



ENVIRONMENTAL IMPACT ASSESSMENT REPORT:

THE PROPOSED CONSTRUCTION OF A 50MW PV SOLAR
PARK PROJECT AND ASSOCIATED INFRASTRUCTURE ON
PORTIONS 15, 27 AND 28 OF FARM SCHIETFONTEIN 437
JQ WITHIN THE MADIBENG LOCAL MUNICIPALITY,
NORTH WEST PROVINCE

*For public review
19 May 2016 to 20 June 2016*

EIA REPORT: DEA Ref: 14/12/16/3/3/2/850

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EIA REPORT: DEA Ref: 14/12/16/3/3/2/850

ENVIRONMENTAL IMPACT ASSESSMENT

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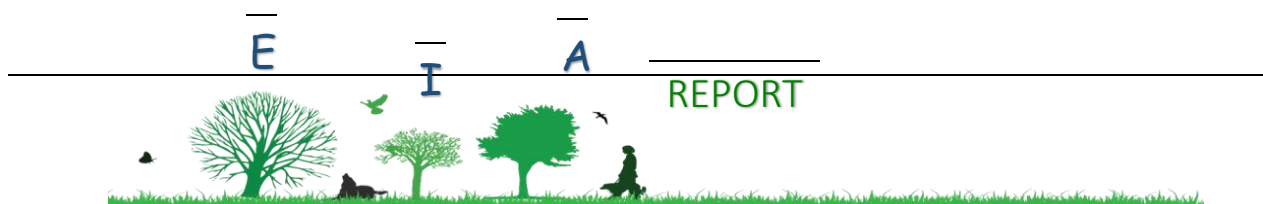
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PROJECT DETAILS

DEA Reference No.	:	14/12/16/3/3/2/850
Title	:	The proposed construction of a 50MW PV solar park project on portions 15, 27 and 28 of farm Schietfontein 437 JQ the Madibeng Local Municipality, North West Province.
within		
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Client	:	Zolograph Investments (RF) Proprietary Limited
Report Status	:	Draft Environmental Impact Assessment report for public review.
Review Period	:	19 May 2016 – 20 June 2016



PURPOSE OF THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Zolograph Investments (RF) Proprietary Limited is proposing to establish/construct a 50MW photovoltaic solar energy park, and associated infrastructure on portions 15, 27 and 28 of the farm Schietfontein 437 JQ, 3km south west of DeWildt within the Madibeng Local Municipality jurisdiction, North West Province.

The proposed project development site is considered suitable and favourable by the developer for the construction of a solar PV facility from a technical perspective due to the following site characteristics:

- **Climatic conditions:** climatic conditions determine the economic viability of a solar energy facility as it is directly dependent on the annual direct solar irradiation values for a particular area.
- **Topographic conditions:** The local site conditions are optimum for a development of this nature. A level surface area (i.e. with a minimal gradient in the region of 1%) is preferred for the installation of PV panels. The site slope and aspect of the proposed development area is predominantly flat.
- **Extent of the site:** Significant land area is required for the proposed development. The site is larger than the area required for development which allows for the avoidance of any environmental and/or technical constraints.
- **Proximity:** A separate study for an 88KV transmission line which is under consideration (DEA Ref: 14/12/16/3/3/1/1496) will be utilized. This will aid in the close proximity to feed the solar electricity into the Eskom national power grid.

The nature and extent of the DeWildt 50 MW Solar PV Park, as well as the potential environmental impacts associated with the construction and operation phases are explored in more detail in this Draft Environmental Impact Report. The Scoping phase of the EIA process identified potential issues associated with the proposed project, and defined the extent of the studies required within the EIA phase. The EIA phase addresses those identified potential environmental impacts and benefits associated with all phases of the project including design, construction and operation, and recommends appropriate mitigation measures for potentially significant environmental impacts.

The EIA Report aims to provide the Environmental authorities with sufficient information to make an informed decision regarding the proposed project. The release of a Draft EIA Report provides stakeholders with an opportunity to verify that the issues they have raised to date have been captured and adequately considered within the study. The Final EIA Report will incorporate all



issues and responses prior to submission to the National Department of Environmental Affairs, the decision-making authority for the proposed project.

The release of a draft EIA Report provides stakeholders with an opportunity to verify that the issues they have raised to date have been captured and adequately considered within the study. The Final EIA Report will incorporate all issues and responses prior to submission to the National Department of Environmental Affairs (DEA), the decision-making authority for the project.



DEA REQUIREMENTS FOR THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Phakanani Environmental has compiled a table (refer to Table 1) which summarises the DEA requirements as outlined in the acceptance of the scoping Report dated 04 March 2016, and where in the Draft EIR the requirements will be addressed within this report for ease of reference.

Table 1-1: INFORMATION REQUIRED BY THE DEA

NO.	INFORMATION REQUIREMENTS	CROSS REFERENCE IN THIS EIA REPORT
GENERAL		
a)	All comments and recommendations made by all stakeholders and Interested and Affected Parties (I&APs) in the draft SR and submitted as part of the SR must be taken into consideration when preparing an Environmental Impact Assessment report (EIAR) in respect of the proposed development. Please ensure that all mitigation measures and recommendations in the specialist studies are addressed and included in the final EIAR and Environmental Management Programme (EMPr).	<ul style="list-style-type: none"> i. All comments received from I&APs are included in Appendix 4 ii. All mitigation measures and recommendations in specialist reports forms part of the EIA report, and the EMPr (Appendix 5)
b)	Please ensure that comments from all relevant stakeholders are submitted to the Department with the final EIAR. This includes but is not limited to the North West Department of Rural, Environment and Agricultural Development, the Department of Agriculture, Forestry and Fisheries (DAFF) and the provincial Department of Agriculture, the South African Civil Aviation Authority (SACAA), the Department of Water and Sanitation (DWS), Eskom Holdings SOC Limited, the South African National Roads Agency Limited (SANRAL), the South African Heritage Resources Agency (SAHRA), the Endangered Wildlife Trust (EWT), Birdlife SA, the Department of Environmental Mineral Resources, the Department of Rural Development and Land Reform, and the Department of Environmental Affairs: Directorate Biodiversity and Conservation.	All comments received from the relevant Departments will form part of the Final EIAR.
c)	Ensure that the EIAR and EMPr comply with the EIA regulations, 2014 before submission to the Department. You are also required to address all issues raised by organs of	Comment noted, issues raised by Organs of State and I&APs will form

	state and I&APs prior to the submission of the EIAr to the Department.	part of the Final EIAr prior to the submission to the Department.
d)	Proof of correspondence with the various stakeholders must be included in the EIAr. Should you be unable to obtain comments, proof should be submitted to the Department of the attempts that were made to obtain comments.	All proof of correspondence with the various stakeholders are included in the EIAr in Appendix 4
e)	<p>In addition, the following information is required for the EIAr:</p> <ul style="list-style-type: none"> i. This department advices that the applied listed activities and their relevant issues be addressed and assessed in the EIAr. ii. Please ensure that all relevant listing notice activities applied for, are specific and that it can be linked to the development activity or infrastructure as described in the project description. iii. Should there be a need to amend the application form, please note that that the Department’s application form template has been amended and can be downloaded from the following link https://www.environment.gov.za/forms. iv. The EIAr must provide an assessment of the impacts and mitigation measures for each of the listed activities applied for. v. The listed activity/ies represented in the EIAr and the application form must be the same and correct. vi. It is noted that no activity under GN R985 is being applied for . However, should they at a later stage be found to be applicable , an amended application form as well as written comments must be obtained and submitted to this Department confirming their applicability to the proposed Development. In addition, a graphical representation of the proposed development within the respective geographical areas must be provided. Potential impacts of these activities must be provided. Potential impacts of these activities must also be assessed and provide mitigation measures for these activities. vii. The EAP must ensure that the EIAr complies with Appendix 3 and Appendix 4 of the EIA Regulations 2014. You are further reminded that you must adequately assess all impacts to the proposed development and ensure that all aspects of the proposed development is assessed. All activities related to the proposed development must be identified and assessed. 	Comments noted, They will be inclusive of the final EIAr.



	<p>viii. All specialist studies submitted with the Scoping Report must form part of the EIAR and must be current, consider cumulative impacts, be relevant to the development and comply with Appendix 6 of the EIA Regulation 2014.</p> <p>ix. This Department requires comments from the Department of Agriculture to be included in the EIAR.</p> <p>x. A significant amount of materials and equipment will be delivered to the site during the construction phase of the development. The EIAR must include a traffic assessment study. The study must determine the specific traffic needs during the different phases of implementation.</p> <p>xi. Should in-house specialist be used for any specialist study, then the specialist study must be peer reviewed by external specialists.</p> <p>xii. Please ensure that the EIAR also includes the undertaking under oath or affirmation by the EAP that is required in terms of 3 (s) of Appendix 3 of GN R. 982.</p> <p>xiii. An Avifaunal Assessment must be conducted as part of the EIAR. The terms of reference for the study must include, <i>inter alia</i> the following:</p> <ul style="list-style-type: none"> ➤ Determine the impacts that the proposed activity (including the powerline) may have on avifauna; ➤ Must cover at a minimum the summer and winter seasons; ➤ The assessment must include mitigation measures to discourage the avifauna from entering the solar field as well and limit nesting and breeding grounds within the solar field. ➤ Assess the cumulative impact on avifauna within the site and within the local area. <p>xiv. You are further reminded to provide a description of any identified alternatives for the proposed activity that are feasible and reasonable, including the advantages and disadvantages that the proposed activity or alternatives will have on the environment and on the community that may be affected by the activity. Alternatively, submit written proof of an investigation and motivation if no reasonable or feasible alternatives exist.</p>	
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<p>xv. The EIAr must provide the technical details for the proposed facility in a table format as well as their description and/or dimensions. A sample of the minimum information required is listed under point 2 of the EIA information required for solar energy facility (SEF) below.</p> <p>xvi. The EIAr must provide the four corner's coordinates for the proposed development site (note that if the site has numerous bend points, each and every bend point coordinates must be provided) as well as the start, middle and end point of all linear activities.</p> <p>xvii. The EIAr must provide the following:</p> <ul style="list-style-type: none"> - Clear indication of the envisioned area for the proposed solar facility; i.e. placing of PV arrays and all associated infrastructure should be mapped at an appropriate scale. - Clear description of all associated infrastructure. This description must include, but not limited to the following: <ul style="list-style-type: none"> ➤ Power lines; ➤ Internal roads infrastructure; and; ➤ All supporting onsite infrastructure such as laydown area, guard house and control room etc. <p>xviii. The EIAr must provide an indication of the location of the solar facility in respect to the location of other energy facilities and its associated infrastructure.</p> <p>xix. The EIAr must provide detailed need and desirability as to why there is a need for the development and why the specific location is desirable.</p> <p>xx. The Department of Water and Sanitation (DWS) must be consulted during the course of the process. Proof of consultation must be provided for in the EIAr.</p> <p>xxi. The EIAr must provide an indication of the internal access roads and the impacts associated with them must be adequately assessed in the EIAr and EMPr.</p> <p>xxii. The inclusion of all received comments and response thereto in the comments and response report.</p> <p>xxiii. Information on services required on the site, e.g. sewage, refuse removal, water and electricity. Who will supply this services and has an agreement and confirmation of capacity been obtained? Proof of these agreements must be provided.</p>	
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	<p>xxiv. The EIA must provide a layout which depicts the entire facility, i.e. the solar and grid connection infrastructure.</p> <p>xxv. The assessment of impacts and the Environmental Impact Assessment process; and, the requirements of the Public Participation Process (PPP) must be in accordance with Regulations 39 to 44 of the GN R982 of EIA Regulations 2014.</p> <p>xxvi. A copy of the final site layout map. All available biodiversity information must be used in the finalization of the layout map. Existing infrastructure must be used as far as possible e.g. roads. The layout map must indicate the following:</p> <ul style="list-style-type: none"> • Positions of PV arrays and its associated infrastructure; • Permanent laydown area footprint; • Internal roads indicating width (construction period width and operation width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible); • Wetlands, drainage lines, rivers, stream and water crossing of roads and cables indicating the type of bridging structures that will be used; • The location of sensitive environmental features on site e.g. CBAs, heritage sites, wetlands, drainage lines etc. that will be affected by the facility and its associated infrastructure; • Substation(s) and/or transformer(s) sites including their entire footprint; • Connection routes (including pylon positions) to the distribution/transmission network; • All existing infrastructure on the site, especially roads; • Buffer areas; • Buildings, including accommodation; and, • All “no-go” areas. 	
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	<p>xxvii. An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.</p> <p>xxviii. A map combining the final layout map superimposed (overlain) on the environmental sensitivity map.</p> <p>xxix. A shapeline of the preferred development layout/footprint must be submitted to this Department. The shapeline must be created using the Hartebeesthoek 94 Datum and the data should be in Decimal Degree Format using the WGS 84 Spheroid. The shapeline must include at a minimum the following extensions i.e. .shp; .shx; .dbf; .prj; and, .xml (Metadata file). If specific symbology was assigned to the file, then the .avl and/or the .lyr file must also be included. Data must be mapped at a scale of 1: 10 000 (please specify if an alternative scale was used). The Metadata must include a description of the base data used for digitizing.</p> <p>The shapefile must be submitted in a zip file using the EIA application reference number as the title.</p> <p>Postal Address: Department of Environmental Affairs Private Bag X447 Pretoria 0001</p> <p>Physical Address: Department of Environmental affairs Environmental House 473 Steve Biko, Arcadia, Pretoria 0001</p> <p>For Attention: Muhammad Essop Integrated Environmental Authorisations Strategic Infrastructure Developments Telephone Number (012) 399 9406 Email Address: MEssop@environment.gov.za</p>	
f)	ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) to be submitted	Appendix 5

The Environmental Management Programme (EMPr) to be submitted as part of the EIAR must include the following:

- i. All recommendations and mitigation measures recorded in the EIAR and the specialist studies conducted.
- ii. The final layout map.
- iii. Measures as dictated by the final site layout map and micro-sitting.
- iv. An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.
- v. A map combining the final layout map superimposed (overlain) on the environmental sensitivity map.
- vi. An alien invasive management plan to be implemented during construction and operation of the facility. The plan must include mitigation measures to reduce the invasion of alien species and ensure that the continuous monitoring and removal of alien species is undertaken.
- vii. A plant rescue and protection plan which allows for the maximum transplant of conservation important species from areas to be transformed. This plan must be compiled by a vegetation specialist familiar with the site and be implemented prior to commencement of the construction phase.
- viii. A re-vegetation and habitat rehabilitation plan to be implemented during the construction and operation of the facility. Restoration must be undertaken as soon as possible after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats.
- ix. An open space management plan to be implemented during the construction operation of the facility.
- x. A traffic management plan for the site access roads to ensure that no hazards would result from the increased truck traffic and that traffic flow would not be adversely impacted. This plan must include measures to minimize impacts on local commuters e.g. limiting construction vehicles travelling on public roadways during the morning

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	<p>and late afternoon commute time and avoid using roads through densely populated built-up areas so as not to disturb existing retail and commercial operations.</p> <p>xi. A transportation plan for the transport of components, main assembly cranes and other large pieces of equipment.</p> <p>xii. A storm water management plan to be implemented during the construction and operation of the facility. The plan must ensure compliance with applicable regulations and prevent off-site migration of contaminated storm water or increased soil erosion. The plan must include the construction of appropriate design measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures must promote the dissipation of storm water run-off.</p> <p>xiii. A fire management plan to be implemented during the construction and operation of the facility.</p> <p>xiv. An erosion management plan for monitoring and rehabilitating erosion events associated with the facility. Appropriate erosion mitigation must form part of this plan to prevent and reduce the risk of any potential erosion.</p> <p>xv. An effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems.</p> <p>xvi. Measures to protect hydrological features such as streams, rivers, pans, wetlands, dams and their catchments, and other environmental sensitive areas from construction impacts including the direct or indirect spillage pollutants.</p>	
g)	The EAP must provide detailed motivation if any of the above requirements is not required by the proposed development and not included in the EMPr.	Chapter 8
h)	The EIAr must include a cumulative impact assessment of the facility if there are other similar facilities in the region. The	Chapter 7

	<p>specialist studies e.g. biodiversity, visual, noise etc. must also assess the facility in terms of potential cumulative impacts.</p>	
<p>i)</p>	<p>Please ensure that all relevant Listing Notice activities are applied for, that the Listing Notice activities applied for are specific and they can be linked to the development activity or infrastructure in the project description.</p> <p>You are hereby reminded that should the EIAR failed to comply with the requirements of this acceptance letter, and Appendix 3 and 4 of the EIA Regulations,2014,the project will be refused in accordance with Regulation 24(1)(b) of the EIA Regulation,2014.</p> <p>The applicant is hereby reminded to comply with the requirements of Regulation 45 with regard to time period allowed for complying with the requirements of the Regulations, and Regulations 43 and 44 with regard to the allowance of a comment period for interested and affected parties on all reports submitted to the competent authority for decision-making.</p> <p>In addition to the above, the Department may undertake a site inspection prior to or upon receipt of the final EIAR.</p> <p>Furthermore, it must be reiterated that, should an application for Environmental Authorisation be subjected to the provision of Chapter II, section 38 of the National Heritage Resources Act, Act 25 of 1999, then his Department will not be able to make nor issue a decision in terms of your application for Environmental Authorisation pending a letter from the pertinent heritage authority category stating that the application fulfils the requirements of the relevant heritage resources authority as described in Chapter II, Section 38(8) of the National Heritage Resources Act, Act 25 Of 1999. Comments from SAHRA and /or the provincial department of heritage must be provided in the EIAR.</p>	<p>Chapter 2</p>

Invitation to comment on the Draft EIA Report

Members of the public, local communities and stakeholders are invited to comment on the draft EIA Report for the Solar Facility which has been made available for 30-day public review and comment period at the following locations from 19 May to 20 June 2016:

Please submit your comments to:
Head Office: 08 Burger Street, Polokwane Johannesburg Office: 33 Wilfred Avenue, Alan Manor, Johannesburg South
Tel: (015) 295 7391 Fax: 086 668 5960 Email: hluke@phakanani.co.za or admin@phakanani.co.za
The due date for comments is 20 June 2016 Comments can be made as written submission via post, fax or email.

