

DRAFT SCOPING REPORT

For the proposed Beta Photovoltaic Energy Facility near Hertzogville, Free State Province



DEA Reference: 14/12/16/3/3/2/674

Prepared by



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PROJECT DETAIL

DEA Reference No. : 14/12/16/3/3/2/674

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TABLE OF CONTENTS

PROJECT DETAILS.....	i
TABLE OF CONTENTS.....	ii
APPENDICES.....	v
GLOSSARY OF TERMS AND ACRONYMS.....	v
CONTEXT FOR THE PROPOSED ACTIVITY.....	vi
EXECUTIVE SUMMARY.....	vii
1. INTRODUCTION.....	1
1.1 Legal mandate and purpose of the report.....	1
1.2 Details of the environmental assessment practitioner (EAP).....	3
1.3 Status of the EIA process.....	3
1.4 Structure of the report.....	4
2. ACTIVITY DESCRIPTION AND ALTERNATIVES.....	7
2.1 Project location and description.....	7
2.2 Photovoltaic technology.....	8
2.3 Layout description.....	9
2.4 Services provision.....	9
2.5 Consideration of alternatives.....	9
2.5.1 No-go alternative.....	10
2.5.2 Location alternatives.....	10
2.5.3 Activity alternatives.....	10
2.5.4 Technical alternatives.....	11
2.5.5 Design and layout alternatives.....	12
2.5.6 Technological alternatives.....	12
3. DESCRIPTION OF THE ENVIRONMENT.....	14
3.1 Site description.....	14
3.1.1 Land uses on and adjacent the site.....	14
3.2 Description of the biophysical environment.....	14
3.2.1 Geotechnical conditions.....	14
3.2.2 Vegetation and landscape features.....	14
3.2.3 Climate.....	15
3.2.4 Visual landscape.....	15
3.3 Description of the socio-economic environment.....	15
3.3.1 Socio-economic conditions.....	15
3.3.2 Cultural and heritage aspects.....	16

4.	LEGISLATIVE AND POLICY CONTEXT.....	17
4.1	Introduction.....	17
4.2	Legislative context.....	18
4.3	Policy context.....	21
4.4	Other legislation.....	27
4.5	Relevant guidance.....	27
4.6	Conclusion.....	27
5.	DESCRIPTION OF ENVIRONMENTAL ISSUES.....	28
5.1	Scoping methodology.....	28
5.2	Checklist analysis.....	28
5.3	Matrix analysis.....	30
5.4	Key issues identified.....	36
5.4.1	Impacts during construction.....	36
5.4.2	Impacts during the operational phase.....	36
5.4.3	Impact during the decommission phase.....	36
5.4.4	Cumulative impacts.....	36
6.	PUBLIC PARTICIPATION AND CONSULTATION.....	38
6.1	Public participation process.....	38
6.2	Consultation process.....	39
6.3	Registered IAPs.....	39
6.4	Issues raised by IAPs and consultation bodies.....	40
7.	THE NEED AND DESIREABILITY OF THE ACTIVITY.....	42
7.1	The need for the proposed activity.....	42
7.2	The desirability of the proposed activity.....	42
8.	PLAN OF STUDY FOR EIA.....	45
8.1	Introduction.....	45
8.2	Anticipated outcomes of the impact assessment phase.....	45
8.3	Tasks to be undertaken.....	45
8.3.1	Project Description.....	46
8.3.2	Consideration of alternatives.....	46
8.3.3	Compilation of Environmental Impact Assessment Report.....	46
8.3.4	Public participation.....	46
8.3.5	Specialist studies.....	46
8.4	Terms of reference for specialist studies.....	47
8.4.1	General Requirements.....	47
8.4.2	Proposed ToR for the Geotechnical Study.....	48
8.4.3	Proposed ToR for the Heritage Assessment.....	48
8.4.4	Proposed ToR for the Ecological Fauna and Flora Habitat Survey.....	49

8.4.5	Proposed ToR for the Visual Impact Assessment.....	49
8.4.6	Proposed ToR for the Soil, Land Capability and Agricultural Potential Study.....	50
8.4.7	Proposed ToR for the Social Impact Assessment.....	50
8.4.8	Expected Deliverables.....	51
8.5	Consultation with the competent authority.....	51
8.6	Method of environmental assessment.....	52
8.6.1	Impact rating system.....	52
9.	CONCLUSION	56
10.	REFERENCES	57

LIST OF TABLES

Table 1.1:	Listed activities
Table 1.2:	Estimated timeframe for completion of the 'scoping and EIA process'
Table 1.3:	Structure of the report
Table 2.1:	General site information
Table 4.1:	Legislative context for the construction of photovoltaic solar plants
Table 4.2:	Policy context for the construction of photovoltaic solar plants
Table 5.1:	Environmental checklist
Table 5.2:	Matrix analysis
Table 6.1:	Issues raised by key consultation bodies
Table 8.1:	Summary of tasks and methods as part of the EIA process
Table 8.2:	The rating system

LIST OF FIGURES

Figure 1:	Locality Map
Figure 2:	Regional Map
Figure 3:	Footprint map
Figure 4:	Land capability classification Map
Figure 5:	Vegetation Map
Figure 6:	Horizontal irradiation for South Africa

PLATES

Plate 1:	The site (taken towards the south).
Plate 2:	The site (taken towards the south-west).
Plate 3:	The site (taken towards the west).
Plate 4:	The site (taken towards the north-west).

- Plate 5: The site (taken towards the north).
- Plate 6: The site (taken towards the north-east).
- Plate 7: The site (taken towards the east).
- Plate 8: The site (taken towards the south-east).
- Plate 9: The R708 Road on the southern border of the site (taken towards the east)
- Plate 10: The R708 Road on the southern border of the site (taken towards the west)
- Plate 11: Current land use
- Plate 12: Power lines east of the site
- Plate 13: Wild olive tree on site
- Plate 14: Vegetation and rocky outcrops on site

APPENDICES

- Appendix A: Bios of environmental assessment practitioner (EAP)
- Appendix B: Press advertisement
- Appendix C: On site notice
- Appendix D: List of I&APs
- Appendix E: Proof of correspondence
- Appendix F: Written comments received

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, Beta Solar Power Plant (Pty) Ltd. is proposing the development of a photovoltaic solar facility and associated infrastructure for the purpose of commercial electricity generation on an identified site located near Hertzogville in the Free State 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 1780 kWh/m²/annum.

EXECUTIVE SUMMARY

The vision for the Tokologo Local Municipality is *"a progressive municipality, which through co-operative governance, creates conditions for economic growth, social development and meet the basic needs for the community and improve the quality of life of all residents"*. A community needs assessment undertaken as part of the Tokologo Local Municipality's Integrated Development Plan (IDP, 2012/17) revision lists a number of needs that are relevant to the proposed project, including, job creation, up-grading of community facilities and infrastructure, support for local economic development and SMMEs, and bursaries for learners. The need to protect the natural environment is also identified as a key objective in the IDP. The IDP also notes that the bulk electrical network in the Tokologo Local Municipality is well established. However, development has been hampered by the quality/stability of the supply (IDP 2012/17).

In response to the above Beta Solar Power Plant intends to develop an 84MW photovoltaic solar facility and associated infrastructure on the farm Talana 1241, Registration Division Boshof, Free State situated within the Tokologo Local Municipality area of jurisdiction. The site is located approximately 18km east-southeast of Hertzogville (refer to Figure 1 and 2 for the locality and regional map). The total footprint of the project will approximately be 180 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 authorisation 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) Free State 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 Beta Solar Power Plant'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 activity 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 impacts relate to the impacts on the soils, geology, existing services infrastructure, socio-economic impacts such as the provision of temporary employment and other economic benefits, and the impacts on heritage resources.

Impacts during the operational phase:

During the operational phase, the potential impacts will take place over a period of 20 – 25 years. The negative impacts are generally associated with impacts on the soils, geology, the increased consumption of water, and visual impacts. The provision of sustainable services delivery also needs to be confirmed. The operational phase will have a direct positive impact through the provision of employment opportunities for its duration, 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 during the decommissioning phase.

Cumulative impacts:

Cumulative impacts could arise if other similar projects are constructed in the area. Numerous other solar plants have been proposed in relative close proximity to the proposed activity, namely the Solar Energy Facility on Wigt Farm, Hertzogville PV 1 (15MW), Free State (DEA/EIA/0000915/2012), the proposed establishment of the Wag 'n Bietjiespan Solar Farm on Portions 3 & 4 of Wag 'n Bietjiespan 1586 (FS DEAT/EIA/12274/2011), and the renewable energy generation project on portion 1 of the farm Rabenthal 264 Bosshof RD, Tokologo Local Municipality, Lejweleputswa District Municipality, Free State Province : Boshof Solar Park (DEA/EIA/0000387/2011). Due to their proximity the potential for cumulative impacts does exist. The Environmental Impact Assessment (EIA) Report will include a detailed assessment of the potential 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 activity are listed in the EIA Regulations:

Table 1.1: Listed activities ¹

Relevant notice:	Activity No (s)	Description of each listed activity as per project description:
GNR. 544, 18 June 2010	Activity 10(i)	<ul style="list-style-type: none"> • <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.”</i> • Activity 10(i) is triggered since the proposed photovoltaic solar facility will transmit and distribute electricity of more than 33 kilovolts outside an urban area.
GNR. 545, 18 June 2010	Activities 1	<ul style="list-style-type: none"> • <i>“The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more.”</i>

¹ Please refer to Table 5.2 for a detailed description of the relevant aspects of the development that will apply to each specific listed activity.

