FINAL SCOPING REPORT

For the proposed Tiger Kloof Solar Photovoltaic Energy Facility near Vryburg,
North West Province




NEAS Reference: DEA/EIA/0001820/2013
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PROJECT DETAIL

NEAS Reference No.	:	DEA/EIA/0001820/2013
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Project Title	:	Proposed Tiger Kloof Solar Photovoltaic Energy Facility near Vryburg, North West Province
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GLOSSARY OF TERMS AND ACRONYMS

BA	Basic Assessment
BAR	Basic Assessment Report
DEA	Department of Environmental Affairs
DoE	Department of Energy
DWA	Department of Water Affairs
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EP	Equator Principles
EPFI	Equator Principles Financial Institutions
Environmental impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects.
GNR	Government Notice Regulation.
I&AP	Interested and affected party.
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
kV	Kilo Volt
Mitigate	Activities designed to compensate for unavoidable environmental damage.
MW	Megawatt
NEMA	National Environmental Management Act No. 107 of 1998
NERSA	National Energy Regulator of South Africa
NWA	National Water Act No. 36 of 1998
PPP	Public Participation Process
PV	Photovoltaic
REIPPP	Renewable Energy IPP Procurement Process
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework

CONTEXT FOR THE PROPOSED PROJECT

According to Eskom, the demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand, fueled by increasing economic growth and social development, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmentally responsible development, the impacts of climate change and the need for sustainable development. The use of renewable energy technologies, as one of a mix of technologies needed to meet future energy consumption requirements is being investigated as part of the national Department of Energy's (DoE) long-term strategic planning and research process.

The primary rationale for the proposed solar photovoltaic (PV) facility is to add new generation capacity from renewable energy to the national electricity mix and to aid in achieving the goal of 42% share of all new installed generating capacity being derived from renewable energy forms, as targeted by DoE (Integrated Resource Plan 2010-2030). In terms of the Integrated Resource Plan (IRP), approximately 8.4GW of the renewable energy capacity planned to be installed will be generated from PV technologies over the next twenty years.

To contribute towards this target and to stimulate the renewable energy industry in South Africa, the need to establish an appropriate market mechanism was identified, and the Renewable Energy IPP Procurement (REIPPP) process was announced in August 2012, with the intention of DoE to purchase 3,750MW of renewable energy from IPPs to be delivered to the national grid by end of 2016 under a 20 year Power Purchase Agreement to be signed with Eskom. The establishment of the REIPPP process in South Africa provides the opportunity for an increased contribution towards the sustained growth of the renewable energy sector in the country, the region and internationally, and promote competitiveness for renewable energy with conventional energies in the medium- and long-term.

In response to the above, Kabi Solar (Pty) Ltd (Kabi Solar) is proposing the development of a solar PV facility and associated infrastructure for the purpose of commercial electricity generation on an identified site located near Vryburg in the North West Province (refer to Figure 1 for the locality map). From a regional site selection perspective, this region is preferred for solar energy development due to its global horizontal irradiation value of 8,501 MJ/m2.

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EXECUTIVE SUMMARY

Like many other small and developing municipalities in the country, the Naledi Local Municipality faces a number of challenges in addressing the needs of the community while planning for a sustainable future (IDP, 2012-17). The Naledi Local Municipality's Integrated Development Plan (IDP, 2012-17) reveals the following key weaknesses for the municipality: municipal financial viability; growing unemployment; generally declining economy; lack of industrial development in Vryburg; infrastructural neglect and service backlogs; and lack of a proper Land Use Management System. The following key threats are also identified: increasing urbanization of rural part of NLM population; environmental degradation; high unemployment and poverty levels; large housing backlogs; lack of capital to provide and maintain services infrastructure. The IDP does not explicitly deal with renewable energy development, but the Naledi local economic development (LED) however identifies carbon-footprint reduction, including supporting alternative energies, as LED programmes for the NLM.

In response to the above Kabi Solar intends to develop a 75MW photovoltaic solar facility and associated infrastructure on Portion 3 & 4 of the farm Waterloo 730, Registration Division IN, North West situated within the Naledi Local Municipality area of jurisdiction. The proposed development is located approximately 3 kilometres south of Vryburg (refer to Figure 1 and 2 for the locality and regional map). The total footprint of the project will approximately be 250 hectares (including supporting infrastructure on site). The site was identified as being highly desirable due to its suitable climatic conditions, topography (i.e. in terms of slope), environmental conditions (i.e. agricultural potential, geology and archaeology), proximity to a grid connection point (i.e. for the purpose of electricity evacuation), as well as site access (i.e. to facilitate the movement of machinery, equipment, infrastructure and people during the construction phase).

The Environmental Impact Assessment (EIA) Regulations, 2010 (Regulation 543) determine that an environmental authorization is required for certain listed activities, which might have detrimental effects on the environment. The following activities have been identified with special reference to the proposed development and are listed in the EIA Regulations:

- Activity 10(i) (Regulation 544): *"The construction of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."*
- Activity 1 (Regulation 545): *"The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more."*
- Activity 15 (Regulation 545): *"Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more."*
- Activity 14(a)(i) (Regulation 546): *"The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation- (a) North West Province (i) All areas outside urban areas."*

Being listed under Listing Notice 1, 2, and 3 (Regulation 544, 545, and 546) implies that the development is considered as potentially having a significant impact on the environment. Subsequently a 'thorough assessment process' is required as described in Regulations 26-35.

Environamics has been appointed as the independent consultant to undertake the EIA on Kabi Solar's behalf.

Regulation 28 of the EIA Regulations requires that a scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping. The potential positive and negative impacts associated with the proposed development have been identified. The potentially most significant environmental impacts associated with the development are briefly summarized below:

Impacts during the construction phase:
During the construction phase minor negative impacts are foreseen over the short term. The latter refers to a period of months. The potentially most significant negative impacts relate to the potential impacts on the soil (soil compaction and chemical soil pollution) and the water features located on the site. The construction phase will however also provide temporary employment and other economic benefits for the duration of the construction phase.

Impacts during the operational phase:
During the operational phase the study area will serve as an electricity generation facility and the negative impacts are generally associated with the potential increase in storm water runoff, soil erosion, leakage of hazardous material, the increased consumption of water, visual intrusion, and security risks. The provision of sustainable services delivery also needs to be confirmed. The operational phase will have direct positive impacts through the provision of permanent employment opportunities for its duration, the generation of additional electricity and the generation of income to the local community.

Impacts during the decommissioning phase:
The physical environment will benefit from the closure of the solar facility since the site will be restored to its natural state. The decommissioning phase will result in the loss of permanent employment. However, skilled staff will be eminently employable and a number of temporary jobs will also be created in the process. The generation of waste that will also require certain management measures.

Cumulative impacts:
Three other solar plants have been proposed in relative close proximity to the proposed development, namely the 19.5MW solar plant on a northern portion of the farm Waterloo 992 (DEA Reference No.: 14/12/16/3/3/1/506), the 75MW solar plant on a southern portion of the farm Waterloo 992 (DEA Ref: 14/12/16/3/3/2/308) and the 75MW solar plant on the remainder Extent of the farm Rosendal 673 (DEA Ref: 14/12/16/3/3/2/390). Due to their proximity the potential for cumulative impacts does exist. The Environmental Impact Assessment (EIA) Report will include a detailed assessment of the cumulative impacts associated with the proposed development.

Regulation 31 of the EIA Regulations determine that an EIA report be prepared and submitted for the proposed activity after the competent authority approves the final scoping report. The EIA report will evaluate and rate each identified impact, and identify mitigation measures that may be required. The EIA report will contain information that is necessary for the competent authority to consider the application and to reach a decision contemplated in Regulation 35.

1. INTRODUCTION

This section aims to introduce the Scoping Report and specifically to address the following requirements of the regulations:

28. (1) A scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include –
(a) details of –
(i) the EAP who prepared the report; and
(ii) the expertise of the EAP to carry out scoping procedures.

1.1 Legal mandate and purpose of the report

Regulations No. 543, 544 and 545 (of 18 June 2010) promulgated in terms of Section 24(5), 24(M) and 44 of the National Environmental Management Act, (107 of 1998) determine that an Environmental Impact Assessment (EIA) process should be followed for certain listed activities, which might have a detrimental effect on the environment. According to the DEAT 2006 general guidelines the main objectives of the Regulations are: *"… to establish the procedures that must be followed in consideration, investigation, and assessment and reporting of the activities that have been identified. The purpose of these procedures is to provide the competent authority with adequate information to make decisions which ensure that activities which may impact negatively on the environment to an acceptable degree are not authorized, and that activities which are authorized are undertaken in such a manner that the environmental impacts are managed to acceptable levels."*

The EIA Regulations No. 544, 545 and 546 outline the activities for which EIA should apply. The following activities with special reference to the proposed development are listed in the EIA Regulations:

- Regulation 544 under Activity 10(i): *"The construction of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."*
- Regulation 545 under Activity 1: *"The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more."*
- Regulation 545 under Activity 15: *"Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more."*
- Regulation 546 under Activity 14(a)(i): *"The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation- (a) North West Province (i) All areas outside urban areas."*

Being listed under Listing Notice 1, 2, and 3 (Regulation 544, 545, and 546) implies that the proposed development is considered as potentially having a significant impact on the environment. Subsequently a 'thorough assessment process' is required as described in Regulations 26-35.

According to the DEAT 2006 'General Guide to the EIA Regulations' the purpose of scoping is defined as, *"… to determine the 'scope' of the EIA that will be conducted in respect of the activity for which authorization is being applied for."* The main outcomes of the scoping report will be to highlight key issues, potential environmental impacts and reasonable alternatives. The Scoping phase is also meant to define the nature and extent of specialist studies required in the EIA stage. The objectives of the scoping study are summarized as follows:

- Identify potential environmental impacts of the proposed development;
- Examine the sustainability of the proposed development in terms of the biophysical, ecological, socio-economic environment;
- Identify environmental issues that require further investigation;
- Identify Interested and Affected Parties (I&APs), inform them of the proposed development and identify any key concerns to be considered in decision making;
- Provide relevant governmental and non-governmental authorities and agencies with the necessary information to make informed decisions regarding the proposed development at the scoping level;
- Consider alternatives, which could be in terms of: site selection, layout, construction materials, processes, engineering solutions and designs and sustainability best practice; and
- Outline the methodology employed to date and proposed activities to be undertaken during the Environmental Impact Assessment (EIA) stage.

This report is the Final Scoping Report to be submitted to the Department of Environmental Affairs. According to Regulation 543 all registered I&APs and relevant State Departments must be allowed the opportunity to review the draft and final scoping reports. The Final scoping report will be made available to registered I&APs and all relevant State Departments. They will be requested to provide written comments on the Final scoping report within 21 days of receiving the notification. All issues identified during this review period will be documented and compiled into a Comments and Response Report to be included as part of the Draft Environmental Impact Report (EIR).

1.2 Details of the environmental assessment practitioner (EAP)

Environamics was appointed by the applicant as the independent EAP to conduct the EIA and prepare all required reports. All correspondence to the EAP can be directed to:

Contact person: Carli Steenkamp
Postal Address: P O Box 6484, Baillie Park, 2526
Telephone: 018 –299 1523 (w) 086 762 8336 (f)
Electronic Mail: Carli.Steenkamp@nwu.ac.za

Regulation 17 determines that an independent and suitably qualified EAP should conduct the EIA. In terms of the independent status of the EAP a declaration was submitted as part of the application form. The expertise of the EAP responsible for conducting the EIA is summarized in a curriculum vitae included as Appendix A to this report.

1.3 Status of the EIA process

The EIA process is conducted strictly in accordance with the stipulations set out in Regulations 26 to 35 of Regulation 543. Table 1.1 provides a summary of the status of the EIA process and future steps to be taken. It can be confirmed that to date:

- A site visit was held on 26 April 2013 to discuss the proposed development and assess the site.
- A fully completed application form was submitted to the National Department of Environmental Affairs (DEA) on 5 April 2013 and the Department registered the application on the 18 April 2013.

It is envisaged that the Final Scoping Report will be accepted by the Department during September/October 2013. The EIA process should be completed within approximately nine months of submission of this report, i.e. by March/April 2014 – see Table 1.