EXECUTIVE SUMMARY

This Draft Environmental Impact Assessment Report (EIAR) has been compiled by Phakanani Environmental on behalf of Zolograph Investments (RF) Proprietary Limited, in response to the undertaking of the proposed construction of facilities and infrastructure intended to generate 50MW of renewable energy on portions 15, 27 and 28 of the farm Schietfontein 437 JQ, 3km south west of De Wildt in the Madibeng Local Municipality within the Bojanala Platinum District, North West Province. The proposed facility and associated infrastructure (i.e. the development foot print) would occupy an area of approximately 183ha.

The project entails the following production units:

- a) The solar facility will have a capacity of 50MW which will accommodate several arrays of photovoltaic (PV) panels and associated infrastructure.
- b) Construction of an 88KV transmission line and other associated infrastructures (buildings, tracks, etc.)

The project will comprise of the following typical infrastructure:

- i. Mounting structures to support the PV panels;
- ii. On-site inverters to step up the power and substation to facilitate the connection between the Solar Facility and the Eskom electricity grid;
- iii. A new 88kV power line between the on-site substation and the de wildt Substation
- iv. Offices and workshop areas for maintenance and storage;
- v. Internal access roads and fencing around the area.

NB: A separate study for an 88KV transmission line is under consideration (DEA Ref: 14/12/16/3/3/1/1496)

The nature and extent of this facility, as well as potential environmental impacts associated with the construction and operation of a facility of this nature are explored in more detail in this Environmental Impact Assessment (EIA) Report. In summary, the following conclusions have been drawn from the specialist studies undertaken (Figure 8-1):

OVERALL CONCLUSION (IMPACT STATEMENT)

The technical viability of establishing a solar energy facility with a net generating capacity of 50 MW on a site located on portions 15, 27 and 28 of the farm Schietfontein 437 JQ, has been established by Zolograph Investments (RF) Proprietary Limited. The positive implications of establishing the Solar Facility on the identified site include the following:

- The potential to harness and utilise solar energy resources within the North West Province
- The project will assist the South African government in reaching their set targets for renewable energy.
- The project will assist the South African government in the implementation of its green growth strategy and job creation targets.
- The project will assist the district and local municipalities in reducing level of unemployment through the creation of jobs and supporting local business
- The National electricity grid in the North West Province will benefit from the additional generated power.
- Promotion of clean, renewable energy in South Africa
- Creation of local employment, business opportunities and skills development for the area.

The findings of the specialist studies undertaken within this EIA to assess both the benefits and potential negative impacts anticipated as a result of the proposed project conclude that there are no environmental fatal flaws that should prevent the proposed project from proceeding, provided that the recommended mitigation and management measures are implemented. The significance levels of the majority of identified negative impacts have been reduced by implementing the mitigation measures recommended by the specialist team during the EIA process, and this specifically included the consideration of the facility layout in relation to sensitivities identified. The avoidance of areas of sensitivity is illustrated by the facility layout drawing included as (Figure 2-3). The project has considered constraints, and is considered to meet the requirements of sustainable development. Environmental specifications for the management of potential impacts are detailed within the draft Environmental Management Programme (EMPr) for the Solar Facility included within Appendix L.

With reference to the information available at this planning approval stage in the project cycle, the confidence in the environmental assessment undertaken is regarded as acceptable provided all measures are taken to protect and preserve surrounding environment.

OVERALL RECOMMENDATION

Global climate change is widely recognised as being one of the greatest environmental challenges facing the world today. How a country sources its energy plays a big part in tackling climate change. As a net off-setter of carbon, renewable energy technologies can assist in reducing carbon emissions, and can play a big part in ensuring security of energy supply, as other sources of energy are depleted or become less accessible. South Africa currently relies on coal powered energy to meet more than 90% of its energy needs. As a result, South Africa is one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer of carbon emissions. With the aim of reducing South Africa's dependency on coal generated energy, and to address climate change concerns, the South African Government has set a target, through the Integrated Resource Plan (IRP) for electricity to develop 17.8 GW of renewables (including 8,4GW solar) within the period 2010 – 2030.

Based on the nature and extent of the proposed project, the local level of disturbance predicted as a result of the construction and operation of the facility and associated infrastructure, the findings of the EIA, and the understanding of the significance level of potential environmental impacts, it is the opinion of the EIA project team that the impacts associated with the development of the Solar Facility project can be mitigated to an acceptable level. In terms of this conclusion, the EIA project team support the decision for environmental authorisation.

The Preferred development footprint, Preferred grid connection and Preferred Access Road layout plan as presented in (Figure 2-3) avoid the high sensitivities identified on the site, and are nominated as the preferred alternatives following the full assessment through this EIA process. The reasons for this are below:

- Preferred development footprint: This layout avoids the major sensitive drainage Course; The abundance of species of concern within the development area is also low and while there are some. Even though the site is situated within CB-1 Marikana Thornveld, there is very little connectivity for conservation
- Preferred Access Road R566: The road is existing and avoids most sensitive features on site.
- Preferred grid connection: the preferred grid connection is located less than 3km from the De wildt Substation (grid connection point), the shorter power line will result in reduced and localised impacts.

The following conditions would be required to be included within an authorisation issued for the project:

- As far as possible, the design and layout of the Solar Facility should consider and accommodate areas of high environmental sensitivity as described in this report.
- Disturbed areas should be rehabilitated as quickly as possible and an on-going monitoring programme should be established to detect and quantify any alien species.
- During construction, unnecessary disturbance to habitats should be strictly controlled and the footprint of the impact should be kept to a minimum.
- All mitigation measures detailed within this report and the specialist reports contained within Appendices D to K to be implemented.
- The draft Environmental Management Programme (EMPr) as contained within Appendix L of this report should form part of the contract with the Contractors appointed to construct and maintain the proposed solar energy facility, and will be used to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the proposed project is considered key in achieving the appropriate environmental management standards as detailed for this project.
- A comprehensive storm water management plan should be compiled for the developmental footprint prior to construction.
- An ecological walk through survey for the PV plant and associated infrastructure (such as pipeline, power line and access roads) must be undertaken prior to construction.
- A walk-through survey be undertaken by an avifauna specialist for the route of the power line only to identify sections of line requiring collision mitigation.
- It is recommended that a post construction (once operational) site walk over be conducted by an avifaunal specialist to determine whether an avifaunal mortality monitoring programme is required for the site. This will contribute significantly towards understanding the short and long term impacts of these facilities of avifauna.
- The relevant Water Use License for water uses to be obtained from DWS.
- Applications for all other relevant and required permits required to be obtained by Zolograph Investments (RF) Proprietary Limited must be submitted to the relevant regulating authorities. This includes permits for the transporting of all components (abnormal loads) to site, disturbance to any heritage sites, disturbance of protected vegetation and protected trees, and water uses

The objectives of the EIA process are as follows:

- To identify issues/ concerns that should be included into the scope of the Environmental Impact Assessment process;
- To inform stakeholders about the proposed project and provide them with an opportunity to raise their concerns that will contribute towards the EIA process; to establish/confirm the scope and contents of the Scoping and EIA Report and to identify possible specialist studies to be conducted to address significant issues;
- To understand and thoroughly document the issues/concerns and comments submitted raised by stakeholders in such a way that delay due to misunderstanding will be prevented at all costs;
- To assess the relevant biophysical environmental components of the site to an appropriate level of detail. This includes the physical, biological, and socio-economic components;
- To identify/ describe possible environmental issues associated with the construction and operational phases of the training facilities and its associated infrastructure; and
- To reflect all the required information/ findings in a logical and systematic way in order to assist the DEA with the evaluation of the proposed activity in terms of the requirements of the National

Environmental Act, 1998 (Act No. 107 of 1998) as amended.

<p><i>R 984 Listing Notice 2: Activity 15: The clearing of indigenous vegetation more than 20Ha</i></p>	<p>An area in excess of 183Ha will be cleared for the building of the manufacturing plant and solar PV farm</p>
<p><i>R 984 Listing Notice 2: Activity 1: The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more.</i></p>	<p>A photo-voltaic solar park will be erected comprising 183Ha on the project site to generate 50MW of electricity</p>

An application was submitted to DEA with respect to the above. The application was accepted and the following Reference Number provided: 14/12/16/3/3/2/850. The draft and final scoping report was also accepted.

This document represents the EIAR as required by the National Environmental Management Act, 1998 (Act no. 107 of 1998): Environmental Impact Assessment Regulations, 2014 R 982 of 4 December 2014.

All environmental impacts are being investigated during the EIA phase and appropriate mitigation will have to be adhered to as governed by the above Regulation. Following which all stakeholders and registered I&APs will be informed of the proposed development and consulted on an on-going basis during the EIA process. This will give them an opportunity to provide comments and/or raise issues. The Draft EIAR is made available for public review and comment from Monday 09 May 2016 to 07 June 2016. After the public comment period, the report will be updated. Subsequent to these findings the Final EIAR will be submitted to the DEA.

Public Review of the Draft EIAR:

Registered Interested and Affected Parties (I&AP's) have been provided via email with a copy of the draft EIAR. A copy of the report is also available upon written request.

The comments received during the public participation process will be included in the final EIAR.

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Glossary

Activity (Development)	An action either planned or existing that may result in environmental impacts through pollution or resource use. For the purpose of this report, the terms ‘activity’ and ‘development’ are freely interchanged.
Alternatives	Different means of meeting the general purpose and requirements of the activity, which may include site or location alternatives; alternatives to the type of activity being undertaken; the design or layout of the activity; the technology to be used in the activity and the operational aspects of the activity.
Applicant	The project proponent or developer responsible for submitting an environmental application to the relevant environmental authority for environmental authorisation.
Archaeological material	Remains resulting from human activities which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.
Biodiversity	The diversity of animals, plants and other organisms found within and between ecosystems, habitats, and the ecological complexes.
Construction	The building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or

specified activity but excludes any modification, alteration or expansion of such a facility, structure or infrastructure and excluding the reconstruction of the same facility in the same location, with the same capacity and footprint.

Cumulative impact

The impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Decommissioning

The demolition of a building, facility, structure or infrastructure.

Direct Impact

Impacts that are caused directly by the activity and generally occur at the same time and at the same place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally quantifiable.

Drainage:

A drainage line is a lower category or order of watercourse that does not have a clearly defined bed or bank. It carries water only during or immediately after periods of heavy rainfall i.e. non-perennial, and riparian vegetation may or may not be present

Ecosystem

A dynamic system of plant, animal (including humans) and micro-organism communities and their non-living physical environment interacting as a functional unit. The basic structural unit of the biosphere, ecosystems are characterised by interdependent interaction between the component species and their physical surroundings. Each ecosystem occupies a space in which macro-scale conditions and interactions are relatively homogenous.

Environment

In terms of the National Environmental Management Act (NEMA) (No 107 of 1998)(as amended), "Environment" means the surroundings within which humans exist and that are made up of:

- a) the land, water and atmosphere of the earth;
- b) micro-organisms, plants and animal life;
- c) any part or combination of (a) and (b), and the interrelationships among and between them; and

d) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

Environmental Assessment	The generic term for all forms of environmental assessment for projects, plans, programmes or policies and includes methodologies or tools such as environmental impact assessments, strategic environmental assessments and risk assessments.
Environmental Authorisation	An authorisation issued by the competent authority in respect of a listed activity, or an activity which takes place within a sensitive environment.
Environmental Assessment Practitioner (EAP)	The individual responsible for planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instrument introduced through the EIA Regulations.
Environmental Impact	Change to the environment (biophysical, social and/ or economic), whether adverse or beneficial, wholly or partially, resulting from an organisation's activities, products or services.
Environmental Impact Assessment (EIA)	In relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application as defined in NEMA.
Environmental Management	Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.
Environmental Management Programme (EMPr)	A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive impacts and limiting or preventing negative environmental impacts are implemented during the life cycle of a project. This EMPr focuses on the construction phase, operation (maintenance) phase and decommissioning phase of the proposed project.

General Waste	Means waste that does not pose an immediate hazard or threat to health or to the environment, and includes – (a) Domestic waste; (b) Building waste and demolition waste; (c) Business waste; (d) Inert waste; or (e) Any waste classified as non-hazardous waste in terms of the regulations made under section 69, and includes non-hazardous substances, materials or objects within business, domestic, inert, building and demolition wastes as outlined in the National Environmental Management: Waste Amendment Act (No 26 of 2014) Schedule 3: Category B – General Waste.
Groundwater	Water in the ground that is in the zone of saturation from which wells, springs, and groundwater run-off are supplied.
Hazardous Waste	Means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles as outlined in the National Environmental Management: Waste Amendment Act (No 26 of 2014).Schedule 3: Category A - Hazardous Waste.
Hydrology	The science encompassing the behaviour of water as it occurs in the atmosphere, on the surface of the ground, and underground.
Indirect Impacts	Indirect or induced changes that may occur as a result of the activity. These types of impacts include all of the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

Integrated Environmental Management

A philosophy that prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development and decision-making process. The IEM philosophy (and principles) is interpreted as applying to the planning, assessment, implementation and management of any proposal (project, plan, programme or policy) or activity - at local, national and international level - that has a potentially significant effect on the environment. Implementation of this philosophy relies on the selection and application of appropriate tools for a particular proposal or activity. These may include environmental assessment tools (such as strategic environmental assessment and risk assessment), environmental management tools (such as monitoring, auditing and reporting) and decision-making tools (such as multi-criteria decision support systems or advisory councils).

Interested and Affected Party (I&AP)

Any person, group of persons or organisation interested in or affected by an activity; and any organ of state that may have jurisdiction over any aspect of the activity.

Mitigate

The implementation of practical measures designed to avoid, reduce or remedy adverse impacts or enhance beneficial impacts of an action.

No-Go Option

In this instance the proposed activity would not take place, and the resulting environmental effects from taking no action are compared with the effects of permitting the proposed activity to go forward.

Public Participation Process

A process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to, specific matters.

Rehabilitation

A measure aimed at reinstating an ecosystem to its original function and state (or as close as possible to its original function and state) following activities that have disrupted those functions.

Scoping	The process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addresses in an environmental assessment. The main purpose of scoping is to focus the environmental assessment on a manageable number of important questions. Scoping should also ensure that only significant issues and reasonable alternatives are examined.
Sensitive Environments	Any environment identified as being sensitive to the impacts of the development.
Significance	Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. magnitude, intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of significance and acceptability).
Stakeholder Engagement	The process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities.
Sustainable Development	According to World Commission on Environment and Development (1987), this is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
Watercourse	Defined as: a) a river or spring; b) a natural channel or depression in which water flows regularly or intermittently; c) a wetland, lake or dam into which, or from which, water flows; and d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998) and a reference to a watercourse includes, where relevant, its bed and banks.

Wetland

Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.