		<ul style="list-style-type: none"> Activity 1 is triggered since the proposed photovoltaic solar facility will generate 84 megawatts electricity.
GNR. 545, 18 June 2010	Activities 15	<ul style="list-style-type: none"> <i>“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.”</i> Activity 15 is triggered since the proposed photovoltaic solar facility is located outside an urban area and will result in the transformation of approximately 180 hectares of undeveloped, vacant or derelict land.
GNR. 546, 18 June 2010	Activities 14(a)(i)	<ul style="list-style-type: none"> <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) Free State Province (i) All areas outside urban areas.”</i> In terms of vegetation type the site falls within the Western Free State Clay Grassland type, which is described by Mucina and Rutherford (2006) as ‘least threatened’. Western Free State Clay Grassland vegetation covers most areas of the western Free State Province. The region is characterised by flat bottomlands which support dry, specie poor grassland with a high number of salt pans (playas) embedded. Dwarf caroo shrublands surround the playas in disturbed habitats. Therefore the proposed activity will result in the clearance of 5 hectares or more of indigenous vegetation outside an urban area.

Being listed under Listing Notice 1, 2, and 3 (Regulation 544, 545, and 546) implies that the proposed activity 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 activity;
- Examine the sustainability of the proposed activity 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 activity 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 activity 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 Draft 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 Draft 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 draft scoping report within 40 days of receiving the report. 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 Final Scoping Report.

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 conducted on 19 March 2014 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 26 March 2014 and the Department registered the application on the 9 April 2014.
- The public participation process was initiated on 19 March 2014 and all I&APs were requested to submit their comments by 19 May 2014.

It is envisaged that the Final Scoping will be submitted to the Department by Aug 2014 and that the final Scoping Report will be accepted by the Department during September 2014. The EIA process

should be completed within approximately eleven months of submission of this report, i.e. by April/May 2015 – see Table 1.

Table 1.2: Project schedule

Activity	Prescribed timeframe	Timeframe
Submit application form	-	March 2014
Conduct initial public participation: 40 day commenting period	40 Days	March–May. 2014
Conduct specialist studies	-	May–Aug. 2014
Submit draft scoping report	-	May 2014
40 day commenting period on draft scoping report	40 Days	May-July. 2014
21 day commenting period on final scoping report	21 Days	July 2014
Submission of final scoping report	-	Aug. 2014
Submission of draft EIR & EMPr	-	Sept. 2014
Comment period on draft EIR & EMPr	40 Days	Sept.-Nov. 2014
Commenting period on final EIR & EMPr	21 Days	Nov. 2014
Submission of final EIR & EMPr	-	Dec. 2014
EIR & EMPr accepted	60 Days	March 2015
Decision	45 Days	April/May 2015
Registered I&APs notified of decision	12 Days	May 2015

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 1.3.

Table 1.3: 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	1-6
	(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	7-13
(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	14-16
(f)	an identification of all legislation and guidelines that have been considered in the preparation of the scoping report;	4	17-27
(g)	a description of environmental issues and potential impacts, including cumulative impacts, that have been identified;	5	28-37
(h)	details of the public participation process conducted in terms of regulation 27(a), including –	6	38-44
	(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	42-44
(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 –		
	(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;	8	45-55
	(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 photovoltaic solar facility and associated infrastructure on the farm Talana 1241, Registration Division Boshof, Free State situated within the Tokologo Local Municipality area of jurisdiction (refer to Figure 2 for the regional map). The town of Hertzogville is located approximately 18km west-northwest of the proposed development (refer to Figure 1 for the locality map).

The project entails the generation of approximately 84MW electrical power through photovoltaic (PV) panels. The total footprint of the project will approximately be 180 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 by Beta Solar Power Plant (Pty) Ltd. from the property owner, which is The Retreat Trust, for the life span of the project (minimum of 20 years).

Table 2.1: General site information

Description of affected farm portion	The farm Talana 1241, Registration Division Boshof, Free State
21 Digit Surveyor General codes	F0040000000124100000
Title Deed	T8261/1997
Photographs of the site	Refer to the Plates
Type of technology	Photovoltaic solar facility with crystalline silicon panels
Structure Height	Panels ~3.5m, buildings ~ 4m and power lines ~32m
Surface area to be covered	Approximately 180 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	Approximately 180 hectares
Generation capacity	84MW
Expected production	130 GWh per annum

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 84MW, 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 arrays 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 will be wired to central inverters. The inverter is a pulse width mode inverter that converts 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 33kV 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 onsite 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 Beta Solar Power Plant has not yet received a cost estimate letter from Eskom, it is expected that generation from the facility will tie in with the KDS-Giraffe 132.0kV line traversing the property and development site. Although the generation capacity is 84MW the capacity at the point of connection with Eskom will be a maximum of 75MW.
- 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. Other supporting infrastructure includes voltage and current regulators and protection circuitry.
- Roads - A new access point/road will be required at the southern point of the development. An internal site road network will also be required to provide access to the solar field and associated infrastructure. All site roads will require a width of approximately 4m.
- 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.

2.4 Services provision

Adequate provision of water will be a prerequisite for the development. Water for the proposed development will most likely be obtained from groundwater sources. 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 200m³ per month during the 12 months of construction. The estimated maximum amount of water required during the facility's 20 years of production is 3 000m³ per annum. The majority of this usage is for the cleaning of the solar panels. Since each panel requires approximately 2 liters of water for cleaning, the total amount of 350 000 panels will require 700 000 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 totals approximately 2,800,000 liters per annum for washing, and allows 200,000 liters per annum (or 548 liter per day) for toilet use, drinking water, etc.

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.

Portable chemical toilets will be utilized, that will be serviced privately or by the local municipality. Waste will be disposed at a licensed waste site (such as Hoopstad, Boshof, Vryburg, Wolmaranstad, Wesselsbron, Warrenton, Kimberley or Welkom). The construction and hazardous waste will be removed to licensed landfill sites accepting such kinds of wastes. During the operational phase household waste will be removed to a licensed landfill site by a private contractor or by the local municipality. The relevant Local Municipality(s) will need to formally confirm that it has the capacity to provide the proposed development with these services for the lifetime of the project (20 years).

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 activity not proceed, the site will remain unchanged and will continue to be used for low density cattle grazing (refer to plates 1-14 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 been secured by Beta Solar Power Plant in the Hertzogville area to potentially establish solar facilities. From a local perspective, the farm Talana 1241 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).

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). The site falls within Class V and therefore the agricultural potential of the site may be suited for cultivation. However, since the site has not been cultivated for numerous years, it is unlikely that the change in land use will impact significantly on agricultural production (refer to figure 3 for an illustration of the land capability classification).

Alternative locations on the farm Talana 1241 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 – Beta Solar Power Plant is part of a portfolio of solar PV projects throughout South Africa. Beta Solar Power Plant is of the opinion that solar PV technology is perfectly suited to the site, given the high irradiation values for the Hertzogville area – refer to figure 6.