Table 1.1: Project schedule

Tasks to be performed	April 2013				May 2013				June 2013				July 2013				Aug. 2013				Sept. 2013				Oct. 2013				Nov. 2013				Dec. 2013			
	1	2	3	4	1	2	3	1	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
REGISTRATION PHASE																																				
Submit application form		X																																		
Pre application meeting	X																																			
Site visit					X																	X														
SCOPING PHASE																																				
Public participation																																				
- Press advertisement					X																															
- On site advertisement					X																															
- Complete PP report										X																										
Consultation																																				
- As required by Regs					X																															
- Local authority					X																															
Draft Scoping Report											X																									
Final Scoping report																																				
- Circulate																			X																	
- Submission																				X																
- Approval																											X									
Plan of Study for EIA report																																				
- Submission																				X																
- Approval																											X									
EIA PHASE																																				
Specialist inputs and reports																																				
- Draft terms of reference																							X													
- Receive specialist studies																												X								
Draft EIA Report																													X							
Final EIA Report & EMP																																				
- Circulate																																				
- Submission																																				X

Environmental authority acknowledges receipt of the final basic assessment report within 14 days after submission according to Regulation 23
Environmental authority accept/reject Final EIA report within 60 days after submission according to Regulation 34
Decision and/or indicate specialist review – within 45 days after acceptance of EIA report according to Regulation 35
Appeal period – expires 20 days after IAPs have been informed of the decision according to Regulation 60

1.4 Structure of the report

This report is structured in accordance with the prescribed contents stipulated in Regulation 28 of R543. It consists of nine sections demonstrating compliance to the specifications of the regulations as illustrated in Table 1.2.

Table 1.2: Structure of the report

Requirements for the contents of a scoping report as specified in the Regulations		Section in report	Pages
29(1) A scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include –			
(a)	details of -	1	1-5
	(i) the EAP who prepared the report; and		
	ii) the expertise of the EAP to carry out scoping procedures.		
(b)	a description of the proposed activity;	2	7-14
(c)	a description of any feasible and reasonable alternatives that have been identified;		
(d)	a description of the property on which the activity is to be undertaken and the location of the activity on the property;		
(e)	a description of the environment that may be affected by the activity and the manner in which the activity may be affected by the environment.	3	15-17
(f)	an identification of all legislation and guidelines that have been considered in the preparation of the scoping report;	4	18-28
(g)	a description of environmental issues and potential impacts, including cumulative impacts, that have been identified;	5	29-37
(h)	details of the public participation process conducted in terms of regulation 27(a), including –	6	38-41
	(i) the steps that were taken to notify potentially interested and affected parties of the application;		
	(ii) proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the application have been displayed, placed or given;		
	(iii) a list of all persons or organisations that were identified and registered in terms of regulation 55 as interested and affected parties in relation to the application; and		
	(iv) a summary of the issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues;		
(k)	Copies of any representations, and comments received in connection with the application or the scoping report from interested and affected parties;		
(l)	Copies of minutes of any meetings held by the EAP with interested and affected parties and other role players which record the view of the participants;		
(m)	Any response by the EAP to those representations and comments and views;		

(i)	a description of the need and desirability of the proposed activity;	7	42-43
(j)	A description of the identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity;	N.A.	-
(n)	a plan of study for environmental impact assessment which sets out the proposed approach to the environmental impact assessment of the application, which must include –	8	44-51
	(i) a description of the tasks that will be undertaken as part of the environmental impact assessment process, including any specialist reports or specialised processes, and the manner in which such tasks will be undertaken;		
	(ii) an indication of the stages at which the competent authority will be consulted;		
	(iii) a description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity; and		
	(iv) particulars of the public participation process that will be conducted during the environmental impact assessment process;		
(o)	any specific information required by the competent authority; and	N.A.	-
(p)	Any other matters required in terms of sections 24(4)(a) and (b) of the Act.	N.A.	-
(2) In addition, a scoping report must take into account any guidelines applicable to the kind of activity which is the subject of the application.		N.A.	-
(3) The EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act.		N.A.	-

2. ACTIVITY DESCRIPTION AND ALTERNATIVES

This section aims to address the following requirements of the regulations:

28. (1) A scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include –
(b) a description of the proposed activity;
(c) a description of any feasible and reasonable alternatives that have been identified; and
(c) a description of the property on which the activity is to be undertaken and the location of the activity on the property.

2.1 Project location and description

The activity entails the development of a solar PV facility and associated infrastructure on Portion 3 & 4 of the farm Waterloo 730, Registration Division IN, North West situated within the Naledi Local Municipality area of jurisdiction. The proposed development is located in the North West Province, in the northern central interior of South Africa (refer to Appendix A, Figure 2 for the regional map). The town of Vryburg, including the Huhudi township is located approximately 3 km north of the proposed development (refer to Appendix A, Figure 1 for the locality map).

The project entails the generation of approximately 75MW electrical power through solar PV technology. The total footprint of the project will approximately be 250 hectares (including supporting infrastructure on site) – refer to table 2.1 for general site information. The property on which the facility is to be constructed will be leased from the property owner, Tiger Kloof Educational Institution via a 25 year notarial lease which has been negotiated between the landowner and Kabi Solar.

Table 2.1: General site information

Description of affected farm portion	Portion 3 & 4 of the farm Waterloo 730, Registration Division IN, North West
21 Digit Surveyor General codes	T0IN00000000073000003 & T0IN00000000073000004
Title Deed	T2778/2004 & T399/2004
Photographs of the site	Refer to the Plates
Type of technology	Photovoltaic solar facility with crystalline silicon panels
Structure Height	Approximately 5 meters
Surface area to be covered	Less than 250 hectares
Structure orientation	The panels will either be fixed to a single-axis horizontal tracking structure where the orientation of the panel varies according to the time of the day, as the sun moves from east to west or tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture the most sun.
Laydown area dimensions	Less than 250 hectares
Generation capacity	75MW
Expected production	168.500.000 kWh/year

2.2 Photovoltaic technology

The term photovoltaic describes a solid-state electronic cell that produces direct current electrical energy from the radiant energy of the sun through a process known as the Photovoltaic Effect. This refers to light energy placing electrons into a higher state of energy to create electricity. Each PV cell is made of silicon (i.e. semiconductors), which is positively and negatively charged on either side, with electrical conductors attached to both sides to form a circuit. This circuit captures the released electrons in the form of an electric current (direct current). The key components of the proposed project are described below:

- PV Panel Array - To produce 75MW, the proposed facility will require numerous linked cells placed behind a protective glass sheet to form a panel. Multiple panels will be required to form the solar PV array which will comprise the PV facility. The PV panels will either be fixed to a single-axis horizontal tracking structure where the orientation of the panel varies according to the time of the day, as the sun moves from east to west or tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture the most sun.

- Wiring to Central Inverters - Sections of the PV array would be wired to central inverters sized from 500kW to 2MW. The inverter's role is to convert direct current (DC) electricity to alternating current (AC) electricity at grid frequency.

- Connection to the grid - Connecting the array to the electrical grid requires transformation of the voltage from 480V to 22kV to 132kV. The normal components and dimensions of a distribution rated electrical substation will be required. Output voltage from the inverter is 480V and this is fed into step up transformers to 132kV. An on-site substation will be required on the site to step the voltage up to 132kV, after which the power will be evacuated into the national grid. Whilst Kabi Solar has not yet received a cost estimate letter from Eskom, it is expected that generation from the facility will be evacuated either via the new Mookodi substation approximately 1,75km north of the site, or via the (to be constructed) Mookodi-Magopela 132kV line which is planned to run parallel to the eastern border of the project site.

- Supporting Infrastructure - A control facility with basic services such as water and electricity will be constructed on the site and will have an approximate footprint 400m² or less. Other supporting infrastructure includes voltage and current regulators and protection circuitry.

- Roads – An access road from the national road (N18) and an internal site road network to provide access to the solar field and associated infrastructure will be required. All site roads will require a width of approximately 5m.

- Fencing - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm.

2.3 Layout description

The layout plan will follow the limitations of the site and aspects such as environmentally sensitive areas, roads, fencing and servitudes will be considered. The total surface area proposed for layout options include the PV panel arrays spaced to avoid shadowing, access and maintenance roads and associated infrastructure (buildings, power inverters, transmission lines and perimeter fences).

Due to the nature of the site being used for grazing (refer to the Plates), limited features of conservation significance exist. However a number of potential wetland areas (depressions) will need to be considered in the layout plan (refer to Figure 3 for the location of the possible wetlands). These small depressions (longest diameter 150m) are neither seepages nor pans and exist only as small depressions on very gentle slopes: some of these depressions are linked by a very shallow and poorly defined drainage line. The drainage line is on very gentle slopes and does not form a channel of note or fall within an area that could be described as a valley bottom. It is anticipated that the proposed development would not have a major influence on the hydrological regime of the depressions at the site. Given the present restricted nature and poorly defined wetlands at the site, as well as the lack of threatened species, it is recommended that proposed developments, if approved, focus on maintaining the integrity of shallow water run-off lines and small depressions. The type of development proposed, if approved, do not have the same impact as a plantation or buildings in terms of shade effects on the flora and fauna, and more importantly, on buffer zones or corridors. Therefore a buffer zone of 50 m, given the type of development and the characteristics of the wetland system listed above, is thought to be sufficient to maintain the functioning of the wetland system at the site. The draft layout plan will be submitted as part of the EIA Report.

2.4 Services provision

Adequate provision of water will be a prerequisite for the development. The Department of Water Affairs has been asked to confirm the water resource availability in the relevant catchment management area in order to ensure sustainable water supply. A full assessment of the application for water use authorisation will only be undertaken in the event that the project proponent has been appointed as a preferred bidder by the Department of Energy.

The estimated maximum amount of water required during construction is 6m³ per MW. Since a 75MW facility is being proposed, the total water consumption during the 24 months of construction will be approximately 450 m³ per annum. The estimated maximum amount of water required during the facility's 20 years of production is 2200m³ per annum. The majority of this usage will be for the cleaning of the solar panels. Since each panel requires approximately 2 liters of water for cleaning, the total amount of 285 000 panels will require 570 000 liters per wash. It is estimated that the panels may only need to be washed twice per annum, but provision is made for quaternary cleaning (March, May, July, and September). This total will be approximately 2,200,000 liters per annum for washing. An additional 20m³ liters per annum will also be required for toilet use, drinking water, etc. Water will be brought to the site by water tankers.

Water saving devices and technologies such as the use of dual flush toilets and low-flow taps, the management of storm water, the capture and use of rainwater from gutters and roofs would be considered by the developer. Furthermore indigenous vegetation will be used during landscaping and the staff will be trained to implement good housekeeping techniques.

Whilst the responsibility of waste disposal will be that of the EPC contractor, the local municipality will need to confirm that there is capacity at the municipal refuse collection sites to deal with any such waste. During the operational period the project will only require normal municipal refuse collection services.

There are expected to be offices with washing and toilet facilities that will be installed on the site. If these services cannot be connected to the municipal sewerage system, Kabi Solar may need to request for Naledi to supply services to drain a septic tank from time to time upon request.

2.5 Consideration of alternatives

The DEAT 2006 guidelines on 'assessment of alternatives and impacts' proposes the consideration of four types of alternatives namely, the no-go, location, activity, and design alternatives. It is however, important to note that the regulation and guidelines specifically state that only 'feasible' and 'reasonable' alternatives should be explored. It also recognizes that the consideration of alternatives is an iterative process of feedback between the developer and EAP, which in some instances culminates in a single preferred project proposal. The following sections explore each type of alternative in relation to the proposed activity.

2.5.1 No-go alternative

This alternative considers the option of 'do nothing' and maintaining the status quo. The description provided in section 3 of this report could be considered the baseline conditions (status quo) to persist should the no-go alternative be preferred. The site is currently zoned for agricultural land uses. Should the proposed development not proceed, the site will remain unchanged and will continue to be used for low density cattle grazing (refer to plates for photographs of the site). However, the potential opportunity costs in terms of the supporting social and economic development in the area would be lost.

2.5.2 Location alternatives

This alternative asks the question, if there is not, from an environmental perspective, a more suitable location for the proposed activity. No other properties have at this stage have been secured by Kabi Solar in the Vryburg area to potentially establish solar facilities. From a local perspective, Portion 3 & 4 of the farm Waterloo 730 is preferred due to its suitable climatic conditions, topography (i.e. in terms of slope), environmental conditions (i.e. agricultural potential, geology and archaeology), proximity to a grid connection point (i.e. for the purpose of electricity evacuation), as well as site access (i.e. to facilitate the movement of machinery, equipment, infrastructure and people during the construction phase). It should also be consider that the landowner in its role as an educational institution (Water Kloof School) wished to engage in such a project to earn financial benefit to secure funds to ensure its sustainability.

