

REPORT

ENVIRONMENTAL ASSESSMENT REPORT FOR THE PROPOSED 4MW PHOTOVOLTAIC AUGUMENTATION POWER PLANT AT BOKPOORT CSP PLANT NEAR UPINGTON, NORTHERN CAPE PROVINCE

BOKPOORT 4MW PHOTOVOLTAIC AUGUMENTATION PLANT

Client: ACWA POWER SOLAFRICA BOKPOORT CSP
POWER PLANT (PTY) LTD (RF)

Reference: MD2562

Revision: 0.1/Final

Date: 13 March 2018

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Classification

Project Related



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1 INTRODUCTION

Increasing economic growth and social development within South Africa is placing a growing demand on energy supply. Coupled with the rapid advancement in economic and social development, is the growing awareness of environmental impact, climate change and the need for sustainable development. Whilst South Africa relies heavily on coal to meet its energy needs, the country is well endowed with renewable energy resources that offer sustainable alternatives to fossil fuels. Renewable energy harnesses naturally occurring non-depletable sources of energy, such as solar, wind, biomass, hydro, tidal, wave, ocean current and geothermal, to produce electricity, gaseous and liquid fuels, heat or a combination of these energy types. The successful use of renewable energy technology in South Africa still requires extensive investigation, however, Concentrating Solar Power (CSP) technologies have been identified as being potentially viable and capable of being employed on a large scale.

1.1 Context and Background

South Africa experiences some of the highest levels of solar radiation in the world. The average daily solar radiation in South Africa varies between 4.5 and 6.5 kWh/m² (16 and 23 MJ/m²), compared to approximately 3.6 kWh/m² for parts of the United States and \pm 2.5 kWh/m² for Europe and the United Kingdom. **Figure 1** below illustrates the annual solar radiation (direct and diffuse) for South Africa, which identifies significant solar resource potential for solar water heating applications, solar photovoltaic and solar thermal power generation.

In 2006, Eskom Holdings Limited conducted an Environmental Impact Assessment (EIA) Study for a pilot CSP plant with an installed capacity of approximately 100MWe. Through a series of feasibility studies and high level assessments undertaken by Eskom - land availability, land use capability, fuel availability and costs, grid connection capacity and strengthening effects, and DNI measurements were considered in the selection of feasible sites. Based on the afore-mentioned considerations the Northern Cape Province ranked as the most favourable area for the establishment of a new CSP plant. Within the Northern Cape Province, the Upington and Groblershoop areas were specifically identified as potential areas for the establishment of the CSP plant – the farms Olyvenhouts Drift, Bokpoort and Tampansrus were selected for further detailed investigation. Subsequent to the Scoping and EIA studies, the farm Olyvenhouts Drift was selected as the preferred site and with consideration of the site specific environmental sensitivities, a preferred location for the plant on the farm was selected. Eskom received authorisation from the Department of Environmental Affairs to construct the CSP plant during 2006.

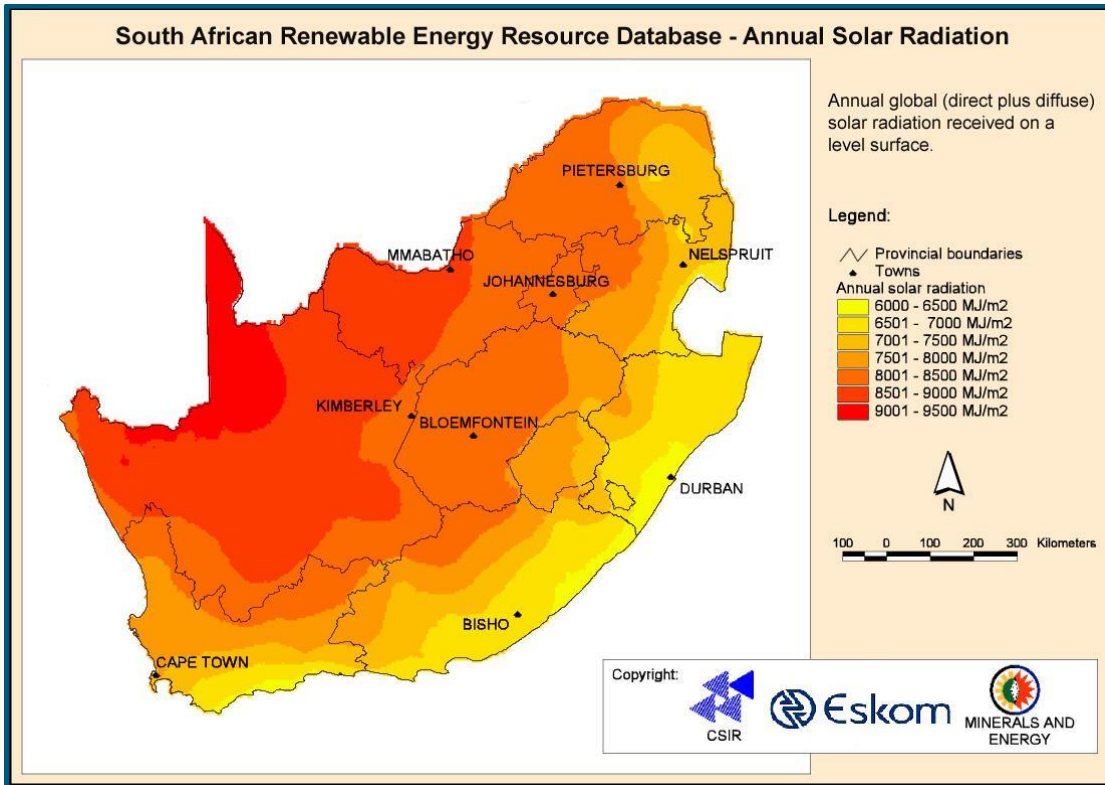


Figure 1: Annual Incoming Short Wave Radiation for South Africa

Table 1: International Solar Potential Relative to South Africa

Location	Site Latitude	Annual DNI (kWh/m ²)	Relative Solar Resource
South Africa			
Upington, Northern Cape	28°S	2955	100%
United States			
Barstow, California	35°N	2725	92%
Las Vegas, Nevada	36°N	2573	87%
Albuquerque, New Mexico	35°N	2443	83%
International			
Northern Mexico	26 - 30°N	2835	96%
Wadi Rum, Jordan	30°N	2500	85%
Quarzazate, Morocco	31°N	2364	80%
Crete	35°N	2293	78%
Jodhpur, India	26°N	2200	74%
Spain	34°N	2100	71%

Against the backdrop of the above Eskom CSP EIA, SolAfrica proposes the construction and operation of a CSP plant associated infrastructure in the Northern Cape Province in the region of two of the alternative sites identified during the Eskom CSP EIA study. The close proximity to the Eskom sites arises from the fact that the selection of feasible sites was guided by similar considerations as mentioned above. The two alternative sites identified by SolAfrica were (refer to Figure 1 for the locality map):

- Site 1: Olyvenhouts Drift (15 km west of Upington), and
- Site 2: Bokpoort 390 (northwest of Groblershoop).

Site 2 which is Bokpoort was the preferred site and the CSP project was implemented on this site.

The SolAfrica power station was proposed to operate at an installed generation capacity of a maximum 75 MW. The exact output will depend on the generating technology utilised, the specification of the equipment installed, and the ambient operating conditions. The potential impacts associated with the maximum output of 75 MW have been evaluated within the environmental studies. The footprint of the proposed CSP plant is conservatively estimated at 382 hectares (ha) including the substation area.

It was preferred that the proposed power plant will utilise a wet cooling method to condense steam, used to drive a turbine, back into water. According to an engineering pre-feasibility study completed by Hatch during July 2010, the plant operation will require approximately 859 000 m³ of water per year. The environmental impact assessment has been based on this maximum amount of water that may be used and the associated abstraction system. If this volume of water is not available from the water resource, the plant will utilise dry cooling or a wet-dry hybrid system employing both evaporative and dry cooling components. In such cases, the overall impact will be lower in respect of water use and transfer.