Acronyms

CA	COMPETENT AUTHORITY
CBA	CRITICAL BIODIVERSITY AREA
CPV	CONCENTRATED PHOTOVOLTAIC
DEA	DEPARTMENT OF ENVIRONMENTAL AFFAIRS
DEA&DP	DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING
DOE	DEPARTMENT OF ENERGY
DNI	DIRECT NORMAL IRRADIANCE
EA	ENVIRONMENTAL AUTHORISATION
EAP	ENVIRONMENTAL ASSESSMENT PRACTITIONER
EIA	ENVIRONMENTAL IMPACT ASSESSMENT
EIAR	ENVIRONMENTAL IMPACT ASSESSMENT REPORT
EMPr	ENVIRONMENTAL MANAGEMENT PROGRAMME
EMS	ENVIRONMENTAL MANAGEMENT SYSTEM
ESS	ENVIRONMENTAL SCOPING STUDY
ESR	ENVIRONMENTAL SCOPING REPORT
GDS	GROWTH AND DEVELOPMENT STRATEGY
GIS	GEOGRAPHIC INFORMATION SYSTEMS
GN	GOVERNMENT NOTICE
I&AP	INTERESTED AND AFFECTED PARTIES
IDP	INTEGRATED DEVELOPMENT PLAN
IPP	INDEPENDENT POWER PRODUCER
IRP	INTEGRATED RESOURCE PLAN
KV	KILOVOLT
MW	MEGAWATT



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PGDP	PROVINCIAL GROWTH AND DEVELOPMENT PLAN
PPA	POWER PURCHASE AGREEMENT
PICC	PRESIDENTIAL INFRASTRUCTURE COORDINATING COMMISSION
PPP	PUBLIC PARTICIPATION PROCESS
PV	PHOTOVOLTAIC
REDZ	RENEWABLE ENERGY DEVELOPMENT ZONES
REIPPPP	RENEWABLE ENERGY INDEPENDENT POWER PRODUCER PROCUREMENT PROGRAMME
S&EIR	SCOPING AND ENVIRONMENTAL IMPACT REPORTING
SARERD	SOUTH AFRICAN RENEWABLE ENERGY RESOURCE DATABASE
SEA	STRATEGIC ENVIRONMENTAL ASSESSMENT
SDF	SPATIAL DEVELOPMENT FRAMEWORK
SIP	STRATEGIC INFRASTRUCTURE PLAN
TOR	TERMS OF REFERENCE

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, Photovoltaic (PV) technology have been demonstrated to be economically and environmentally viable and capable of being employed on a large scale.

Zolograph Investments (RF) Proprietary Limited is proposing the development of the Dewildt Solar Photovoltaic (PV) Facility (referred to as the Solar Facility thereafter in this report) as well as all associated infrastructure on a site to be located within Portions 15, 27 & 28 of farm Schietfontein 437 JQ within the Madibeng Local Municipality, North West Province (Figure 1-1). The proposed project development site is located approximately 20 km east of Brits and 50km west of Pretoria.

From a regional perspective, the greater Brits-Dewildt area is considered favourable for the development of commercial solar electricity generating facilities by virtue of the prevailing climatic conditions (primarily as the economic viability of a solar energy facility is directly dependent on the annual solar irradiation values for a particular area), relief and aspect, the extent of the site, and the availability of a direct grid connection (i.e. point of connection to the Eskom National grid). The nature and extent of this facility, as well as potential environmental impacts associated with the construction, operation and decommissioning phases are explored in more detail in this EIA Report.



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1.1 Background

Zolograph Investments (RF) Proprietary Limited is currently assessing the feasibility of constructing a PV plant including all associated infrastructure with a maximum generation capacity of 50MW. Zolograph Investments (RF) Proprietary Limited is owned by Blue Falcon 194 Trading (Pty) Ltd, which is wholly owned by SunEdison (Appendix 2a)

The proposed plant is required to be sited on a technically and environmentally feasible site and to this end, Zolograph has considered land availability, land use capability, fuel availability and costs, grid connection proximity, capacity and strengthening, and other aspects related to the feasibility of solar power sites. With consideration of the aforementioned aspects, Zolograph has identified a site in the North West Province that will suit the requirements for a power generating complex (i.e. a PV solar park).

Phakanani Environmental (Phakanani) has been appointed as an Environmental Assessment Practitioners (EAP'S) by Zolograph Investments (RF) Proprietary Limited to facilitate the Environmental Impact Assessment (EIA) process and also obtain environmental authorization for the proposed establishment of a 50MW PV Solar Park and associated infrastructure such as the 88KV transmission line that will transmit electricity from the 50MW power station to the national grind (Dewildt station). The Department of Environmental Affairs (DEA) REF for the 50MW development is 14/12/16/3/3/2/850

An application for authorization for the 88KV transmission line infrastructure linked to the above mentioned activity has been conducted independently, *DEA ref: 14/12/16/3/3/1/1496*

Table 1-1: A detailed description of the farm Schietfontein 437-JQ

Province	North West
Local Municipality	Madibeng Local Municipality
District Municipality	Bojanala Platinum District Municipality
Nearest Town	Brits
Farm Name	Schietfontein 437 JQ
Portions & 21 Digits	
Portion 15	TOJQ00000000043700015
Portion 27	TOJQ00000000043700027

Portion 28

TOJQ0000000043700028

The scope of the EIA applies to the development footprint for the Solar Facility and associated infrastructure, including access roads, power lines, substations, cables, offices, etc. The Solar facility will have a contracted capacity of 50MW, which will accommodate several arrays of PV panels and associated infrastructure. The project will comprise the following typical infrastructure, which is included in the scope of this EIA:

- mounting structures to support the PV panels;
- on-site inverters to step up the power and a substation to facilitate the connection between the Solar Facility and the Eskom electricity grid;
- a new 88kV power line between the on-site substation and the Dewildt Substation
- cabling between the project components, to be laid underground where practical;
- offices and workshop areas for maintenance and storage;
- temporary laydown areas; and
- internal access roads and fencing around the development area

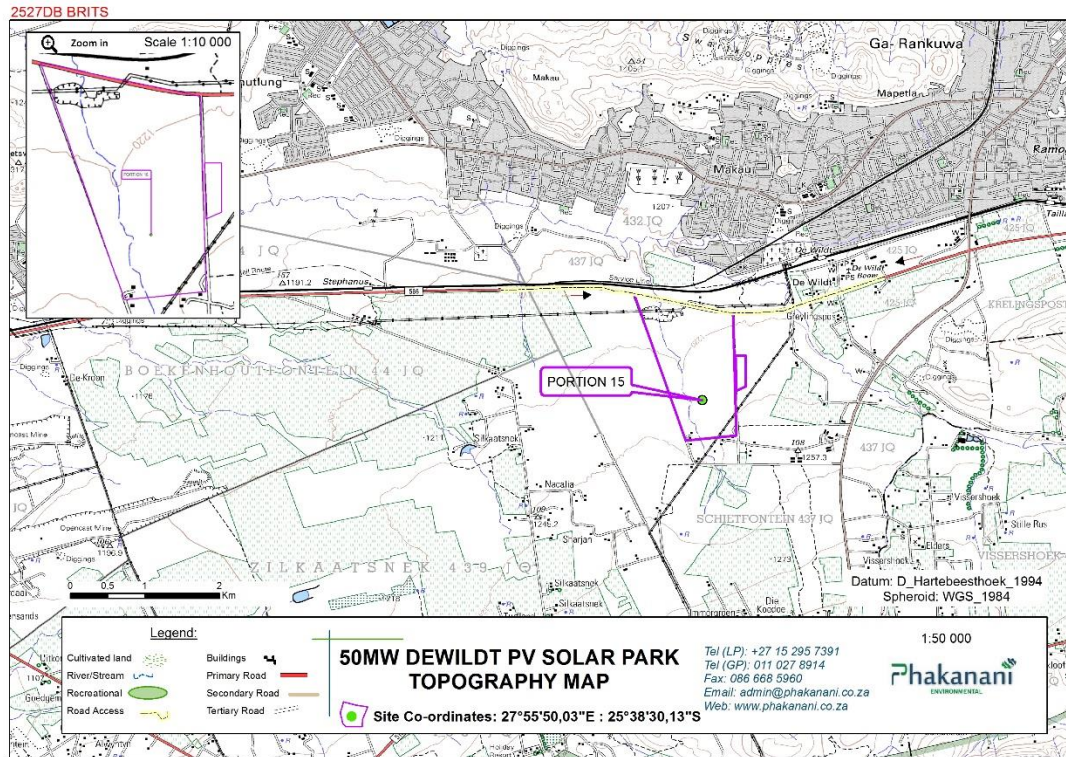


Figure 1-1:: Locality map

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

1.2 Conclusions from the Scoping Phase

Several desktop specialist studies were undertaken for the purposes of identifying potential impacts and potential fatal flaws relating to the proposed Solar Facility. The impacts identified as potentially resulting from the project broadly included agricultural, ecological, heritage, visual, and social impacts, and are summarized below:

- Ecologically sensitive areas on the site: The majority of the site consists of CB1 Marikana Thornveld considered to be of high sensitivity. The proposed development area for the abovementioned project has been degraded by years of livestock farming, irregular fire



regimes, invasion by exotic plants species and excavation of a large gravel pit that has compromised the ecological functionality of the survey area. The survey area is completely surrounded by two large public roads (N4 & R566) however there is limited connectivity with more Marikana Thornveld to the west of the survey area. This lack of connectivity with surrounding Marikana Thornveld reduces the conservation value of the survey area. However another ecological sensitive feature within the area includes the drainage line north of the property.

- Visual / Social Receptors: Indicates that there are potentially sensitive visual receptors, namely the farm houses to the south of the study area, as well as the users of the R566, a wall will be built around the property in order to reduce the impact. Mitigation of this impact is also achieved through the low nature of the array and the flatness of the landscape which, in combination, limits visibility.
- Agricultural potential: there is no direct impact on areas with agricultural potential, with indirect impacts only associated with access through the site to the planned facility. The development of the facility will not have a significant impact on the current land use, which is limited to grazing and the land itself has very severe limitations to agricultural potential.
- Heritage: No heritage or paleontological sensitivities were identified.

An area of focus which is environmentally preferred for the development of a PV project on portions 15, 27 and 28 of the farm Schietfontein 437 JQ, as identified through the scoping phase, is indicated in (Figure 1-2). The area represents the portion of the farms with the greatest potential for development of a PV facility after taking into consideration the sensitivity identified on the farm portions making up the larger site. The areas of potential environmental sensitivity relate mostly to the ecological aspects of the site and are illustrated in the sensitivity map (Figure 8-1). It was recommended that infrastructure should be placed so as to consider the identified sensitive areas to minimise impacts. Subsequently, the sensitive environmental features that were identified during the Scoping phase have been taken into consideration by the developer in designing the layout of the solar energy facility. The proposed layout of infrastructure for the Solar Facility is discussed further in Chapter 2.

Public participation: During the public participation process conducted in the Scoping phase, the proposed project was generally well received by the recipient community, interested and affected parties, and stakeholders. Objections to the proposed project were received on the basis of environmental and social impacts that may arise as a result of the development, the concerns were raised with the EIA team, and these concerns are considered and assessed in this EIA report.



Approval of the Scoping Report: No environmental or social fatal flaws were identified to be associated with the broader site during the Scoping stage of the EIA process and the Final Scoping Report was accepted by DEA in March 2016.

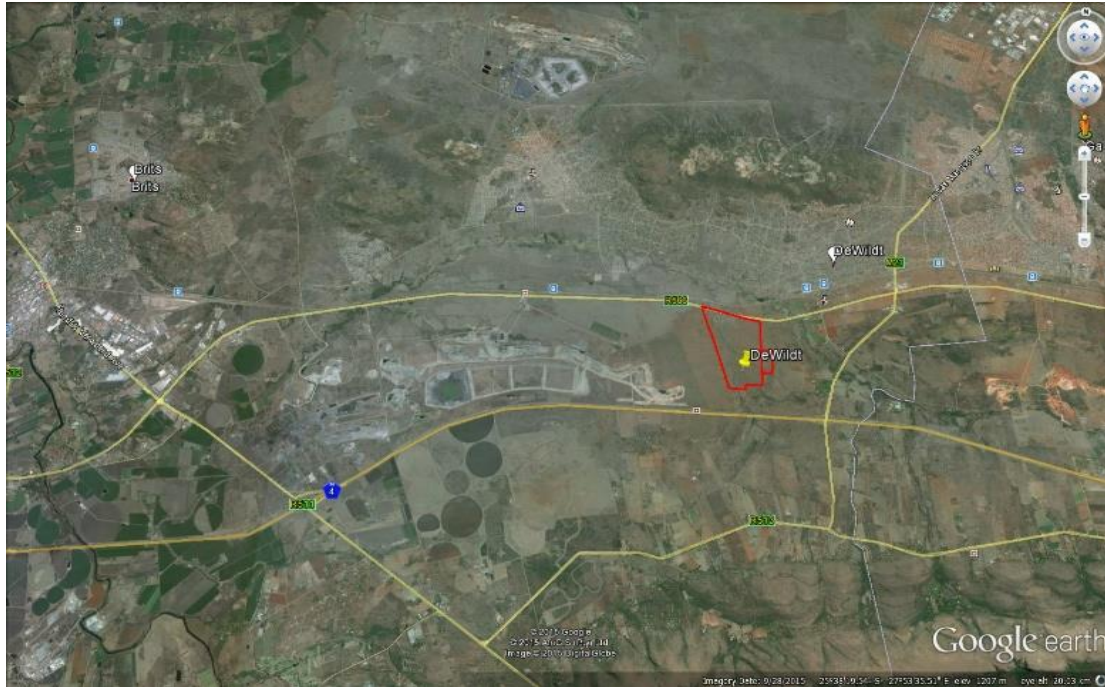


Figure 1-2: Google image of site

1.3 Requirement for an Environmental Impact Assessment Process

The construction and operation of the proposed Solar Facility is subject to the requirements of the EIA Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA) 107 of 1998. This section provides a brief overview of the EIA Regulations and their application to this project.

NEMA is national legislation that provides for the authorisation of certain controlled activities known as “listed activities”. In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed, and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation. The National Department of Environmental Affairs (DEA) is the competent authority for this project. An application for authorisation for the Solar Facility has been accepted by the DEA (under Application Reference number: 14/12/16/3/3/2/850). Through the decision making process, the DEA will be supported by the



North West Department of Rural, Environment, Agricultural Development (READ), as the commenting authority.

The need to comply with the requirements of the EIA Regulations ensures that decision makers are provided the opportunity to consider the potential environmental impacts of a project early in the project development process, and assess if environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the competent authority with sufficient information in order for an informed decision to be taken regarding the project. Zolograph Investments (RF) Proprietary Limited has appointed Phakanani Environmental as the independent Environmental Assessment Practitioner (EAP) to undertake the environmental impact assessment and prepare the EIA Report for the Solar Facility.

1.4 Objectives of the EIA Process

The Scoping Phase was completed in January 2016 with the submission of a Final Scoping Report to the DEA, and the acceptance of scoping was received from DEA on Marh 2015. The scoping phase included desk-top studies and served to identify potential impacts associated with the proposed project and to define the extent of studies required within the EIA Phase. Input from the project proponent, specialists with experience in the study area and in EIAs for similar projects, as well as a public consultation process with key stakeholders, which included both government authorities and interested and affected parties (I&APs), was included in the evaluation of impacts.

The EIA Phase aimed to address those identified potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with the project including design, construction, operation, and decommissioning, and recommend appropriate mitigation measures for potentially significant environmental impacts. The purpose of this EIA report is to consider the impacts associated with the currently proposed layout for the Solar Facility. This EIA report aims to provide the environmental authorities with sufficient information to make an informed decision regarding the proposed project. The release of a draft EIA Report for a 30 day period will provide stakeholders with an opportunity to verify that issues that they raised through the EIA Process have been captured and adequately considered. The final EIA Report for submission to the DEA will incorporate all issues and responses raised during the public review period of the draft report.



1.5 Details of the Environmental Assessment Practitioner and Expertise to conduct the Scoping and EIA Phases

In terms of the NEMA the proponent must appoint an independent Environmental Assessment Practitioner (EAP) to undertake the EIA of any activities regulated in terms of the National Environmental Management Act, 1998. Zolograph Investments (RF) Proprietary Limited appointed Phakanani Environmental, an independent consultancy to undertake the environmental authorisation process for the proposed project in accordance with the NEMA Environmental Impact Assessment (EIA) Regulations, 2014 (R.982). Phakanani Environmental offers a variety of specialised environmental services. Phakanani operates offices in Polokwane and Johannesburg, has employees that are equipped with the relevant skills and knowledge of carrying out the job. Expertise of the EAP Full CV (Appendix 1).

Phakanani has been involved in the management and execution of numerous environmental assessment and management studies throughout the country. These studies have included both public and private sector clients. Consequently, Phakanani offers a wealth of experience and appreciation of the environmental and social priorities and national policies and regulations in South Africa. The EIA Project Team is led by Tsunduka Hatlane who has more than 12 years' experience in environmental assessment and management studies, primarily in the leadership and integration functions. This has included Strategic Environmental Assessments (SEA), EIAs and EMPs. Tsunduka has extensive experience in conducting environmental assessment and management processes through-out South Africa. Below is a list of the EIA team responsible for the DeWildt PV Solar Park Project

In order to adequately identify and assess potential environmental impacts associated with the proposed project, Phakanani Environmental has included the following specialist consultants to conduct specialist assessments:

Table 1-2: EIA team

NAME	ORGANIZATION	ROLE
PHAKANANI ENVIRONMENTAL		
Tsunduka Hatlane	Phakanani Environmental	Senior EAP
Hluke Baloyi		Project Manager
Aluwani Ramagwedzha		Junior EAP
SPECIALIST		
Carl Schoeman	ENVASS (Environmental Assurance)	Noise impact study
Vincent van Der Merwe	Specialist Ecological Consultant	Ecological Impact study

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Vanessa Marais	Galago Environmental	Avifauna Study
Munyadziwa Magoma	Vhubvo Archaeo-Heritage Consultants Cc	Heritage impact assessment
Mr. Petrus Stephanus Rossouw,	Terra Soil Science cc	soil, agricultural potential, land type and land use study
Mr. Mfanelo Khosa	Manna Group Architects	Visual Impact study
Shannon McKay	Animal Behaviour Consulting	Wild animal behavior (In progress)
Dr JF Durand (Sci.Nat.)	Private	Paleontology
Dr Herman Joubert	Tech IQ Consulting Engineers	Traffic Impact Study

2 OVERVIEW OF THE PROPOSED PROJECT

This chapter provides an overview of the Solar Facility and details the project scope which includes the planning/design, construction, operation and decommissioning activities. This chapter also explores the need and desirability of the project at the preferred site location, site and technology alternatives as well as the 'do nothing' option. Lastly, it explores the use of solar energy as a means of power generation.