The proposed development falls within an area used for grazing and the site is therefore considered to have limited environmental sensitivity as a result. The National Department of Agriculture (2006) classified land capability into two broad categories, namely land suited to cultivation (Classes I – IV) and land with limited use, generally not suited to cultivation (Classes V – VIII). Figure 4 illustrates that the site falls within Class V, indicated by the blue shade covering the south eastern parts of the map. The agricultural potential of the site is therefore limited and it is unlikely that the change in land use will impact significantly on agricultural production.

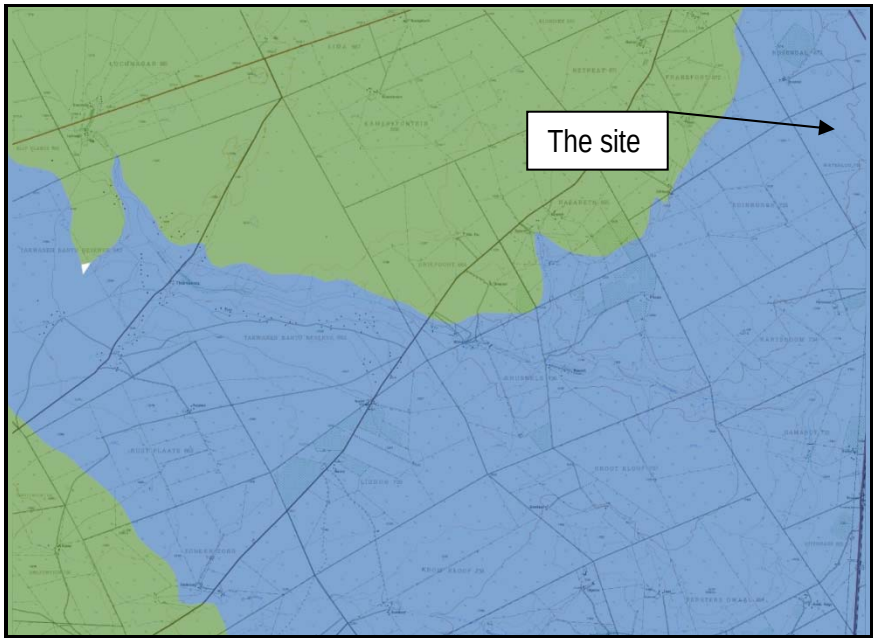


Figure 4: Land capability classification (The National Department of Agriculture, 2006)

Alternative locations on Portion 3 & 4 of the farm Waterloo 730 may be considered should it be required as a result of specialist studies.

2.5.3 Activity alternatives

The scoping process also needs to consider if the development of a solar PV facility would be the most appropriate land use for the particular site.

Photovoltaic (PV) solar facility – Kabi Solar is establishing a portfolio of solar PV projects throughout South Africa but focusing on the Northern Cape and North West Province. Kabi Solar is of the opinion that solar PV technology is perfectly suited to the site, given the high irradiation values for the Vryburg area (8,501 MJ/m2). The technology furthermore entails low visual impacts, have relatively low water requirements, is a simple and reliable type of technology and all of the components can be recycled.

Wind energy facility - Due to the local climatic conditions a wind energy facility is not considered suitable as the area does not have the required wind resource. Furthermore the applicant has opted for the generation of electricity via solar power rather than the use of wind turbines. This alternative is therefore regarded as not feasible and will not be evaluated further in this report.

Concentrated Solar Power (CSP) technology - CSP technology requires large volumes of water and this is a major constraint for this type of technology in the proposed project area. While the irradiation values are high enough to generate sufficient solar power, the water constraints render this alternative not feasible. Therefore, this alternative will not be considered further in this report.

2.5.4 Technical alternatives

The electricity generated from the solar panels will be transmitted via 132kV an overhead line to the Mookodi substation north of the site. The transmission line will be constructed within a 32m

wide servitude and will traverse the property of the Naledi Local Municipality (The farm Rosendal 673). The 132kV overhead transmission line is the only preferred alternative for the applicant due to the following reasons:

Overhead Transmission Lines - Overhead lines are less costly to construct than underground lines. Therefore, the preference with overhead lines is mainly on the grounds of cost. Overhead lines allow high voltage operations and the surrounding air provides the necessary electrical insulation to earth. Further, the surrounding air cools the conductors that produce heat due to lost energy (Swingler et al, 2006).

The overall weather conditions in the North West Province are less likely to cause damage and faults on the proposed overhead transmission power line. Nonetheless, if a fault occurs, it can be found quickly by visual means using a manual line patrol. Repair to overhead lines is relatively simple in most cases and the line can usually be put back into service within a few days. In terms of potential impacts caused by overhead transmission lines include visual intrusion and threats to sensitive habitat (where applicable).

Underground Transmission Lines - Underground cables have generally been used where it is impossible to use overhead lines for example because of space constraints. Underground cables are oil cooled and are also at risk of groundwater contamination. Maintenance is also very difficult on underground lines compared to overhead lines. When a fault occurs in an underground cable circuit, it is almost exclusively a permanent fault due to poor visibility. Underground lines are also more expensive to construct than overhead lines.

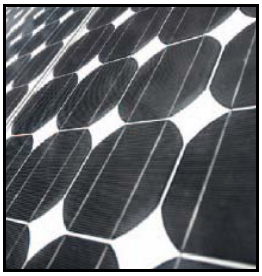
2.5.5 Design and layout alternatives

Design alternatives were considered throughout the planning and design phase (i.e. what would be the best design option for the development?). In this regard discussions on the design are being held between the EAP and the developer. The final layout plan will have to consider the possible wetlands/depressions and the shallow drainage line located on the site – refer to Figure 3 for the location of the possible wetlands and a drainage line. It is envisaged that the applicant will consult with the Department of Water Affairs in order to develop within the 500m buffer zones surrounding the depressions. Discussions will be held with the Department of Water Affairs and the layout plan will be submitted as part of the EIA Report.

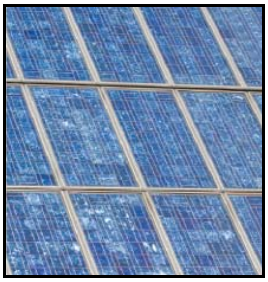
2.5.6 Technology alternatives

There are several types of semiconductor technologies currently available and in use for PV solar panels. Two, however, have become the most widely adopted, namely crystalline silicon and thin film. These technologies are discussed in more detail below:

Crystalline (high efficiency technology at higher cost):
Crystalline silicon panels are constructed by first putting a single slice of silicon through a series of processing steps, creating one solar cell. These cells are then assembled together in multiples to make a solar panel. Crystalline silicon, also called wafer silicon, is the oldest and the most widely used material in commercial solar panels. Crystalline silicon modules represent 85-90% of the global annual market today. There are two main types of crystalline silicon panels that can be considered for the solar facility:



- Monocrystalline Silicon - Monocrystalline (also called single crystal) panels use solar cells that are cut from a piece of silicon grown from a single, uniform crystal. Monocrystalline panels are among the most efficient yet most expensive on the market. They require the highest purity silicon and have the most involved manufacturing process.



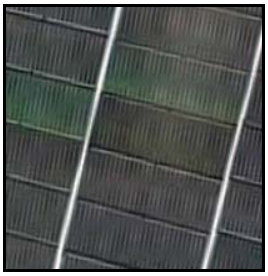
- Multicrystalline Silicon - Multicrystalline (also called polycrystalline) panels use solar cells that are cut from multifaceted silicon crystals. They are less uniform in appearance than monocrystalline cells, resembling pieces of shattered glass. These are the most common solar panels on the market, being less expensive than monocrystalline silicon. They are also less efficient, though the performance gap has begun to close in recent years (First Solar, 2011).

Thin film (low-cost technology with lower efficiency):

Thin film solar panels are made by placing thin layers of semiconductor material onto various surfaces, usually on glass. The term *thin film* refers to the amount of semiconductor material used. It is applied in a thin film to a surface structure, such as a sheet of glass. Contrary to popular belief, most thin film panels are not flexible. Overall, thin film solar panels offer the lowest manufacturing costs, and are becoming more prevalent in the industry. Thin films currently account for 10-15% of global PV module sales. There are three main types of thin film used:

- Cadmium Telluride (CdTe) - CdTe is a semiconductor compound formed from cadmium and tellurium. CdTe solar panels are manufactured on glass. They are the most common type of thin film solar panel on the market and the most cost-effective to manufacture. CdTe panels perform significantly better in high temperatures and in low-light conditions.

- Amorphous Silicon - Amorphous silicon is the non-crystalline form of silicon and was the first thin film material to yield a commercial product, first used in consumer items such as calculators. It can be deposited in thin layers onto a variety of surfaces and offers lower costs than traditional crystalline silicon, though it is less efficient at converting sunlight into electricity.



- Copper, Indium, Gallium, Selenide (CIGS) - CIGS is a compound semiconductor that can be deposited onto many different materials. CIGS has only recently become available for small commercial applications, and is considered a developing PV technology (First Solar, 2011).

The technology that proved most feasible and reasonable with respect to the proposed solar facility is crystalline silicon panels. Although it is more expensive than thin films it is approximately 10 times more efficient, is non-reflective and has a higher durability than thin-film systems. The active material in thin films tends to be less stable than crystalline causing degradation over time and the lower cost to manufacture some of the module technologies is partially offset by the higher area-related system costs (costs for mounting and the land required) due to their lower conversion efficiency. Furthermore thin film modules have higher visibility and reflections.

3. DESCRIPTION OF THE ENVIRONMENT

This section aims to address the following requirements of the regulations:

28. (1) A scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include –
(e) a description of the environment that may be affected by the activity and the manner in which the activity may be affected by the environment.

3.1 Site description

The site description deals with land uses on site as well as land uses adjacent the development area (see Plates).

3.1.1 Land uses on and adjacent the site

The site survey revealed that land uses in the immediate vicinity of the proposed development are essentially comprised of grazing (cattle), rural residential, and institutional. A number of service infrastructure elements are currently present in the vicinity of the site, including the N18, and the Kimberley-Mahikeng railway line. A new municipal landfill site and Eskom's new Mookodi substation are currently being constructed on the farm Rosendal to the north of the site. Three solar PV facilities are also being proposed on adjacent farms, namely on the farm Waterloo 992 and the Remaining Extent of the farm Rosendal 673. Currently the dominant land uses in the area essentially consist of grazing (cattle) – refer to plates 1-13 for photographs of the development area.

3.2 Description of the biophysical environment

The biophysical environment is described with specific reference to geotechnical aspects, topography, soils and general biodiversity. However, due to the fact that the area proposed for development exclusively consists of land used for grazing, nothing of note was identified from an ecological or conservation perspective apart from the existing water features (in the form of pans) that will have to be considered in the final layout plan.

3.2.1 Geotechnical conditions

The geological environment south of Vryburg is fairly complicated and contains materials of numerous geological origins. Geological lithologies that may be encountered can be summarised in chronological order as follows:

- *Dwyka Formation (C-Pd)*: The Dwyka Formation belongs to the Karoo Supergroup and is mainly concentrated south, east and south east of Vryburg. The Dwyka Formation consists mainly of diamictite and shale in this region.
- *Vryburg Formation (Vv)*: The Vryburg Formation forms part of the Griqualand West Supergroup and comprises quartzite, flagstone, dolomite, conglomerate, shale and andesitic lava.

- *Clearwater Formation (Vc)*: The Clearwater Formation (Schmidtsdrif Subgroup, Ghaap Group, Griqualand West Supergroup) is a dolomitic lithology. The Formation consists of shale and siltstone with interbedded dolomite.

The area investigated may therefore be located on dolomitic land. Hence, a detailed geotechnical study will need to be conducted to determine the feasibility of the site for the proposed development of a solar facility.

3.2.2 Vegetation and landscape features

In terms of vegetation type the site falls within the Ghaap Plateau Vaalbosveld vegetation type (Mucina and Rutherford, 2006). Ghaap Plateau Vaalbosveld vegetation covers areas of the Northern Cape and North West Provinces. The region is characterised by fairly flat plains with very elongated undulating landscape. Site drainage in all instances takes place by means of sheet wash and infiltration. Flood lines are not applicable to the study area. The conservation status of this vegetation type is described by Mucina and Rutherford (2006) as 'least threatened'.