Project Related

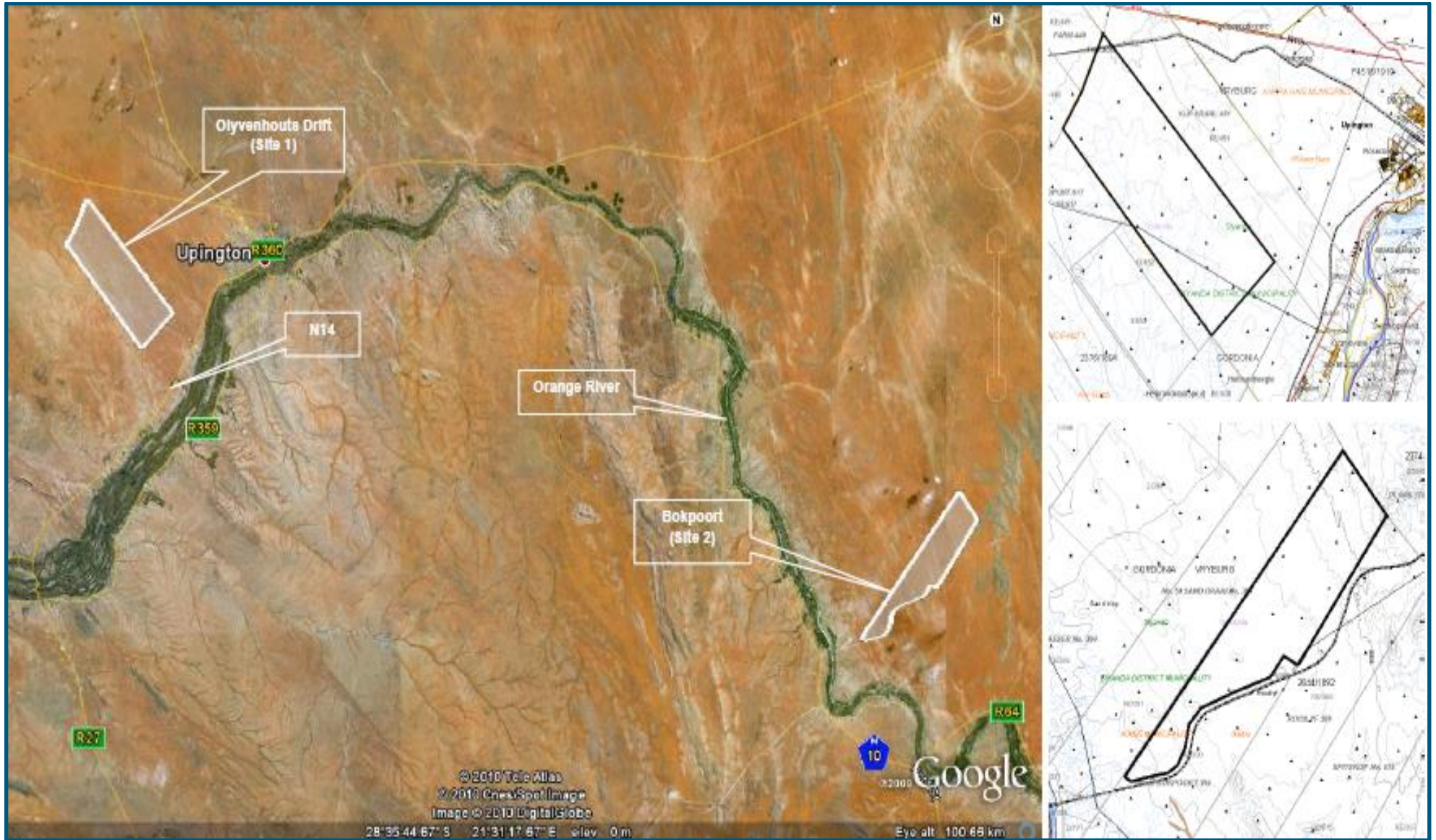


Figure 2: Locality of Two Alternative Sites Considered of the CSP Plant

1.2 Environmental Authorisation

Royal HaskoningDHV previously known SSI Engineers and Environmental Consultants was appointed by Solafrica Thermal Energy Pty Ltd in 2011 to conduct the Environmental Impact Assessment (EIA) study for the proposed 75MW Concentrating Solar Thermal Power Plant and associated infrastructure in the Siyanda District, Northern Cape Province. The study was conducted in order to identify the environmental impacts, assess their significance and provide mitigation measures for the project to be implemented accordingly without causing significant impacts in the environment. The environmental studies were completed and approved by the Department of Environmental Affairs (DEA) and an Environmental Authorisation (EA) was granted for the project on the **14th of June 2011 (DEA Ref No: 12/12/20/1920)**.

The Environmental Authorisation issued for the Proposed 75MW Concentrating Solar Thermal Power Plant and associated infrastructure authorised the following activities:

1. A power block consisting of 4 heat exchangers (the length of the heat exchanger will be approximately 70 m x 22 m x 20 m), a single turbine (the turbine is approximately 45 m x 25m x13m). The turbine will consist of two rotors connected to one another through speed reduction gear and to the generator rotor with a solid bolted coupling. The turbine will be connected to a high pressure steam inlet and a steam outlet and connect to a common axial shaft to a single generator where electricity will be generated.
2. 171.1 m³ capacity Aboveground Storage Tanks (AST) for the storage of hazardous chemical substances and asphyxiants (i.e. one 80m³ capacity AST is for the storage of Nitrogen, one 17.1m³ capacity AST is for the storage of turbine oil, one 3.8m³ capacity AST is for the storage of Heat Transfer Fluid and one 70.2m³ capacity ASTis for the storage of water treatment chemicals).
3. 542 m³ capacity AST for the storage of diesel and liquid petroleum gas (LPG) (i.e. one 50m³ capacity AST is for the storage of diesel for a generator, one 12m³ capacity AST is for the storage of diesel for a standby generator and one 480m³ capacity AST is for the storage of LPG).
4. Construction of a gravel and tarred road. The service road will be approximately 1000m long and 8m wide. The gravel road will be approximately 3200 m long and 8 m wide and the tarred road will be 667 m long and 8m wide.
5. Approximately 3,467 km 132 kilovolts overhead powerline.
6. A water pipeline of approximately 25 km long and 250 mm in diameter. The water pipeline will abstract water from the Orange River and connect to a settling tank where after it will follow the route of the existing transformed servitude for the Sishen-Saldana railway line in the north easterly direction towards the Garona Substation.
7. Office block which includes board rooms, kitchen, dining facilities, first aid room and ablution facilities of approximately 12 m high and 3 m² per floor.
8. Temporary staff accommodation, access control building, visitors centre and shades of ports of approximately 12m high.
9. The ablution facilities, administration building, office and storeroom will be a two storey masonry structure (i.e. approximately 12 m high, 3m per floor and 3m pitch height).

Subsequently, numerous amendments were made to the EA regarding the activities which were approved and the change of the EA ownership. These amendments are briefly described below.

▪ **22 September 2011 Amendment**

- Activity 3 above was rephrased to: 50 m³ capacity AST for the storage of diesel during the project construction phase and 492 m³ capacity AST for the storage of diesel and/or liquid petroleum gas (LPG) during the operational phase of the CSP plant (i.e. one 12 m³ capacity AST is for the storage of diesel for a standby generator and one 480 m³ capacity AST is for the storage of diesel and/or LPG).
- Activity 4 above was rephrased to: The tarred road providing access to the Concentrating Solar Thermal Plant from Transnet service road will be approximately 1000 m long and 8 m wide.
- Activity 5 above was rephrased to: 132 Kilovolts (KV) overheard powerline of approximately 933 m long.
- Addition of Project Coordinates: Preferred Alternative: Plant location Alternative A within Farm Bokpoort 390: 28°43'26.96"S 21°59'34.88"E
- Activity 1(c) of GNR 387 of 21 April 2006 is no longer authorised and does not form part of the authorisation.
- Rephrasing of condition 10.3.14 of the environmental authorisation dated 14 June 2011 to: All noisy construction operations must only occur during daylight hours.

▪ **10 July 2012 Amendment**

- The phrasing of activity 3 above was further refined to: 50 m³ capacity AST for the storage of diesel during the project construction phase and 499 m³ capacity AST for the storage of diesel and/or liquid petroleum gas (LPG) during the operational phase of the CSP plant (i.e. one 12 m³ capacity AST is for the storage of diesel for a standby generator and one 487 m³ capacity AST is for the storage of diesel and/or LPG).
- Activity 1 above was rephrased to: A power block consisting of 4 heat exchangers (the length of the heat exchanger will be approximately 70 m x 22 m x 20 m), a single turbine (the turbine is approximately 45 m x 25m x13m) and a 49.9MW boiler.

▪ **28 March 2013 Amendment**

- The amendment was relating to the change of Ownership of the Environmental Authorisation from Solafrica Thermal Energy Pty Ltd to ACWA Power Solafrica Bokpoort CSP Power Plant Pty Ltd.
- Inclusion of the omitted activity item 16 of GNR 546 of 18 June 2010 which was related to an abstraction pump facility that will be constructed within the 32 meters of a watercourse.
- Activity 6 above was rephrased to: The proposed construction of a 15km pipeline and associated infrastructure from portions 0 and 5 of Farm No 391, Farm Sand Draai to Portion 0 of Farm No 390, Farm Bokpoort.

Additional applications for Environmental Authorisation were lodged to DEA for the construction of the water pipeline. The additional environmental Basic assessment processes were conducted due to the refinement of the design that resulted in the re-alignment of the previously authorised pipeline as well as the substitution of storage tanks with storage/regulation ponds in line with the industry standard design for

bulk raw water storage in CSP plants worldwide. Positive Environmental Authorisations were obtained and these are described below:

Environmental Authorisation (**Ref No: 14/12/16/3/3/1/591 – 08 March 2013**) focused on the following activities:

- The 15km water pipeline (extending from the Orange River through the farm Sand Draai 391 and terminating at the farm Bokpoort 390).
- A pump station on the farm Sand Draai 391 (portions 0 and 5).
- Storage ponds as well as associated infrastructure on the approved CSP site on portion 0 of the farm Bokpoort 390.

