input as may be forthcoming and will respond as appropriate to issues and concerns as raised by I&APs.

Should amendments to any Draft Report be substantive, or should the Final Report contain substantive information that was not included in the Draft Report, registered I&APs will be afforded an opportunity to comment on the Final Report before it is submitted to the competent authority as provided for by Regulation.

Thereafter a Final EIR report will be submitted to the competent authority for evaluation.

8.5. Criteria for Specialist Assessment of Impacts

Based on the issues raised by I&APs and the project team, further specialist studies may be undertaken to provide or supplement information to address the concerns and assess the impacts of the proposed development on the environment. The specialist will assessed, comment and respond to all issued raised by the registered I&AP's and key Departments.

The various specialists have provided baseline information. This information has been used by the planning team to inform the current development proposals. The specialists are provided with set criteria for undertaking their assessments, to allow for comparative assessment of all issues, inclusive of input as received from IA&Ps. These criteria are detailed in the Terms of Reference to each specialist, inclusive of the need to consider the no go option as the base line option. These criteria are defined in the NEMA Environmental Impact Assessment Regulations: Guideline and Information Document Series: Generic Terms of Reference for Environmental Assessment Practitioners: For Basic Assessment and Scoping-EIA as published in March 2010.

These criteria to include for assessment:

- **Nature of the impact**

  This is an appraisal of the type of effect the construction, operation and maintenance of a development would have on the affected environment. This description should include what is to be affected and how.

- **Extent of the impact**

  Describe whether the impact will be:
  (i) local extending only as far as the development site area;
  (ii) limited to the site and its immediate surroundings;
  (iii) will have an impact on only the region,
  (iv) will have an impact on a national scale or across international borders.

- **Duration of the impact**

  The specialist should indicate whether the lifespan of the impact would be

  (i) short term (0-5 years),
  (ii) medium term (5-15 years),
  (iii) long terms (16-30 years) or
  (iv) permanent

- **Intensity of the impact**

  The specialist should establish whether the impact is destructive or benign and intensity should be qualified as low, medium or high.

  The specialist study must attempt to quantify the magnitude of the impacts and outline the rationale used.

- **Probability of occurrence**

  The specialist should describe the probability of the impact actually occurring and should be described as

  (i) improbable (low likelihood)
  (ii) probable (distinct possibility)
  (iii) highly probable (most likely) or
  (iv) definite (impact will occur regardless of any prevention measures)

  The impacts should also be assessed in terms of the following aspects:

- **Status of the impact**

  The specialist should determine whether the impacts are negative, positive or neutral (“cost – benefit” analysis).

  The impacts are to be assessed in terms of their effect on the project and the environment. For example, an impact that is positive for the proposed development may be negative for the environment. It is important that this distinction is made in the analysis.

- **Accumulative impact**

  Consideration must be given to the extent of any accumulative impact that may occur due to the proposed development. Such impacts must be evaluated with an assessment of similar developments already on the environment. Such impacts will be either positive or negative, and will be graded as being of negligible, low, medium or high impact.

- **Degree of confidence in predictions**

  The specialist should state what degree of confidence (low, medium or high) is there in the predictions based on the available information and level of knowledge and expertise.

  Based on a synthesis of the information contained in the above-described procedure, the specialist is required to assess the potential impacts in terms of the following significance criteria:

- Is of no significance as the impact does not influence the proposed development and/or environment in any way.

- Low significance as the impacts will have a minor influence on the proposed development and/or environment. Such impacts require some attention or modification to the project design where possible, or alternative mitigation.

- Moderate significance as the impacts will have a moderate influence on the proposed development and/or environment. Such impact can be ameliorated by a modification in the project design or implementation of effective mitigation measures.

- High significance as such impacts will have a major influence on the proposed development and/or environment.

The final impact assessment report should at least cover the following sections:

- Executive Summary
- Introduction and Description Of Study
- Methodology
- Results
- Assessment of Impacts (including mitigation measures to reduce negative impacts and measures to enhance positive impacts and the completion of impact tables)
- Discussion
- Recommendations (Pre-Construction, Construction and Operational Phases)
- Conclusion

8.6. Terms of Reference for Specialist Studies to be undertaken as part of the EIA

Biodiversity and Ecological Study:

The study will be undertaken by Eco Impact to establish the impacts of the proposed development on the ecological environment. The following is required:

- A description of the methodology used to determine significant potential environmental impacts;
- A description of environmental issues identified during the environmental impact assessment process;
- An assessment of direct, indirect and cumulative impacts in terms of standard criteria;
- A description and assessment of all alternatives identified during the EIA process;
- Recommendations that include mitigation measures for potentially significant impacts to be included in the EMP;
- An indication of the extent to which issues can be addressed by the adoption of achievable mitigation measures;
- A description of any assumptions, uncertainties and gaps in knowledge; and
- An environmental impact statement which contains a summary of the key findings of the environmental impact assessment; as well as positive and negative implications of the proposed activity versus the alternatives.
- Review the Comments and Responses Report to ensure that all relevant issues or concerns relevant to the specialist's field of expertise are addressed.

Agricultural Impact Assessment:

The study will be undertaken by Eco Impact to establish the impacts of the proposed development on the agricultural environment. The following is required:

- 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 area's 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.

Archaeology:

The bigger area will be assessed in accordance to the scoping phase terms of reference in the EIR phase.

Fresh Water and Water Quality Management Report:

The solar panels electricity connections will cross the drainage lines. The impact of this will be assessed in the EIR phase. A Water Quality Management report as per DWA standard will also form part of the EIR phase to assess and apply for the water use needs associated with the facilities to be constructed.

Flood Line determination:

The solar panels electricity connections will cross the drainage lines. The impact of this will be assessed in the EIR phase.

Other Issues Raised

Any further substantive issues raised during the public participation process and not captured to date by the process will be dealt with as needed in process by members of the project team.

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