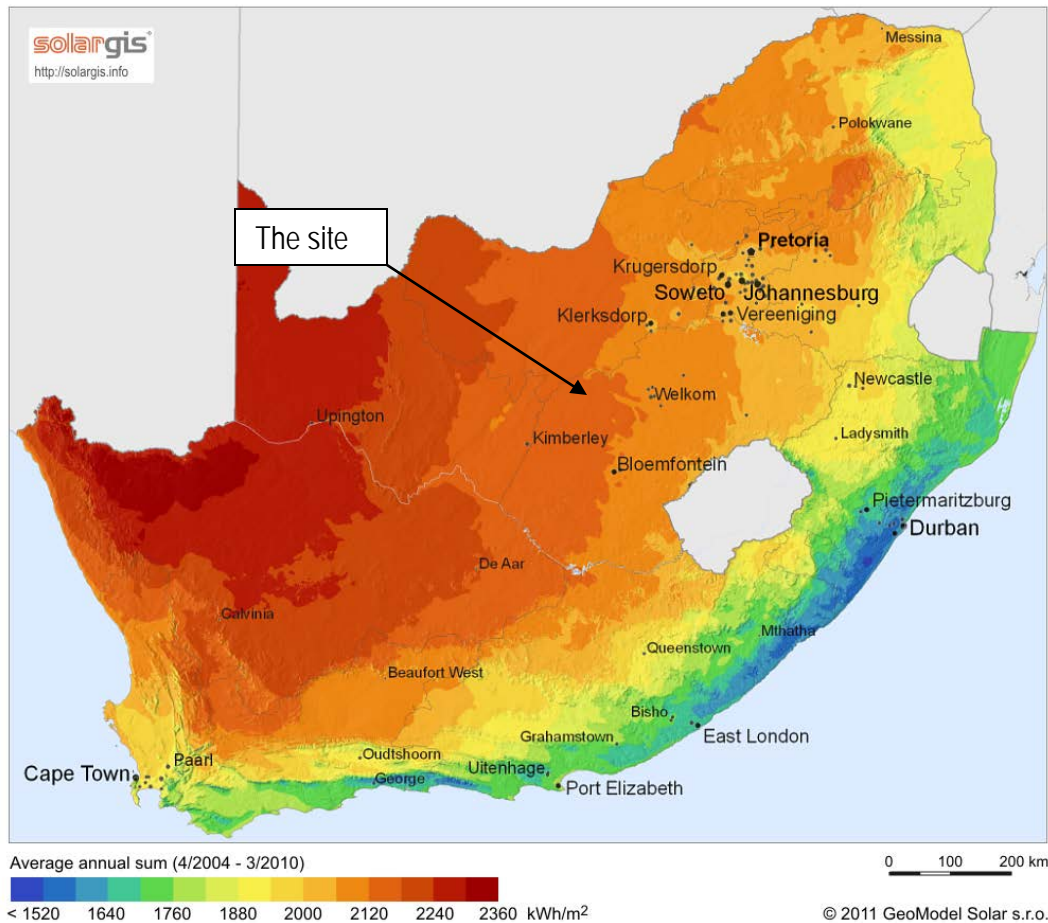


Figure 6: Horizontal irradiation for South Africa (SolarGIS, 2011)

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

It is expected that generation from the facility will tie in with the KDS-Griaffe 132.0kV line traversing the property and development site. The transmission line will be constructed within 36m wide servitude and will traverse the farm Talana 1241. 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 Free State 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

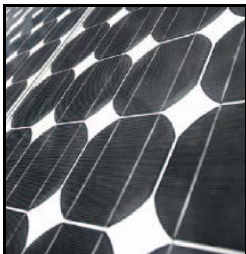
Design alternatives were considered throughout the planning and design phase (i.e. what would be the best design option for the development?). In this regard discussions on the design are being held between the EAP and the developer. The layout plan will be submitted as part of the EIA Report.

2.5.6 Technology alternatives

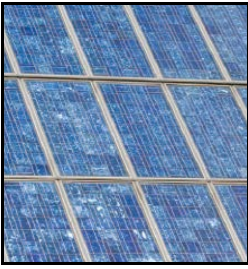
There are several types of semiconductor technologies currently available and in use for PV solar panels. Two, however, have become the most widely adopted, namely crystalline silicon and thin film. These technologies are discussed in more detail below:

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:



- Mono-crystalline Silicon - mono-crystalline (also called single crystal) panels use solar cells that are cut from a piece of silicon grown from a single, uniform crystal. Mono-crystalline 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.



- Poly-crystalline Silicon – poly-crystalline panels use solar cells that are cut from multifaceted silicon crystals. They are less uniform in appearance than mono-crystalline cells, resembling pieces of shattered glass. These are the most common solar panels on the market, being less expensive than mono-crystalline 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):

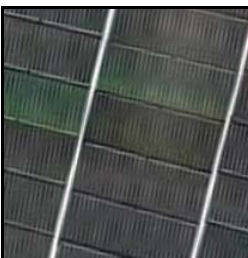
Thin film solar panels are made by placing thin layers of semiconductor material onto various surfaces, usually on glass. The term *thin film* refers to the amount of semiconductor material used. It is applied in a thin film to a surface structure, such as a sheet of glass. Contrary to popular belief, 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 farm is bordered to the south by the R708 provincial road. The site survey revealed that land uses on and in the immediate vicinity of the proposed development are essentially comprised of grazing (cattle) – refer to plates 1-14 for photographs of the development area.

3.2 Description of the biophysical environment

The biophysical environment is described with specific reference to geology and soils, vegetation and landscape features, climate and the visual landscape. 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 point of view apart from the wetlands and/or pans in close proximity to the site.

3.2.1 Geotechnical conditions

According to Mucina and Rutherford (2006) deposits of sandstone, mudstone and shale (volksrust Formation, Ecca Group) underlie extensive areas of flat to undulating plains, interrupted by dolerite sills in places. No rivers or streams drain away from these plains, and all the water drains into the various playas (pans) – a unique feature of this landscape. Although playas (pans) are a characteristic of the vegetation type, no pans are located in close proximity to the site. Dry, clayey, duplex soils typical of land types Da, Db and Dc. Fc landscapes also occurs (Mucina and Rutherford, 2006).

3.2.2 Vegetation and landscape features

In terms of vegetation type the site falls within the Western Free State Clay Grassland vegetation type (Mucina and Rutherford, 2006). The Western Free State Clay Grassland vegetation type is described by Mucina and Rutherford (2006) as 'least threatened'. Western Free State Clay Grassland vegetation covers most areas of the western Free State Province. The region is restricted to flat bottomlands which support dry, species-poor grassland with a high number of salt pans (playas) embedded, Dwarf karoo shrublands surround the plays in disturbed habitats. Almost

20% already transformed for maize and wheat cultivation. A species of *Prosopis* appears as occasional invasive alien.

3.2.3 Climate

According to Mucina and Rutherford (2006) the site is situated in an area with seasonal rainfall that is concentrated from November to March with an overall mean annual precipitation of 450mm. The area is also characterised by a cool temperate regime with mean annual temperatures of 16-17°C. The occurrence of frost is frequent during winter months.

3.2.4 Visual landscape

The visual impact of photovoltaic 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 and a substation are already located in close proximity to the site and the polycrystalline panels considered for this development are non-reflective. However due to the extent of the proposed development (180 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 Lejweleputswa District Municipality is located in the north western part of the Free State Province and is one of five district municipalities in the Free State. The district covers an area of 31 686km² and is made up of five local municipalities, of which the Tokologo Local Municipality (which covers the study area) is one. According to the Free State Provincial Growth and Development Strategy (FSPGDS) (2004-2014), Lejweleputswa District Municipality is the major contributor in the Free State Gross Geographic Product (GGP) and is also an important agricultural area. The district is predominantly known as the Free State Goldfield which forms a part of the larger Witwatersrand basin. The economy of the region is dominated by the gold mining industry and agriculture sectors in particular maize production.

The Tokologo Local Municipality covers an area of 9 326km² and is located in the western part of the Free State Province within Lejweleputswa District Municipality. The Tokologo Local Municipality consists of three former Transitional Local Councils, namely Boshof, Dealesville and Hertzogville, as well as a portion of a former Transitional Rural Council (Moddervaal) which contains approximately 1480 farms. Boshof is the administrative seat of the Tokologo Local Municipality.

Socio-economic data from Census 2011 indicates that the population in the Tokologo Local Municipality decreased marginally from 32 455 in 2001 to 28 986 in 2011. The dependency ratio also improved from 62.4% to 58.9%. On terms of employment, unemployment increased from 26.8% in 2001 to 27.5% in 2011. The main contributor was the increase in youth unemployment from 33.1% to 35.8%. In terms of employment, there was an improvement in the education levels, with the number of people with no schooling decreasing from 31.5% to 20.8%. This does, however, still represent a high level of people over the age of 20 with no schooling. While the percentage of

the population over the age of 20 with no metric also increased from 12% in 2001 to 17.8% in 2011, this is still well below the provincial average of 26.7%. Education levels in the Tokologo Local Municipality are therefore low and this can be attributed to the rural nature of the area.

The level of services provided by government in the Tokologo Local Municipality improved, with households supplied with flush toilets linked to sewage increasing from 13.9% to 18.5%, households with piped water within the house increasing from 19% to 22.7% and households provided with electricity growing from 73.1% to 84.2%. It is therefore reasonable to say that the quality of life of the residents of the Tokologo Local Municipality has improved since 2001. However, having said this, the service level in the Tokologo Local Municipality is substantially lower than those for the Free State Province as a whole. The percentages for flush toilets, piped water and households with electricity for the Free State Province as a whole in 2011 were 64.9%, 44.8% and 89.9% respectively.

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 activity. 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 solar PV 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 activity 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)
- Free State Province Growth and Development Strategy (2004-2014)
- Renewable Energy Strategy for the Free State Province
- Lejweleputswa District Municipality Integrated Development Plan (IDP) 2010/2011
- Tokologo Local Municipality Integrated Development Plan (IDP) 2010-2011
- Tokologo Spatial Development Framework (SDF) 2009

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 activity.