Environmental Authorisation (**Ref No: 14/12/16/3/3/1/1214 – 24 November 2014**) focused on the following activities:


- The construction of a 3km water pipeline and associated infrastructure on Portion 0 and 5 of Farm Sand Draai 391.
- New proposed abstraction point (Shalom) and associated pumps and station.
- Raw water rising main to the filtration plant and associated infrastructure.
- Pump station deviation and associated infrastructure.

To date a 50MW CSP has been constructed on site instead of the 75MW authorised.

1.3 Details of the Project Developer

The developer is ACWA Power Solafrika Bokpoort CSP Power Plant Pty Ltd and the details of the responsible person are listed in **Table 2** below.

Table 2: Applicant Details

Applicant	ACWA Power Solafrika Bokpoort CSP Power Plant Pty Ltd	
Representative	Ms Lusani Rathanya	
Physical Address	7th Floor, 90 Grayston Drive, Sandton, 2196	
Postal Address	7th Floor, 90 Grayston Drive, Sandton, 2196	
Telephone	011 722 4127	
Facsimile	011 722 4113	
E-mail	lrathanya@acwapower.com	

1.4 Proposed 4MW PV Power Plant and Associated Infrastructure

ACWA Power Solafrica Bokpoort CSP Power Plant Pty Ltd has identified a need to develop a 4MW Photovoltaic (PV) Augmentation Power Plant and associated infrastructure in ZF Mgcawu District Municipality previously known as Siyanda District Municipality, Northern Cape Province. The proposed project will be developed within a 12 ha (9ha PV and 3ha laydown area) on a portion of the Remainder of the Farm Bokpoort 390 as depicted by **Figure 3** below and will comprise of the following components:

- Si-poly PV modules (Jinkosolar or any other), 30 modules arranged in series with 540 strings in parallel. With a unit nominal power of 330 Wp and a total module area of 31434m².
- The PV mounting structures will be of a fixed system including fire detection and alarm, fire protection devices firefighting water systems including jockey.
- MW Inverters (GE Power Conversion or any other) with an operating voltage of 910 – 1300 V. Sub-arrayed in Nb. Of Inverters – 3 units, with a total power of 4911 kWac.
- Area of the PV – 12 ha.
- Orientation of the PV - 20 degrees, fixed tilt at 7, 5 pitch.
- Laydown area - 3 Ha
- 6, 6 kV switchgear.
- The two blocks arrangement has a road with width of 4m.
- A fence surrounding the site at a height of 1,680 m.
- An internal road that is 4.5 m wide.



Figure 3: Location of the 4MW Power Plant

Project Related

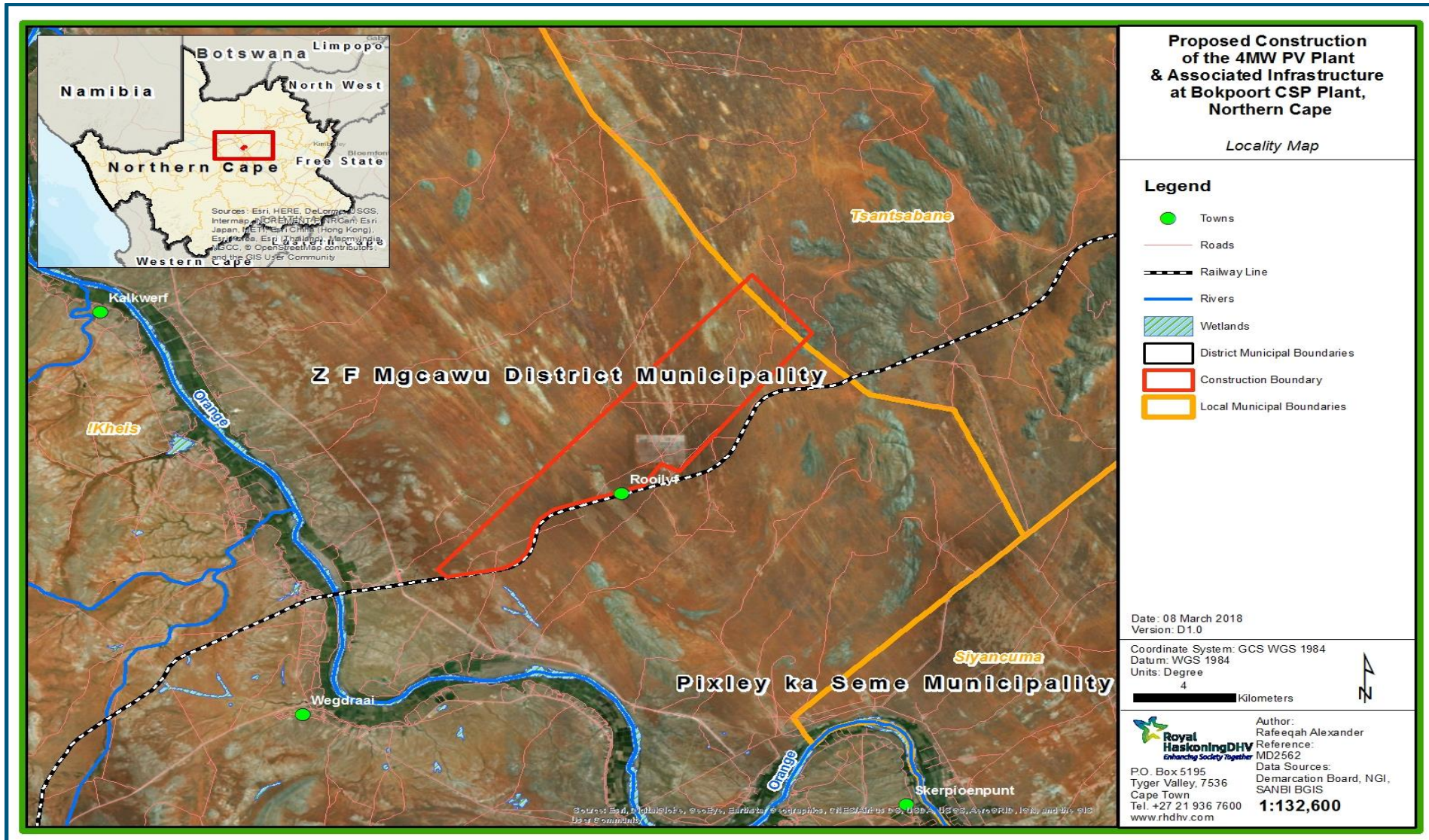


Figure 4: Location of the Study Area

2 ENVIRONMENTAL LEGISLATION

In order to protect the environment and ensure that the development is undertaken in an environmentally responsible manner, there are a number of significant pieces of environmental legislation that need to be considered during this amendment process. This section outlines the legislation that is applicable to the proposed project and has been considered in the preparation of this report (**Table 3**).

Table 3: Key Legislation Considered

Acts	Consideration
National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended	<p>To provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state.</p> <p><i>Relevance to the Proposed Project:</i></p> <ul style="list-style-type: none"> ▪ Development must be socially, environmentally and economically sustainable. ▪ Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated; the social, economic and environmental impacts of activities including disadvantages and benefits, must be considered, assessed and evaluated and decisions must be appropriate in the light of such consideration. ▪ 'Polluter Pays' principle. ▪ Any activity that is proposed and which is listed in the NEMA EIA Regulations requires environmental authorisation.
National Water Act (Act No. 36 of 1998) (as amended)	<p>The National Water Act (NWA) is a legal framework for the effective and sustainable management of water resources in South Africa. Central to the NWA is recognition that water is a scarce resource in the country which belongs to all the people of South Africa and needs to be managed in a sustainable manner to benefit all members of society. The NWA places a strong emphasis on the protection of water resources in South Africa, especially against its exploitation, and the insurance that there is water for social and economic development in the country for present and future generations. Sustainable protection, use, development and conservation of water resources – including aquatic ecosystems.</p>
National Heritage Resources Act(Act No 25 of 1999)	<p>The Act provides general principles for governing heritage resources management throughout South Africa including national and provincial heritage sites, burial grounds and graves; archaeological and palaeontological sites, and public monuments and memorials.</p>
The Constitution (No. 108 of 1996)	<p>Chapter 2 – Bill of Right Section 24 – Environmental Rights</p>
National Environmental Management Biodiversity Act (Act No. 10 of 2004) and	<p>Provide for the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources.</p>