The vegetation consists of a well-developed shrub layer with *Tarchonanthus camphorates* and *Acacia karroo*. It is indicated that *Acacia erioloba* may be present in this vegetation type. In terms of the National Forests Act of 1998, *A. erioloba* has protected status due to concerns over the large volumes of *A. erioloba* wood being removed for commercial sale of firewood. Many trees are also killed as a result of bush encroachment control through pesticides. In terms of the National Forests Act of 1998 protected tree species may not be cut, disturbed, damaged or destroyed except under license granted by the Department of Forestry (or a delegated authority). Although only one *Acacia erioloba* were observed during the site visit, a limited number of *Acacia erioloba* (commonly known as camel thorn) may be present on site. Due to the extent of the proposed development (250 hectares) a fauna and flora ecological study will be conducted to determine the sensitivity of the habitat and the extent to which *Acacia erioloba* are present on the site.

3.2.3 Climate

The Vryburg area is situated in an area with a Weinert N-value of 8,2 and a Thornthwaite Moisture Index between -20 and -40. Climatically the area may thus be described as semi-arid. The mean monthly maximum and minimum temperatures is 36.6ºC and -5.5ºC for December and July respectively. Kabi Solar (Pty) Ltd. is of the opinion that solar PV technology is perfectly suited, given the region's high irradiation values.

3.2.4 Visual landscape

The visual impact of the solar PV facility depends on the complex relationship between the visual environment (landscape), the development (object), and the observer/receptor (e.g. farmer). The establishment of a solar facility on the site is not expected to have a significant visual effect, given that the number of sensitive receptors is very low, electrical infrastructure such as power lines are already located in close proximity to the site and the polycrystalline panels considered for this development are non-reflective. In addition Eskom's Mokoodi Main Transmission Substation, which is in the final stages of commissioning and is 1,5 km to the north of the site already dominates the environment (see Plate 12). However due to the extent of the proposed development (250 hectares) a visual impact study will be conducted to determine to what extent the proposed

development will be visible to observers and whether the landscape provides any significant visual absorption capacity.

3.3 Description of the socio-economic environment

3.3.1 Socio-economic conditions

The 2012-2017 NLM IDP notes that Vryburg and Naledi are at the hub of the economically most underperforming district in the North West (NLM, 2012: 23). The 2009 Naledi GDP was estimated at ~R1.945 billion. The main sectors of the NLM economy in terms of GDP generation were Agriculture and hunting (21%), Finance and Insurance (8%), Administration (8%), and Transport (5%). Manufacturing (food, beverages and tobacco) accounts for ~1%. Beef production development centered on Vryburg currently constitutes the anchoring economic strategy. Construction and manufacturing (agricultural, especially beef processing) have been identified as further potential growth areas in the 2012-2017 IDP, specifically in order to absorb the large group of unemployed youth (NLM, 2012).

The Naledi population is currently estimated at 68 380 people (~16 338 households). The NLM reflects the DM's high youthful dependence rate. Approximately 49.5% of the NLM population is of school going age, or younger (0-19), while only 4% is retired (65 and older). The 2012-2017 IDP also notes that the number of youthful dependents has significant implications in terms of household income and poverty (NLM, 2012). Approximately 18% of the NLM adult population had no formal schooling, and 66% had some schooling, but less than Grade 12. Only 6.5% of the NLM population has tertiary qualifications, including diplomas. The NLM unemployment rate is estimated at 47%. The bulk of the NLM economically active population cohort is comprised of Black Africans (78%), but the majority of this group however lacks skills and is not functionally literate. The population group with the highest overall unemployment was the Coloured group (~45%). The NLM IDP notes that, as a result of reinforcing factors of unemployment, lack of skills, illiteracy and poverty, average Naledi household income levels are generally low, with ~53% of household heads earning less than R3 500/month.

The key employment sectors in the NLM are Agriculture and hunting (~37%), Community Services (~21%), Private households (~18%), and Trade (~10.5%). Manufacturing provides less than 2% of employment opportunities. The Agriculture subsector is largely responsible for the uptake of lower skilled portion of the Black part of the labour force. The NLM informal economy is sizeable. Approximately half of those employed in the sector is so as street traders, retailers and marketers (NLM, 2012).

3.3.2 Cultural and heritage aspects

Special attention was given to the identification of possible cultural or heritage resources on site. The initial site investigation concluded that there are no obvious heritage resources located on the site earmarked for development. However a Heritage Impact Assessment will be conducted to ensure that there would be no impact on cultural or historical features as a result of the proposed development. From a heritage point of view the following condition will apply:

- To address any subsurface cultural or heritage resources it needs to be clearly stated in the construction environmental management plan, submitted with the EIA report, that SAHRA will be informed immediately should any artefacts be exposed during construction. Training of contractors on heritage issues will also form part of the contractors brief.

4. LEGISLATIVE AND POLICY CONTEXT

This section aims to address the following requirements of the regulations:

28. (1) A scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include –
(f) an identification of all legislation and guidelines that have been considered in the preparation of the scoping report.

4.1 Introduction

Environmental decision making with regards to photovoltaic solar plants is based on numerous policy and legislative documents. These documents inform decisions on project level environmental authorisations issued by the National Department of Environmental Affairs (DEA) as well as comments from local and district authorities. Moreover it is significant to note that they also inform strategic decision making reflected in IDPs and SDFs. Therefore to ensure streamlining of environmental authorisations it is imperative for the proposed development to align with the principles and objectives of key national, provincial and local development policies and legislation. The following acts and policies are briefly summarised:

- The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)
- National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA]
- The National Energy Act, 2008 (Act 34 of 2008)
- National Water Act, 1998 (Act No. 36 of 1998)
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
- The National Heritage Resources Act, 1999 (Act No. 25 of 1999)
- Conservation of Agricultural Resources Act, 1983 (Act No. 85 of 1983)
- The White Paper on the Energy Policy of the Republic of South Africa (1998)
- The White Paper on Renewable Energy (2003)
- Integrated Resource Plan (IRP) for South Africa (2010-2030)
- North West Province Growth and Development Strategy (2004-2014)
- Dr Ruth S Mompati District Municipality Integrated Development Plan (IDP) 2012-2017
- Naledi Local Municipality Integrated Development Plan (IDP) 2012-2017
- Naledi Spatial Development Framework (SDF) 2007

The key principles and objectives of each of the legislative and policy documents are briefly summarised in Table 4.1 to provide a reference framework for the implications for the proposed development.

4.2 Legislative context

Table 4.1: Legislative context for the construction of photovoltaic solar plants

LEGISLATION	ADMINISTERING AUTHORITY	DATE	SUMMARY / IMPLICATIONS FOR PROPOSED DEVELOPMENT
The Constitution of South Africa (Act No. 108 of 1996)	National Government	1996	The Constitution is the supreme law of the Republic and all law and conduct must be consistent with the Constitution. The Chapter on the Bill of Rights contains a number of provisions, which are relevant to securing the protection of the environment. Section 24 states that "everyone has the right to (a) an environment that is not harmful to their health or well-being and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that – (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. The Constitution therefore, compels government to give effect to the people's environmental right and places government under a legal duty to act as a responsible custodian of the countries environment. It compels government to pass legislation and use other measures to protect the environment, to prevent pollution and ecological degradation, promote conservation and secure sustainable development.
The National Environmental Management Act (Act No. 107 of 1998)	National and Provincial Department of Environmental Affairs	1998	NEMA provides for co-operative governance by establishing principles and procedures for decision-makers on matters affecting the environment. An important function of the Act is to serve as an enabling Act for the promulgation of legislation to effectively address integrated environmental management. Some of the principles in the Act are accountability; affordability; cradle to grave management; equity; integration; open information; polluter pays; subsidiary; waste avoidance and minimisation; co-operative governance; sustainable development; and environmental protection and justice. The mandate for EIA lays with the National Environmental Management Act (107 of 1998) and the EIA Regulations No. 543, 544, 545, and 546 promulgated in terms of Section 24 of NEMA. The EIA Regulations determine that an Environmental Authorisation is required for certain listed activities, which might have a detrimental effect on the environment. This EIA was triggered by activity 10 listed in Regulation R544, activities 1 and 15 listed in Regulation R545, and Activity 14(a)(i) listed in Regulation R546, which requires a 'scoping and environmental impact assessment process.'

The National Energy Act (Act No. 34 of 2008)	Department of Minerals and Energy	2008	One of the objectives of the National Energy Act was to promote diversity of supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources, including solar: "To ensure that diverse energy resources are available, in sustainable quantities, and at affordable prices, to the South African economy, in support of economic growth and poverty alleviation, taking into account environmental management requirements (…); to provide for (…) increased generation and consumption of renewable energies…" (Preamble).
The National Water Act (Act No. 36 of 1998)	Department of Water Affairs (DWA)	1998	Sustainability and equity are identified as central guiding principles in the protection, use, development, conservation, management and control of water resources. The intention of the Act is to promote the equitable access to water and the sustainable use of water, redress past racial and gender discrimination, and facilitate economic and social development. The Act provides the rights of access to basic water supply and sanitation, and environmentally, it provides for the protection of aquatic and associated ecosystems, the reduction and prevention of pollution and degradation of water resources. As this Act is founded on the principle that National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, a person can only be entitled to use water if the use is permissible under the Act. Chapter 4 of the Act lays the basis for regulating water use.
National Environmental Management: Waste Act (Act No. 59 of 2008)	Department of Environmental Affairs (DEA)	2008	NEMWA has been developed as part of the law reform process enacted through the White Paper on Integrated Pollution and Waste Management and the National Waste Management Strategy (NWMS). The objectives of the Act relate to the provision of measures to protect health, well-being and the environment, to ensure that people are aware of the impact of waste on their health, well-being and the environment, to provide for compliance with the measures, and to give effect to section 24 of the Constitution in order to secure an environment that is not harmful to health and well-being. Regulations No. R718 (of 3 July 2009) promulgated in terms of Section 19(1) of the National Environmental Management: Waste Act (59 of 2008) determine that no person may commence, undertake or conduct a waste management activity listed in this schedule unless a license is issued in respect of that activity.

National Environment Management: Air Quality Act (Act No. 39 of 2004)	Department of Environmental Affairs (DEA)	2004	The object of this Act is to protect the environment by providing reasonable measures for the protection and enhancement of the quality of air in the Republic; the prevention of air pollution and ecological degradation; and securing ecologically sustainable development while promoting justifiable economic and social development. Regulations No. R248 (of 31 March 2010) promulgated in terms of Section 21(1)(a) of the National Environmental Management Act: Air Quality Act (39 of 2004) determine that an Atmospheric Emission License (AEL) is required for certain listed activities, which result in atmospheric emissions which have or may have a detrimental effect on the environment. The Regulation also sets out the minimum emission standards for the listed activities.
The National Heritage Resources Act (Act No. 25 of 1999)	South African Heritage Resources Agency (SAHRA)	1999	The Act aims to introduce an integrated and interactive system for the management of the heritage resources, to promote good government at all levels, and empower civil society to nurture and conserve heritage resources so that they may be bequeathed to future generations and to lay down principles for governing heritage resources management throughout the Republic. It also aims to establish the South African Heritage Resources Agency together with its Council to co-ordinate and promote the management of heritage resources, to set norms and maintain essential national standards and to protect heritage resources, to provide for the protection and management of conservation-worthy places and areas by local authorities, and to provide for matters connected therewith. The Act protects and manages certain categories of heritage resources in South Africa. For the purposes of the Heritage Resources Act, a "heritage resource" includes any place or object of cultural significance. In this regard the Act makes provision for a person undertaking an activity listed in Section 28 of the Act to notify the resources authority. The resources authority may request that a heritage impact assessment be conducted if there is reason to believe that heritage resources will be affected.
Conservation of Agricultural Resources Act (Act No. 85 of 1983)	National and Provincial Government	1983	The objective of the Act is to provide for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.

4.3 Policy context

Table 4.2: Policy context for the construction of photovoltaic solar plants

POLICY	ADMINISTERING AUTHORITY	DATE	SUMMARY / IMPLICATIONS FOR PROPOSED DEVELOPMENT
The White Paper on the Energy Policy of the Republic of South Africa	Department of Minerals and Energy	1998	The White Paper on the Energy Policy of the Republic of South Africa establishes the international and national policy context for the energy sector, and identifies the following energy policy objectives: • Increasing access to affordable energy services • Improving energy governance • Stimulating economic development • Managing energy-related environmental and health impacts • Securing supply through diversity • Energy policy priorities The White Paper sets out the advantages of renewable energy and states that Government believes that renewables can in many cases provide the least cost energy service, particularly when social and environmental costs are included. The White Paper acknowledges that South Africa has neglected the development and implementation of renewable energy applications, despite the fact that the country's renewable energy resource base is extensive and many appropriate applications exist. The White Paper notes that renewable energy applications have specific characteristics that need to be considered. Advantages include: • Minimal environmental impacts in operation in comparison with traditional supply technologies; and • Generally lower running costs, and high labour intensities. Disadvantages include: • Higher capital costs in some cases; • Lower energy densities; and • Lower levels of availability, depending on specific conditions, especially with sun and wind based systems.