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	<p>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.</p> <p>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(i), 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.’</p>

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	<p>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.</p> <p>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.</p> <p>It is not envisaged that a Water Use License will be required for the proposed development. The Department of Water Affairs (DWA) has been requested to issue a non-binding letter of confirmation that water will be available for the proposed development.</p>
National Environmental Management: Waste Act (Act No. 59 of 2008)	Department of Environmental Affairs (DEA)	2008	<p>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.</p> <p>Regulations No. R718 (of 3 July 2009) promulgated in terms of Section 19(1) of the National</p>

			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. It is not envisaged that a waste permit will be required for the proposed development.
National Environment Management: Air Quality Act (Act No. 39 of 2004)	Department of Environmental Affairs (DEA)	2004	<p>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.</p> <p>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. It is not envisaged that an Atmospheric Emission License will be required for the proposed development.</p>
The National Heritage Resources Act (Act No. 25 of 1999)	South African Heritage Resources Agency (SAHRA)	1999	<p>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.</p> <p>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.</p>

Conservation of Agricultural Resources Act (Act No. 85 of 1983)	National and Provincial Government	1983	<p>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.</p> <p>Consent will be required from the Department of Agriculture in order to confirm that the proposed development is not located on high potential agricultural land and to approve the long term lease agreement.</p>
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4.3 Policy context

Table 4.2: Policy context for the construction of solar PV 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	<p>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:</p> <ul style="list-style-type: none"> • 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 <p>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.</p>

			<p>The White Paper notes that renewable energy applications have specific characteristics that need to be considered. Advantages include:</p> <ul style="list-style-type: none"> • Minimal environmental impacts in operation in comparison with traditional supply technologies; and • Generally lower running costs, and high labour intensities. <p>Disadvantages include:</p> <ul style="list-style-type: none"> • 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	<p>This White Paper on Renewable Energy supplements the <i>White Paper on Energy Policy</i>, 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.</p> <p>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: <i>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)</i> (Executive Summary, ix).</p>
Integrated Resource Plan (IRP) for South Africa	Department of Minerals and Energy	2010-2030	<p>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</p>

			<p>“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.</p> <p>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%).</p> <p>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:</p> <ul style="list-style-type: none"> • 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. <p>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.</p>
Free State Province Growth and Development Strategy	Free State Provincial Government	2004 - 2014	The provincial government of the Free State has developed a Free State Provincial Growth and Development Strategy (PGDS) Free State Vision 2030. The PGDS is the fundamental policy framework for the Free State Provincial Government. It is the embodiment of the broad strategic policy goals and objectives of the province in line with national policy objectives. The strategy addresses the key and most fundamental issues of development, spanning the social, economic and political environment. It constantly

			<p>takes into account annual provincial priorities and sets broad targets in terms of provincial economic growth and development, service delivery and public service transformation.</p> <p>The Free State Provincial Growth and Development Strategy (PGDS2004/14) states that agriculture dominates the Free State landscape. With cultivated land covering 32 000 square kilometers, and natural veld and grazing a further 87 000 square kilometers of the province. Due to climate change, Free State's agricultural potential has been declining and this increased the level of unemployment. The FSPGDS also identifies a number of natural constraints to economic growth and development. These include, low rainfall coupled with limited soil potential and the impact of this on agriculture, limited water availability and depletion of mineral resources. The Free State Province's objective is to achieve an economic growth of 6%-7% per annum; to reduce unemployment from 30% to 15%; to reduce the number of households living in poverty by 5% per annum; and to improve adequate infrastructure for economic growth and development.</p>
Lejweleputswa District Municipality Integrated Development Plan (IDP)	Lejweleputswa District Municipality	2012 - 2017	<p>The Lejweleputswa District Municipality IDP is informed by and aligned with the Free State Provincial Growth and Development Strategy (FSPGDS) and other governmental programmes and policies. In this regard the FSPGDS identified four key priority areas, two of which are relevant to the proposed solar energy project, namely:</p> <ul style="list-style-type: none"> • Economic development, employment and investment; and • Social and human development. <p>The IDP (2012-2017) identifies a number of priority areas, of which the following are regarded as relevant:</p> <ul style="list-style-type: none"> • Local Economic Development; Basic Service Delivery and Infrastructure investment; and • The proposed solar energy facility will boost the local economy through job creation and supporting local business.
Tokoloko Integrated Development Plan (IDP) Review	Tokoloko Local Municipality	2012/ 2017	<p>The Tokoloko Integrated Development Plan (2012-2017) state that the vision for the Tokoloko Local Municipality is "<i>a progressive municipality, which through cooperative governance, creates conditions for economic growth, social development and meet the basic needs of the community and improve the quality of life of all residents</i>". The mission statement linked to the vision notes that the: "Tokoloko Local Municipality is committed to provide a better life for all residents within its area of jurisdiction through:</p>

			<ul style="list-style-type: none"> • Creating conditions for economic growth and sustainability; • Improve access to basic services; • Prompting social upliftment through improved education, skills development and job opportunities; • Ensuring cooperative, transparent and democratic governance through community participation and involvement; • Creating a healthy and safe environment; and • Improving sports and recreational facilities". <p>The IDP (2012-2017) notes that Local Economic Development within the municipal area will require strategic and focused efforts in those economic areas where the Tokologo Local Municipality already shows stability and growth. An economic SWOT analysis was undertaken as part of the IDP revision. The key findings that are of relevance to the project include:</p> <p>Strengths</p> <ul style="list-style-type: none"> • One of the most fertile agricultural regions of the Free State; • Strong and versatile agricultural sectors; • Skilled and semi-skilled labour force; • Well-developed infrastructure; and • Tourism destinations. <p>Weaknesses</p> <ul style="list-style-type: none"> • High rate of poverty, especially women and children; • High unemployment and dependency rates; and • High levels of illiteracy. <p>Opportunities</p> <ul style="list-style-type: none"> • Development of skills; • Transfer of skills; • Availability of labour; and • Development of holistic LED Strategy for Tokologo.
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			<p>Treats/constraints</p> <ul style="list-style-type: none"> Limited job opportunities. <p>A community needs assessment undertaken as part of the IDP revision lists a number of needs that are relevant to the proposed project, including, job creation, up-grading of community facilities and infrastructure, support for local economic development and SMME's, and bursaries for learners. The need to protect the natural environment is also identified as a key objective in the IDP. The IDP also notes that the bulk electrical network in the Tokologo Local Municipality is well established. However, development has been hampered by the quality/stability of the supply.</p>
Tokologo Local Municipality Spatial Development Framework (SDF)	Tokologo Local Municipality	2011	The Tokologo Local Municipality SDF aims to provide general direction and guide decision-making and action on all land related matters. The SDF provides spatial guidance in the form of maps and spatial development plans.

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)²
- 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.

² 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 activities, 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 activity. The matrix is designed to indicate the relationship between the different stressors and receptors which leads to specific impacts. The matrix also indicates the specialist studies, which will be submitted as part of the Environmental Impact Report in order to address the potentially most significant impacts.

5.2 Checklist analysis

The independent consultant conducted a site visit on 19 March 2014. 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		✗		None.
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		×		None.
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	×			A new access point/road will be required at the southern point of the development. An internal site road network will also be required to provide access to the solar field and associated infrastructure. All site roads will require a width of approximately 4m.
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 300 employment opportunities will be created during 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 2 800m ³ per annum.

VIII. Job creation	×		Approximately 350 employment opportunities will be created during the construction and operational phases.
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 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		×	A non-perennial pan is located approximately 750m north west of the site.
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 describes the relevant listed activities, the aspects of the development that will apply to the specific listed activity, a description of the environmental issues and potential impacts, and the significance and magnitude of the potential impacts. The matrix also highlights areas of particular concern (see Table 5.2) for more in depth assessment during the EIA process. An indication is provided of the specialist studies which will be conducted. 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.

In order to conceptualise the different impacts the matrix specify the following:

- **Stressor:** Indicates the aspect of the proposed activity, 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.