Acts	Consideration
Regulations.	
National Environmental Management: Protected Areas Act (Act No. 57 of 2003) - NEMPAA	Creates a legal framework and management system for all protected areas in South Africa as well as establishing the South African National Parks (SANParks) as a statutory board. Each conservation area will have its own set of land use restrictions or regulations that stem either from generic restrictions under NEM: PAA, or customized regulations for individual protected areas.
National Environmental Management: Waste Act (Act No. 59 of 2008)	Section 17 - Every attempt must be made to reduce, recycle or re-use all waste before it is disposed. Section 25 - All waste (general and hazardous) generated during construction may only be disposed of at appropriately licenced waste disposal sites.
National Environmental Management: Air Quality Act (Act No 39 of 2004)	Section 32 - Control of dust. Section 34 - Control of noise. Section 35 - Control of offensive odours.
Occupational Health and Safety Act (Act No. 85 of 1993)	Section 8 - General duties of employers to their employees. Section 9 - General duties of employers and self-employed persons to persons other than their employees.
Construction Regulations (2014)	Contractors must comply with the Construction Regulations which lay out the framework for construction related activities.
Municipal By-laws	

3 ENVIRONMENTAL SCREENING AND ASSESSMENT

3.1 Environmental Screening Aims and Objectives

Environmental Screening is a decision-making process that is initiated during the early stages of the development of a proposal (DEAT (2002)). The aim of the Environmental Screening is to establish whether there are aspects of the proposal development that have the potential to give rise to significant or unacceptable environmental consequences – the identification of potential ‘fatal flaws’. In addition, the Environmental Screening establishes whether the proposal is environmentally flawed and it further determines the following:

- Whether the proposal requires environmental assessment and authorisation from a Competent Authority;
- The level of the environmental assessment required; and
- Legal and other regulatory requirements or constraints.

It is in the above context that a screening exercise and verification against previous specialist studies were undertaken to inform this Part 2 Amendment Application Process.

3.2 Appointment of the Environmental Assessment Practitioner

3.2.1 Details of the Environmental Assessment Practitioner

In March 2018 ACWA Power Solafrika Bokpoort CSP Power Plant Pty Ltd appointed Royal HaskoningDHV as the Environmental Assessment Practitioner (EAP) to conduct an Environmental Screening and Part 2 Amendment Application Process for the proposed 4MW PV project. The Part 2 Application Amendment is conducted in order to identify the environmental sensitive features related to the proposed project as well as to determine if any triggering of EIA Listing Notices 1-3 applies, which in turn will require an Environmental Authorisation. The contact details of the responsible person are provided in **Table 4** below.

Table 4: Environmental Assessment Practitioner Details

Company	Royal HaskoningDHV
Contact Persons	Ms Sibongile Gumbi
Postal Address	PO Box 867, Gallo Manor, 2052 (Johannesburg)
Telephone	011 798 6449
E-mail	Sibongile.gumbi@rhdhv.com
Qualification	MSc Environmental Sciences
Expertise	Sibongile Gumbi has eleven years of experience in the environmental field. Her expertise ranges from Environmental Training, Environmental Auditing and Monitoring, Environmental Impact Assessment studies, Environmental Management Plans and Programmes, Stakeholder Engagement, Project Management. Sibongile is also a registered Pri.Sci.Nat.
Signature of the EAP	

3.3 Approach to the Environmental Screening and Assessment

3.3.1 Authority Consultation

3.3.1.1 Department of Environmental Affairs

A pre-consultation meeting with DEA and ACWA Power Solafrika Bokpoort CSP Power Plant Pty Ltd as well as Royal HaskoningDHV DHV was convened on the **28th of February 2018** to seek guidance on the amendment process (if any) that need to be undertaken for the proposed project as per the Environmental Management Act (Act No 107 of 1998). The DEA then advised that a Part 2 Environmental Authorisation Amendment must be undertaken for the project as per Regulation 31 requirements (**Refer to BOX 1 below**) prior to the implementation of the project.

BOX 1: PART 2 AMENDMENT PROCESS

31. An environmental authorisation may be amended by following the process prescribed in this Part if the amendment will result in a change to the scope of a valid environmental authorisation where such change will result in an increased level or change in the nature of impact where such level or change in nature of impact was not—

- (a). assessed and included in the initial application for environmental authorisation; or
 - (b). taken into consideration in the initial environmental authorisation;
- and the change does not, on its own, constitute a listed or specified activity.

Process and consideration of application for amendment

32. (1). The applicant must within 90 days of receipt by the competent authority of the application made in terms of regulation 31, submit to the competent authority—

- (a). a report, reflecting—
 - (i). an assessment of all impacts related to the proposed change;
 - (ii). advantages and disadvantages associated with the proposed change; and
 - (iii). measures to ensure avoidance, management and mitigation of impacts associated with such proposed change; and
 - (iv). any changes to the EMPr;

which report—

- (aa) had been subjected to a public participation process, which had been agreed to by the competent authority, and which was appropriate to bring the proposed change to the attention of potential and registered interested and affected parties, including organs of state, which have jurisdiction in respect of any aspect of the relevant activity, and the competent authority, and
 - (bb) reflects the incorporation of comments received, including any comments of the competent authority; or
- (b). a notification in writing that the report will be submitted within 140 days of receipt of the application by the competent authority, as significant changes have been made or significant new information has been added to the report, which changes or information was not contained in the report consulted on during the initial public participation process contemplated in subregulation (1)(a) and that the revised report will be subjected to another public participation process of at least 30 days.
- (2). In the event where subregulation (1)(b) applies, the report, which reflects the incorporation of comments received, including any comments of the competent authority, must be submitted to the competent authority within 140 days of receipt of the application by the competent authority.

Decision on amendment application

33. (1). The competent authority must within 107 days of receipt of the report contemplated in regulation 32, in writing, decide the application.

- (2). On having reached a decision, the competent authority must comply with regulation 4(1), after which the holder applicant must comply with regulation 4(2).

3.3.2 Environmental Legislation Permit Requirements

3.3.2.1 National Environmental Management Act (Act 107 of 1998)

The Environmental Impact Assessment Regulations Government Notices R 983, 984, 985 (also referred to as Listing Notices 1, 2 and 3) promulgated under the National Environmental Management Act (Act No 107 of 1998) in December 2014 (as amended in April 2017) were scrutinised in order to identify any

triggers in relation to be proposed development and the results indicated that a new Environmental Authorisation will not be required. The details of the findings are depicted in the **Table 5**.

3.3.2.2 Other Environmental Legislation

Other environmental legislation were also examined and it was determined that there are no permits required. It must be noted that the project developer is not exempted from complying with these environmental legislation and municipal bylaws should these be triggered by the construction activities at later stage.

3.3.3 The Environmental Assessment Report

This report is aimed at addressing and documenting the following:

- Identification of potential positive and negative environmental impacts (biophysical and social) associated with the proposed project;
- Optimisation of positive project impacts to the benefit of the local environment and community;
- Identification of EIA Listing Notices triggered that require an authorisation; and
- To recommend mitigation measures for significant impacts identified.

The focus of this environmental assessment report is largely on the impacts of the proposed 4MW Photovoltaic (PV) Augmentation Power Plant and associated infrastructure on the bio-physical and social environment. The specialist's studies which were previously conducted for the original CSP Plant were revised in order to determine whether there will be any potential environmental impacts as a result of the proposed project and mitigation measures were provided where required. The findings of the specialist studies are detailed in **Section 4**.

Project Related

Table 5: EIA Regulations Listing Notices

Proposed Developments	Listing Notice 1 Activities	Listing Notice 2 Activities	Listing Notice 3 Activities	Applicability	
				YES	NO
<p>1. Internal Road that is 4.5m wide.</p> <p>2. The two blocks arrangement has a road with width of 4m.</p>	<p>No 24: The development of a road (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.</p>	<p>No 27: The development of a road (ii) with a reserve wider than 30 metres; or (iv)catering for more than one lane of traffic in both directions.</p>	<p>No 4: The development of a road wider than 4 metres with a reserve less than 13,5 metres</p> <p>g. Northern Cape</p> <p>i. In an estuary;</p> <p>ii. Outside urban areas:</p> <p>(aa) A protected area identified in terms of NEMPAA, excluding disturbed areas;</p> <p>(bb) National Protected Area Expansion Strategy Focus areas;</p> <p>(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</p> <p>(dd) Sites or areas identified in terms of an international convention;</p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>(ff)Core areas in biosphere reserves;</p> <p>(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas; or</p> <p>(hh) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; or</p> <p>iii. Inside urban areas:</p> <p>(aa) Areas zoned for use as public open space;</p> <p>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose; or</p> <p>(cc) Seawards of the development setback line or within urban protected areas.</p>		✓

Project Related

Proposed Developments	Listing Notice 1 Activities	Listing Notice 2 Activities	Listing Notice 3 Activities	Applicability	
				YES	NO
3. Area of the PV – 12 ha. 4. Fence surrounding the site at a height of 1,680 m. 5. Laydown area - 3 Ha 6. 6,6 kV switchgear.	No 27: The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i)the undertaking of a linear activity.	No 15: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— (i)the undertaking of a linear activity.	NO 12: The clearance of an area of 300 square metres or more of indigenous vegetation g. Northern Cape i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans; iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuary, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; or iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.		✓
7. The development of the 4MW PV Plant	No36: The expansion of facilities or structures for the generation of electricity from a renewable resource where— (i) the electricity output will be increased by 10 megawatts or more, excluding where such expansion takes place on the original development footprint; or (ii) regardless the				✓

Project Related

Proposed Developments	Listing Notice 1 Activities	Listing Notice 2 Activities	Listing Notice 3 Activities	Applicability	
				YES	NO
	<p>increased output of the facility, the development footprint will be expanded by 1 hectare or more; <u>excluding where such expansion of facilities or structures is for photovoltaic installations and occurs-</u></p> <p>(a) within an urban area; or</p> <p>(b) on existing <u>infrastructure.</u></p>				

4 DESCRIPTION OF BASELINE ENVIRONMENT

This section of the report serves to describe the baseline environment, identify and evaluate the potential environmental impacts (positive and negative) associated with the proposed project and recommend mitigation measures where required.