2.1 The Need and Desirability of the Development at the preferred site location

The North West Province area has been ear-marked as a hub for the development of solar energy projects due to the viability of the solar resource for the area. The overarching objective for the solar energy facility is to maximize electricity production through exposure to the solar resource, while minimizing infrastructure, operational and maintenance costs, as well as social and environmental impacts. The use of solar irradiation for electricity generation is essentially a non-consumptive use of a natural resource. 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) as it meets all international requirements in this regard. The proposed site was selected for the development of multiple PV Plants based on its predicted climate (solar resource), suitable proximity in relation to the existing and available electricity grid, and minimum technical constraints from a construction and technical perspective. Studies of solar irradiation worldwide indicate that the North West shows great potential for the generation of solar power.

The proposed Solar Facility is located in an area of high global horizontal irradiation (up to 2280 kWh/m² annually), therefore from a regional site selection perspective, this region is considered to be preferred for solar energy development. From a local perspective, the site has specifically been identified by Zolograph as being highly desirable for the development of a solar PV facility due to its suitable topography (i.e. in terms of slope and local topography), site access (i.e. to facilitate the movement of machinery during the construction phase), land availability, the extent of the site, and enabling optimal placement of the infrastructure considering potential environmental sensitivities or technical constraints, as well as the consolidation of renewable projects within an already identified node. These favourable characteristics are further explored in the sections below.

At a Provincial level, the North West has been identified as the area with the highest potential for solar renewable energy generation; with high solar radiation levels and the availability of vast tracts of land.

2.2 Receptiveness of the site to development of a PV Facility

The Dewildt Solar PV facility is proposed to be constructed outside of the Dewildt. Portions 1, 27 and 28 of the farm Schietfontein 437 JQ has not been considered for an alternative land use. Zolograph considers this area to be highly preferred for the development of a solar energy facility. The reasons include:

- Extent of site: Availability of level land of sufficient area can be a restraining factor, as a 50MW PV facility requires 183 ha.
- Grid connection considerations: Grid connection will be easy due to the close proximity of the Dewildt Substation to the proposed development site.
- Site access: the site can be readily accessed via the R566 road.
- Loss of current land use: There is no cultivated agricultural land within the farm portions which could be impacted upon by the proposed development.
- Climatic conditions: Climatic conditions determine the economic viability of a solar energy facility as it is directly dependent on the annual direct solar irradiation values for a particular area. The North West receives the high average daily direct normal and global horizontal irradiation which indicates that the regional location of the project is appropriate for a solar energy facility. Factors contributing to the location of the project include the relatively high number of daylight hours and the low number of rainy days experienced in this region. A Global Horizontal Irradiation (GHI)² of more than 2270 kWh/m²/year is relevant for the area in which the site is located.



- Topographic conditions: The site conditions are optimum for a development of this nature, with the project area being of a suitable gradient for a PV project.
- Geographic location: The project site falls within the identified geographical areas / focus area most suitable for the rollout of the development of solar energy projects.

Solar Irradiation

The economic viability of a solar facility is directly dependent on the annual direct solar irradiation values. The North West receives the high average daily direct normal irradiation in South Africa. In addition, Brits exhibits some of the best solar irradiation in South Africa, and the world (Figure 2-1). Global horizontal irradiation (GHI) for the Dewildt region varies between 2250 and 2300kWh/m²/annum. The GHI for the Solar PV Facility site is in the region of approximately 2270kWh/m²/annum.

Technology choice

Solar PV is one of the most cost-effective, reliable and proven approaches for generating solar power. These systems have no moving parts, emit no emissions and create no waste. They are nearly silent in operation. Simple and reliable, a solar farm utilising PV modules delivers clean, infinitely-renewable power when it is needed (on-peak). It is a sustainable power solution for both the short and long-term. Solar power has numerous advantages over fossil-fuelled power generation and other renewable technologies. For one, the fuel source, sunlight, is delivered to the site for free. The risks of mining, exploring and transporting fossil fuels such as coal, natural gas and oil are completely eliminated. Since there is no waste, there is no need to contain or store waste products. Solar PV has the benefit of not requiring large amount water during the power production cycle. Like in most of the world, in the Dewildt area water is becoming an ever-scarcer resource. In such locations, there is a significant positive ecological and practical advantage to utilising a power generation technology that does not require large amount of water resources.

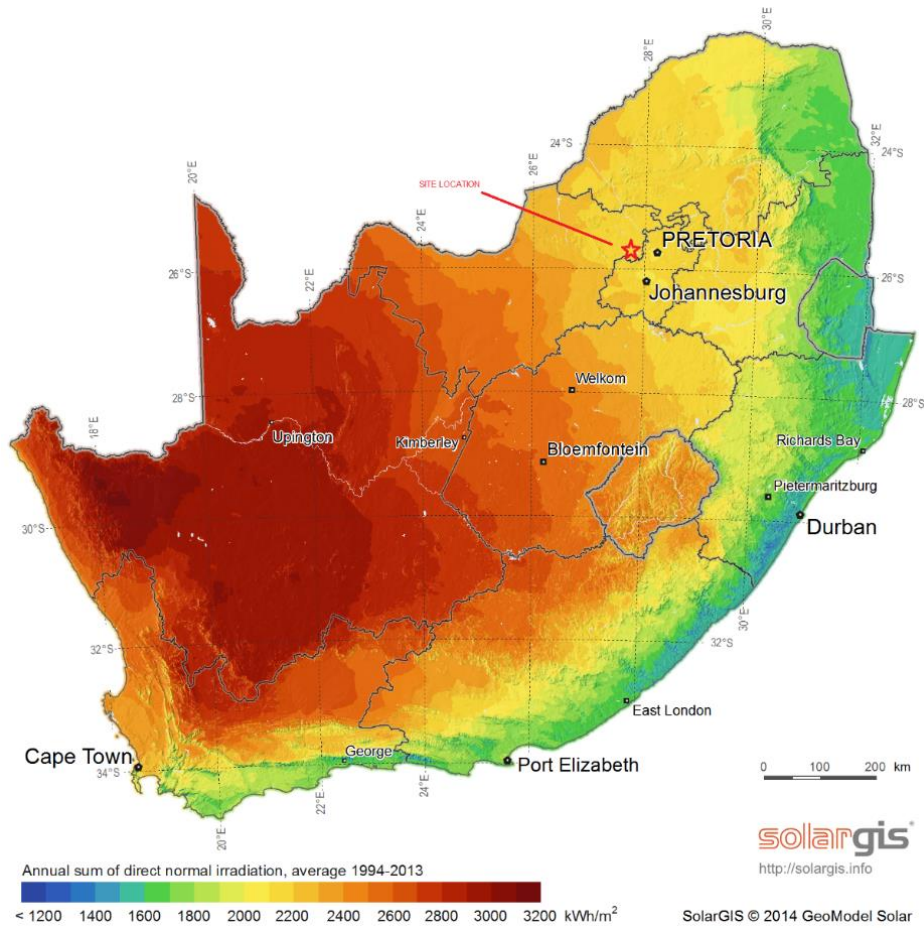


Figure 2-1: Annual incoming short wave radiation for South Africa (Courtesy of CSIR)

Topography

The slope gradients of the site are low with average slope percentage being 4.0%. There is a drainage lines cutting through the western margin of the proposed site. Aside from the drainage line the site is generally flat. A level development area is desirable for the construction of the facility.

Access to the Grid

Ease of access into the Eskom electricity grid is vital to the viability of a solar PV facility. Projects which are in close proximity to a connection point and/or demand centre are favourable, and reduce the losses associated with power transmission. In addition Eskom’s ‘2040 Transmission Network Study’ has drawn on various scenarios to determine the grid’s development requirements, as well as to identify critical power corridors for future strategic development, of which the Northern corridor is one of these. The national power corridors have been refined and consolidated into five transmission power corridors of 100 km in width, which are being used by

the Department of Environmental Affairs for a strategic environmental assessment (SEA) which will seek to identify environmentally acceptable routes over which long-term environmental impact assessment (EIA) approval can be secured. The Solar Facility site falls into the Northern corridor (refer to Figure 2-2).

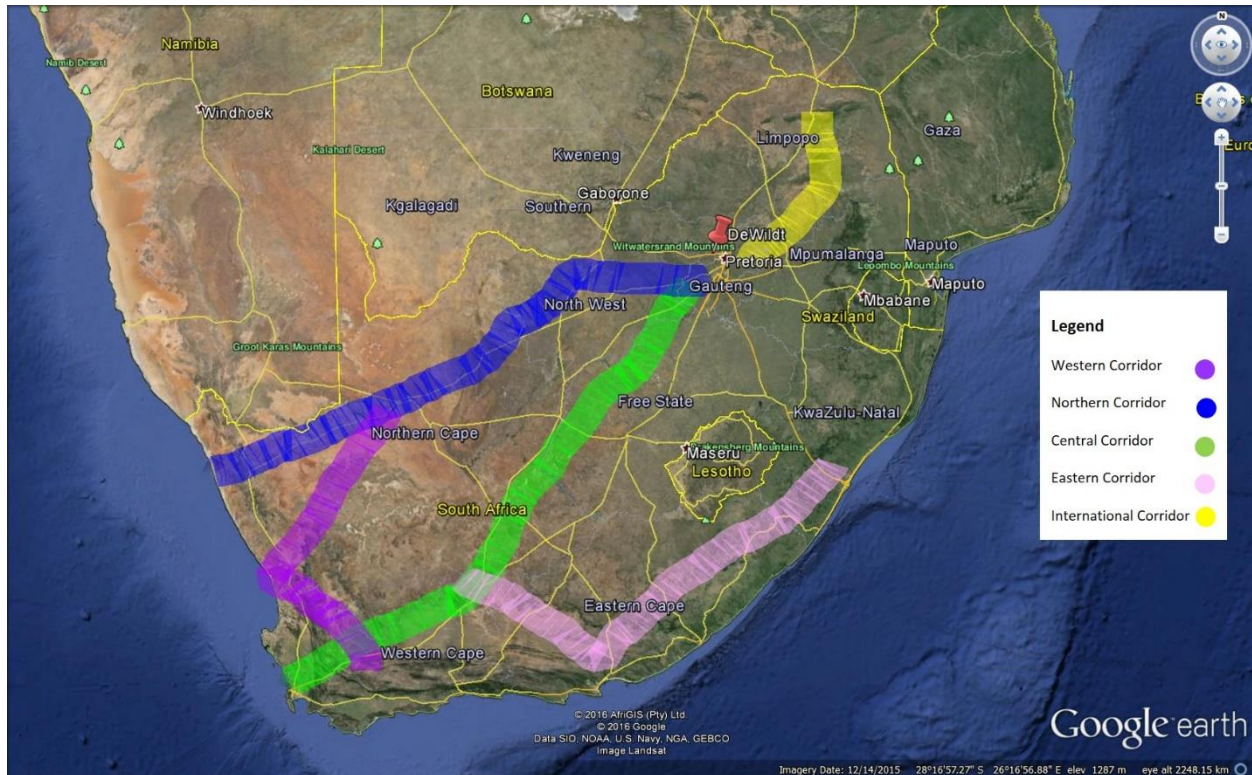


Figure 2-2: Eskom “Critical Power” Corridors

The project proponent has also consulted with local Eskom technicians as well as the Eskom planning departments to understand the future demand centres as well as strategic plans to upgrade and strengthen any local networks. These discussions have been informed to a large extent by the Eskom Transmission Development Plan (TDP) 2015 – 2024. This is a 10-year plan which seeks to meet the long-term requirements of the electricity consumers in South Africa by maintaining the legislated adequacy and reliability of the transmission grid. The objective is to produce a plan containing the expected development projects for the transmission system for this 10-year period. These expected projects will consist of the approved projects, the projects that are to be prepared for approval, and the projects likely to be approved over the defined period. In order to undertake the system adequacy studies to determine the weakness in the system, a number of assumptions need to be made. These assumptions are required in order to assure



consistency in the network studies and analysis as well as to inform the organisation of the basis of the Transmission Development Plan (TDP) for the defined period.

Benefits to local economy

The North West has high potential for renewable energy due to its climate. The solar PV facility will contribute to the economic and social development of surrounding local communities with job creation of between 300- 400 jobs during construction (12 to 18 months) and 20 to 40 permanent jobs during the operational life of the plant (typically 20 years). The knock-on effect could potentially add another 50 to 100 jobs in the support and service industries.

The North West Province, like most of South Africa, is marred by unemployment, inequalities and poverty. To this extent the Solar Facility is situated in close proximity to the towns of Brits and De wildt and consequently, local labour would be easy to source, which fits in well with the REIPPPP economic development criteria for socio-economic upliftment. Currently, a large proportion of local labour is used in the mining and agricultural industry. A few negatives related to agricultural employment are that it is very seasonal and it is not always in close proximity to their homes, forcing workers to travel large distances on a daily basis to reach their place of employment. Owing to its proximity to preferred bidder projects which are in various stages of the development and construction cycles, the project would present a new opportunity for local labour skilled through previous work experience on the preferred bidder plants.

Proximity to Access Road for Transportation of Material and Components.

The proximity of the site to the N4 decreases the impact on secondary roads from traffic during the construction and operation phases. As material and components would need to be transported to the project site during the construction phase of the project, the accessibility of the site was a key factor in determining the viability of the project, particularly taking transportation costs (direct and indirect) into consideration and the impact of this on project economics and therefore the ability to submit a competitive bid under the DoE's REIPPPP programme.

2.3 Strategic Context for Energy Planning: National and Local Policy level

According to the DEA Guideline on Need and Desirability (October 2014) in terms of the EIA Regulations 2010, and in the requirements outlined in Appendix 2 of the EIA Regulations 2014, a motivation for the need and desirability of a development must be measured against the contents of the Integrated Development Plan (IDP), Spatial Development Framework (SDF) and Environmental Management Framework (EMF) for an area, and the sustainable development vision, goals and objectives formulated in, and the desired spatial form and pattern of land use

reflected in the area's IDP and SDF. This section of the report provides a summary of the findings from the review of relevant policies and guidelines at a national, provincial and local scale regarding the need for renewable energy and the Solar Facility.

2.3.1 The Integrated Resource Plan (IRP)

The need for harnessing renewable energy resources (such as solar energy for electricity generation) is linked to increasing pressure on countries to increase their share of renewable energy generation due to concerns such as exploitation of non-renewable resources and the rising cost of fossil fuels. In order to meet the long-term goal of a sustainable renewable energy industry, a target of 17.8GW of renewables (including 8.4GW solar); and 8.9 GW of other generation sources by 2030 has been set by the Department of Energy (DoE) within the Integrated Resource Plan (IRP) 2013 and incorporated in the Renewable Energy Independent Power Producer Procurement (REIPPP) Programme initiated by the DoE. This programme has been designed so as to contribute towards a target of 3725 MW to be generated from renewable energy sources, required to ensure the continued uninterrupted supply of electricity, towards socioeconomic and environmentally sustainable growth, and to start and stimulate the renewable industry in South Africa. The energy procured through this programme will be produced mainly from wind, solar, biomass, and small-scale hydro (with wind and solar comprising the bulk of the power generation capacity). This 17,8GW of power from renewable energy amounts to ~42% of all new power generation being derived from renewable energy forms by 2030.

2.3.2 Strategic Integrated Projects (SIPs)

In 2010, a National Development Plan was drafted to address socio economic issues affecting development in South Africa. These issues were identified and placed under 18 different Strategic Integrated Projects (SIPs) to address the spatial imbalances of the past by addressing the needs of the poorer provinces and enabling socio-economic development. Amongst these is the green energy in support of the South African Economy i.e. SIP 8 (Green energy in support of the South African economy). SIP 8 aims at supporting sustainable green energy initiatives on national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP, 2010). Zolograph is proposing the establishment of the Solar Facility for the purpose of reducing total carbon emissions and diversifying electricity supply. In the event of the project being developed, it will contribute to the local electricity supply and increase the security of supply to consumers. In addition, the implementation of the proposed project will both stimulate the local economy through the construction process and long term employment opportunities in site



management and the operation and maintenance of the facility. Therefore should the proposed project become a preferred bidder project, it could potentially become a SIP 8 project.