Table 5.2: Matrix analysis

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY	POTENTIAL IMPACTS		SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS			MITIGATION OF POTENTIAL IMPACTS		SPECIALIST STUDIES / INFORMATION			
		Receptors	Impact description	Minor	Major	Duration	Possible Mitigation	Mitigation measures (to be provided in the DEIR)				
CONSTRUCTION PHASE												
<p>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".</p> <p>Activity 1 (Regulation 545): "The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more."</p>	<p>Site clearing and preparation Certain areas of the site will need to be cleared of vegetation and some areas may need to be levelled.</p> <p>Civil works The main civil works are:</p> <ul style="list-style-type: none"> • Terrain levelling if necessary– Levelling will be minimal as the potential site chosen is relatively flat. • Laying foundation- The structures will be connected to the ground through cement pillars, cement slabs or metal screws. The exact method will depend on the detailed geotechnical analysis. • Construction of access and inside roads/paths – existing paths will be used where reasonably possible. Additionally, the turning circle for trucks will also be taken into consideration. • Trenching – all Direct Current (DC) and Alternating Current (AC) wiring within the PV plant will be buried underground. Trenches will have a river sand base, space for pipes, backfill of sifted soil and soft sand and concrete layer where vehicles will pass. <p>Transportation and installation of PV panels into an Array The panels are assembled at the supplier's premises and will be transported from the factory to the site on trucks. The panels will be mounted on metal structures which are fixed into the ground either through a concrete foundation or a deep seated screw.</p> <p>Wiring to the Central Inverters Sections of the PV array would be wired to central inverters which have a maximum rated power of 2000kW each. The inverter is a pulse width mode inverter that converts DC electricity to alternating</p>	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	<ul style="list-style-type: none"> • Loss or fragmentation of indigenous natural vegetation. • Loss of sensitive species. • Loss or fragmentation of habitats. 	-	-	S	Yes	-	Ecological Fauna and Flora Habitat Survey		
			Air	<ul style="list-style-type: none"> • Air pollution due to the increase of traffic of construction vehicles. 	-	-	S	Yes	-	-	-	
			Soil	<ul style="list-style-type: none"> • Soil degradation, including erosion. • Disturbance of soils and existing land use (soil compaction). • Physical and chemical degradation of the soils by construction vehicles (hydrocarbon spills). 	-	-	S	Yes	-	-	Soil, Land Capability and Agricultural Potential Study	
			Geology	<ul style="list-style-type: none"> • Collapsible soil. • Seepage • Active soil (high soil heave). • Erodible soil. • Hard/compact geology. If the bedrock occurs close to surface it may present problems when driving solar panel columns. • The presence of undermined ground. • Instability due to soluble rock. • Steep slopes or areas of unstable natural slopes. • Areas subject to seismic activity. • Areas subject to flooding. 	-	-	S	Yes	-	-	Geotechnical Study	
			Existing services infrastructure	<ul style="list-style-type: none"> • Generation of waste that need to be accommodated at a licensed landfill site. • Generation of sewage that need to be accommodated by the local sewage plant. • Increase in construction vehicles on existing roads. 	-	-	S	Yes	-	-	Confirmation from the Local Municipality	
			Ground water	<ul style="list-style-type: none"> • Pollution due to construction vehicles. 	-	-	S	Yes	-	-	-	
			Surface water	<ul style="list-style-type: none"> • Increase in storm water run-off. • Pollution of water sources due to soil erosion. 	-	-	S	Yes	-	-	-	
			Local unemployment rate	<ul style="list-style-type: none"> • Job creation. • Business opportunities. • Skills development. 	-	+	S	Yes	-	-	Social Impact Assessment	
			Visual landscape	<ul style="list-style-type: none"> • Potential visual impact on residents of farmsteads and motorists in close proximity to proposed facility. 	-	-	S	Yes	-	-	-	
			Traffic volumes	<ul style="list-style-type: none"> • Increase in construction vehicles. 	-	-	S	Yes	-	-	-	
			Health & Safety	<ul style="list-style-type: none"> • Air/dust pollution. • Road safety. • Impacts associated with the presence of 	-	-	S	Yes	-	-	Social Impact Assessment	
					SOCIAL/ECONOMIC ENVIRONMENT							

	electricity (AC) at grid frequency.			<ul style="list-style-type: none"> construction workers on site and in the area. Influx of job seekers to the area. Increased safety risk to farmers, risk of stock theft and damage to farm infrastructure associated with presence of construction workers on the site. Increased risk of veld fires. 							
			Noise levels	<ul style="list-style-type: none"> The generation of noise as a result of construction vehicles, the use of machinery such as drills and people working on the site. 	-		S	Yes	-	-	
			Tourism industry	<ul style="list-style-type: none"> Since there are no tourism facilities in close proximity to the site, the proposed activities will not have an impact on tourism in the area. 	N/A	N/A	N/A	N/A	N/A	-	
			Heritage resources	<ul style="list-style-type: none"> Removal or destruction of archaeological and/or palaeontological sites. Removal or destruction of buildings, structures, places and equipment of cultural significance. Removal or destruction of graves, cemeteries and burial grounds. 			S	Yes	-	Heritage Impact Assessment	
<p>Activity 14(a)(i) (Regulation 546): <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) Free State Province (i) All areas outside urban areas."</i></p>	<p>Site clearing and preparation Certain areas of the site will need to be cleared of vegetation and some areas may need to be levelled. This will inevitably result in the removal of indigenous vegetation located on the site.</p>	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	<ul style="list-style-type: none"> Loss or fragmentation of indigenous natural vegetation. Loss of sensitive species. Loss or fragmentation of habitats. 			S	Yes	-	Ecological Fauna and Flora Habitat Survey	
			Air quality	<ul style="list-style-type: none"> Air pollution due to the increase of traffic. 	-		S	Yes	-	-	
			Soil	<ul style="list-style-type: none"> Soil degradation, including erosion. Disturbance of soils and existing land use (soil compaction). Physical and chemical degradation of the soils by construction vehicles (hydrocarbon spills). Loss of agricultural potential (low significance relative to agricultural potential of the site). 	-		S	Yes	-	-	
			Geology	<ul style="list-style-type: none"> It is not foreseen that the removal of indigenous vegetation will impact on the geology or vice versa. 	N/A	N/A	N/A	N/A	N/A	N/A	-
			Existing services infrastructure	<ul style="list-style-type: none"> Generation of waste that need to be accommodated at a licensed landfill site. Generation of sewage that need to be accommodated by the local sewage plant. Increase in construction vehicles on existing roads. 	-		S	Yes	-	-	
			Ground water	<ul style="list-style-type: none"> Pollution due to construction vehicles. 	-		S	Yes	-	-	
			Surface water	<ul style="list-style-type: none"> Increase in storm water run-off. Pollution of water sources due to soil erosion. 	-		S	Yes	-	-	
		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	<ul style="list-style-type: none"> Job creation. Skills development. 				S	Yes	-	Social Impact Assessment
			Visual landscape	<ul style="list-style-type: none"> Potential visual impact on residents of farmsteads and motorists in close proximity to proposed facility. 	-			S	Yes	-	-
			Traffic volumes	<ul style="list-style-type: none"> Increase in construction vehicles. 	-			S	Yes	-	-
			Health & Safety	<ul style="list-style-type: none"> Air/dust pollution. Road safety. Increased crime levels. The presence of construction workers on the site may increase security risks 				S	Yes	-	Social Impact Assessment

				associated with an increase in crime levels as a result of influx of people in the rural area.							
			Noise levels	<ul style="list-style-type: none"> The generation of noise as a result of construction vehicles, and people working on the site. 	-		S	Yes	-	-	
			Tourism industry	<ul style="list-style-type: none"> Since there are no tourism facilities in close proximity to the site, the proposed activity will not have an impact on tourism in the area. 	N/A	N/A	N/A	N/A	N/A	-	
			Heritage resources	<ul style="list-style-type: none"> Removal or destruction of archaeological and/or palaeontological sites. Removal or destruction of buildings, structures, places and equipment of cultural significance. Removal or destruction of graves, cemeteries and burial grounds. 			S	Yes	-	Heritage Impact Assessment	
OPERATIONAL PHASE											
<p>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."</p>	<p>The key components of the proposed project are described below:</p> <ul style="list-style-type: none"> PV Panel Array - To produce 84MW, 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 arrays which will comprise the PV facility. The PV panels will be tilted at a northern angle in order to capture the most sun. Wiring to Central Inverters - Sections of the PV array will be wired to central inverters. The inverter is a pulse width mode inverter that converts 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 33kV 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 onsite 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 Beta Solar Power Plant has not yet received a cost estimate letter from Eskom, it is expected that generation from the facility will tie in with the KDS-Griaffe 132.0kV line traversing the property and development site. Although the generation 	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	<ul style="list-style-type: none"> Fragmentation of habitats. Establishment and spread of declared weeds and alien invader plants (operations). 	-		L	Yes	-	-	
			Air quality	<ul style="list-style-type: none"> The proposed development will not result in any air pollution during the operational phase. 	N/A	N/A	N/A	N/A	N/A	N/A	-
			Soil	<ul style="list-style-type: none"> Soil degradation, including erosion. Disturbance of soils and existing land use (soil compaction). Physical and chemical degradation of the soils by construction vehicles (hydrocarbon spills). Loss of agricultural potential (low significance relative to agricultural potential of the site). 			L	Yes	-	Soil, Land Capability and Agricultural Potential Study	
			Geology	<ul style="list-style-type: none"> Collapsible soil. Seepage (shallow water table). Active soil (high soil heave). Erodible soil. Hard/compact geology. If the bedrock occurs close to surface it may present problems when driving solar panel columns. The presence of undermined ground. Instability due to soluble rock. Steep slopes or areas of unstable natural slopes. Areas subject to seismic activity. Areas subject to flooding. 			S	Yes	-	Geotechnical Study	
			Existing services infrastructure	<ul style="list-style-type: none"> Generation of waste that need to be accommodated at a licensed landfill site. Generation of sewage that need to be accommodated by the municipal sewerage system and the local sewage plant. Increased consumption of water. Approximately 2,800,000 liters of water per annum will be required for the operation of the solar plant. 			L	Yes	-	Confirmation from the Local Municipality	
			Ground water	<ul style="list-style-type: none"> Leakage of hazardous materials. The development will comprise of a distribution substation and will include transformer bays which will contain transformer oils. Leakage of these oils can 	-		L	Yes	-	-	