4.1 Location of the Study Area

The proposed project is located within the ZF Mgcawu District Municipality previously known as Siyanda District Municipality (refer to **Figures 4 and 5**). More specifically, the project is located approximately 15km north of Groblershoop town within the !Kheis Local Municipality and approximately 70km south-west of Upington town within the //Khara Hais Local Municipality, in Northern Cape Province. The proposed 4MW PV Augmentation is 12 ha (9ha PV and 3ha laydown area) on a portion of the Remainder of the Farm Bokpoort 390 as depicted by the image below. The proposed project and associated infrastructure are located on the southerly portion of the existing 50MW CSP Plant in an area previously used as laydown area during the construction of the 75MW CSP Plant within the 382 ha footprint .

4.1.1 Site Description and Ownership

The land in which the proposed project is situated, is owned by ACWA Power SolAfrica Bokpoort CSP Power Plant (Pty) Ltd (RF) and is located on the Remainder of the Farm Bokpoort 390. The footprint of the proposed project is bordered by the CSP panels, evaporation ponds and associated infrastructure in the north and westerly direction and open veld in the east-south direction. The substation and a railway line are located further south of the project footprint (**Figure 5**).

4.1.2 Coordinates of the Site

Table 6: Co-ordinates of the Site

Location	Latitude	Longitude
PV Plant		
Site	28°43'26.96"S	21°59'34.88"E

4.1.3 Surrounding Land Uses

Table 7: Surrounding Land uses within a 500m Radius of the Site

Description	Y/N	Description	Y/N
Natural area	Y	Light industrial	N
Low density residential	N	Medium industrial	N
Medium density residential	N	Heavy industrial	N

Description	Y/N	Description	Y/N
High density residential	N	Power station	Y
Informal residential	N	Military or police base/station/compound	N
Retail commercial & warehousing	N	Spoil heap or slimes dam	N
Office/consulting room	N	Dam or reservoir	N
Quarry, sand or borrow pit	N	Hospital/medical centre	N
School	N	Tertiary education facility	N
Church	N	Old age home	N
Sewage treatment plant	N	Train station or shunting yard	N
Railway line	Y	Major road (4 lanes or more)	N
Harbour	N	Plantation	N
Sport facilities	N	Agriculture	N
Golf course	N	River, stream or wetland	N
Polo fields	N	Nature conservation area	N
Filling station	N	Mountain, koppie or ridge	N
Landfill or waste treatment site	N	Museum	N
Historical building	N	Protected Area	N
Graveyard	N	Archaeological site	N
Airport	N	Other:	N

Key: Y = Yes N = No

4.2 Project Need and Desirability

Table 8: Project Need, Desirability and Benefits

Project Need			
1.	Was the relevant provincial planning department involved in the application?	YES	
2.	Does the proposed land use fall within the relevant provincial planning framework?	YES	
	The proposed PV Augmentation will be located on a portion of land previously utilised as a laydown area. The footprint of the proposed PV is within the 382 ha footprint of the authorised CSP. Thus, it does not constitute a new land use and is therefore considered to be in line with the provincial framework.		
3.	If the answer to questions 1 and / or 2 was NO, please provide further motivation / Explanation – N/A.		
Desirability			
1.	Does the proposed land use / development fit the surrounding area?	YES	

2.	Does the proposed land use / development conform to the relevant structure plans, SDF and planning visions for the area?	YES	
3.	Will the benefits of the proposed land use / development outweigh the negative impacts of it?	YES	
4.	If the answer to any of the questions 1-3 was NO, please provide further motivation / Explanation – N/A.		
5.	Will the proposed land use / development impact on the sense of place?		NO
	There is a CSP Plant already in existence and in operation.		
6.	Will the proposed land use / development set a precedent?		NO
	The project is limited to an area already developed.		
7.	Will any person's rights be affected by the proposed land use / development?		NO
8.	Will the proposed land use / development compromise the "urban edge"?		NO
	The area is completely rural in nature and will have no effect on the urban edge.		
9.	If the answer to any of the question 5-8 was YES, please provide further motivation / explanation – N/A.		
Benefits			
1.	Will the land use / development have any benefits for society in general?	YES	
2.	Explain: The implementation of the project will not only ensure the adequate green energy supply by the CSP but will create jobs during the construction and operational phase of the PV plant. This will promote the socio-economic status of the local area and that of the local municipality.		
3.	Will the land use / development have any benefits for the local communities where it will be located?	YES	
4.	Explain: Employment opportunities for the local communities will be created during the construction phase and operation phase.		

Project Related



Figure 5: Location of the Study Area and Associated Landuses

4.3 Climate

Groblershoop normally receives about 108mm of rain per year, with most rainfall occurring mainly during autumn. **Figure 6** shows the average rainfall values for Groblershoop per month. It receives the lowest rainfall (0mm) in June and the highest (32mm) in March. The monthly distribution of average daily maximum temperatures (**Figure 7**) shows that the average midday temperatures for Groblershoop range from 19°C in June to 33°C in January. The region is the coldest during July when the mercury drops to 2°C on average during the night. **Figure 8** for an indication of the monthly variation of average minimum daily temperatures (SA Explorer, 2000-2014).