2.3.3 Renewable Energy Development Zones (REDZ)

The DEA has been mandated to undertake a Strategic Environmental Assessment (SEA) process. The wind and solar photovoltaic SEAs are being undertaken in order to identify geographical areas most suitable for the rollout of wind and solar photovoltaic energy projects and the supporting electricity grid network. The DEA and Council for Scientific and Industrial Research (CSIR) have released a map with focus areas best suited for the roll-out of wind and solar photovoltaic energy projects in South Africa. The aim of the assessment is to designate renewable energy development zones (REDZs) within which such development will be incentivised and streamlined. The proposed Solar Facility falls within the identified geographical areas / focus area most suitable for the rollout of the development of solar energy projects within the North West Province.

2.4 Project Alternatives

In terms of the EIA Regulations, reasonable and feasible alternatives are required to be considered within the EIA process. All identified, feasible alternatives are required to be assessed in terms of social, biophysical, economic and technical factors. A key challenge of the EIA process is the consideration of alternatives. Most guidelines use terms such as ‘reasonable’, ‘practicable’, ‘feasible’ or ‘viable’ to define the range of alternatives that should be considered. Essentially there are two types of alternatives:

- incrementally different (modifications) alternatives to the project; and
- Fundamentally (totally) different alternatives to the project.

Fundamentally different alternatives are usually assessed at a strategic level, and EIA practitioners recognise the limitations of project-specific EIAs to address fundamentally different alternatives. Electricity generating alternatives have been addressed as part of the National Integrated Resource Plan (IRP) by the DoE. In this regard, the need for renewable power generation has been identified. Zolograph is therefore proposing the development of a solar PV facility.

Incrementally different alternatives relate specifically to the project under investigation. “Alternatives”, in relation to a proposed activity, means different ways of meeting the general purposes and requirements of the activity, which may include alternatives to:

- the property on which, or location where, it is proposed to undertake the activity;

- the type of activity to be undertaken;
- the design or layout of the activity;
- the technology to be used in the activity; and
- the operational aspects of the activity.

These alternatives are discussed below.

2.4.1 Site Alternatives

No site alternatives are proposed for this project as the placement of a solar PV facility is strongly dependent on several factors including climatic conditions (solar radiation levels), topography, the location of the site, availability of grid connection, the extent of the site and the need and desirability for the project. Based on the findings as described in Sections 2.1 and 2.2 above, Zolograph consider the proposed site to be highly favourable and the most suitable site for the development of the Solar Facility due to the following site characteristics

- Solar resource: The economic viability of a solar facility is directly dependent on the annual direct solar irradiation values. The GHI for the Solar Facility site is in the region of approximately 2278 kWh/m²/annum.
 - Topography: A surface area with favourable topography facilitates the work involved in construction and maintenance of the PV facility.
 - Site access: The site can be accessed via the R566 road
 - Grid access: Grid connection is within close proximity. The principle to minimise associated infrastructure and the resulting impacts is also supported. Development on any other site will result in a significant increase in disturbance, longer power lines and their associated impacts.
 - Land suitability: The current land use of the site is an important consideration in site selection in terms of limiting disruption to existing land use practices. Agricultural land was preferred as the majority of farming practices can continue in tandem to the operation of the Solar Facility once the construction and commissioning of the project is complete.
 - Geographic location: The project site falls within the identified geographical areas/ focus area most suitable for the rollout of the development of solar energy projects.
 - Landowner support: The selection of sites where the landowners are supportive of the development of renewable energy is essential for ensuring the success of the project. The landowners do not view the development as a conflict with their current land use practices.
- No site alternatives are available for assessment.



2.4.2 Layout and Design Alternatives

The 50MW Solar Facility and associated infrastructure will have a development footprint of up to 183 ha. The Solar Facility and its associated infrastructure can be appropriately located within (Portion 15, 27 and 28 of the farm Schietfontein 437 JQ). During the Scoping Phase potentially environmentally sensitive areas were identified for consideration in detail (through site-specific specialist studies) during this EIA Phase. The layout of the proposed Solar Facility occupies the full extent of areas. The layout plan provided by the developer is therefore considered to be the most optimal layout from an environmental perspective. The environmental sensitivity identification process informed the layout design for the Solar Facility, avoiding sensitive areas as far as possible.

Development footprint: For the PV array, an optimal location within the broader site was identified based on the constraints identified during the ecology assessment undertaken during the Scoping Phase, and an area for development of the Solar Facility was recommended within the preferred site location at the farm Schietfontein 437 JQ. Technical considerations within the PV array area further allowed for the identification of alternative layouts, described as follows:

- Preferred development footprint –This layout is in line with the landowner’s desires. This layout is therefore technically preferred. An exclusion zone traversing the development footprint (drainage line) will be avoided. The drainage line has been avoided and appropriately buffered.

Alternative development footprint – This layout alternative (shown by the hatched section in Figure 2-3) is shaped to avoid environmentally sensitive features on the site.

- Grid connection Alternative 1: The substation site is located approximately 3km east of the grid connection point (known as the Dewildt Substation). The power line follows the northern boundary of the facility development footprint. This substation and power line is technically preferred.
- Grid connection Alternative 2: The alternative substation site is located 3.5 km east of the Dewildt Substation grid connection point. The power line follows the southern boundary of the facility development footprint.

The grid connection for the project will be finalised based on input from Eskom and the environmental assessment.

Access Road(s) - The proposed project site is accessible via the R566 road.

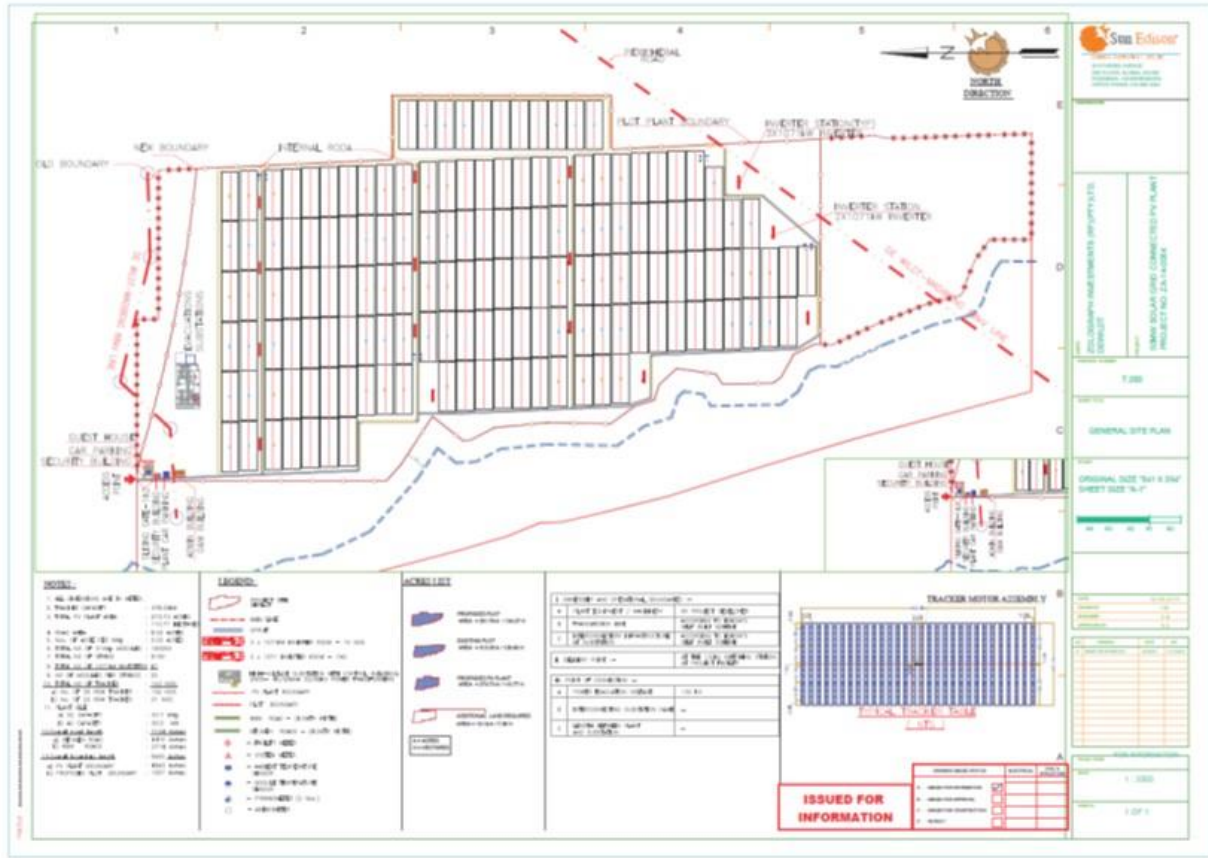


Figure 2-3: Layout plan



2.4.3 Technology Alternatives

Few technology options are available for PV facilities, and the use of those that are considered are usually differentiated by weather and temperature conditions that prevail on the site, so that optimality is obtained by the final site selection. Solar energy is considered to be the most suitable renewable energy technology for this site, based on the site location, ambient conditions and energy resource availability. Solar PV was determined as the most suitable option for the proposed site as large volumes of water are not required for power generation purposes compared to concentrated solar power technology (CSP). PV is also preferred when compared to CSP technology because of the lower visual profile. Two solar energy technology alternatives are being considered for the proposed project and include:

- Fixed mounted PV systems (static/fixed-tilt panels);
- Tracking PV systems (with solar panels that rotate around a defined axis to follow the sun's movement).

The primary differences between technologies available which affect the potential for environmental impacts relate to the extent of the facility, or land-take (disturbance or loss of habitat), as well as the height of the facility (visual impacts). The PV panels are designed to operate continuously for more than 20 years, unattended and with low maintenance. The impacts associated with the operation and decommissioning of the facility will be the same irrespective of the technology chosen.

Table 2-1: Technology alternative

TECHNOLOGIES	ADVANTAGES	DISADVANTAGES
<p>CSP - Parabolic Trough Technology</p> 	<ul style="list-style-type: none"> • Is the most proven CSP technology; • Over 30+ years of operating experience; • Energy storage is feasible and can be added. Therefore, the system could provide energy under cloudy conditions or at night; and • The cost, performance and risk of parabolic trough technology are well established with existing parabolic trough plants around the world. 	<ul style="list-style-type: none"> • Relatively low thermal efficiency; • Requires significant site grading with gradient <3%.
<p>CSP - Central Receiver Technology</p> 	<ul style="list-style-type: none"> • When using tower technology, energy storage could be added. Therefore, the system could provide energy, even in cloudy conditions or at night; • Requires minimum site grading (can tolerate gradients >5%); 	<ul style="list-style-type: none"> • Central receiver technology needs to proceed from conceptual to demonstration to commercial development. Currently less experience with commercial deployment than trough technology; • Central receiver design is a challenge – specifically in seismic zones.

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	<ul style="list-style-type: none"> • Energy storage is feasible and can be added; and • The advantage of this design above the parabolic trough design is the higher temperature (up to 550°C compared to 400°C). Thermal energy at higher temperatures can be converted to electricity more efficiently and can be more cheaply stored for later use. 	
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TECHNOLOGIES	ADVANTAGES	DISADVANTAGES
<p>CSP – Linear Fresnel Technology</p> 	<ul style="list-style-type: none"> • Commercially proven technology albeit on a relatively small scale. Modular design allows for an easy scale-up of the plant capacity; • Storage can be added. Therefore, the system could provide energy under cloudy conditions or at night; and • Linear Fresnel technology has a relatively low footprint and therefore limits environmental disturbance. 	<ul style="list-style-type: none"> • Low thermal efficiency and relatively small install base. The technology has not benefitted from the same technology advancement as the other concentrated solar thermal technologies.
<p>Photovoltaic Technology</p> 	<ul style="list-style-type: none"> • PV panels provide clean – green energy. During electricity generation with PV panels there is no harmful greenhouse gas emissions thus solar PV is environmentally friendly; • PV cells have a very long lifespan that needs minimum upkeep; 	<ul style="list-style-type: none"> • Some toxic chemicals, like cadmium and arsenic, are used in the PV production process. These environmental impacts are minor and can be easily controlled through recycling and proper disposal; • Solar energy is somewhat more expensive to produce



	<ul style="list-style-type: none"> • PV is currently the lowest price solar technology due to the lower costs of PV panels; • Minimal operations and maintenance support staff required; • Require a minimal amount of water; and • Solar energy is a locally available renewable resource. It does not need to be imported from other regions of the country or across the world. This reduces environmental impacts associated with transportation and also reduces our dependence on imported oil. And, unlike fuels that are mined and harvested, when we use solar energy to produce electricity we do not deplete or alter the resource. 	<p>than conventional sources of energy due in part to the cost of manufacturing PV devices and in part to the conversion efficiencies of the equipment. As the conversion efficiencies continue to increase and the manufacturing costs continue to come down, PV will become increasingly cost competitive with conventional fuels;</p> <ul style="list-style-type: none"> • Energy storage options (batteries) are expensive; • Significant power output fluctuations due to no inertia in the system; • PV efficiency is significantly affected at high ambient temperatures; and • Solar power is a variable energy source, with energy production dependent on the sun. Solar facilities may produce no power at all some of the time, which could lead to an energy shortage if too much of a region's power comes from solar power.
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2.4.4 The 'Do-Nothing' Alternative

The 'do-nothing' alternative is the option of not constructing the proposed Solar Facility. Should this alternative be selected, there would be no environmental impacts on the site due to the construction and operation activities of a solar PV facility. While the no-go alternative will have limited socio-economic benefits at a local and regional scale, the extent of the physical impact in

the area would be minimised by the number of projects developed in the Dewildt area. The do-nothing alternatives will therefore likely result in minimising the cumulative impact on the land, although it is expected that pressure to develop the site for renewable energy purposes will be actively pursued due to the very factors which make the site a viable option for renewable energy development as discussed previously. Other developers will likely seek to develop the site for renewable energy purposes in order to realise targets for renewable energy in the country, the socio-economic and environmental benefits.

2.5 Description of the Associated Infrastructure

The facility is proposed to accommodate either static or tracking PV arrays to harness the solar resource on the site. The facility is proposed to have a nominal/contracted capacity of up to 50MW. An area of approximately 183ha in extent will be occupied by the PV panels and associated infrastructure. A layout of the proposed Solar Facility and associated infrastructure has been provided by the project developer, and is indicated in (Figure 2-3). This is the layout which has been assessed within this EIA Report. (Table 2-2) summarises the detail of the project components. The Solar Facility is proposed to include several arrays of PV solar panels and will comprise the following:

- mounting structures to support the PV panels;
- on-site inverters to step up the power and a substation to facilitate the connection between the Solar Facility and the Eskom electricity grid;
- a new 88kV power line between the on-site substation and the Dewildt Substation;
- cabling between the project components, to be laid underground where practical;
- offices and workshop areas for maintenance and storage;
- temporary laydown areas; and
- internal access roads and fencing around the development area.

Table 2-2: Details of the Solar Facility infrastructure.

Component	Description/ Dimensions
Location of the site	Portions 15, 27 and 28 of the farm Schietfontein 437 JQ, Madibeng Local Municipality in the North West Province

SG Code	TOJQ0000000043700015 TOJQ0000000043700027 TOJQ0000000043700028
Project development footprint	183ha
Proposed technology	Static or tracking photovoltaic
Contracted capacity	50MW
Height of installed panels from ground level	4 - 6 meters
Access road	Site is accessible directly off the R566 road
Width and length of internal roads	Main internal road – length: ~1000m, width: 5m, Secondary internal roads –length: ~4000m. width: 5m
On-site substation	± 80m x 120m
Power line	Servitude width – 15 m Length – Approx. 500m Height of towers – up to 15-25m
Building	5 ± 500m ²

2.6 Technology considered for the Solar Facility and the Generation of Electricity

Solar energy facilities, such as those using PV panels, use the energy from the sun to generate electricity through a process known as the Photovoltaic Effect. This effect refers to photons of light colliding with electrons, and therefore placing the electrons into a higher state of energy to create electricity. A (PV) cell is made of silicone that acts as a semi-conductor used to produce the photovoltaic effect. Individual PV cells are linked and placed behind a protective glass sheet to form a PV panel. The PV cell is positively charged on one side and negatively charged on the other side and electrical conductors are attached to either side to form a circuit. This circuit then



captures the released electrons in the form of an electric current (direct current). An inverter must be used to change the direct current (DC) to alternating current (AC). The electricity is then distributed through a power line for use.

The PV panels can either comprise a fixed/static support structure set at an angle (fixed tilt) so to receive the maximum amount of solar irradiation (as illustrated in Figure 2-4), or a single or double axis support structure which can be either fixed or tracking. The angle of the panel is dependent on the latitude of the proposed facility and the angles may be adjusted to optimise for summer or winter solar irradiation characteristics.