	<p>capacity is 84MW the capacity at the point of connection with Eskom will be a maximum of 75MW.</p> <ul style="list-style-type: none"> <u>Supporting Infrastructure</u> - A control facility with basic services such as water and electricity will be constructed on the site and will have an approximate footprint 400m². Other supporting infrastructure includes voltage and current regulators and protection circuitry. <u>Roads</u> – A new access point/road will be required at the southern point of the development. An internal site road network will also be required to provide access to the solar field and associated infrastructure. All site roads will require a width of approximately 4m. <u>Fencing</u> - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm. 	SOCIAL/ECONOMIC ENVIRONMENT		contaminate water supplies.						
			Surface water	<ul style="list-style-type: none"> Increase in storm water runoff. The development will potentially result in an increase in storm water runoff that needs to be managed to prevent soil erosion. Leakage of hazardous materials. The development will comprise of a distribution substation and will include transformer bays which will contain transformer oils. Leakage of these oils can contaminate water supplies. 	-		L	Yes	-	-
			Local unemployment rate	<ul style="list-style-type: none"> Job creation. Security guards will be required for 24 hours every day of the week and general laborers will also be required for the cleaning of the panels. Skills development. 		+	L	Yes	-	Social Impact Assessment
			Visual landscape	<ul style="list-style-type: none"> Change in land-use/sense of place. The site is characterized by open veldt with a rural agricultural sense of place. The use of the area for the construction and operation of the PV plant will result in the area not being used for livestock grazing anymore. Potential visual impact on residents of farmsteads and travellers in close proximity to proposed facility. 		-	L	Yes	-	Visual Impact Assessment
			Traffic volumes	<ul style="list-style-type: none"> The proposed development will not result in any traffic impacts during the operational phase. 	-		L	Yes	-	-
			Health & Safety	<ul style="list-style-type: none"> The proposed development will not result in any health and safety impacts during the operational phase. 	N/A	N/A	N/A	N/A	-	-
			Noise levels	<ul style="list-style-type: none"> The proposed development will not result in any noise pollution during the operational phase. 	N/A	N/A	N/A	N/A	N/A	-
			Tourism industry	<ul style="list-style-type: none"> Enhance tourism in the area. The facility may become an attraction or a landmark within the region that people would want to come and see. 	+		L	Yes	-	-
			Heritage resources	<ul style="list-style-type: none"> It is not foreseen that the proposed activity will impact on heritage resources or vice versa. 	N/A	N/A	N/A	N/A	N/A	-
			Electricity supply	<ul style="list-style-type: none"> Generation of additional electricity. The facility will generate electricity that will be fed into the grid. 	+		L	Yes	-	-
Local community	<ul style="list-style-type: none"> The establishment of a Community Trust. 		+	L	Yes	-	Social Impact Assessment			
Electrical infrastructure	<ul style="list-style-type: none"> Additional electrical infrastructure. The proposed solar facility will add to the existing electrical infrastructure and aid to lessen the reliance of electricity generation from coal-fired power stations. 	+		L	Yes	-	-			
DECOMMISSIONING PHASE										
-	<p><u>Dismantlement of infrastructure</u> During the decommissioning phase the Solar PV Energy facility and its associated infrastructure will be dismantled.</p> <p><u>Rehabilitation of biophysical environment</u> The biophysical environment will be rehabilitated.</p>	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	<ul style="list-style-type: none"> Re-vegetation of exposed soil surfaces to ensure no erosion in these areas. 	+		L	Yes	-	-
			Air quality	<ul style="list-style-type: none"> Air pollution due to the increase of traffic of construction vehicles. 	-		S	Yes	-	-
			Soil	<ul style="list-style-type: none"> Soil degradation, including erosion. Disturbance of soils and existing land use (soil compaction). Physical and chemical degradation of the soils by construction vehicles (hydrocarbon spills). 	-		S	Yes	-	-

			Geology	<ul style="list-style-type: none"> It is not foreseen that the decommissioning phase will impact on the geology of the site or vice versa. 	N/A	N/A	N/A	N/A	N/A	-
			Existing services infrastructure	<ul style="list-style-type: none"> Generation of waste that need to be accommodated at the local landfill site. Generation of sewage that need to be accommodated by the municipal sewerage system and the local sewage plant. Increase in construction vehicles. 	-		S	Yes	-	-
			Ground water	<ul style="list-style-type: none"> Pollution due to construction vehicles. 	-		S	Yes	-	-
			Surface water	<ul style="list-style-type: none"> Increase in storm water run-off. Pollution of water sources due to soil erosion. 	-		S	Yes	-	-
		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	<ul style="list-style-type: none"> Loss of employment. 		-	L	Yes	-	Social Impact Assessment
			Visual landscape	<ul style="list-style-type: none"> Potential visual impact on visual receptors in close proximity to proposed facility. 	-		S	Yes	-	-
			Traffic volumes	<ul style="list-style-type: none"> Increase in construction vehicles. 	-			Yes	-	-
			Health & Safety	<ul style="list-style-type: none"> Air/dust pollution. Road safety. Increased crime levels. The presence of construction workers on the site may increase security risks associated with an increase in crime levels as a result of influx of people in the rural area. 	-			Yes	-	-
			Noise levels	<ul style="list-style-type: none"> The generation of noise as a result of construction vehicles, the use of machinery and people working on the site. 	-			Yes	-	-
			Tourism industry	<ul style="list-style-type: none"> Since there are no tourism facilities in close proximity to the site, the decommissioning activities will not have an impact on tourism in the area. 	N/A	N/A	N/A	N/A	N/A	-
Heritage resources	<ul style="list-style-type: none"> It is not foreseen that the decommissioning phase will impact on any heritage resources. 	N/A	N/A	N/A	N/A	N/A	-			

(N/A) No impact (+) Positive Impact (-) Negative Impact (S) Short Term (M) Medium Term (L) Long Term

5.4 Key issues identified

From the above it is evident that mitigation measures should be available for potential impacts associated with the proposed activity and development phases. The scoping methodology identified the following key issues which should be addressed in the EIA report.

5.4.1 Impacts during the construction phase

During the construction phase the following activities will have various potential impacts on the biophysical and socio-economic environment:

- 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 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) Free State Province (i) All areas outside urban areas."*

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 soils, geology, existing services infrastructure, socio-economic impacts such as the provision of temporary employment and other economic benefits, and the impacts on heritage resources.

5.4.2 Impacts during the operational phase

During the operational phase the study area will serve as a solar PV energy facility and the potential negative impacts relate to 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."* The potential impacts will take place over a period of 20 – 25 years. The negative impacts are generally associated with impacts on the soils, geology, the increased consumption of water, and visual impacts. The provision of sustainable services delivery also needs to be confirmed. The operational phase will have a direct positive impact through the provision of employment opportunities for its duration, and the generation of income to the local community.

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

5.4.4 Cumulative impacts

Cumulative impacts could arise if other similar projects are constructed in the area. Numerous other solar plants have been proposed in relative close proximity to the proposed activity, namely the Solar Energy Facility on Wigt Farm, Hertzogville PV 1 (15MW), Free State (DEA/EIA/0000915/2012), the proposed establishment of the Wag 'n Bietjiespan Solar Farm on Portions 3 & 4 of Wag 'n Bietjiespan 1586 (FS DEAT/EIA/12274/2011), and the renewable

energy generation project on portion 1 of the farm Rabenthal 264 Bosshof RD, Tokologo Local Municipality, Lejweleputswa District Municipality, Free State Province : Boshof Solar Park (DEA/EIA/0000387/2011). Due to their proximity the potential for cumulative impacts does exist. The Environmental Impact Assessment (EIA) Report will include a detailed assessment of the potential cumulative impacts associated with the proposed development.

It should be noted that at this stage, the number of facilities that will actually be established in the broader area is unclear as this is dependent on each project being selected by the Department of Energy through a competitive tendering process. Prior to construction these facilities are still required to obtain a number of licenses and approvals in terms of South African Legislation.

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 extend 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 2 April 2014 (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 19 March 2014 to inform surrounding communities and immediately adjacent landowners of the proposed development. I&APs were given the opportunity to raise comments by 19 May 2014. 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 4 April 2014 and were requested to submit comments by 19 May 2014. For a complete list of stakeholder details see Appendix D and for proof of registered post see Appendix E. The consultees included:

- Free State Department of Economic Development, Tourism and Environmental Affairs (FSDEDTEA)
- The Department of Energy
- The Free State Department of Energy
- The Department of Water Affairs
- The National Department of Agriculture
- The Free State Department of Agriculture
- The South African Heritage Resources Agency (SAHRA)
- The Provincial Heritage Resources Agency (PHRA), Free State
- ESKOM
- National Energy Regulator of South Africa (NERSA)
- The Wildlife and Environment Society of South Africa (WESSA)
- The Lejweleputswa District Municipality
- The Municipal Manager at the Tokologo Local Municipality
- The Local Councilor at the Tokologo Local Municipality
- The Civil Aviation Authority (CAA)
- The Hertzogville Ratepayers association
- The Free State Department of Public Works, Roads and Transport

It was expected from I&APs to provide their inputs and comments by 19 May 2014. To date only the Department of Water Affairs provided comments (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 4 April 2014. The surrounding land owners were given the opportunity to raise comments by 19 May 2014. To date only Mr. Tewie Wessels of the farm Exelsior asked to be registered as an I&AP (see Appendix F for written comments). For a list of surrounding land owners see Appendix D.