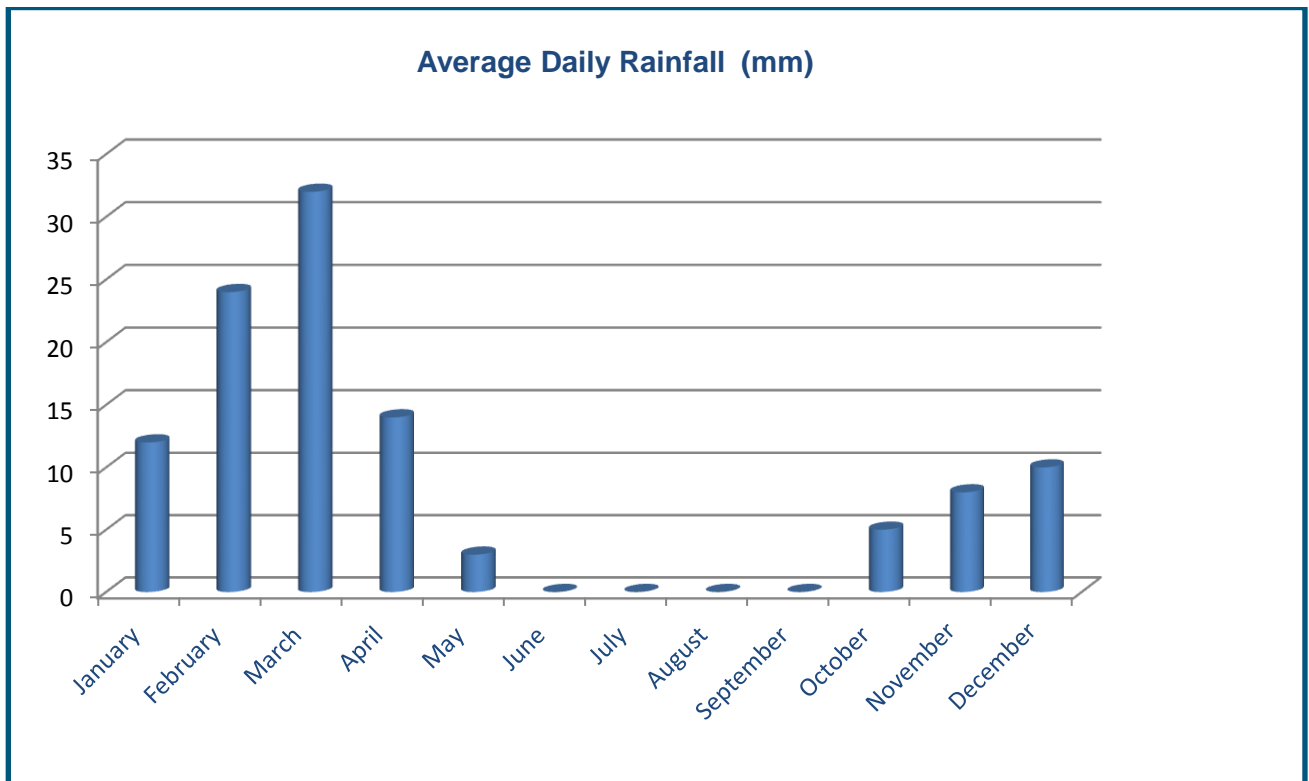


Figure 6: Graphical Presentation of Average Daily Rainfall

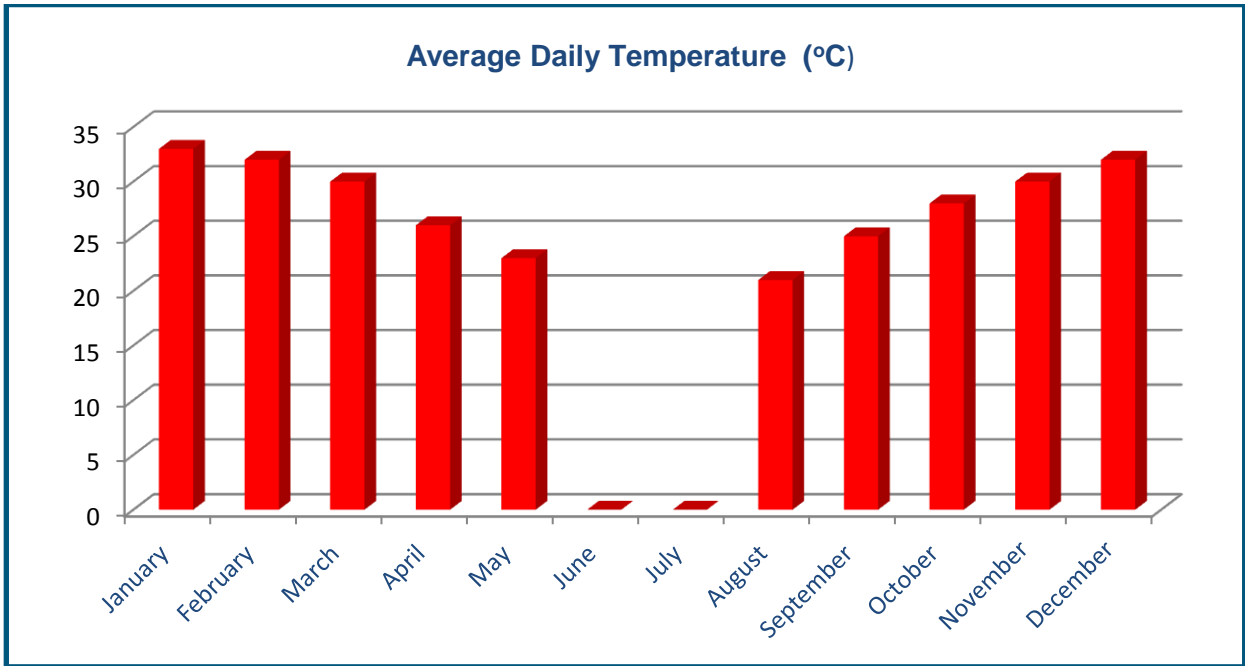


Figure 7: Graphical Presentation of Average Daily Temperatures

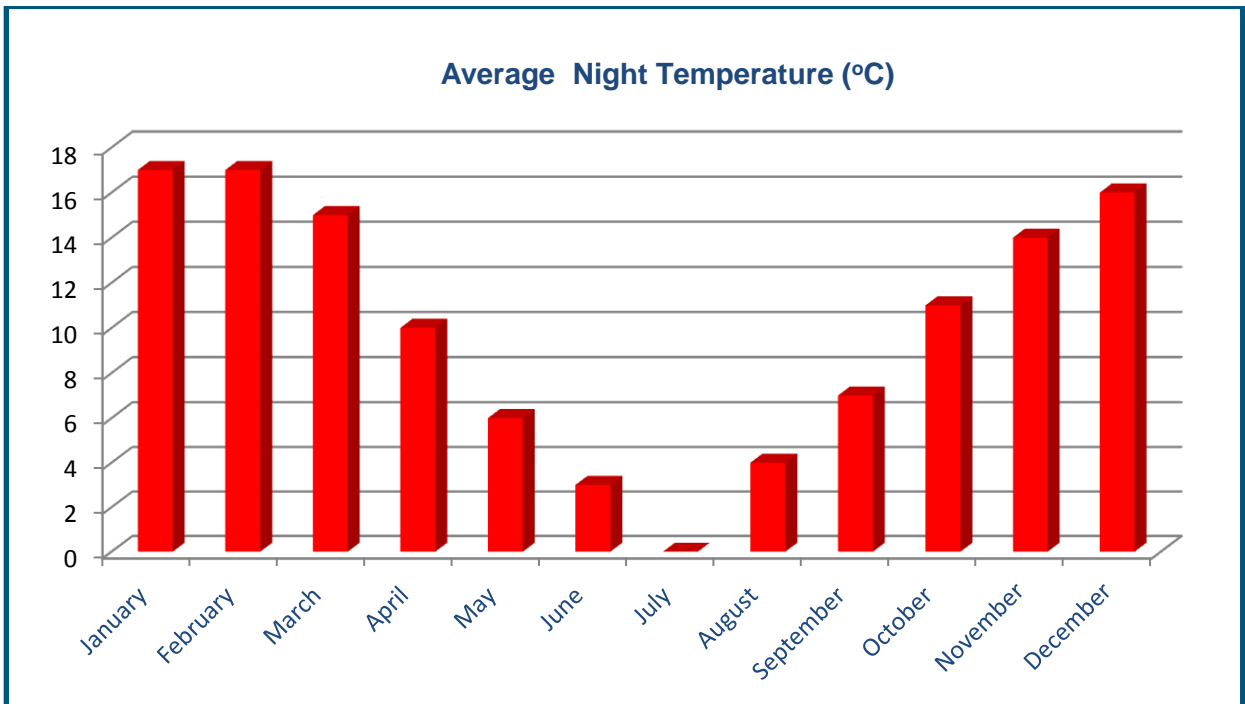


Figure 8: Graphical Presentation of Average Night Temperatures

4.4 Agriculture and Soil Potential Findings

This study was undertaken by an independent specialist: Garry Paterson from ARC -Institute for Soil, Climate and Water

There will be no change in the agriculture and soil impacts due to the arid nature of the region and the shallow or sandy nature of the soils. Any survey, no matter how detailed, will fail to locate any soils with meaningful arable potential. The recommendation is therefore that, unless specific problems (such as erosion) occur in the vicinity of the chosen site, a detailed soil investigation should not be necessary.

The addition of the PV component will therefore have no additional impact on agriculture potential and the mitigation and recommendations made in the original EIA specialist in this regard study will stand.

4.5 Air Quality Findings

This study was undertaken by an independent specialist: Stuart Thompson from EBSAdvisory

The air quality impact assessment undertaken in 2011 covered the three standard phases for the project including construction, operation and eventual decommissioning of the CSP plant. The construction phase focused on the construction and development of access roads, the preparation of the surface area, required prior to infrastructure set-up, and the transportation of equipment to site. Due to the temporary nature of these activities, these aspects have only been covered qualitatively.

These impacts were modelled using the Department of Environmental Affairs approved AERMOD model, with emissions calculated using USEPA AP42 Emission Factors, a methodology approved as part of the Regulations Regarding Air Dispersion Modelling. The decommissioning phase of the operations was also covered in the air quality study as a qualitative assessment due to the temporary nature of the activities. These include the clearing of all infrastructure, and revegetating of land.

Based on the air quality impact assessment undertaken, and the proposed addition of 4MW of PV (which have no inherent air quality emission), the existing air quality assessment sufficiently covers all aspects of the Solar Power Plant with the additional PV having no significant air quality impact to the receiving environment, and no impact which is not covered under the existing air quality impact study or environmental management plan.

4.6 Avifauna Findings

This study was undertaken by an independent specialist: Andrew Pearson from ArcusConsulting

4.6.1 Avifauna of the Area

The proposed PV project site is situated within the arid Northern Cape Province, within the Nama Karoo Biome, and the land use in the surrounding area is predominantly low intensity stock farming. Bird microhabitats within 2 km surrounding the Bokpoort CSP site include “Kraals and Associated Reservoirs”, natural “Scrubland/Thornveld”, “Open Grassy Scrubland”, “Duneveld” and “Open Gravel Plains”. These areas may support a number of arid species, particularly smaller passerines such as canaries, larks, chats, finches, sparrows, sparrow-larks, as well as sandgrouse and doves. Larger terrestrial species such as courser, korhaans and bustards are also likely.