The White Paper on Renewable Energy	Department of Minerals and Energy	2003	This White Paper on Renewable Energy supplements the *White Paper on Energy Policy*, which recognizes that the medium and long-term potential of renewable energy is significant. This Paper sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa. The White Paper notes that while South Africa is well-endowed with renewable energy resources that have the potential to become sustainable alternatives to fossil fuels, these have thus far remained largely untapped. Government's long-term goal is the establishment of a renewable energy industry producing modern energy carriers that will offer in future years a sustainable, fully non-subsidised alternative to fossil fuels. The medium-term (10-year) target set in the White Paper is: *10 000 GWh (0.8 Mtoe) renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro. The renewable energy is to be utilised for power generation and non-electric technologies such as solar water heating and bio-fuels. This is approximately 4% (1667 MW) of the projected electricity demand for 2013 (41539 MW)* (Executive Summary, ix).
Integrated Resource Plan (IRP) for South Africa	Department of Minerals and Energy	2010-2030	The current iteration of the Integrated Resource Plan (IRP) for South Africa, after a first round of public participation in June 2010, led to the Revised Balanced Scenario (RBS) that was published in October 2010. The document outlines the proposed generation new build fleet for South Africa for the period 2010 to 2030. This scenario was derived based on the cost-optimal solution for new build options, which was then "balanced" in accordance with qualitative measures such as local job creation. In addition to all existing and committed power plants, the RBS included a nuclear fleet of 9,6GW; 6,3GW of coal; 11,4GW of renewables; and 11,0GW of other generation sources. A second round of public participation was conducted in November/December 2010, which led to several changes to the IRP model assumptions. The main changes were the disaggregation of renewable energy technologies to explicitly display solar photovoltaic (PV), concentrated solar power (CSP) and wind options; the inclusion of learning rates, which mainly affected renewables; and the adjustment of investment costs for nuclear units (a possible increase of 40%). Additional cost-optimal scenarios were generated based on the changes. The outcomes of these scenarios, in conjunction with the following policy considerations, led to the Policy-Adjusted IRP:

			• The installation of renewables were brought forward in order to accelerate a local industry; • To account for the uncertainties associated with the costs of renewables and fuels, a nuclear fleet of 9,6GW was included in the IRP; • The emission constraint of the RBS (275 million tons of carbon dioxide per year after 2024) was maintained; and • Energy efficiency demand-side management (EEDSM) measures were maintained at the level of the RBS. The Policy-Adjusted IRP includes the same amount of coal and nuclear new builds as the RBS, while reflecting recent developments with respect to prices for renewables. In addition to all existing and committed power plants (including 10GW committed coal), the plan includes 9,6GW of nuclear; 6,3GW of coal; 17,8GW of renewables; and 8,9GW of other generation sources. The Policy-Adjusted IRP has therefore resulted in an increase in the contribution from renewables from 11,4 GW to 17,8 GW.
North West Province Growth and Development Strategy	North West Provincial Government	2004 - 2014	The Strategy (PGDS) provides a framework for integrated and sustainable growth and economic development for the province and its people over the next ten years. It addresses the formulation of a common vision, goals and objectives of what should be achieved and how the provincial government and its social partners should achieve its objectives. The PGDS notes that the NWP is a medium-size province, covering ~10% of the total national surface area, accounting for ~8% of the national population, and contributing ~7% to the national economy. With the exception of the mining sector (~23.5% of provincial GDP in 2002), private sector activity in the NWP is very modest. Other development challenges include low population densities; inadequate infrastructure, and enormous service delivery backlogs; a predominantly poor population with high levels of illiteracy and dependency; great inequalities between rich and poor, and disparities between urban and rural; and the HIV/Aids pandemic. Both the primary immediate and long term objectives of the PGDS are therefore to address poverty and unemployment, while simultaneously improving the low level of expertise and skills. Additional objectives include promoting equal and fair access to opportunities and assets; enhancing competitiveness, profitability and SMME development; and ensuring sustainable development.

Renewable Energy Strategy for the North West Province	North West Department of Economic Development, Environment, Conservation and Tourism	2012	The renewable energy strategy for the North West Province was developed in response to the need of the North West Provinces to participate meaningfully within the renewable energy sector of South Africa. The renewable energy strategy aims to improve the North West Province's environment, reduce the North West Province's contribution to climate change, and alleviate energy poverty, whilst promoting economic development and job creation in the province whilst developing its green economy. This strategy attempts to focus the efforts of all stakeholders and provides a foundation to make the North West Province a primary contributor towards the renewable energy sector within South Africa. There are a number of international, national and provincial mandates and driving forces that play a pivotal role in the development of this renewable energy strategy for the North West Provinces. These include the fact that South Africa was ranked the 12th largest emitter of CO2 emissions in 2009 and has committed to reduce its greenhouse gas emissions by 34% by 2020. The North West is rated as the fourth largest electricity consuming province in South Africa and consumes approximately 12% of the available electricity. This is mainly due to the high demand of the electrical energy-intensive mining and related industrial sector. Approximately 63% of the electricity supplied to the North West Province is consumed in its mining sector. South Africa has an abundance of renewable energy resources available. The applicability of these RE resources depend on a number of factors and are consequently not equally viable for the NWP. The renewable energy sources that were identified to hold the most potential and a competitive strength for the North West Province are Solar Energy (photovoltaic as well as solar water heaters), Municipal Solid Waste, hydrogen and fuel cell technologies, bio-mass, and energy efficiency. The Dr Ruth Segomotsi Mompati District Municipality has an annual Solar radiation range of 8,501 MJ/m2. Compared to a location such as Upington, which is considered a prime location for solar energy projects and also located within the area of maximum solar radiation, the Dr Ruth Segomotsi Mompati District Municipality receive on average only 5% less solar radiation than Upington. The North West Province consequently shows considerable potential for solar applications in renewable energy as a whole, with high potential specifically in the Dr. Ruth Mompati district municipality.
Dr Ruth S Mompati District	Dr Ruth S Mompati District	2012 - 2017	The IDP serves as the basic developmental framework and the basis for annual reviews of municipal performance for the period up to 2017. The IDP is explicitly aligned with the requirements of the Municipal

Municipality Integrated Development Plan (IDP)	Municipality		Systems Act (2000) and the developmental objectives outlined in the National Priority Outcomes, and the National Medium Term Strategic Framework (2009). Identified key intervention priority areas include: • More inclusive economic growth, decent work and sustainable livelihoods; • Developing economic and social infrastructure; • Rural development, food security and land reform; • Improving access to quality education; • Improved health care; • Fighting crime and corruption; • Sustainable resource management and use. A situation analysis of the DM indicates, amongst others, the following key developmental challenges: • The DM's largely African population generally suffers from low education, low income and high unemployment levels, and many have minimal access to water and sanitation; • A mainly youthful African population, with a correspondingly small labour force cohort, and hence high levels of youthful dependency; • High functional illiteracy amongst the African population group; • Great dependency upon government as employer in the DM, and therefore the crucial need to develop the private sector (mainly in agriculture and mining), and develop the Small Medium Micro Enterprise (SMME) sector both in the formal and informal sectors; Renewable energy is not directly addressed, but the IDP does indicate the transition to a low carbon economy as a DM goal, and recommends that the DM speeds up and expands renewable energy (generation) (DRSMDM, 2012: 114).
Naledi Local Municipality Integrated Development Plan (IDP)	Naledi Local Municipality	2012-2017	The Naledi IDP includes a municipal turnaround strategy ("Municipal Plan") in response to the NLM's current financial non-viability, and consequent inability to fully meet its developmental and service delivery obligations. The IDP is aligned with key national and provincial developmental policy, including the National Priority Outcomes and the NWP PGDS. The IDP is informed by a SWOT analysis of the Naledi LM. Key identified NLM Strengths include: a

			strong agricultural sector in a high capacity beef grazing area; the most diverse and dominant economy in the DRSMDM; strategic location with regard to the N14 transport corridor; identification of the NLM as Priority Two investment area in the NWP Spatial Development Framework. Key Weaknesses include: municipal financial viability; growing unemployment; generally declining economy; lack of industrial development in Vryburg; infrastructural neglect and service backlogs; and lack of a proper Land Use Management System. Key Opportunities include: capitalizing on Vryburg's status as Secondary Regional Centre and the NLM's strategic location; local economic development (LED) opportunities linked to establishing Vryburg as regional beef beneficiation centre, tourism, and game farming. Key Threats include: increasing urbanization of rural part of NLM population; environmental degradation; high unemployment and poverty levels; large housing backlogs; lack of capital to provide and maintain services infrastructure. A summary of the 9 NLM Ward Plans indicates that key identified community needs are mainly linked to roads (1), housing (2), municipal services (3), security, and employment/ LED. The IDP notes that the NLM has been suffering from chronic water shortages since 2009; that the waste water treatment plant exceeds capacity by 40%, that many municipal roads are in a bad state; and that illegal dumping is a serious and widespread issue in the NLM. The IDP does not explicitly deal with renewable energy development, but identifies carbon-footprint reduction, including supporting alternative energies, as LED programmes for the NLM. The Local Economic Development (LED) Strategy is specifically aligned with National Priority Outcomes 4 ("decent employment through inclusive economic growth); 5 (a skilled and capable economic work force to support an inclusive growth path") and 7 (vibrant, equitable rural communities and food security for all).
Naledi Spatial Development Framework (SDF)	Naledi Local Municipality	2007	As noted in the 2012-2007 IDP, the most recent approved 2007 SDF is outdated, and lacks spatial guidance in the form of maps and spatial development plans. The SDF is currently under review, and in early Final stage. The NLM planner has indicated that the Vryburg urban edge is currently in the process of being demarcated, but that no urban-edge or land use related maps were available for the Vryburg area. The development of a municipal landfill site on the northern portion of Rosendal Farm west of the N18 was confirmed, but the planner was unable to provide specific details with regard to location.

4.4 Other legislation

Other legislation mainly refers to the following:

- Planning legislation governing the rezoning process and approval of the layout plan.
- Design standards and legislation for services provision such as water, sewerage, electricity, etc.
- Municipal bylaws related to building plans, building regulations, etc.

4.5 Relevant guidance

The following guidance was considered in conducting the EIA:

- The Equator principles (2006)[1]
- World Bank Group Environmental, Health and Safety General Guidelines (EHS Guidelines)(2007)
- Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution (2007)
- International Finance Corporation's Policy on Environmental and Social Sustainability (2012)
- DEA, (2012), Guideline 5 – Final companion to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2010
- DEA, (2012), Guideline 7 – Public participation in the Environmental Impact Assessment process
- DEAT, (2006), Guideline 3 – General guide to the Environmental Impact Assessment Regulations
- DEAT, (2006), Guideline 4 – Public participation in support of the Environmental Impact Assessment Regulations
- DEAT, (2006), Guideline 5 – Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations

4.6 Conclusion

The Environmental Impact Assessment was undertaken in accordance with the Environmental Impact Assessment Regulations (2010) published in GNR 543, in terms of Section 24(5), 24(M) and 44 of the National Environmental Management Act, 1998 (Act No 107 of 1998) as amended; all relevant National legislation, policy documents, national guidelines, the World Bank EHS Guidelines, the IFC Performance Standards, and the Equator Principles.

[1] Although this report is not written in terms of the Equator Principles (EPs), it fully acknowledges that the EPs will need to be complied with should funding for the project be required.

5. DESCRIPTION OF ENVIRONMENTAL ISSUES

This section aims to address the following requirements of the regulations:

28. (1) A scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include –
(g) a description of environmental issues and potential impacts, including Cumulative impacts that have been identified.

5.1 Scoping methodology

The contents and methodology of the scoping report aims to provide, as far as possible, a user-friendly analysis of information to allow for easy interpretation.

- Checklist (see section 5.2): The checklist consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts.
- Matrix (see section 5.3): The matrix analysis provides a holistic indication of the relationship and interaction between the various development phases and the impact thereof on the environment. The method aims at providing a first order cause and effect relationship between the environment and the proposed development.
- Conceptual model (see section 5.4): The model is designed to indicate the relationship between the different stressors and receptors which leads to specific impacts and related mitigation measures. The environmental management plan as part of the EIA report should aim to formalise the proposed mitigation measures.