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 activity. 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 Draft Scoping Report and will be made available to the following registered I&APs and State Departments:

- Free State Department of Economic Development, Tourism and Environmental Affairs (FSDEDTEA)
- The Department of Water Affairs
- The National Department of Agriculture
- The Department of Energy
- The South African Heritage Resources Agency (SAHRA)
- The Provincial Heritage Resources Agency (PHRA), Free State
- ESKOM
- The Lejweleputswa District Municipality
- Tokologo Local Municipality
- The Free State Department of Public Works, Roads and Transport
- The Department of Mineral Resources
- The Civil Aviation Authority (CAA)
- Department of Communications (DoC)
- SENTECH
- Square Kilometre Array (SKA)
- Mr. Tewie Wessels of the farm Exelsior

They will be provided with a copy of the Draft Scoping report and will be requested to provide written comments on the report within 40 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 final Scoping report.

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)
I&AP	Mr. Tewie Wessels	Mr. Wessels indicated in a letter dated 5 May 2014 that he would like to receive a copy of the report via mail and that he will be interested in attending a meeting.
Department of Water Affairs –Free State Regional Office	Boitumelo Melato	The Department provided the following comments in a letter dated 19 May 2014: <ul style="list-style-type: none"> • The project may not take place within 100m from a water resource or within 1:100 year floodline without obtaining the necessary authorisation from the Department. • Any development within 500m from the boundary of any wetland requires a water use license according to the Department's regulations. • No surface, ground or storm water may be polluted as a result of any activities emanating from activities associated with this development. • All sections of the National Waste Management

		<p>Act (Act 59 of 2008) must be adhered to.</p> <ul style="list-style-type: none">• Storm water management must be in place.• If the applicant will require abstracting water from a water resource (ground or surface) their office must be consulted to obtain the necessary authorisation.
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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 activity

The proposed activity 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 PV technologies over the next thirty years.

The establishment of the photovoltaic solar facility will significantly contribute to achieving this objective and will also address some of the objectives identified by the Tokologo Local Municipality's Integrated Development Plan (IDP, 2012/17).

7.2 The desirability of the proposed activity

The facility's contribution towards sustainable development and the associated benefits to society in general is discussed below:

- Lesser dependence on fossil fuel generated power - The deployment of the facility will have a positive macro-economic impact by reducing South Africa's dependence on fossil fuel generated power and assisting the country in meeting its growing electricity demand.
- Increased surety of supply - By diversifying the sources of power in the country, the surety of supply will increase. 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. 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 economic growth - 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 Free State 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 development of the photovoltaic solar facility will in turn lead to growth in tax revenues for local municipalities and sales of carbon credits, resulting in increased foreign direct investment.
- 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.
- Reduction in greenhouse gas emissions - The additional power supplied through solar energy will reduce the reliance on the combustion of fossil fuels to produce power. The South African electricity grid is predominantly coal-fired and therefore GHG emissions intensive (coal accounts for more than 92% of the fuel used in South Africa's electricity generation). 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.
- CDM Project - A solar energy facility also qualifies as a Clean Development Mechanism (CDM) project (i.e. a financial mechanism developed to encourage the development of renewable technologies).
- Climate change mitigation - On a global scale, the project makes a contribution to greenhouse gas emission reduction and therefore contributes toward climate change mitigation.
- Reduced environmental impacts - The reduction in electricity consumed from the grid will not only result in a reduction in greenhouse gas emissions, but also the prevention of negative impacts associated with coal mining. For example, coal power requires high volumes of water, in areas of South Africa where water supply is already over-stretched and water availability is highly variable. Photovoltaic solar energy technology also does not produce the sulphur emissions, ash or coal mining concerns associated with conventional coal fired electricity generation technologies resulting in a relatively low level of environmental impacts. It is a clean technology which contributes toward a better quality environment for employees and nearby communities.
- Social benefits - The project activity is likely to have significant long-term, indirect positive social impacts that may extend to a regional and even national scale. The larger scale impacts are to be derived in the utilization of solar power and the experience gained through the construction and operation of the power plant. In future, this experience can be employed at other similar solar installations in South Africa.
- 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. The operational phase will provide permanent job opportunities to the local communities from the surrounding area since security guards and general labourers will be required on a full time basis. Approximately 350 employment opportunities will be created during the construction and operational phases.

- Indirect socio-economic benefits - The increase in the demand for services such as accommodation, transportation, security, general maintenance and catering will generate additional indirect socio-economic benefits for the local community members.

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 Introduction

This section gives a brief outline of the Plan of Study for EIA (PoSEIA) and the tasks that will be undertaken and the anticipated process to meet the objectives for the EIA phase. 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.

8.2 Anticipated outcomes of the impact assessment phase

According to the DEA 2012 Integrated Environmental Management Guideline Series (Guideline 5) 'Companion to the Environmental Impact Assessment Regulations, 2010' the "*EIA phase assesses issues identified in the scoping phase and includes an environmental management programme (EMPr). The EMPr provides information on the proposed activity and the manner in which potential impacts will be minimized or mitigated*". The EIA report must comply with regulation 31(2) and include inter alia:

- A description and comparative assessment of all alternatives identified;
- A description of all environmental issues identified as well as significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;
- A reasoned opinion as to whether the activity should, or should not be authorised;
- An environmental impact statement; and
- A draft Environmental Management Programme (EMPr).

8.3 Tasks to be undertaken

The following sections describe the tasks that will be undertaken as part of the EIA process.

8.3.1 Project Description

Further technical and supporting information will be gathered to provide a more detailed project description. This will include aspects on the need and desirability for the project, and a detailed site layout plan will be compiled once the low – medium areas of sensitivity have been indicated by the specialists.

8.3.2 Consideration of alternatives

The following project alternatives will be investigated in the EIR:

- The no-go alternative: Maintaining the status quo – refer to section 2.5.1 of this report.
- Design/Layout alternatives: In terms of the actual infrastructure positioning on the site.
- Alternative technologies: Technologies to be used during the operation of the proposed energy facility.

8.3.3 Compilation of Environmental Impact Assessment Report

A Draft EIR will be compiled to meet the content requirements as per regulation 31 of GNR543 of the EIA Regulations (18 June 2010) and will also include a draft Environmental Management Programme containing the aspects contemplated in Regulation 33.

8.3.4 Public participation

All registered I&APs and relevant State Departments will be given the opportunity to review the Draft Scoping Report in accordance with Regulation R543. A minimum of 40 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. In addition, a stakeholder meeting will be scheduled during the review period of the Draft EIR. 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 Final Scoping Report to be submitted to the National Department of Environmental Affairs (DEA).

Once the Department accepts the Final Scoping Report a Draft EIR will be submitted to the Department and all registered I&APs and relevant State Departments will be given the opportunity to review the Draft EIR in accordance with Regulation R543. A minimum of 40 days commenting period will once again be allowed.

After a 21 day public review period comments from the public on the Final EIR will be incorporated into the Final EIR, and the report will be submitted to the DEA for consideration.

8.3.5 Specialist studies

Based on the initial descriptions of potential environmental impacts the EAP will perform desktop studies to identify possible mitigation measures (as part of the EMPr) for the potential impacts as they related to the listed activities and the development phases. Information will be obtained from existing information sources combined with a site visit to confirm desktop studies. If at any stage of the process it appears that an environmental aspect will be impacted during the project, a full study and assessment will be commissioned.

Due to the sensitivity of certain features, specialists have been subcontracted to assess all potential impacts that are significant. The specialist studies will assess impacts on both the

social and the biophysical environment and will also help in identifying ways that can help to mitigate the envisaged impacts. The following specialist studies have been requested to address the potentially most significant impact as identified during the scoping phase – refer to Table 5.2:

- Geotechnical report: To determine whether the geotechnical conditions at the site are favorable for the development and construction of a solar PV plant.
- Heritage report: To determine whether the proposed activity will impact on any heritage or archeological artifacts.
- Ecological fauna and flora habitat survey: To determine what the impact of the proposed activity will be on the ecology (fauna and flora) in the area.
- Visual Impact Assessment: To determine to what extent the proposed activity will be visually intrusive to the surrounding communities or other receptors.
- Soil, Land Capability and Agricultural Potential Study: To determine how the proposed activity will impact on soil and agricultural resources.
- Social Impact Assessment: To determine how the proposed activity will impact on the socio-economic environment.

All the specialist studies will be included with submission of EIR.

8.4 Terms of reference for specialist studies

Specialists in their field of expertise will consider baseline data and identify and assess impacts according to predefined rating scales. Specialists will also suggest optional or essential ways in which to mitigate negative impacts and enhance positive impacts. Further, specialists will, where possible, take into consideration the cumulative effects associated with this and other projects which are either developed or in the process of being developed in the local area.

The results of these specialist studies will be integrated into a Draft Environmental Impact Report (DEIR). The Terms of Reference (ToR) or general requirements proposed for the inputs are presented below and stakeholders are encouraged to comment and provide input on these.