Figure 2-4: Photovoltaic (fixed-tilt/ static) panel array

The PV panels are designed to operate continuously for more than 20 years, unattended and with low maintenance. The Photovoltaic Effect is achieved through the use of the following components

Photovoltaic Cells

A PV cell is made of silicone that acts as a semiconductor used to produce the photovoltaic effect. A single cell is sufficient to power a small device such as an emergency telephone. However, to produce up to 50 MW of power, the proposed facility will require numerous cells arranged in multiples/arrays which will be placed behind a protective glass sheet and fixed to a support structure. Each PV cell is positively charged on one side and negatively charged on the other side, with electrical conductors attached to either side to form a circuit. This circuit captures the released electrons in the form of an electric current (direct current).

The Inverter

An inverter is used to convert the electricity which is produced as direct current into alternating current for the purpose of grid connection. In order to connect a large solar facility to the national grid, numerous inverters will be arranged in several arrays to collect, and convert the produced power.

The Support Structure

The PV panels will be fixed to a support structure set at an angle (fixed-tilt) so to receive the maximum amount of solar irradiation. The angle of the panel is dependent on the latitude of the proposed facility and the angles may be adjusted to optimise for summer or winter solar radiation characteristics.

2.7 Water Requirements, Availability and Use

Water requirements: The proposed Solar Facility will require the use of water during its construction and operation phase. The water requirements for a solar PV project is anticipated to be a maximum of approximately 10 000m³ over a ± 18 month construction period and a maximum of approximately 5 000 m³ per annum for a 20-25-year operational lifespan of the Solar Facility (for maintenance/cleaning of panels). **Water availability:** Zolograph is considering to Source water from groundwater, i.e. new boreholes on site (Portion 15 of the farm Schietfontein 437 JQ).

Water Use: Section 21 of the National Water Act (NWA) 36 of 1998 identifies water uses for which registration or licensing is required including abstraction, storage, wastewater disposal and water resource impacts, amongst others. Section 21 c (impeding or diverting the flow of water in a watercourse) and Section 21 i (altering the bed, banks, course or characteristics of a watercourse) may be triggered by the proposed project in terms of the NWA. A water use licence application



(WUL) has been submitted to the DWS and acknowledged, proof of application is included in Appendix 2b.

2.8 Proposed Activities during the Project Development Stages

In order to construct the Solar Facility and its associated infrastructure, a series of activities will need to be undertaken during the design, pre-construction, construction, operation, and decommissioning phases which are discussed in more detail below.

2.8.1 Design and Pre-Construction Phase

Pre-planning: Several post-authorisation factors are expected to influence the final design of the facility and could result in small-scale modifications of the PV array or associated infrastructure.

While an objective of the Construction Contractor responsible for the overall construction phase of the project will be to comply with the approved facility design as far as possible, it should be understood that the construction process is dynamic and that unforeseen changes to the project specifications will result. This EIA Report therefore describes the project in terms of the best available knowledge at the time. The final facility design is required to be approved by the DEA. Importantly, should there be any substantive changes or deviations from the original scope or layout of the project, the DEA will need to be notified and where relevant, approval obtained.

Conduct Surveys: Prior to initiating construction, a number of surveys will be required including, but not limited to confirmation of the micro-siting footprint (i.e. the precise location of the PV panels, substation and the plant's associated infrastructure) and a geotechnical survey. Geotechnical surveys are executed by geotechnical engineers and geologists to acquire information regarding the physical characteristics of soil and rocks underlying a proposed site. The purpose is to design earthworks and foundations for structures and to execute earthwork repairs necessitated due to changes in the subsurface environment.

2.8.2 Construction Phase

The construction phase will entail a series of activities including: Procurement and employment. The proposed Solar Facility is likely to create approximately 300-400 employment opportunities depending on the final design. Of this 60% of the opportunities (240 employees) will be available to low-skilled workers (construction labourers, security staff etc.), 25% (100 employees) to semi-skilled workers (drivers, equipment operators etc.), and 15% (60 employees) to skilled personnel



(engineers, land surveyors, project managers etc.). Approximately 50% of jobs will be sourced from local communities. The injection of income into the area in the form of wages will represent a significant opportunity for the local economy and businesses in the Dewildt area. The majority of the employment opportunities, specifically the low and semi-skilled opportunities, are likely to be available to residents of in Dewildt and surrounding areas. The majority of the beneficiaries are likely to be historically disadvantaged (HD) members of the community, representing a significant positive social benefit in an area where unemployment is in the region of 10%. Establishment of an Access Road to the Site Project is directly accessible via the R566 road.

Within the site itself, access will be required from new/existing roads for construction purposes (and limited access for maintenance during operation). Internal access roads of up to 5m in width will be required. New access roads may be required to be constructed in order to access the site; internal access roads will be required to access the individual components within the facility during construction and operation. Where necessary, it may be required, in some areas, to strip off the existing vegetation and level the exposed ground surface to form an access track surface. The final layout of the access roads will be determined following the identification of site related sensitivities. Undertake Site Preparation Site preparation activities will include clearance of vegetation. These activities will require the stripping of topsoil which will need to be stockpiled, backfilled and/or spread on site.

Transport of Components and Equipment to Site

The components for the proposed facility will be transported to site by road. For the proposed Solar Facility, transport of components would occur via the R566. Some of the components (i.e. substation transformer) may be defined as abnormal loads in terms of the Road Traffic Act (Act No. 29 of 1989)⁷ by virtue of the dimensional limitations. Typical civil engineering construction equipment will need to be brought to the site (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.) as well as components required for the mounting of the PV support structures, construction of the substation and site preparation.

Establishment of Laydown Areas on Site

Laydown and storage areas will be required for the typical construction equipment which will be required on site. Once the required equipment has been transported to site, a dedicated equipment construction camp and laydown area will need to be established adjacent to the workshop area. The equipment construction camp serves to confine activities and storage of equipment to one designated area to limit the potential ecological impacts associated with this phase of the project. The laydown area will be used for the assembly of the PV panels and the general placement/storage of construction equipment.



Erect PV Cells and Construct Substation and Invertors

The construction phase involves installation of the solar PV panels and the entire necessary structural and electrical infrastructure to make the plant operational. In addition, preparation of the soil and improvement of the access roads would continue for most of the construction phase. For array installation, typically vertical support posts are driven into the ground. Depending on the results of the geotechnical report a different foundation method, such as screw pile, helical pile, micropile or drilled post/pile could be used. The posts will hold the support structures (tables) on which PV modules would be mounted. Brackets attach the PV modules to the tables. Trenches are dug for the underground AC and DC cabling and the foundations of the inverter enclosures and transformers are prepared. While cables are being laid and combiner boxes are being installed, the PV tables are erected. Wire harnesses connect the PV modules to the electrical collection systems. Underground cables and overhead circuits connect the Power Conversion Stations (PCS) to the on-site AC electrical infrastructure and ultimately the project's substation.



Figure 2-5: Frame, structural details

The construction of a substation would require a survey of the site, site clearing and levelling and construction of access road/s (where required), construction of a level terrace and foundations, assembly, erection, installation and connection of equipment, and rehabilitation of any disturbed areas and protection of erosion sensitive areas.

Establishment of Ancillary Infrastructure

Ancillary infrastructure will include a power line for connection to the Eskom national grid, workshop, storage and laydown areas, gatehouse and security complex, as well as a temporary contractor's equipment camp. The establishment of these facilities/buildings will require the clearing of vegetation and levelling of the development site and the excavation of foundations prior to construction. A laydown area for building materials and equipment associated with these buildings will also be required.

Construction of power line

A power line is constructed by surveying the power line route, construction of foundations for the towers, installation of the towers, stringing of conductors and finally the rehabilitation of disturbed area and protection of erosion sensitive areas.

Undertake Site Remediation

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

2.8.3 Operational Phase

The proposed Solar PV facility is expected to be operational for a minimum of 20 years. The project will operate continuously, 7 days a week, during daylight hours. While the project will be largely self-sufficient upon completion of construction, monitoring and periodic, as needed maintenance activities will be required. Key elements of the Operation and Maintenance plan include monitoring and reporting the performance of the project, conducting preventative and corrective maintenance, receiving visitors, and maintaining security of the project. The operational phase (for one solar energy facility) will create about 40 full-time employment positions.

2.8.4 Decommissioning Phase

Depending on the continued economic viability of the facility following the initial 20-25 year operational period, the Solar Facility will either be decommissioned or the operational phase will be extended. If it is deemed financially viable to extend the operational phase, existing components would either continue to operate or be disassembled and replaced with new, more



efficient technology/infrastructure available at that time. However, if the decision is made to decommission the facility, the following activities will form part of the project scope.

Site Preparation

Site preparation activities will include confirming the integrity of the access to the site to accommodate the required decommissioning equipment.

Disassemble and Remove Existing Components

When the project is ultimately decommissioned, the equipment to be removed will depend on the proposed land use for the site at that time. At this time, all above ground facilities that are not intended for future use at the site will be removed. Underground equipment (e.g. foundation, wiring) will be removed, and the surface restored to the original contours. Much of the above ground wire, steel, and PV panels of which the system is comprised are recyclable materials and would be recycled to the extent feasible. The components of the plant would be deconstructed and recycled or disposed of in accordance with regulatory requirements. The site will be rehabilitated and can be returned to the agricultural or other beneficial land-use.

Future plans for the site and infrastructure after decommissioning

The plant capacity would have degraded by $\pm 15\%$ over 20 years. The plant will have the opportunity to generate power for a Merchant Market operation (i.e. the client would sell power on bid basis to the market).



3 REGULATORY AND LEGAL CONTEXT

3.1 Requirement for an EIA

In terms of sections 24 and 24D of NEMA, as read with Government Notices R982, R983, R984, R985, a Scoping and EIA process is required for the proposed Solar Facility. The key listed activity contained in GN984 which triggered a full EIA process is Listed Activity 1 of GN984: The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, as the solar project will have a contracted (nominal) capacity of up to 50 MW. The table below contains the listed activities in terms of the EIA Regulations of December 2014 which apply to the Solar Facility, and for which an Application for Authorisation has been applied. The table also includes a description of those project activities which relate to the applicable listed activities.

Activity	Description
GN R. 984 Item 15: The clearance of an area of 20 hectares or more of indigenous vegetation.	The development of the proposed project will require the clearance of more than 20 hectares of indigenous vegetation within a sensitive and critical biodiversity area.
GN R. 984 Item 1: The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development facilities or infrastructure is for photovoltaic installations and occurs within an urban area.	Electricity generation of the proposed photovoltaic facility is 50 MW

3.2 Strategic Electricity Planning in South Africa

The need to expand electricity generation capacity in South Africa is based on national policy and is informed by on-going strategic planning undertaken by the DoE. The hierarchy of policy and planning documentation that support the development of renewable energy projects such as solar energy facilities are discussed in more detail in the following sections, along with the provincial and local policies or plans that have relevance to the development of the proposed Solar Facility.

3.2.1 The Kyoto Protocol, 1997

South Africa's electricity is mainly generated from coal-based technologies. South Africa accounts for ~38 % of Africa's CO² (a greenhouse gas contributing to climate change) from burning of fossil fuels and industrial processes. The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. South Africa ratified the Kyoto Protocol in 2002. The Kyoto Protocol requires developing countries to reduce its greenhouse gas emissions through actively cutting down on using fossil fuels, or by utilising more renewable resources. Therefore certain guidelines and policies (discussed further in the sections below) were put in place for the Government's plans to reduce greenhouse gas emissions. The development of renewable energy projects (such as the proposed solar energy facility) is therefore in line with South Africa's international obligations in terms of the Kyoto Protocol. A second commitment period commenced from 1 January 2013, and extends to 31 December 2020.

3.2.2 White Paper on the Energy Policy of the Republic of South Africa, 1998

Development within the energy sector in South Africa is governed by the White Paper on a National Energy Policy (the National Energy Policy), published by DME in 1998. This White Paper identifies five key objectives for energy supply within South Africa, i.e.:

- increasing access to affordable energy services;
- improving energy sector governance;
- stimulating economic development;
- managing energy-related environmental impacts; and
- securing supply through diversity.

Furthermore, the National Energy Policy identifies the need to undertake an Integrated Energy Planning (IEP) process and the adoption of a National Integrated Resource Planning (NIRP) approach. Through these processes, the most likely future electricity demand based on long-term southern African economic scenarios can be forecasted, and provide the framework for South Africa to investigate a whole range of supply and demand side options.

3.2.3 Renewable Energy Policy in South Africa

Internationally there is increasing development of the use of renewable technologies for the generation of electricity due to concerns such as climate change and exploitation of resources. In response, the South African government ratified the United Nations Framework Convention on Climate Change (UNFCCC) in August 1997 and acceded to the Kyoto Protocol, the enabling

mechanism for the convention, in August 2002. In addition, national response strategies have been developed for both climate change and renewable energy.

Investment in renewable energy initiatives, such as the proposed Solar Facility, is supported by the National Energy Policy (DME, 1998). This policy recognises that renewable energy applications have specific characteristics which need to be considered. The Energy Policy is “based on the understanding that renewables are energy sources in their own right, and are not limited to small-scale and remote applications, and have significant medium- and long-term commercial potential.” In addition, the National Energy Policy states that “Renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future”.

The White Paper on Renewable Energy (DME, 2003) supplements the Energy Policy, and sets out Government’s vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa. It also informs the public and the international community of the Government’s vision, and how the Government intends to achieve these objectives, and informs Government agencies and organs of their roles in achieving the objectives.

The support for the Renewable Energy Policy is guided by a rationale that South Africa has a very attractive range of renewable resources, particularly solar and wind, and that renewable applications are, in fact, the least cost energy service in many cases from a fuel resource perspective (i.e. the cost of fuel in generating electricity from such technology), more so when social and environmental costs are taken into account. In spite of this range of resources, the National Energy Policy acknowledges that the development and implementation of renewable energy applications has been neglected in South Africa.

Government policy on renewable energy is therefore concerned with addressing the following challenges:

- ensuring that economically feasible technologies and applications are implemented;
- ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options; and
- addressing constraints on the development of the renewable industry.



The White Paper on Renewable Energy states “It is imperative for South Africa to supplement its existing energy supply with renewable energies to combat Global Climate Change which is having profound impacts on our planet.”

3.2.4 Final Integrated Resource Plan (IRP) 2010 - 2030

The Energy Act of 2008 obligates the Minister of Energy to develop and publish an integrated resource plan for energy. Therefore, the DoE, together with the National Energy Regulator of South Africa (NERSA) has compiled the IRP for the period 2010 to 2030, as introduced in Section 2.2.1. The objective of the IRP is to develop a sustainable electricity investment strategy for generation capacity and transmission infrastructure for South Africa over the next twenty years. The IRP is intended to:

- improve the long term reliability of electricity supply through meeting adequacy criteria over and above keeping pace with economic growth and development;
- ascertain South Africa’s capacity investment needs for the medium term business planning environment;
- consider environmental and other externality impacts and the effect of renewable energy technologies; and
- provide the framework for Ministerial determination of new generation capacity (inclusive of the required feasibility studies).

The objective of the IRP is to evaluate the security of supply, and determine the least cost supply option by considering various demand side management and supply-side options. The IRP also aims to provide information on the opportunities for investment into new power generating projects.

The outcome of the process confirmed that coal-fired options are still required over the next 20 years and that additional base load plants will be required from 2010. The first and interim IRP was developed in 2009 by the DoE. The initial four years of this plan was promulgated by the Minister of Energy on 31 December 2009, and updated on 29 January 2010. The DoE released the Final IRP in March 2011, which was accepted by Parliament at the end of the same month. This Policy-Adjusted IRP is recommended for adoption by Cabinet and subsequent promulgation as the final IRP. In addition to all existing and committed power plants (including 10 GW committed coal), the plan includes 9.6 GW of nuclear; 6.3 GW of coal; 17.8 GW of renewables (including 8.4GW solar); and 8.9 GW of other generation sources.

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3.2.5 Department of Energy Process for Independent Power Producers (IPPs)

In responding to the growing electricity demand within South Africa, as well as the country's targets for renewable energy, Zolograph proposes the establishment of the Solar Facility to add new capacity to the national electricity grid. Zolograph will be required to apply for a generation license from NERSA, as well as a power purchase agreement from Eskom (typically for a period of 20 - 25 years) in order to build and operate the proposed Solar Facility. As part of the agreement, Zolograph would be remunerated per kWh by Eskom or subsequent authority/market operator. Depending on the economic conditions following the lapse of this period, the Solar Facility can either be decommissioned, or the power purchase agreement renegotiated and extended.

The IPP will undergo a bidding process in which the DoE will determine preferred bidders. A preferred bidder will be held to compliance with the price and economic development proposals in its bid, with regular reporting to demonstrate compliance during the life of the project.