5.2 Checklist analysis

The independent consultant together with the developer conducted site visits on 26 April 2013. The site visit was conducted to ensure a proper analysis of the site specific characteristics of the study area. Table 5.1 provides a checklist, which is designed to stimulate thought regarding possible consequences of specific actions and so assist scoping of key issues. It consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts. The table highlights certain issues, which are further analysed in matrix format in section 5.3.

Table 5.1: Environmental checklist

QUESTION	YES	NO	Un-sure	Description
1. Are any of the following located on the site earmarked for the development?				
I. A river, stream, dam or wetland	✕			A number of poorly defined wetlands/depressions and drainage lines may potentially be located on the site – refer to Figure 3.

II. A conservation or open space area		✕		None.
III. An area that is of cultural importance		✕		The initial site investigation concluded that there are no obvious heritage resources located on the site earmarked for development. However a Heritage Impact Assessment will be conducted to ensure that there would be no impact on cultural or historical features as a result of the proposed development.
IV. Site of geological significance	✕			The site is subject to the presence of dolomite. A geotechnical study will need to be conducted to determine the feasibility of the site.
V. Areas of outstanding natural beauty		✕		None.
VI. Highly productive agricultural land		✕		None.
VII. Floodplain		✕		None.
VIII. Indigenous forest		✕		None.
IX. Grass land		✕		None.
X. Bird nesting sites		✕		None.
XI. Red data species		✕		None.
XII. Tourist resort		✕		None.
2. Will the project potentially result in potential?				
I. Removal of people		✕		None.
II. Visual Impacts	✕			The visual impact of a low-lying PV facility is not expected to be significant as the number of sensitive receptors in the area is very low and the polycrystalline modules are non-reflective. However a visual impact study will be conducted.

III. Noise pollution		✕		Construction activities will result in the generation of noise over a period of months. The noise impact is unlikely to be significant.
IV. Construction of an access road		✕		None.
V. Risk to human or valuable ecosystems due to explosion/fire/ discharge of waste into water or air.		✕		None.
VI. Accumulation of large workforce (>50 manual workers) into the site.	✕			Approximately 20 people may be employed per MW over a 6-month period. Therefore a maximum of approximately 1400 employees may be present at the site at any one time during construction. However on average only approximately 350 employees will be present on the site over the period of 24 months that stretches the length of the construction phase of the project.
VII. Utilisation of significant volumes of local raw materials such as water, wood etc.	✕			The estimated maximum amount of water required during the facility's 20 years of production is approximately 2200m³ per annum.
VIII. Job creation	✕			It is envisaged that 8 onsite electrical technicians will be required during the operational phase. It is also envisaged that cleaning staff will be required to come on site twice a year for a 2-week period.
IX. Traffic generation		✕		None.
X. Soil erosion		✕		The site will need to be cleared or graded to a limited extent, which may potentially result in a degree of dust being created, increased runoff and potentially soil erosion. The time that these areas are left bare will be limited to the construction phase, since vegetation will be allowed to grow back to a height of 0.5m after construction.

XI. Installation of additional bulk telecommunication transmission lines or facilities		✕		None.
3. Is the proposed project located near the following?				
I. A river, stream, dam or wetland	✕			There are a number of poorly defined wetlands/depressions in the surrounding area and the site is also located approximately 1 kilometre west of the Dry Harts river.
II. A conservation or open space area		✕		None.
III. An area that is of cultural importance		✕		None.
IV. A site of geological significance		✕		None.
V. An area of outstanding natural beauty		✕		None.
VI. Highly productive agricultural land		✕		None.
VII. A tourist resort		✕		None.
VIII. A formal or informal settlement		✕		None.

5.3 Matrix analysis

The matrix highlights areas of particular concern (see Table 5.2). Each cell is evaluated individually in terms of the nature of the impact, duration and its significance – should no mitigation measures be applied. This is important since many impacts would not be considered insignificant if proper mitigation measures were implemented. The matrix also provides an indication if mitigation measures are available.

Table 5.2: Matrix Analysis

Elements		Significance and magnitude of potential impacts									
		Construction Phase			Operational Phase			Decommissioning Phase			Possible Mitigation
		Minor	Major	Duration	Minor	Major	Duration	Minor	Major	Duration	
PHYSICAL ENVIRONMENT	Flora	-		S	-		L	+		**L**	✓
	Fauna	-		S	-		L	+		**L**	✓
	Air Quality	-		S	*		NA	*		NA	✓
	Soil		-	S		-	L		+	**L**	✓
	Geology	-		S	*		NA	*		NA	✓
	Waste Disposal	-		S	-		L		-	**S**	✓
	Ground Water	-		S	-		L	+		**L**	✓
	Surface Water		-	S		-	L		+	**L**	✓
SOCIAL / ECONOMIC ENVIRONMENT	Employment		+	S		+	L		+	**S**	✓
	Visual Impacts	-		S		-	L		+	**L**	✓
	Security	-		S	-		L	+		**L**	✓
	Traffic Volumes	-		S	-		L	+		**L**	✓
	Health Hazard	-		S	*		NA	*		NA	✓
	Noise Pollution	-		S	*		NA	*		NA	✓
	Tourism	*		NA	*		NA	*		NA	**NA**
	Aesthetics	-		S	-		L	+		**L**	✓
	Archaeology	*		NA	*		NA	*		**NA**	**NA**

(*) No impact (+) Positive Impact (-) Negative Impact (✓) Mitigation Measures Available
(S) Short Term (M) Medium Term (L) Long Term

From the above it is evident that mitigation measures should be available for potential impacts associated with the development.

5.3.1 Physical environment

During the construction phase various minor negative impacts are foreseen over the short term. The latter refers to a period of months. The installation of services will inevitably result in the removal of topsoil with a degree of dust being created in the process. The construction activities may also potentially impact on water features and soil in terms of soil compaction and pollution.

During the operational phase the study area will serve as an electricity generation facility and the negative impacts are generally associated with soil erosion, the potential increase in storm water runoff, the increased consumption of water, and the leakage of hazardous materials. The provision of sustainable services delivery also needs to be confirmed and the applicant will need to put in place an appropriate storm water management system in line with the requirement of development on dolomite land (SANS-1936).

The physical environment will benefit from the closure of the solar facility since the site will be restored to its natural state. However the disposal of waste during decommissioning will require certain management measures. It should be noted that 90% of the decommissioned PV plant material (panels, cables, and steel mounting structures) will be recyclable.

5.3.2 Social/Economic environment

The negative impacts during the construction phase relate primarily to security risks, the increase in construction vehicle traffic and associated dust and noise pollution. Special care should be taken to minimise the latter. The potentially most significant impacts relate to the provision of temporary employment and other economic benefits for the duration of the construction phase.

The negative impacts during the operational phase are generally associated with security risks, and the visual impact of photovoltaic solar facilities. The operational phase will have direct positive impacts through the provision of employment opportunities for its duration, the generation of additional electricity and the generation of income to the local community.

The decommissioning phase will result in the loss of permanent employment. However, skilled staff will be eminently employable and a number of temporary jobs will also be created.

5.4 Conceptual framework

The anticipated key impacts are evaluated for the construction and operational phases of the proposed development respectively. In order to conceptualise the different impacts a diagram is presented, which specify the following (see Diagrams 1 and 2):

- Stressor: Indicates the aspect of the proposed development, which initiates and cause impacts on elements of the environment.
- Receptor: Highlights the recipient and most important components of the environment affected by the stressor.
- Impacts: Indicates the net result of the cause-effect between the stressor and receptor.

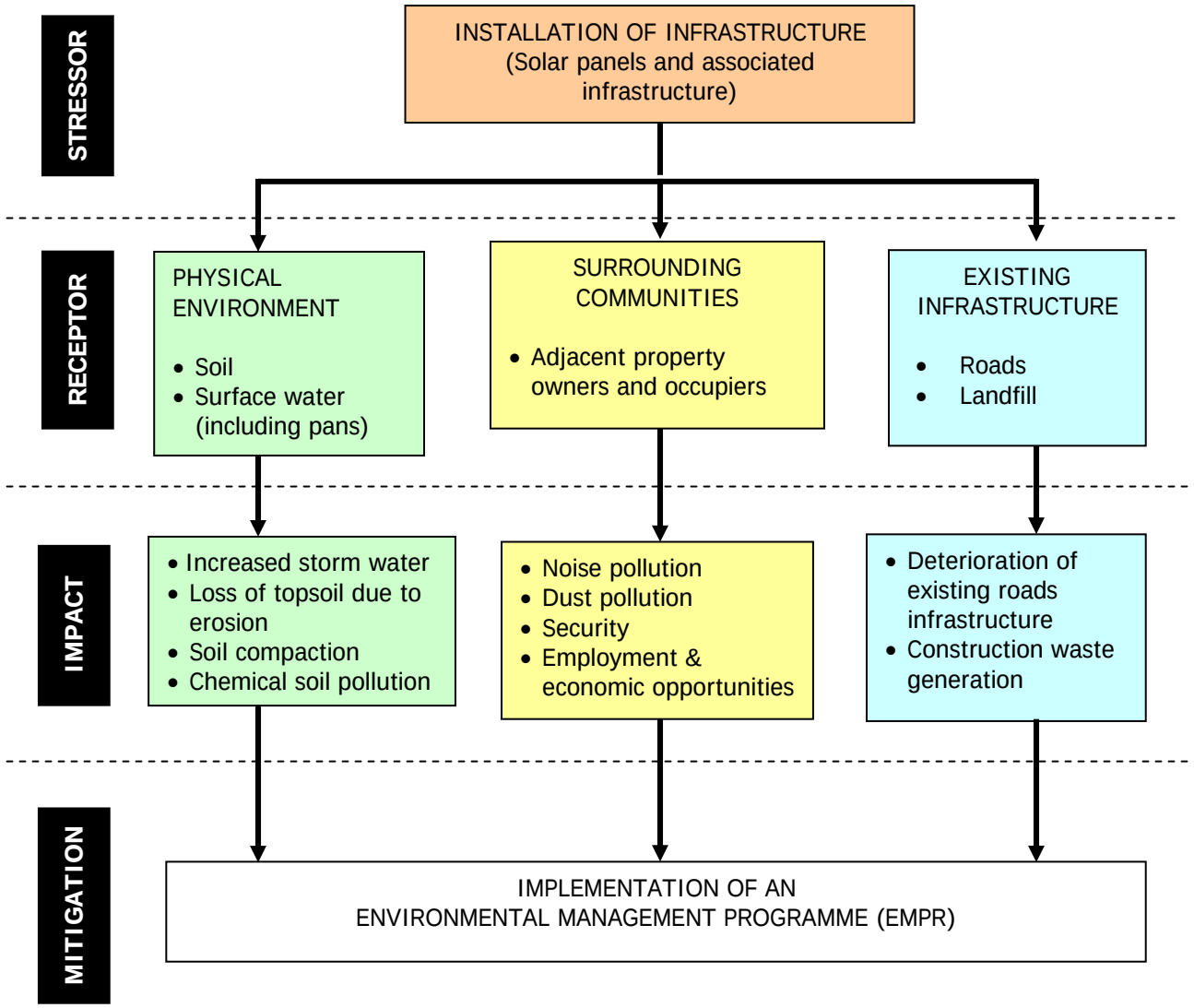
- Mitigation: Impacts need to be mitigated to minimise the effect on the environment.

The scoping process aims to scope potential impacts and focus on the most significant impacts in order to determine key issues for more in depth assessment during the EIA process as well as whether the proposed mitigation measures (if available) would be sufficient.

5.4.1 Impacts during the construction phase

Stressors during the construction phase predominantly refer to the installation of the solar panels and associated infrastructure. Receptors refer to the physical environment and surrounding communities as well as the existing infrastructure. Diagram 1 provides a conceptual model of the stressors, receptors and impacts. The main mitigation measures would be included in a detailed construction environmental management programme (EMPr) to be compiled as part of the EIA report.