Van Rooyen (2010) did not conduct any long term field work, and highlighted key species occurring in the area around the Bokpoort CSP plant primarily based on desk based data sources. The following species were mentioned as being important: Kori Bustard, Martial Eagle, Tawny Eagle, Karoo Korhaan, Ludwig’s Bustard, Fawn-coloured Lark, Kalahari Scrub Robin, White-backed Vulture, Lappet-faced Vulture, Black-shouldered Kite, Booted Eagle, African Fish Eagle, Southern Pale Chanting Goshawk, Secretarybird, Verreaux’s Eagle, and Jackal Buzzard. None of these species suffered mortality during Jeal’s (2017) study of the operational Bokpoort CSP site and it is unlikely that any have been significantly impacted. Jeal (2017) revealed another microhabitat for birds, namely the CSP plant itself. Certain species such as Cape Sparrow, Red-headed Finch, Familiar Chat, Rock Martin and Western Barn Owl were recorded utilizing the solar fields as either roosting or nesting sites, or foraging around the plant’s buildings. A large number of Western Barn Owl were roosting in the pipes supporting the mirrors with as many as 15 owls recorded over two rows, and total of 63 records of this species made by the study.

A total of 89 bird species were recorded on the proposed Bokpoort II solar farm site across a 12 month study period (Arcus, 2016), including eight regionally red listed species (Taylor, 2015). Of these, three are listed as endangered (Ludwig’s Bustard, Martial Eagle and Lappet-faced Vulture), three are vulnerable (Verreaux’s Eagle, Lanner Falcon and Burchell’s Courser), while two are near-threatened (Double-banded Courser and Kori Bustard). Arcus (2016) identified the following focal species: Martial Eagle, Verreaux’s Eagle, Lappet-faced Vulture, Cape Eagle-Owl, Lanner Falcon, Pygmy Falcon, Pale-chanting Goshawk, Greater Kestrel, Kori Bustard, Ludwig’s Bustard, Northern Black Korhaan, Burchell’s Courser, Eastern Clapper Lark, Fawn-coloured Lark, Black-eared Sparrowlark, Black-headed Canary, Sociable Weaver, Namaqua Sandgrouse, Rock Martin, Barn Swallow, and Namaqua Dove. The majority of these species are unlikely to be negatively affected by the proposed 4 MW PV development. An active Martial Eagle nest site on a pylon was located during the Arcus (2016) study at S -28.714505°; E 22.038635° approximately 4.3 km north east of the Bokpoort CSP plant.

4.6.2 Potential Impacts on Avifauna

There is generally a lack of information, both internationally and more so in South Africa, on the impact of solar PV facilities on birds. In the literature there is a wide variation in the nature and significance of predicted impacts which range from effective and physical habitat loss to direct collision-related mortality (Jeal, 2017). The potential impacts of Solar PV facilities on birds include (Lovich & Ennen, 20114; Kagan et al., 20145; Jeal, 2017; Visser, 20166):

- Destruction of habitat used by birds through the removal of vegetation and habitat degradation resulting in temporary/permanent displacement;
- Changes in landscape connectivity and habitat fragmentation;
- Collisions with solar PV infrastructure (including fencing and power lines);
- Electrocutation on associated power lines;
- Bird entrapment between fencing; and
- Increased availability of nesting/perching/roosting structures (a potentially positive impact).

The environmental impact assessment (EIA) of the Bokpoort CSP regarded the impact of collisions of birds with mirrors and burning of birds to be of moderate significance (van Rooyen Consulting, 2010), but Jeal (2017) showed that these impacts may not be as significant as first thought. Jeal (2017) recorded 8 bird mortalities in 3 months at the Bokpoort CSP, none of which occurred within the three-month study period.

Jeal (2017) concluded with a high degree of confidence that mortality rates for large birds are negligible and with somewhat less confidence that mortality of small birds is not very high at the Bokpoort CSP plant. Higher levels of bird mortality were found by Jeal (2017) associated with the plant's evaporation ponds where 24 bird mortalities (many likely caused by drowning) were found. Jeal (2017) did however find evidence of significant displacement of birds caused by habitat destruction/alteration. There were significant changes in bird distribution across the landscape with more species richness and greater abundance in the rangeland compared to the solar fields. Jeal concluded though that over all the CSP facility had a low impact on bird populations.

Arcus is aware of only one detailed study in South Africa on the impacts of birds at an operational utility scale PV facility (Visser, 2016). This study at the Jasper PV site (conducted over a similar time span) had more mortality records than at Bokpoort, with 12 carcasses, eight of which occurred during the 3-month study (although they could not be conclusively linked to collision related mortality). This may be due to more birds utilising operational PV sites because of better habitat, as PV sites are generally not as intensively cleared of vegetation compared to CSP trough sites. Indeed at the Jasper PV site there was no significant difference in overall bird density and diversity between the PV collector area and the adjacent rangelands area. Habitat destruction and displacement is therefore potentially less of a concern at PV sites than initially thought. Various species were recorded both foraging, hunting, perching and breeding within the operational Jasper PV site. Visser (2016) estimated an annual bird fatality rate at the Jasper PV site of 4.53 fatalities.MW-1.yr-1. It must be noted though that the 96 MW Jasper PV plant (covering -180 ha) is substantially bigger than the proposed 4 MW Bokpoort PV project. One fatality at Jasper, of an Orange River Francolin, resulted from the bird being trapped between the inner and outer fence, where personnel observed the bird stunned after attempting to take flight between the fencing (Visser, 2016).

Red-crested Korhaan were also trapped between fencing on three occasions, but were able to escape when assisted.

Based on the above review, the proposed 4 MW project is likely to have low levels of collision impacts, and low levels of displacement impacts on birds. Impacts caused by the perimeter fence are likely to be moderate to low, while there will be no additional impacts associated with evaporation ponds as these are not part of the proposed project.

4.6.3 Recommendations and Mitigations

An operational monitoring programme should be implemented by an avifaunal specialist for the 4 MW PV facility to monitor for bird fatalities during the first year of operations, which can be implemented by ACWA power's on site operational staff. Results of this monitoring should then advise if further operational monitoring is needed. A single fence design should be utilised around the PV facility. The perimeter fence must be checked regularly (at least twice weekly) for trapped or stranded birds, which should then be assisted to escape. Site staff must be trained by an avifaunal specialist in the capture and handling of birds, to aid in dealing with such situations. All exposed electrical cabling and or power lines associated with the project must be adequately insulated to prevent bird electrocutions. Any new overhead powerlines must be fitted with bird flight diverters to reduce potential bird collisions.

Jeal (2017) states that Bokpoort CSP facility management has begun implementing steps to reduce the risk of Western Barn Owl collisions by installing nest boxes in the surrounding rangeland landscape to provide alternative 'safer' roosting (and nesting) sites. It is recommended that this continues, and that the boxes are monitored for use.

4.6.4 Conclusion and Impact Statement

In conclusion, the proposed construction of a 4 MW PV plant within the Bokpoort CSP site is unlikely to have any significant negative impacts on avifauna. No additional cause of impacts (from those previously identified for the CSP project site) are expected. One of the main potential impacts of PV plants in general, is that of habitat destruction and displacement of birds. As the proposed project is within the already disturbed footprint of the Bokpoort CSP project, and considering its relatively small size and the extensive remaining existing habitat in the broader area, this impact is likely to be negligible. Collisions of certain species with the PV panels are possible, but is likely to be at a moderate to low significance. Should all recommendations and mitigations discussed be implemented, the construction and operation of the 4 MW PV Plant will have no additional significant impacts on birds.

4.7 Biodiversity Findings

This study was undertaken by an independent specialist: Riaan Robbeson from Bathusi Environmental Consultants

The following key Biodiversity considerations are presented:

- The proposed PV arrays and laydown areas form part of the original ecological study area and was therefore assessed in the principal ecological assessment. A major conclusion of the ecological report was that the largest extent of the proposed area comprises of habitat that exhibit medium ecological sensitivities and that the proposed development will unlikely result in significant impacts on the receiving biological environment on a regional scale.
- Results of the principal ecological assessment indicate the spatial location of the proposed PV plant within the Open Shrub Duneveld Habitat type;
- As part of the original assessment, a walkdown assessment of the proposed footprint was also conducted to establish the presence and abundance of protected trees and the required permits were obtained for the removal of protected species from the development footprint;
- Results and recommendations presented in the principal ecological report are therefore regarded sufficient to present an account of the type, significance and likelihood of impacts within the receiving biological/ biodiversity environment;
- The proposed PV footprint has already been affected by the existing development and does not constitute natural/ pristine habitat that was assessed as part of the principal ecological assessment (refer to **Figure 9**);
- Existing habitat within the proposed footprint currently comprises deteriorated savanna habitat that is typically associated with industrial developments and does not reflect the original characteristics and sensitivity;
- Expected and likely impacts associated with the additional 4 MW PV development are not expected to add cumulatively to existing impacts of the development/ footprint;
- Typical and expected impacts associated with the proposed development are highly unlikely to contribute to significant losses of important and sensitive biological receptors of the environment on a local or regional scale; and
- It was the Biodiversity specialist's understanding that the proposed development of the 4 MW PV Plant will be managed and administrated within the existing Environmental Management Programme for the existing Bokpoort development, with specific reference to authorisation requirements and conditions presented in the EA.

Based on the above, Biodiversity specialists indicated that the area was therefore adequately assessed in terms of biological and biodiversity attributes and that no additional/ further biological/ biodiversity studies are required for the proposed 4 MW PV arrays for the Bokpoort Development.