3.3 Regulatory and Legal Context

The South African energy industry is evolving rapidly, with regular changes to legislation and industry role-players. The regulatory hierarchy for an energy generation project of this nature consists of three tiers of authority who exercise control through both statutory and non-statutory instruments – that is National, Provincial and local levels. As solar energy development is a multi-sectoral issue (encompassing economic, spatial, biophysical, and cultural dimensions) various statutory bodies are likely to be involved in the approval process for a solar energy facility and the related statutory environmental assessment process. At **National Level**, the main regulatory agencies are:

- Department of Energy (DoE): This Department is responsible for policy relating to all energy forms, including renewable energy, and is responsible for forming and approving the IRP (Integrated Resource Plan for Electricity).
- National Energy Regulator of South Africa (NERSA): This body is responsible for regulating all aspects of the electricity sector, and will ultimately issue licenses for solar energy developments to generate electricity.
- Department of Environmental Affairs (DEA): This Department is responsible for environmental policy and is the controlling authority in terms of NEMA and the EIA Regulations. The DEA is the competent authority for this project, and charged with granting the relevant environmental authorisation.



- The South African Heritage Resources Agency (SAHRA): SAHRA is a statutory organisation established under the National Heritage Resources Act, No 25 of 1999, as the national administrative body responsible for the protection of South Africa's cultural heritage.
- National Department of Agriculture, Forestry, and Fisheries (DAFF): This Department is responsible for activities pertaining to subdivision and rezoning of agricultural land. The forestry section is responsible for the protection of tree species under the National Forests Act (Act No 84 of 1998).
- South African National Roads Agency (SANRAL): This Agency is responsible for the regulation and maintenance of all national routes.
- Department of Water and Sanitation: This Department is responsible for water resource protection, water use licensing and permits.
- Department of Mineral Resources (DMR): Approval from the DMR may be required to use land surface contrary to the objects of Mineral and Petroleum Resources Development Act in terms of section 53 of the Mineral and Petroleum Resources Development Act (No 28 of 2002): In terms of the Act approval from the Minister of Mineral Resources is required to ensure that proposed activities do not sterilise a mineral resource that might occur on site.

At the **Provincial Level**, the main regulatory agencies are:

- Provincial Government of the North West – Department of Rural, Environment and Agricultural Development (READ): This Department is the commenting authority for these projects as well as being the conservation authority for the Province, and responsible for issuing of other biodiversity and conservation-related permits.
- Department of Transport and Public Works: This Department is responsible for roads and the granting of exemption permits for the conveyance of abnormal loads on public roads.
- North West Department of Agriculture, Land Reform and Rural Development: This Department is responsible for all matters which affect agricultural land. At the Local Level, the local and municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the North West, both the local and district municipalities play a role. The local municipality is the Madibeng Local Municipality which forms part of the Bojanala Platinum District Municipality. There are also non-statutory bodies such as environmental non-governmental organisations (NGOs) and community based organisations (CBO) working groups that play a role in various aspects of planning and environmental monitoring that will have some influence on proposed solar energy development in the area.

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3.4 Legislation and Guidelines that have informed the preparation of this EIA Report

The following legislation and guidelines have informed the scope and content of this EIA Report:

- National Environmental Management Act (NEMA) 107 of 1998
- EIA Regulations, published under Chapter 5 of NEMA (GNR R982 in Government Gazette No 38282 of December 2014)
- Guidelines published in terms of the NEMA EIA Regulations, in particular:
 - i. Public Participation in the EIA Process (DEA, 2010)
 - ii. Integrated Environmental Management Information Series (published by DEA)
- Madibeng Local Municipality Integrated Development Plan (2012-2017)
- Bojanala Platinum District Municipality Integrated Development Plan (2012-2017)
- International guidelines – the Equator Principles and the International Finance Corporation and World Bank Guidelines.

Several other Acts, standards or guidelines have also informed the project process and the scope of issues assessed in this report. A listing of relevant legislation is provided in

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
National Legislation			
National Environmental Management Act (Act No 107 of 1998)	<p>The EIA Regulations have been promulgated in terms of Chapter 5 of the Act. Listed activities which may not commence without an environmental authorisation are identified within these Regulations.</p> <p>In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation.</p> <p>In terms of GN R982, R983, R984 and R985 of December 2014, a Scoping and EIA Process is required to be undertaken for the proposed project.</p>	<p>DEA – lead authority.</p> <p>READ- commenting authority.</p>	<p>The final EIA report is to be submitted to the DEA and Provincial Environmental Departments in support of the application for authorisation.</p>
National Environmental Management Act (Act No 107 of 1998)	<p>In terms of the Duty of Care Provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised. In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.</p>	<p>DEA (as regulator of NEMA).</p>	<p>While no permitting or licensing requirements arise directly by virtue of the proposed project, this section will find application during the EIA phase and will continue to apply throughout the life cycle of the project.</p>
Environment Conservation Act (Act No 73 of 1989)	<p>National Noise Control Regulations (GN R154 dated 10 January 1992)</p>	<p>DEA – lead authority.</p> <p>READ- commenting authority. Local Authorities</p>	<p>There is no requirement for a noise permit in terms of the legislation. Noise impacts may result from specific activities carried out during the construction phase of the project and could present an intrusion impact to the local community.</p>



<p>National Water Act (Act No 36 of 1998)</p>	<p>Water uses under S21 of the Act must be licensed, unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorisation (and then registration of the water use is required). Consumptive water uses may include the taking of water from a water resource and storage - Sections 21a and b. Non-consumptive water uses may include impeding or diverting of flow in a water course - Section 21c; and altering of bed, banks or characteristics of a watercourse – Section 21i.</p>	<p>Department of Water and Sanitation (DWS)</p>	<p>A water use license (WUL) is required in terms of Section 21(c) and 21 (i) of the National Water Act. If wetlands or drainage lines are impacted on, or the regulated area of a watercourse (being the riparian zone or the 1:100yr floodline whichever is greatest). Should water be extracted from groundwater/ a borehole on site for use within the facility, a water use license will be required in terms of Section 21(a) and 21 (b) of the National Water Act.</p>
<p>Minerals and Petroleum Resources Development Act (Act No 28 of 2002)</p>	<p>According to S27 of the act, any person who wishes to apply to the Minister for a mining permit must simultaneously apply for an environmental authorisation and must lodge the application (repealed by section 23 (b) of Act 49 of 2008).</p> <p>Requirements for Environmental Management Programmes and Environmental Management Plans are set out in S39 of the Act (repealed by section 33 of Act 49 of 2008)</p> <p>S53 Department of Mineral Resources: Approval from the Department of Mineral Resources (DMR) may be required to use land surface contrary to the objects of the Act in terms of section 53 of the Mineral and Petroleum Resources Development Act, (Act No 28 of 2002). Section 42 of Act 49 of 2008 (Repealed of section of S53) states that the Minister may cause an investigation to be conducted if it is alleged that a person intends to use the surface of any land in any way that could result in the mining of mineral resources being detrimentally affected.’’.</p>	<p>DMR</p>	<p>As no borrow pits are expected to be required for the construction of the facility, no mining permit or environmental authorisation is to be obtained.</p> <p>A Section 53 application has been submitted to the relevant DMR office.</p>
<p>National Environmental</p>	<p>Sections 18, 19 and 20 of the Act allow certain areas to be declared and managed as “priority areas” in terms of air quality. Declaration</p>	<p>DEA – air quality</p>	<p>No permitting or licensing requirements applicable for air</p>



<p>Management: Air Quality Act (Act No 39 of 2004)</p>	<p>of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards.</p> <p>Section 32 makes provision for measures in respect of dust control.</p> <p>Section 34 makes provision for:</p> <ul style="list-style-type: none"> i. the Minister to prescribe essential national noise standards – <ul style="list-style-type: none"> (a) for the control of noise, either in general or by specified machinery or activities or in specified places or areas; or (b) for determining – <ul style="list-style-type: none"> (i) a definition of noise (ii) the maximum levels of noise (2) When controlling noise the provincial and local spheres of government are bound by any prescribed national standards. 	<p>Local Municipality - Noise</p>	<p>quality aspects. The section of the Act regarding noise control is in force, but no standards have yet been promulgated. Draft regulations have however, been promulgated for adoption by Local Authorities. An atmospheric emission licence issued in terms of Section 22 may contain conditions in respect of noise. This will however, not be relevant to the facility, as no atmospheric emissions will take place. The Act provides that an air quality officer may require any person to submit an atmospheric impact report if there is reasonable suspicion that the person has failed to comply with the Act.</p>
<p>National Heritage Resources Act (Act No 25 of 1999)</p>	<p>Section 38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including</p> <ul style="list-style-type: none"> • the construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300 m in length; • any development or other activity which will change the character of a site exceeding 5 000 m² in extent. <p>The relevant Heritage Resources Authority must be notified of developments such as linear developments (such as roads and power lines), bridges exceeding 50 m, or any development or other activity which will change the character of a site exceeding 5 000 m²; or the re-zoning of a site exceeding 10 000 m² in extent. This notification must be provided in the early stages of initiating that</p>	<p>DEA where heritage assessment is a component of the EIA</p> <p>» SAHRA – National heritage sites (grade 1 sites) as well as all historic graves and human remains.</p>	<p>A permit may be required should identified cultural/heritage sites on site be required to be disturbed or destroyed as a result of the proposed development.</p>

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	<p>development, and details regarding the location, nature and extent of the proposed development must be provided. Standalone HIAs are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils the provisions of Section 38. In such cases only those components not addressed by the EIA should be covered by the heritage component.</p>		
<p>National Environmental Management: Biodiversity Act (Act No 10 of 2004)</p>	<ul style="list-style-type: none"> • Provides for the MEC/Minister to identify any process or activity in such a listed ecosystem as a threatening process (S53) • A list of threatened and protected species has been published in terms of S 56(1) - Government Gazette 29657. • Three government notices have been published, i.e. GN R 150 (Commencement of Threatened and Protected Species Regulations, 2007), GN R 151 (Lists of critically endangered, vulnerable and protected species) and GN R152 (Threatened or Protected Species Regulations). • Provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (G 34809, GN 1002), 9 December 2011). • DEA published Regulations on Alien and Invasive Species (AIS) in terms of the National Environmental Management: 	<p>DEA</p>	<p>Under this Act, a permit would be required for any activity which is of a nature that may negatively impact on the survival of a listed protected species. An ecological study has been undertaken as part of the EIA Phase. As such the potential occurrence of critically endangered, endangered vulnerable, and protected species and the potential for them to be affected has been considered. This report is contained in Appendix 6.</p>



	<p>Biodiversity Act, on Friday 1st August 2014. A total of 559 alien species are now listed as invasive, in four different categories. A further 560 species are listed as prohibited, and may not be introduced into the country</p>		
<p>Conservation of Agricultural Resources Act (Act No 43 of 1983)</p>	<ul style="list-style-type: none"> Regulation 15 of GNR1048 provides for the declaration of weeds and invader plants, and these are set out in Table 3 of GNR1048. Declared Weeds and Invaders in South Africa are categorised according to one of the following categories: <ul style="list-style-type: none"> Category 1 plants: are prohibited and must be controlled. Category 2 plants: (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread. Category 3 plants: (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the floodline of watercourses and wetlands. These regulations provide that Category 1, 2 and 3 plants must not occur on land and that such plants must be controlled by the methods set out in Regulation 15E. 	<p>DAFF</p>	<ul style="list-style-type: none"> While no permitting or licensing requirements arise from this legislation, this Act will find application during the EIA phase and will continue to apply throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies must be developed and implemented. In addition, a weed control and management plan must be implemented. The permission of agricultural authorities will be required if the Project requires the draining of vleis, marshes or water sponges on land outside urban areas. However, none of these activities are expected to be undertaken on site.
<p>National Forests Act (Act No. 84 of 1998)</p>	<p>» Protected trees: According to this act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that ' no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner</p>	<p>DEA</p>	<p>A permit or license will be required for any destruction of protected tree species and/or indigenous tree species within a natural forest.</p>



	<p>acquire or dispose of any protected tree, except under a licence granted by the Minister’.</p> <p>» Forests: Prohibits the destruction of indigenous trees in any natural forest without a licence.</p>		
National Veld and Forest Fire Act (Act 101 of 1998)	<p>In terms of S12 the applicant must ensure that the firebreak is wide and long enough to have a reasonable chance of preventing the fire from spreading, not causing erosion, and is reasonably free of inflammable material. In terms of S17, the applicant must have such equipment, protective clothing, and trained personnel for extinguishing fires.</p>	DAFF	<p>While no permitting or licensing requirements arise from this legislation, this act will find application during the operational phase of the project. Due to the fire prone nature of the area, it must be ensured that the landowner and developer proactively manage risks associated with veld fires and provide cooperation to the local Fire Protection Agency</p>
Hazardous Substances Act (Act No 15 of 1973)	<p>This Act regulates the control of substances that may cause injury, or ill health, or death by reason of their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.</p> <p>» Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared to be Group I or Group II hazardous substance;</p> <p>» Group IV: any electronic product;</p>	Department of Health	<p>It is necessary to identify and list all the Group I, II, III and IV hazardous substances that may be on the site and in what operational context they are used, stored or handled. If applicable, a license is required to be obtained from the Department of Health.</p>

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	<p>» Group V: any radioactive material.</p> <p>The use, conveyance or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.</p>		
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	<p>The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by –</p> <ul style="list-style-type: none"> » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. In terms of the Regulations published in terms of this Act (GN 921), a Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities. Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that: <ul style="list-style-type: none"> » The containers in which any waste is stored, are intact and not corroded or in any other way rendered unfit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise; and » Pollution of the environment and harm to health are prevented. 	Hazardous Waste – National DEA General Waste –READ	A waste licence could be required in the event that more than 100m ³ of general waste or more than 35m ² of hazardous waste is to be stored on site at any one time. The volumes of waste generated during construction and operation of the facility are not expected to be large enough to require a waste license.
National Road Traffic Act (Act No 93 of 1996)	<p>» The technical recommendations for highways (TRH 11): “Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads” outline</p>	Provincial Department of Transport (provincial roads) South African	An abnormal load/vehicle permit may be required to transport the various components to site for construction.

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	<p>the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed.</p> <p>» Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts.</p> <p>» The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.</p>	<p>National Roads Agency Limited (national roads)</p>	<p>These include: Route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads. Transport vehicles exceeding the dimensional limitations (length) of 22m. Depending on the trailer configuration and height when loaded, some of the power station components may not meet specified dimensional limitations (height and width).</p>
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4 APPROACH TO UNDERTAKING THE EIA PHASE

An EIA process refers to that process (in line with the EIA Regulations) which involves the identification of and assessment of direct, indirect, and cumulative environmental impacts associated with a proposed project/ activity. The EIA process comprises two main phases: i.e. Scoping Phase and EIA Phase. The EIA process culminates in the submission of an EIA Report (including an Environmental Management Programme (EMPr)) to the competent authority for decision-making. The EIA process is illustrated below:

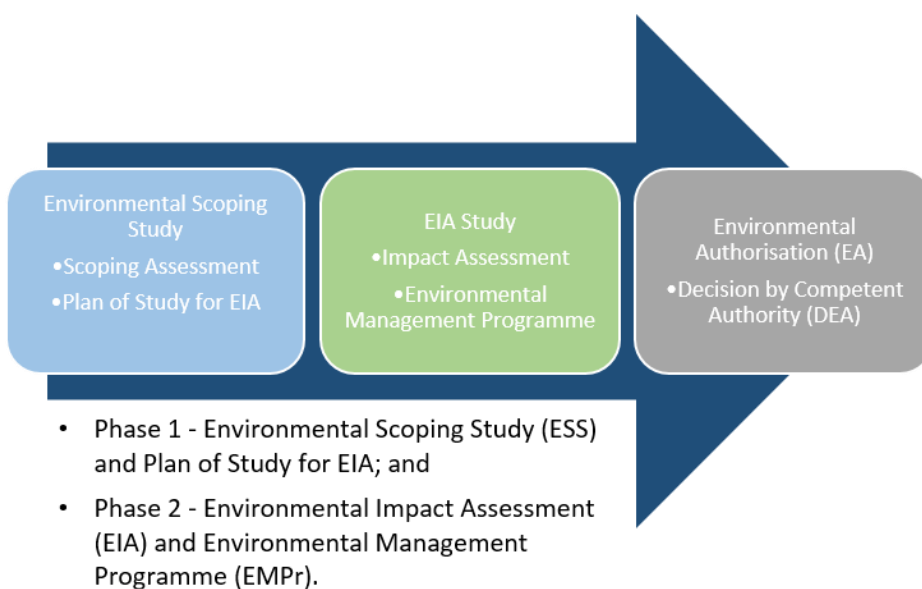


Figure 4-1: Environmental studies flowchart

4.1 Scoping Phase

A draft Scoping Report was released for public review in June-July 2015 for a 30-day comment period. Following the review of the draft scoping, a final scoping report was submitted to DEA in Jan 2016, this together with the Plan of Study for the EIA was accepted by the DEA, as the competent authority, in March 2016. In terms of this acceptance, an EIA was required to be undertaken for the proposed project.