8.4.1 General Requirements

Specialists' reports must comply with Regulation 32 of Government Notice No. 543 published under sections 24(5), 24M and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and whereby the following are to be included:

- The details and the expertise of the person who compiled the report;
- A declaration of the person's independence;
- An indication of the scope, the purpose and the audience for which the report was prepared;
- A description of the methodology employed in preparing the report or the carrying out the specialized process;
- A description of any assumptions made and any uncertainties or gaps in knowledge;
- A description of any consultation process that was undertaken during the course of carrying out the study as well as a summary and copies of any comments that were received during any consultation process;
- A summary and copies of any comments that were received during any consultation process;

- A description of the findings and the potential implications of such finding on the impact of the proposed activity, including all identified alternatives, on the environment;
- Recommendations in respect of any mitigation measures that should be considered by the applicant and the competent authority; and
- Any other information requested by the competent authority.

In addition to the above, specialists are expected to:

- Review the Scoping Report, with specific reference to the Comments and Response Report to familiarize with all relevant issues or concerns relevant to their field of expertise;
- In addition to the impacts listed in this Scoping Report, identify any issue or aspect that needs to be assessed and provide expert opinion on any issue in their field of expertise that they deem necessary in order to avoid potential detrimental impacts;
- Assess the degree and extent of all identified impacts (including cumulative impacts) that the preferred project activity and its proposed alternatives, including that of the no-go alternative, may have;
- Identify and list all legislation and permit requirements that are relevant to the development proposal in context of the study;
- Reference all sources of information and literature consulted; and
- Include an executive summary to the report.

8.4.2 Proposed ToR for the geotechnical study

The geotechnical study will present the findings of a preliminary evaluation of the geotechnical conditions at the proposed Beta solar farm project, the investigation should be carried according to standard practice codes and guidelines. The aims of the investigation will be to:

- Verify the underlying geology and soil cover by means of limited surface mapping.
- Assessing the suitability of the area with regard to the proposed development, based on the available geological- and geotechnical information.
- Identify the general constraints and required precautionary measures that may be required for the proposed development from a planning perspective.
- Make recommendations on the most-, intermediately- and least suitable portions of the project area with regard to the proposed development.

It must be noted that this investigation is requested for planning purposes only and will not be utilized for detailed design and construction. The following actions will be excluded from this investigation:

- Detailed flood line delineation.
- Detailed slope analysis.
- Soil mechanical analysis and sampling for laboratory analysis.

8.4.3 Proposed ToR for the heritage assessment

A Heritage Impact assessment will be undertaken for the site in accordance with the requirements of Section 38(3) of the NHRA. The scope of work for this study will consist of:

- A desk-top investigation of the area, in which all available literature, reports, databases and maps were studied; and

- A visit to the proposed development area.

The objectives will be to:

- Identify possible archaeological, cultural and historic sites within the proposed development area;
- Document (GPS coordinates and map) all sites, objects and structures identified on the candidate sites;
- Evaluate the potential impacts of construction, operation and maintenance of the proposed development on archaeological, cultural and historical resources;
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance; and
- Consider relevant guidelines.

8.4.4 Proposed ToR for the ecological fauna and flora habitat survey

The proposed ToR for the ecological fauna and flora habitat survey is as follows:

- Provide a detailed fauna and flora habitat survey;
- Provide a detailed habitat survey of possible threatened or localised plant species, vertebrates and invertebrates;
- Record possible host plants or foodplants of fauna such as butterflies;
- Evaluate the conservation importance and significance of the site with special emphasis on the current status of threatened species;
- Conduct a literature investigation of possible species that may occur on site;
- Identify potential ecological impacts on fauna and flora that could occur as a result of the development;
- An assessment of the potential direct and indirect impacts resulting from the proposed development during the construction, operation and decommissioning phases; and
- Make recommendations to reduce or minimise impacts, should the development be approved.

8.4.5 Proposed ToR for the visual impact assessment

The proposed ToR for this Visual Impact Assessment is as follows:

- Conduct a desktop review of available information that can support and inform the specialist study;
- Describe the receiving environment and the visual absorption for the proposed project;
- Conduct a field survey to determine the actual or practical extent of potential visibility of the proposed development;
- Conduct a photographic survey of the landscape surrounding the development;
- Identify issues and potential visual impacts for the proposed project, to be considered in combination with any additional relevant issues that may be raised through the public consultation process;
- Identify possible cumulative impacts related to the visual aspects for the proposed project;
- Assess the potential impacts, both positive and negative, associated with the proposed project for the construction, operation and decommissioning phases;

- Identify management actions to avoid or reduce negative visual impacts; and to enhance positive benefits of the project; and
- Use mapping and photo-montage techniques as appropriate.

8.4.6 Proposed ToR for the soil, land capability and agricultural potential study

The purpose of the soil, land capability and agricultural potential study will be to determine the soil forms and current land capability of the area where the proposed project will be situated. The objectives of this study will be to:

- Describe the soils (distribution, types, depth, surface features, suitability for agriculture, physical and chemical characteristics, fertility, erodability, dry land production potential and irrigation potential);
- Determine the pre-development land capability;
- Determine the present land use;
- Conduct an Impact Assessment for the soils and land capability which will feed into the overall Environmental Impact Assessment;
- Propose mitigation measures for the impacts to form part of the Environmental Management Program; and
- Compile a soil, land capability and agricultural potential report to meet the Department of Agriculture's requirements and to encompass the findings of the desktop assessment, soil survey, agricultural evaluation and impact assessment.

The soil assessment must include the following as per DEAs requirements:

- Identification of the soil forms present on site;
- The size of the area where a particular soil form is found;
- GPS reading of soil survey points;
- The depth of the soil at each survey point;
- Soil colour;
- Limiting factors;
- Clay content; and
- Slope of the site.

8.4.7 Proposed ToR for the social impact assessment

The terms of reference for the social impact assessment (SIA) are as follow:

- Provide a description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed facility;
- Provide a description and assessment of the potential social issues associated with the proposed facility; and
- Identify enhancement and mitigation aimed at maximising opportunities and avoiding and or reducing negative impacts.

The key activities in the SIA process as embodied in the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February 2007) will include:

- Describing and obtaining an understanding of the proposed intervention (type, scale, location), the communities likely to be affected and determining the need and scope of the SIA;
- Collecting baseline data on the current social environment and historical social trends;
- Identifying and collecting data on the Social Impact Assessment variables and social change processes related to the proposed intervention. This requires consultation with affected individuals and communities;
- Assessing and documenting the significance of social impacts associated with the proposed intervention; and
- Identifying alternatives and mitigation measures.

In this regard the study should involve:

- Review of demographic data from the Census Survey;
- Review of relevant planning and policy frameworks for the area;
- Site specific information collected during the a site visit to the area and interviews with key stakeholders;
- Review of information from similar projects; and
- Identification of social issues associated with the proposed project.

8.4.8 Expected deliverables

The specialist is expected to prepare a report that addresses the scope of the work as set out above. The report should be prepared in a suitable font (such as Arial 12) and submitted to Environamics in draft form. If accepted by Environamics and the client an electronic copy should be provided for submission to the DEA.

8.5 Consultation with the competent authority

Consultation with the competent and commenting authorities will continue throughout the duration of impact assessment phase. The authorities will also comment on whether they deem it necessary to conduct additional specialist assessments other than what is proposed already in this PoSEIA. On-going consultation will include:

- Submission of the Draft Scoping Report after which a 40 day public review period will commence (and consideration of comments received).
- An invitation to attend the stakeholder meeting during the review period of the DSR.
- Submission of the Final Scoping Report following a 21 day public review period (and consideration of comments received).
- Submission of the DEIR after which a 40 day public review period will commence (and consideration of comments received).
- Arrangements will be made to discuss the report with the Environmental Officer responsible for the project from the DEA during the review period of the DEIR.
- Submission of the Final Environmental Impact Report (FEIR) following a 21 day public review period (and consideration of comments received).
- An opportunity to visit and inspect the site.

8.6 Method of environmental assessment

The environmental assessment aims to identify the various possible environmental impacts that could result from the proposed activity. Different impacts need to be evaluated in terms of their 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.

8.6.1 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.
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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:

$(\text{Extent} + \text{probability} + \text{reversibility} + \text{irreplaceability} + \text{duration} + \text{cumulative effect}) \times \text{magnitude/intensity}$.

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 Draft Scoping Report is 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:
 - Impacts on the fauna and flora
 - Impacts on the soil
 - Impacts associated with the geology of the site
 - Impacts on existing services infrastructure
 - Temporary employment and other economic benefits
 - Impacts on heritage resources
- Impacts during the operational phase:
 - Impacts on the soil
 - Impacts associated with the geology of the site
 - Increase in employment and other economic benefits
 - Visual impacts
 - Generation of income to the local community
 - Pressure on existing services infrastructure and water sources.
- Impacts during the decommissioning phase:
 - Loss of permanent employment & the creation of temporary employment
- Cumulative biophysical impacts resulting from similar development in close proximity to the proposed activity.

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

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