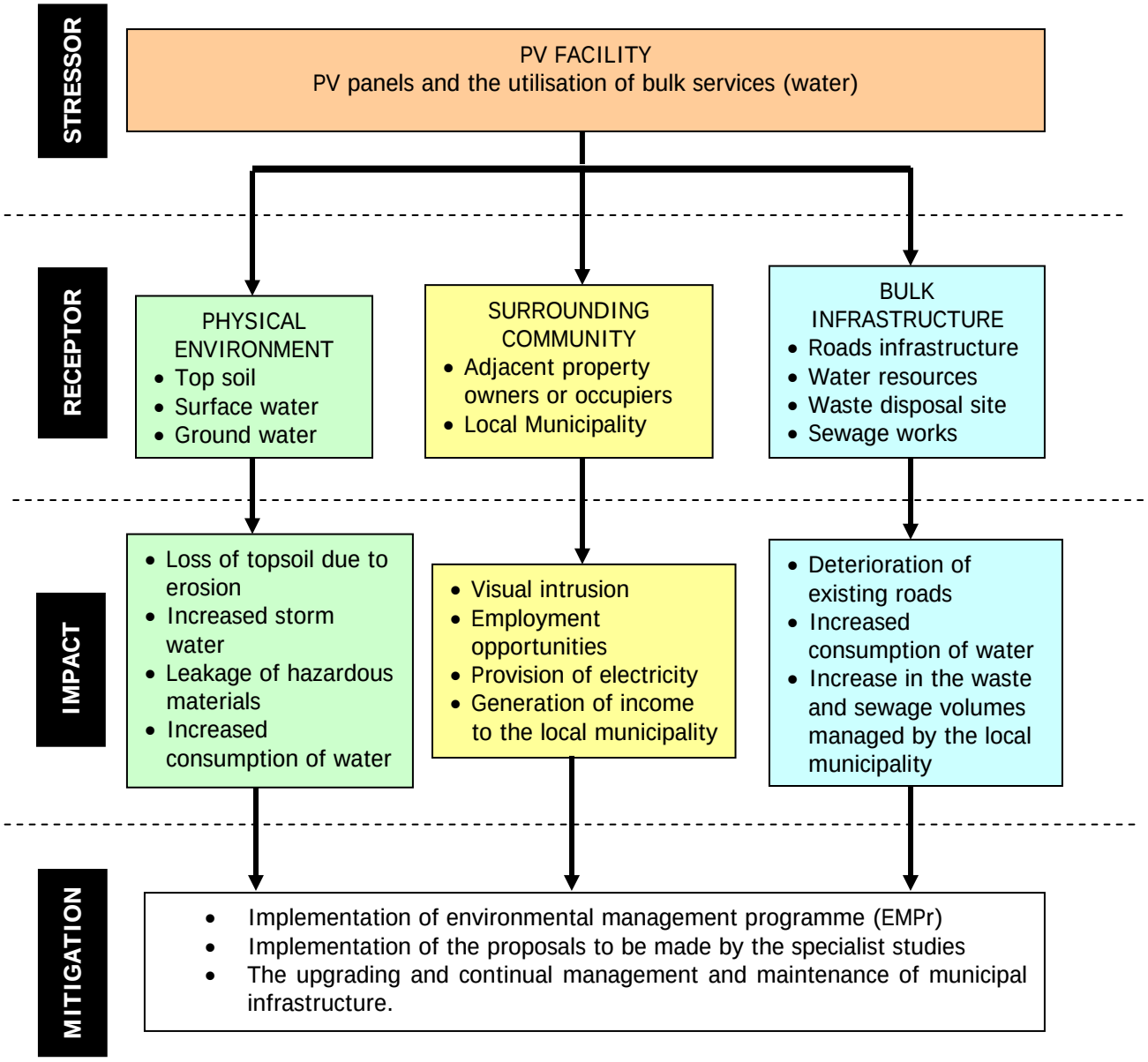
Diagram 1: Conceptual model of impacts during the construction phase



5.4.2 Impacts during the operational phase

Stressors during the operational phase predominantly refer to the multiple photovoltaic (PV) panels and the utilisation of bulk services. Receptors refer to the physical and socio-economic environment. Diagram 1 provides a conceptual model of the stressors, receptors and impacts. The main mitigation measures would be included in a detailed environmental management programme (EMPr) to be compiled as part of the EIA report.

Diagram 2: Conceptual model of impacts during the Operational Phase



5.5 Key issues identified

The scoping methodology identified the following key issues which should be addressed in the EIA report.

5.5.1 Impacts during the construction phase

During the construction phase minor negative impacts are foreseen over the short term. The latter refers to a period of months. The potentially most significant impacts relate to the impacts on the soil and pans, and the provision of temporary employment and other economic benefits for the duration of the construction phase.

5.5.2 Impacts during the operational phase

During the operational phase the study area will serve as an electricity generation facility and the negative impacts are generally associated with soil erosion, the potential increase in storm water runoff, the increased consumption of water, leakage of hazardous materials, visual intrusion, and security risks. The provision of sustainable services delivery also needs to be confirmed. The operational phase will have direct positive impacts through the provision of employment opportunities for its duration, the generation of additional electricity and the generation of income to the local community.

5.5.3 Impacts during the decommissioning phase

The physical environment will benefit from the closure of the solar facility since the site will be restored to its natural state. The decommissioning phase will result in the loss of permanent employment. However, skilled staff will be eminently employable and a number of temporary jobs will also be created in the process. The generation of waste that will also require certain management measures.

6. PUBLIC PARTICIPATION AND CONSULTATION

This section aims to address the following requirements of the regulations:

28. (1) A scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include –
(h) details of the public participation process conducted in terms of regulation 27(a), including –
(i) the steps that were taken to notify potentially interested and affected parties of the application;
(ii) proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the application have been displayed, placed or given;
(iii) a list of all persons or organisations that were identified and registered in terms of regulation 55 as interested and affected parties in relation to the application; and
(iv) a summary of the issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues.

6.1 Public participation process

The public participation process was conducted strictly in accordance with Regulations 27 and 54 to 57. The following three categories of variables were taken into account when deciding the required level of public participation:

- The scale of anticipated impacts
- The sensitivity of the affected environment and the degree of controversy of the project
- The characteristics of the potentially affected parties

Since the scale of anticipated impacts is low, the site already being degraded and the fact that no conflict were foreseen between potentially affected parties, no additional public participation mechanisms were considered at this stage of the process. The following actions have already been taken:

- Newspaper advertisement
  Since the proposed development is unlikely to result in any impacts that extent beyond the municipal area where it is located, it was deemed sufficient to advertise in a local newspaper. An advertisement was placed in English in the local newspaper (Stellalander) on the 1 May 2013 (see Appendix B) notifying the public of the EIA process and requesting Interested and Affected Parties (I&APs) to register with, and submit their comments to Environamics Environmental Consultants. I&APs were given the opportunity to raise comments within 40 days of the advertisement.

- Site notices
  Site notices were placed on site in English on the 26 April 2013 to inform surrounding communities and immediately adjacent landowners of the proposed development. I&APs

were given the opportunity to raise comments by 10 June 2013. Photographic evidence of the site notices is included in Appendix C.

- Direct notification of identified I&APs

  Identified I&APs, including key stakeholders representing various sectors, were directly informed of the proposed development via registered post on 30 April 2013 and were requested to submit comments by 10 June 2013. For a complete list of stakeholder details see Appendix D and for proof of registered post see Appendix E. The consultees included:

  - North West Department of Economic Development, Environment, Conservation and Tourism (NWDEDECT)
  - The Department of Energy
  - The Department of Water Affairs
  - The National Department of Agriculture
  - Department of Mineral Resources
  - The South African Heritage Resources Agency (SAHRA)
  - ESKOM
  - National Energy Regulator of South Africa (NERSA)
  - The Wildlife and Environment Society of South Africa (WESSA)
  - The Dr. Ruth Segomotsi Mompati District Municipality
  - The Municipal Manager at the Naledi Local Municipality
  - The Local Councilor
  - The Civil Aviation Authority (CAA)
  - The Vryburg Ratepayers association
  - Transnet
  - Passenger Rail Agency of South Africa (PRASA)
  - The South African National Roads Agency Ltd. (SANRAL)

  It was expected from I&APs to provide their inputs and comments within 40 days after receipt of the notification. To date the NWDEDET, the National Department of Agriculture, Eskom, SAHRA and SANRAL provided feedback (see Appendix F for written comments).

- Direct notification of surrounding land owners and occupiers

  Written notices were also provided to all surrounding land owners and occupiers on 30 April 2013. For a list of surrounding land owners see Appendix D. To date only E.A.L. van der Merwe has provided verbal feedback (see Appendix F for written comments).

6.2 Consultation process

Regulation 54 requires that the municipality, relevant ward councillor and any organ of state having jurisdiction in respect of any aspect of the activity should be given written notice of the activity. A complete list of all the consultees who received written notice as well as proof of registered post is attached as Appendices D and E.

6.3 Registered I&APs

I&APs include all stakeholders who deem themselves affected by the proposed development. According to Regulation 56(1) "*A registered interested and affected party is entitled to comment, in writing, on all written submissions, including Final reports made to the competent authority*". This

report is the Final Scoping Report to be issued for public comments in terms of the EIA Regulations. The Final Scoping Report will be made available to the following registered I&APs and State Departments:

- The North West Department of Agriculture, Conservation, Environment and Rural Development (NWDEDECT)
- The Department of Water Affairs
- The National Department of Agriculture
- The South African Heritage Resources Agency (SAHRA)
- ESKOM
- SANRAL
- Transnet
- The Municipal Manager at the Naledi Local Municipality
- Mr. Mark Boobbyer (Land owner)
- The representative for E.A.L. van der Merwe (I&AP)

They will be notified of the availability of the Final Scoping Report and will be requested to provide written comments on the report within 21 days. All issues identified during this review period will be documented and compiled into a Comments and Response Report to be included as part of the Draft Environmental Impact Report (EIR).

6.4 Issues raised by IAPs and consultation bodies

Table 6.1 summarises the comments received from consultation bodies. The full wording and original correspondence is included in Appendix F.

Table 6.1: Issues raised by key consultation bodies

Organisation	Person	Written comment (see Appendix F)
Land owner	Mr. Mark Boobbyer	Mr. Boobbyer, the duly authorised representative of Tiger Kloof Educational Institution confirmed in a letter dated 13 March 2013, that he is aware of the EIA process and his right to participate in the process. In an email dated 12 June 2013, Mr. Boobbyer requested a copy of the Draft Scoping Report.
NWDEDECT	Ms. Skosana & Ms. Mosadi	Ms. Skosana confirmed receipt of the initial notification during a telephone conversation on 14 May 2013 and requested a copy of the registration document for the proposed project. Ms. Skosana confirmed receipt of additional information in an e-mail dated 18 April 2013. Ms. Mosadi requested to conduct a site visit on 20 June 2013. In response to the EAP's request Ms. Mosadi confirmed that the site visit will be held on 24 June 2013. Ms. Mosadi however cancelled the site visit scheduled for this date and requested that the site visit be conducted during the month of July.

Department of Agriculture	HJ Buys	The Department acknowledged receipt of the notice and confirmed that the application has been captured in their electronic AgriLand tracking and management system in a letter dated 16 May 2013.
Surrounding Land Owner	Representative for E.A.L. van der Merwe	A representative for E.A.L. van der Merwe requested a comments and response form via a telephone conversation on 14 May 2013. She also provided the contact details of another surrounding landowner, namely Mr. Viljoen, which may be interested and/or affected by the proposed development.
Eskom	Mulalo Muelelwa	In an email dated 21 June 2013, Eskom requested an electronic copy of the draft scoping report.
SAHRA	Mr. Phillip Hine	SAHRA confirmed receipt of the initial notification in a letter dated 11 July 2013. SAHRA also outlined the requirements for conducting a Heritage Impact Assessment.
SANRAL	Tiyiselani Mashele	SANRAL confirmed in a letter dated 4 June 2013 that they support the approval of the EIA.

7. THE NEED AND DESIRABILITY

This section aims to address the following requirements of the regulations:

28. (1) A scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include –
(i) a description of the need and desirability of the proposed activity.

7.1 The need for the proposed development

The proposed development is a direct result of the growing demand for electricity and the need for renewable energy in South Africa. According to Eskom, the demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand, fuelled by increasing economic growth and social development, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmental responsible development, the impacts of climate change and the need for sustainable development.

The primary rationale for the proposed solar PV facility is to add new generation capacity from renewable energy to the national electricity mix and to aid in achieving the goal of 42% share of all new installed generating capacity being derived from renewable energy forms, as targeted by the Department of Energy (DoE) (Integrated Resource Plan 2010-2030). In terms of the Integrated Resource Plan (IRP), approximately 8.4GW of the renewable energy mix is planned to be the new installed capacity generated from solar photovoltaic (PV) technologies over the next thirty years
.
The establishment of the proposed solar PV facility will significantly contribute to achieving this objective and will also address some of the key weaknesses and threats identified by the Naledi Local Municipality's Integrated Development Plan (Naledi IDP, 2012-17).

7.2 The desirability of the proposed development

The development of a solar facility will have several benefits for society in general, some of which are discussed below:

- Security of power supply - The project has the potential of "securing" economic activity by assisting in removing supply constraints if Eskom generation activities result in a supply shortfall. When supply is constrained it represents a limitation to economic growth. When a supply reserve is available, it represents an opportunity for economic growth.