Figure 9: Status of the Footprint for the 4MW PV Plant

4.8 Heritage Findings

This study was undertaken by an independent specialist: Johan van Schalkwyk

The previous heritage impact assessment reports conducted for the CSP project and other heritage studies conducted for the study area were reviewed (Dreyer 2007, 2014, 2015; Morris 2012, 2014; Van der Walt 2015; Van Ryneveld 2007).

Based on the above review, it is possible to conclude that the region has a low presence of heritage sites and features, with the only recurrent theme being low density surface scatters of mostly Middle Stone Age tools occurring in places; Later Stone Age material represents an even smaller occurrence.

Linked to this is the fact that the area where the planned expansion is to take place has already being impacted on by the original development of the CSP facility, which would have destroyed any heritage features that might have occurred here in the past.

Therefore, the specialist did with a high degree of confidence state that the new development, located within the previously investigated footprint of the CSP would not lead to any impact on sites, features or objects of cultural heritage significance and that an amendment to the Environmental Authorisation would be in order, on condition of SAHRA's acceptance of this review.

However, considering the fact that archaeological sites in many cases occur below ground surface, if, during construction, archaeological site or graves are discovered, work must immediately be suspended and a heritage specialist must be consulted to assess the finds.

4.9 Noise Findings

This study was undertaken by an independent specialist: Barend van der Merwe from dBAcoustics

4.9.1 Prevailing Ambient Noise

The prevailing ambient noise levels (2016 noise survey) at the nearest noise receptor (Mr Honiball's farm – Bokpoort 390) to the south-west of the proposed 4MW PV panels were as follows:

- Bokpoort 390 (Mr Honiball's farm) – 50.2dBA during the day and 35.0dBA during the night;
- Bokpoort 390 (southern side of the farm) – 44.1dBA during the day and 35.0dBA during the night;
- Bokpoort 390 (Mr Honiball's farm and 500m north-west of the district road) – 36.9dBA during the day and 35.0dBA during the night.

The distance between the farmhouse and the proposed 4MW PV panels are 2 416m. The assessment of environmental noise impacts will vary because of the different prevailing ambient noise levels in different districts according to SANS 10103 of 2008. The recommended noise levels of these districts are referred to (**Table 9**). In order to simplify the assessment of the magnitude of noise impacts in terms of noise increases, it is recommended that the increase in the in the prevailing ambient noise level is quantified. The following equation was used to calculate the noise level from the 4MW PV panel project at Mr. Honiball’s property:

$$L_p = L_w - 20 \log R - \alpha$$

- Where, L_p is the sound level at a distance from the source in dBA;
- L_w is the sound level at the source in dBA;
- α is the noise reduction due to the distance from the source (5.0dBA);
- R is the distance from the source.

The above formula and the Interactive noise calculator (ISO 9613) were used to determine the noise intrusion levels during the construction and operational phase of the project. The noise intrusion levels are calculated in the following manner:

$$L_{Req,T} = L_{Req,T} (post) - L_{Req,T} (pre)$$

where,

- $L_{Req,T} (post)$ – noise level after completion of the project – projected or calculated noise levels;
- $L_{Req,T} (pre)$ – noise level before the proposed project – ambient noise level.

The noise intrusion level during the construction phase and operational phase is illustrated in **Table 10** (Construction phase) and **Table 11** (Operational phase).

Table 9: Recommended Noise Levels for Different Districts

Type of district	Equivalent continuous rating level (LReq.T) for ambient noise - dBA					
	Outdoors			Indoor, with open windows		
	Day-night LRdn	Daytime LReqd	Nighttime LReqn	Day-night LR.dn	Daytime LReq.d	Night-time LReq.n
a) Rural districts	45	45	35	35	35	25
b) Suburban districts with little road traffic	50	50	40	40	40	30
c) Urban districts	55	55	45	45	45	35
d) Urban districts with some workshops, with business premises and with main roads	60	60	50	50	50	40
e) Central business district	65	65	55	55	55	45
f) Industrial districts	70	70	60	60	60	50

Table 10: Construction Phase

Location	Installation of the PV Panels - dBA	Earthworks - dBA	Civil construction - dBA	Cumulative Levels - dBA	Daytime cumulative noise level - dBA	Night time cumulative noise level - dBA	Daytime intrusion noise level - dBA	Night time intrusion noise level - dBA
Mr Honiball's property	14.3	17.3	17.3	21.3	50.2	35.2	0.0	0.2

Table 11: Operational Phase

Location	Operational phase of the PV panels - dBA	Maintenance - dBA	Substation - dBA	Cumulative Levels - dBA	Daytime cumulative noise level - dBA	Night time cumulative noise level - dBA	Daytime intrusion noise level - dBA	Night time intrusion noise level - dBA
Mr Honiball's property	14.3	7.3	7.3	15.8	50.2	35.1	0.00	0.05

4.9.2 Conclusion and Recommendations

The proposed 4MW PV Panels will be situated within the boundaries of the CSP plant where there are other parabolic troughs and activities with similar noise levels. The noise impact assessment revealed that the noise increase will be insignificant at the nearest noise receptor. The noise impact at the other noise receptors which are further than Mr. Honiball's property will not be an issue as the activities will not be audible. The activities, during the construction and operational phases of the proposed 4MW PV Panels project will comply with the Noise Control Regulations, 1994, IFC Health and safety Guideline and SANS 10103 of 2008. There will be no noise increase at the abutting noise sensitive areas and the proposed project can be approved.

4.10 Social Findings

This study was undertaken by an independent specialist: Kementthree Moonsamy from Royal HaskoningDHV

The below information outlines the findings of the social study for the proposed project:

- The Bokpoort development site does not support cattle grazing, cultivated lands, game farming or communal crop or cattle farming activities;
- There is no current labour force residing or working on the farm;
- There are no residential or farm structures on the farm;
- There are no areas of natural resources use (water bodies or woodlands); and

- The roads that are in use by surrounding farmers are also being used by existing (and future) contractors to the Bokpoort development site.

The negative impacts will be limited to the construction phase. Impacts are not likely to occur to human activities or livelihood generation in the surrounding areas. The main negative impact would be an “Inconvenience and danger to proximate residents through increased road traffic, dust and noise”. Positive impacts that remain high (during the operation phase) include, the potential increase in local gross geographic figures; the increase in local job creation activities; and an increase in South Africa’s power producing independence.

A 2016 SIA on the Sandraai farm, neighbour to the Bokpoort Solar Power Plant, revealed two points of action that are applicable to the proposed activity on the Bokpoort development site:

- Development and implementation of a grievance mechanism; and
- Contractor behaviour and safety protocols on and off site will need to be monitored via the grievance mechanism.

This Social opinion thus concludes that:

- The additional activities planned for the Bokpoort development site, in the current development footprint, will not yield further/additional/new impacts to the surrounding landowners and communities; and
- The additional assurance that a grievance management system is in place for the project duration will strengthen the Company’s social responsibility and accountability characteristics, not to mention its ESMS criteria (for best practice requirements).

5 CONCLUSION AND RECOMMENDATIONS

The environmental assessment has been undertaken in accordance with the Section 28 of the National Environmental Management Act (Act No 107 of 1998) as amended in 2017, and in accordance with the requirements associated with a Part 2 amendment process as provided for in the EIA Regulations 2014 (as amended).

This assessment process is aimed at ensuring that informed decision-making by the DEA and to ensure that environmental accountability is achieved.

The preceding chapters of this report provide a detailed assessment of the predicted environmental impacts on specific components of the social and biophysical environment as a result of the proposed 4MW project. This Chapter concludes by providing a holistic evaluation of the most important environmental impacts identified through the process. In so doing, it draws on the information gathered as part of the impact assessment process. No environmental fatal flaws were flagged, since the identified impacts can be mitigated to acceptable levels.

5.1 Recommendation

In order to achieve appropriate environmental management standards and ensure that the findings of this amendment process are implemented through practical measures, the recommendations contained within the specialist studies/inputs have been included within an updated **EMPr (see Appendix E)**. This updated EMPr should form part of the contract signed with the Contractors appointed to construct and maintain the proposed 4MW project. The EMPr must be used to ensure compliance with environmental specifications and management measures. The implementation of the updated EMPr for all life cycle phases (i.e. construction and operation) of the proposed project is considered to be instrumental in achieving the appropriate environmental management standards as detailed for this project. It is also recommended that the process of communication and consultation with the community representatives is maintained throughout the project.

5.2 Proposed Amendment of the EA

It is recommended that the Environmental Authorisation issued by DEA dated **14 June 2011** be amended to specifically include a 4MW PV plant as one of the main infrastructure components (page 5 of 20) and that reference be made to the approval revised EMPr submitted in support of this Part 2 amendment application.



APPENDIX A LOCALITY MAPS



APPENDIX B PHOTOS



APPENDIX C FACILITY ILLUSTRATION



APPENDIX D SPECIALIST REPORTS



APPENDIX E ENVIRONMENTAL MANAGEMENT PROGRAMME