- Local employment - The proposed project will contribute to local economic growth by supporting industry development in line with provincial and regional goals and ensuring advanced skills are drawn to the North West Province. The project will likely encounter widespread support from government, civil society and businesses, all of whom see potential opportunities for revenues, employment and business opportunities locally. The promotion and development of photovoltaic solar facilities, which will in turn lead to growth in tax revenues and sales of carbon credits, will result in increased foreign direct investment.

- Reduced air pollution, carbon dioxide emissions and water consumption - The additional power supplied through solar energy will reduce the reliance on the combustion of fossil fuels to produce power. The reduction of GHG emissions as a result of the project implementation will be achieved due to reduction of CO2 emissions from combustion of fossil fuel at the existing grid-connected power plants and plants which would likely be built in the absence of the project activity. Coal power also requires high volumes of water, in areas of South Africa where water supply is already over-stretched and water availability is highly variable.

- Lower costs of alternative energy - An increase in the number of solar facilities commissioned will eventually reduce the cost of the power generated through solar facilities. This will contribute to the country's objective of utilising more renewable energy and less fossil fuel based power sources. It will assist in achieving the goal to generate 10 000 GWh of electricity from renewable energy by 2015 and the reduction of South Africa's GHG emissions by approximately 34% below the current emissions baseline by 2020.

- Increased surety of supply and increased quantity of available power - By diversifying the sources of power in the country, the surety of supply will increase. Additionally, the power demands of South Africa are ever increasing and by adding solar power this demand can be met, even exceeded without increasing pollution in relation to the use of fossil fuels.

- Provision of job opportunities - The main benefit of the proposed development operating in the area is that local companies or contractors will be hired for the duration of the construction period (24 months). Based on the information from similar projects approximately 11 people may be employed per MW and create some 1,200 jobs during the 24 month construction period. However, only approximately 350 employees will on average be present on the site over the same period. The operational phase will provide permanent job opportunities to the local communities since security guards and general labourers will be required on a full time basis.

- Generation of income to the Local Community - In addition to the provision of job opportunities, the REIPPP process has a target that the applicant spend 2.1% of the company's revenue per annum on socio economic and local enterprise development initiatives. This will be for the full length of the project (minimum of 20 years). Therefore the local community may be granted the opportunity to improve their social and economic situation.

8. PLAN OF STUDY FOR EIA

This section aims to address the following requirements of the regulations:

28. (1) A scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include –
(n) a plan of study for environmental impact assessment which sets out the proposed approach to the environmental impact assessment of the application, which must include –
(i) a description of the tasks that will be undertaken as part of the environmental impact assessment process, including any specialist reports or specialised processes, and the manner in which such tasks will be undertaken;
(ii) an indication of the stages at which the competent authority will be consulted;
(iii) a description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity; and
(iv) particulars of the public participation process that will be conducted during the environmental impact assessment process.

8.1 Approach to EIA

This section gives a brief outline of the process Environamics will follow when conducting the Environmental Impact Report (EIR) process for the construction of the proposed 75MW photovoltaic solar facility. The approach to the EIA is to focus on those key issues identified during the scoping process. This will ensure that the EIA focus on the most significant impacts and in the process save time and resources. During this phase, specialist studies will be undertaken to assess all potential impacts that are significant. The specialist studies will assess impacts on both the social and the biophysical environment. The studies will also help in identifying ways that can help to mitigate the envisaged impacts.

Table 8.1 provides a summary description of:

- Key environmental issues;
- Key questions to be addressed as part of the EIA;
- Tasks to be performed in order to address the questions;
- Specialist to be involved (if applicable);
- Methods to be applied; and
- Target date for completion of the task.

The EIA will thus aim to identify impacts and make proposals to avoid them, and where they cannot be avoided to mitigate them to acceptable levels.

Table 8.1: Summary of tasks and methods as part of EIA process

Key issues	Question to be addressed (terms of reference)	Task	Specialist to be appointed (if applicable)	Method to be applied	Target date for completion
CONSTRUCTION PHASE					
Addressing impacts associated with construction activities	➢ How will the construction process be managed to minimize and avoid environmental impacts?	The EAP to compile a detailed construction environmental management programme (EMPr).	N/A	Review of best practice EMPr to be included in the contractual agreements and tender documentation	Included with submission of EIA report.
OPERATIONAL PHASE					
Addressing impacts associated with the operation of the solar plant (This includes the provision of services by the local municipality)	➢ How will the facility be managed to minimize and avoid environmental impacts? ➢ Will the Local Municipality have the capacity to provide the required services?	The EAP to compile an environmental management programme (EMPr). The Local Municipality to confirm that they have capacity to provide the required services.	N/A	Review of best practice EMPr As determined by the Local Municipality	Included with submission of EIA report.
Impacts on water quantity and quality	➢ Will the proposed development have a sustainable supply of water? ➢ What will the impact of the proposed development be on any water features in the area?	The EAP to consult with the Department of Water Affairs on the availability of water. An ecologist to conduct a wetland delineation study.	N/A	As determined by the Department of Water Affairs and the specialist	Included with submission of EIA report.

Geotechnical impacts	➢ Are the geotechnical conditions favorable for the development of a solar plant?	A geologist to conduct a geotechnical investigation, comprising a geotechnical soil investigation.	Geologist	As determined by specialist	Included with submission of EIA report.
Heritage and archeological impacts	➢ Will the proposed development impact on any heritage or archeological artifacts?	An archeologist to conduct a heritage and archeological study.	Archeologist	As determined by specialist	Included with submission of EIA report.
Visual impacts	➢ To what extent will the proposed development be visually intrusive to the surrounding communities or other receptors?	A specialist to conduct a visual impact assessment.	Visual specialist	As determined by specialist	Included with submission of EIA report.
Socio-economic impacts	➢ How will the proposed development impact on the socio-economic environment?	A specialist to conduct a social impact assessment.	Socio-economic specialist	As determined by specialist	Included with submission of EIA report.
Agricultural impacts	➢ How will the proposed development impact on soil and agricultural resources?	A specialist to conduct a soil survey.	Agricultural economist	As determined by specialist	Included with submission of EIA report.
Ecological Impacts	➢ How will the proposed development impact on the ecology?	A specialist to conduct an Ecological Fauna and Flora Habitat Survey.	Ecologist	As determined by specialist	Included with submission of EIA report.
DECOMMISIONING PHASE					
Addressing impacts associated with	➢ How will the decommissioning process be managed to minimize	The EAP to compile a environmental management programme (EMPr)	N/a	Review of best practice EMPr	Included with submission of EIA report.

decommissioning activities	and avoid environmental impacts?				
CUMMULATIVE IMPACTS					
Addressing cumulative impacts associated with the development of solar plants in the vicinity of the proposed development.	➢ How will the cumulative impacts resulting from the proposed facilities be managed?	The EAP to conduct a detailed assessment of the cumulative impacts associated with the development of multiple solar plants in the proximity of the proposed development.	N/a	Cumulative effects assessment.	Included with submission of EIA report.

8.2 Public participation process

All registered I&APs and relevant State Departments will be given the opportunity to review the Final Scoping Report in accordance with Regulation R543. A minimum of 21 days commenting period will be allowed and all stakeholders and I&APs will be given an opportunity to forward their written comments within that period. All issues identified during this public review period will be documented and compiled into a Comments and Response Report to be included as part of the Draft Environmental Impact Report (EIR).

After comments from the public on the Final Scoping Report have been received and incorporated into the Draft EIR, the report will be submitted to the National Department of Environmental Affairs for consideration. In addition, registered I&APs and relevant State Departments would be afforded, unless otherwise indicated by DEA, at least 40 days to comment on the Draft EIR. Arrangements will be made to discuss the report with the Environmental Officer responsible for the project from the DEA.

8.3 Method of environmental assessment

The environmental assessment aims to identify the various possible environmental impacts that could results from the proposed development. Different impacts need to be evaluated in terms of its significance and in doing so highlight the most critical issues to be addressed.

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in Table 8.2.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

8.3.1. Impact Rating System

Impact assessment must take account of the nature, scale and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the project phases:

- planning
- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance should also be included. The rating system is applied to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact the following criteria is used:

Table 8.2: *The rating system*

NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.

INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/ component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
REVERSIBILITY		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		

1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects

SIGNIFICANCE

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula:

(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.

The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.

9. CONCLUSION

This Final Scoping Report aimed at identifying the 'scope' of the EIA that will be conducted in respect of the activity for which authorization is being applied for. It can be concluded that:

- The scoping phase complied with the specifications set out in Regulations 26 to 29.
- All key consultees have been consulted as required by the Regulations 26 and 54 to 57.

Based on the contents of the report the following key environmental issues were identified which need to be addressed in the EIA report:

- Impacts during construction phase to be addressed through an environmental management programme.
  - Impacts on the soil (soil compaction and chemical soil pollution)
  - Impacts on water features
  - Temporary employment and other economic benefits
- Impacts during the operational phase:
  - Soil erosion
  - Increase in storm water runoff
  - Increased consumption of water
  - Leakage of hazardous material
  - Visual intrusion
  - Security risks
  - Sustainable services delivery (water, waste, sanitation, stormwater)
  - Permanent employment opportunities
  - Generation of additional electricity
  - Generation of income to the Local Community
- Impacts during the decommissioning phase:
  - Generation of waste
  - Loss of permanent employment & the creation of temporary employment
- Cumulative biophysical impacts resulting from similar development in close proximity to the proposed development.

The latter issues will be addressed in more detail in the EIA report. The EAP thus recommended that:

The scoping report be approved after which the EIA process, as required by Regulations 31 to 35 can commence.

We trust that the department find the report in order and eagerly await your final decision in this regard.

Ms. Carli Steenkamp
Environamics Environmental Consultants

10. REFERENCES

ACTS *see* SOUTH AFRICA

CONSTITUTION *see* SOUTH AFRICA. 1996.

DEPARTMENT OF ENERGY (DoE). Integrated Resource Plan 2010-2030

DEPARTMENT OF MINERALS AND ENERGY (DME). 2003. White Paper on Renewable Energy.

FIRST SOLAR. 2011. PV Technology comparison.

INTERNATIONAL FINANCE CORPORATION (IFC). 2012. International Finance Corporation's Policy on Environmental and Social Sustainability.

IFC & WORLD BANK GROUP. 2007. Environmental, Health, and Safety General Guidelines.

MUCINA, L. AND RUTHERFORD, M.C. 2006. The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

NALEDI LOCAL MUNICIPALITY. Final Integrated Development Plan (IDP), 2012-2017.

NATIONAL DEPARTMENT OF AGRICULTURE. 2006. Development and Application of a Land Capability Classification System for South Africa.

NERSA. 2009. South Africa Renewable Energy Feed-in Tariff (REFIT) – Regulatory Guidelines.

SOUTH AFRICA(a). 1998. The Conservation of Agricultural Resources Act, No. 85 of 1983. Pretoria: Government Printer.

SOUTH AFRICA. 1996. Constitution of the Republic of South Africa as adopted by the Constitutional Assembly on 8 May 1996 and as amended on 11 October 1996. (B34B-96.) (ISBN: 0-260-20716-7.)

SOUTH AFRICA(a). 1998. The National Environmental Management Act, No. 107 of 1998. Pretoria: Government Printer.

SOUTH AFRICA(b). 1998. The National Water Act, No. 36 of 1998. Pretoria: Government Printer.

SOUTH AFRICA. 1999. The National Heritage Resources Act, No. 25 of 1999. Pretoria: Government Printer.

SOUTH AFRICA. 2004. The National Environment Management: Air Quality Act, No. 39 of 2004. Pretoria: Government Printer.

SOUTH AFRICA(a). 2008. The National Energy Act, No. 34 of 2008. Pretoria: Government Printer.

SOUTH AFRICA(b). 2008. The National Environmental Management: Waste Act, No. 59 of 2008. Pretoria: Government Printer.

SOUTH AFRICA. 2010. Regulations in terms of Chapter 5 of the National Environmental Management Act, 1998. (GNR. 543, 544 and 545. 2010.). Pretoria: Government Printer.

SOUTH AFRICA. Minister in the Presidence: Planning (2009). *Medium Term Strategic Framework. – A Framework to guide Governments Programme in the Electoral Mandate Period 2009-2014*.

SWINGLER, S. 2006. Statistics on Underground Cable in Transmission networks, Final Report of CIGRE Working Group B1.07.

WORLD BANK GROUP. 2006. The Equator Principles.