The Scoping Study provided interested and affected parties (I&APs) with the opportunity to receive information regarding the proposed project, participate in the process, and raise issues of concern. The Scoping Report aimed at detailing the nature and extent of the proposed Solar



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Facility, identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA. This was achieved through an evaluation of the proposed project, involving the project proponent, specialist consultants, and a consultation process with key stakeholders that included both relevant government authorities and I&APs. The public participation undertaken for the Scoping phase is summarised in Appendix 4 of this report.

4.2 Environmental Impact Assessment Phase

The EIA Phase for the proposed Solar Facility aims to achieve the following:

- Provide a comprehensive assessment of the social and biophysical environments affected by the proposed phases put forward as part of the project.
- Assess potentially significant impacts (direct, indirect, and cumulative, where required) associated with the proposed facility.
- Comparatively assess any alternatives put forward as part of the projects.
- Identify and recommend appropriate mitigation measures for potentially significant environmental impacts.
- Undertake a fully inclusive public participation process to ensure that I&APs are afforded the opportunity to participate, and that their issues and concerns are recorded.

The EIA Report addresses potential direct, indirect, and cumulative impacts (both positive and negative) associated with all phases of the project including design, construction, operation and decommissioning. In this regard the EIA Report aims to provide the relevant authorities with sufficient information to make an informed decision regarding the proposed project.

4.2.1 Tasks completed during the EIA Phase

The EIA Phase for the proposed Solar Facility has been undertaken in accordance with the EIA Regulations published in GN 38282 in December 2014, in terms of NEMA. Key tasks undertaken within the EIA phase included:

- Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
- Undertaking a public participation process throughout the EIA process in accordance with Chapter 6 of Government Notice R982 of 2014 in order to identify any additional issues and concerns associated with the proposed project. Preparation of a Comments and Response Report detailing key issues raised by I&APs as part of the EIA Process



- Undertaking of independent specialist studies in accordance with Appendix 6 of Government Notice R982 of 2014
- Preparation of a Draft EIA Report in accordance with Appendix 3 of Government Notice R982 of 2014.

These tasks are discussed in detail below.

4.2.2 Authority Consultation

The National DEA is the competent authority for this application. A record of all authority consultation undertaken is included within this EIA report. Consultation with the regulating authorities (i.e. DEA and North West (READ)) has continued throughout the EIA process. On-going consultation included the following:

- The Final Scoping Report for the proposed project was submitted in Jan 2016. The Scoping Report was accepted by DEA in March 2016.
- During the scoping phase, a site visit was undertaken with DWS for the proposed project.

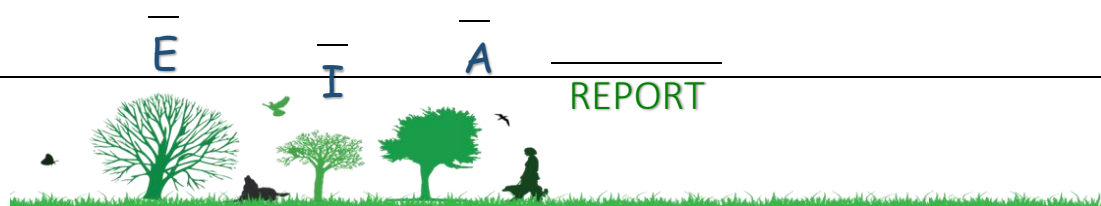
The following will also be undertaken as part of this EIA process:

- Submission of a final EIA Report to DEA following the 30-day public review period for the draft EIA.
- If required, an opportunity for DEA and READ representatives to visit and inspect the proposed project site.
- Notification and Consultation with Organs of State (refer to Table 4-1) that may have jurisdiction over the project, including:
 - i. Provincial departments
 - ii. Parastatals and Non-Governmental Organisations
 - iii. Local Municipality and District Municipality

A record of the authority consultation in the EIA process is included within Appendix 4

4.2.3 Public Involvement and Consultation

The aim of the public participation process is primarily to ensure that:



- Information containing all relevant facts in respect of the proposed project was made available to potential stakeholders and I&APs.
- Participation by potential I&APs was facilitated in such a manner that all potential stakeholders and I&APs were provided with a reasonable opportunity to comment on the proposed project.
- Comments received from stakeholders and I&APs were recorded and incorporated into the EIA process.

In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their inputs regarding the project, various opportunities for stakeholders and I&APs to be involved in the EIA Phase of the process have been provided, as follows:

- Focus group meetings and a public meeting (pre-arranged and stakeholders invited to attend - for example with directly affected and surrounding landowners).
- Telephonic consultation sessions (consultation with various parties from the EIA project team, including the project participation consultant, lead EIA consultant as well as specialist consultants).
- Written, faxed or e-mail correspondence.
- The Draft EIA Report has been released for a 30-day public review period from 19 May 2016 – 20 June 2016: The comments received from I&APs will be captured within a Comments and Response Report, and will be included within the EIA Report, for submission to the authorities for decision-making.

In terms of the requirement of Chapter 6 of the EIA Regulations of December 2014, the following key public participation tasks are required to be undertaken:

- Fixing a notice board at a place conspicuous to the public at the boundary or on the fence of—
 - i. the site where the activity to which the application relates is or is to be undertaken; and
 - ii. any alternative site mentioned in the application;
- Giving written notice to:
 - i. the owner or person in control of that land if the applicant is not the owner or person in control of the land;

- ii. the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - iii. owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - iv. the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
 - v. the municipality which has jurisdiction in the area;
 - vi. any organ of state having jurisdiction in respect of any aspect of the activity; and
 - vii. any other party as required by the competent authority.
- Placing an advertisement in:
 - i. one local newspaper; and
 - ii. in at least one provincial newspaper
 - Open and maintain a register/ database of interested and affected parties and organs of state.
 - Release of a Draft EIA Report for Public Review
 - Preparation of a Comments and Responses Report which documents all of the comments received and responses from the project team.

In compliance with the requirements of Chapter 6 of the EIA Regulations, 2014, the following summarises the key public participation activities conducted to date.

Placement of Site Notices

Site notices have been placed on-site and at relevant public places and proof of this is included in Appendix 4c

Identification of I&APs and establishment of a database



Identification of I&APs was undertaken by Phakanani Environmental through existing contacts and databases, recording responses to site notices and the newspaper advertisement, as well as through the process of networking. The key stakeholder groups identified include authorities, local and district municipalities, public stakeholders, Parastatals and Non-Governmental Organisations (refer to Table 4-1 below).

Table 4-1: Key stakeholder groups identified during the EIA Process

Organs of State
National Government Departments
Department of Agriculture, Forestry and Fisheries (DAFF)
Department of Communications
Department of Energy (DoE)
Department of Mineral Resources (DMR)
Department of Public Works (DPW)
Department of Rural Development and Land Reform (DRDLR)
Department of Water and Sanitation (DWS)
Department of Science and Technology (DST)
Eskom SOC Limited
National Energy Regulator of South Africa (NERSA)
South African Civil Aviation Authority (CAA)
Square Kilometre Array: Southern Africa
South African Heritage Resources Agency (SAHRA)
South African National Roads Agency Limited (SANRAL)
Provincial Government Departments
Rural Environment and Agricultural Development (READ)
Local Government Departments
Madibeng Local Municipality
Bojanala District Municipality

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Conservation Authorities
BirdLife South Africa
Wildlife and Environment Society of South Africa (WESSA)
Endangered Wildlife Trust (EWT)
Landowners
Affected landowners and tenants
Neighbouring landowners and tenants

All relevant stakeholder and I&AP information has been recorded within a database of affected parties (refer to Appendix 4). While I&APs were encouraged to register their interest in the project from the onset of the process undertaken by Phakanani Environmental, the identification and registration of I&APs has been on-going for the duration of the EIA phase of the process.

- Newspaper Advertisements During the scoping phase, newspaper adverts was placed to notify and inform the public of the propose project, the availability of the Draft Scoping report for public review and of the public meeting. These adverts were placed in the following newspapers:

- The Brits Pos (December 2015)

During the EIA phase, a second round of newspaper adverts has been placed to inform the public of the availability of the Draft EIA report in the following newspapers:

- The Brits Pos (May 2015)

- Consultation In order to accommodate the varying needs of stakeholders and I&APs, the following opportunities have been provided for I&AP issues to be recorded and verified through the EIA process.

4.2.4 Identification and Recording of Issues and Concerns

Issues and comments raised by I&APs over the duration of the EIA process have been synthesised into a Comments and Response Reports. The Comments and Response Report includes responses from members of the EIA project team and/or the project proponent. This is included in Appendix 4



4.2.5 Assessment of Issues Identified through the Scoping Process

Issues which require investigation within the EIA Phase, as well as the specialists involved in the assessment of these impacts are indicated in (Table 4-2) below.

Table 4-2: Specialist consultants appointed to evaluate the potential impacts associated with the Solar Facility

Contact Person	Company	Study
Mr. Carl Schoeman	ENVASS (Environmental Assurance)	Noise impact study
Vincent van Der Merwe	Specialist Ecological Consultant	Ecological Impact study
Vanessa Marais	Galago Environmental	Avifauna Study
Munyadziwa Magoma	Vhubvo Archaeo-Heritage Consultants Cc	Heritage impact assessment
Mr. Petrus Stephanus Rossouw,	Terra Soil Science cc	soil, agricultural potential, land type and land use study
Mr. Mfanelo Khosa	Manna Group Architects	Visual Impact study
Shannon McKay	Animal Behaviour Consulting	Wild animal behavior (In progress)
Dr. JF Durand (Sci.Nat.)	Private	Paleontology
Dr. Herman Joubert	Tech IQ Consulting Engineers	Traffic Impact Study
C J Coetzer (Pr. Eng)	Water Tech: CWT Consulting	Storm Water and floodline

Specialist studies considered direct, indirect, cumulative, and residual environmental impacts associated with the development of the proposed Solar Facility and issues were assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected, and how it will be affected
- The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high)
- The **duration**, wherein it is indicated whether:
 - i. The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1

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- ii. The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2
 - iii. Medium-term (5–15 years) – assigned a score of 3
 - iv. Long term (> 15 years) - assigned a score of 4
 - v. Permanent - assigned a score of 5
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
 - i. 0 is small and will have no effect on the environment
 - ii. 2 is minor and will not result in an impact on processes
 - iii. 4 is low and will cause a slight impact on processes
 - iv. 6 is moderate and will result in processes continuing but in a modified way 8 is high (processes are altered to the extent that they temporarily cease)
 - v. 10 is very high and results in complete destruction of patterns and permanent cessation of processes
- The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
 - i. Assigned a score of 1–5, where 1 is very improbable (probably will not happen)
 - ii. Assigned a score of 2 is improbable (some possibility, but low likelihood)
 - iii. Assigned a score of 3 is probable (distinct possibility)
 - iv. Assigned a score of 4 is highly probable (most likely)
 - v. Assigned a score of 5 is definite (impact will occur regardless of any prevention measures)
- The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high
- The **status**, which is described as either positive, negative or neutral
- The degree to which the impact can be reversed
- The degree to which the impact may cause irreplaceable loss of resources
- The degree to which the impact can be mitigated

The **significance** is determined by combining the criteria in the following formula:

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$S = (E+D+M) P$; where

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area)
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated)
- 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area)

As the developer has the responsibility to avoid or minimise impacts and plan for their management (in terms of the EIA Regulations), the mitigation of significant impacts is discussed. Assessment of impacts with mitigation is made in order to demonstrate the effectiveness of the proposed mitigation measures. A draft EMP is included as Appendix 5

4.2.6 Assumptions and Limitations

The following assumptions and limitations are applicable to the studies undertaken within this EIA Phase:

- All information provided by the developer and I&APs to the environmental team was correct and valid at the time it was provided.
- It is assumed that the development site identified by the developer represents a technically suitable site for the establishment of the proposed Solar Facility.
- It is assumed correct that the proposed connection to the National Grid is correct in terms of viability and need.
- Studies assume that any potential impacts on the environment associated with the proposed development will be avoided, mitigated, or offset.

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- This report and its investigations are project-specific, and consequently the environmental team did not evaluate any other power generation alternatives.

Refer to the specialist studies in Appendices 6 for specialist study specific limitations.



5 DESCRIPTION OF THE RECEIVING ENVIRONMENT

This section of the Draft EIA Report provides a description of the environment that may be affected by the Solar Facility. This information is provided in order to assist the reader in understanding the receiving environment within which the proposed Solar Facility is situated. Features of the biophysical, social and economic environment that could directly or indirectly be affected by, or could affect, the proposed development have been described. This information has been sourced from existing information available for the area, and aims to provide the context within which this EIA is being conducted. As the layout and/or ancillary infrastructure associated with the construction of the Solar Facility could be located on portions 15, 27 and 28 of the farm Schietfontein 437 JQ, the full extent of the area is described below. A comprehensive description of each aspect of the affected environment is included within the specialist reports contained within the Appendices 6.

5.1 Regional Setting: Location of the Study Area

The site is located in the Madibeng Local Municipality which is within the Bojanala Platinum District Municipality in the North West Province. The proposed development site lies approximately 20 km west Brits and 50km east of Pretoria. The project is proposed to be developed on Portions 15, 27 and 28 on the Farm Schietfontein 437 JQ (Figure 5-1).

The site can be accessed via the R566 road. The current land-use in this area consists primarily of farms used for commercial livestock production. Degradation of vegetation has been attributed to high stocking rates of domestic livestock in the farm area.

Farm Portions Map

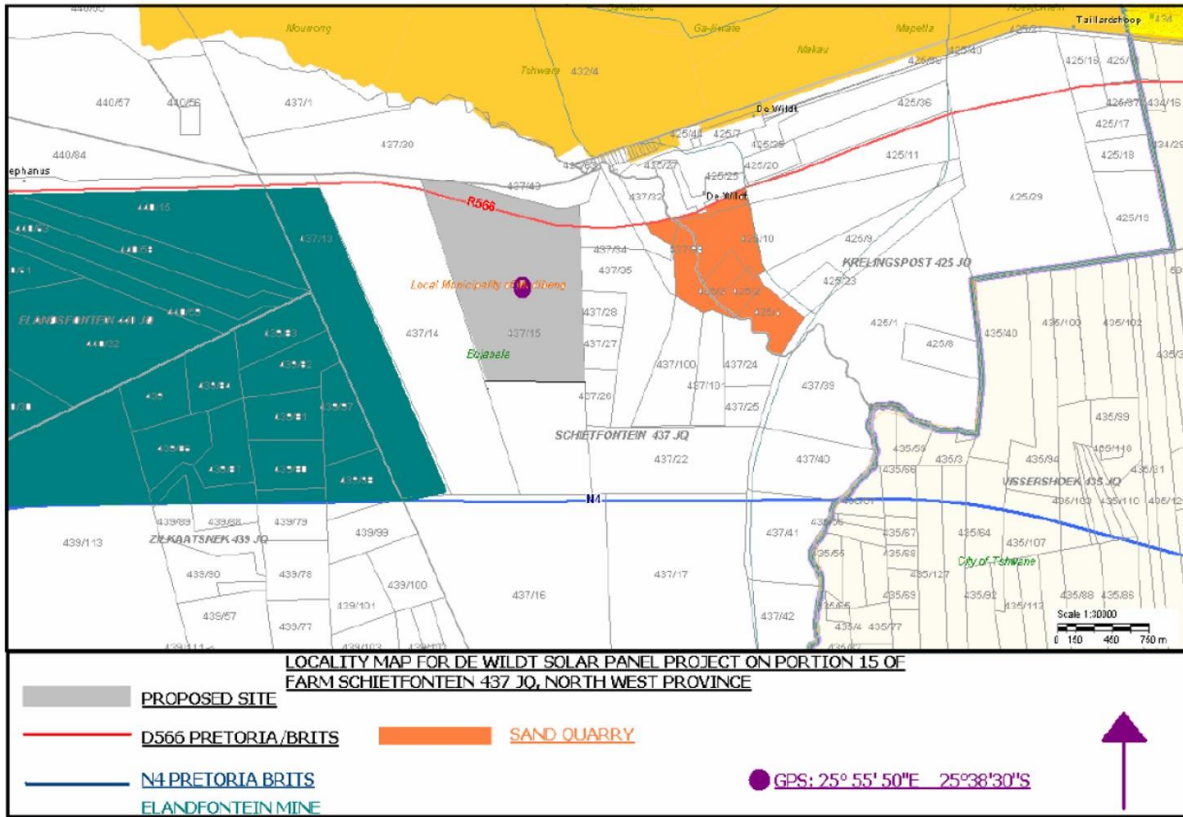


Figure 5-1: Farm portions (15, 27 and 28)

5.2 Biophysical Characteristics of the Study Area

5.2.1 Climatic conditions

The mean annual rainfall of South Africa is shown in (Figure 5-2) below. The climate of the North West Province is warm-temperate with a summer rainfall regime. Severe frost may occur in winter. Average rainfall of the area varies from 500 - 600 millimeters (mm) per year. Climate conditions are extreme; very cold in winter and very hot in summer.

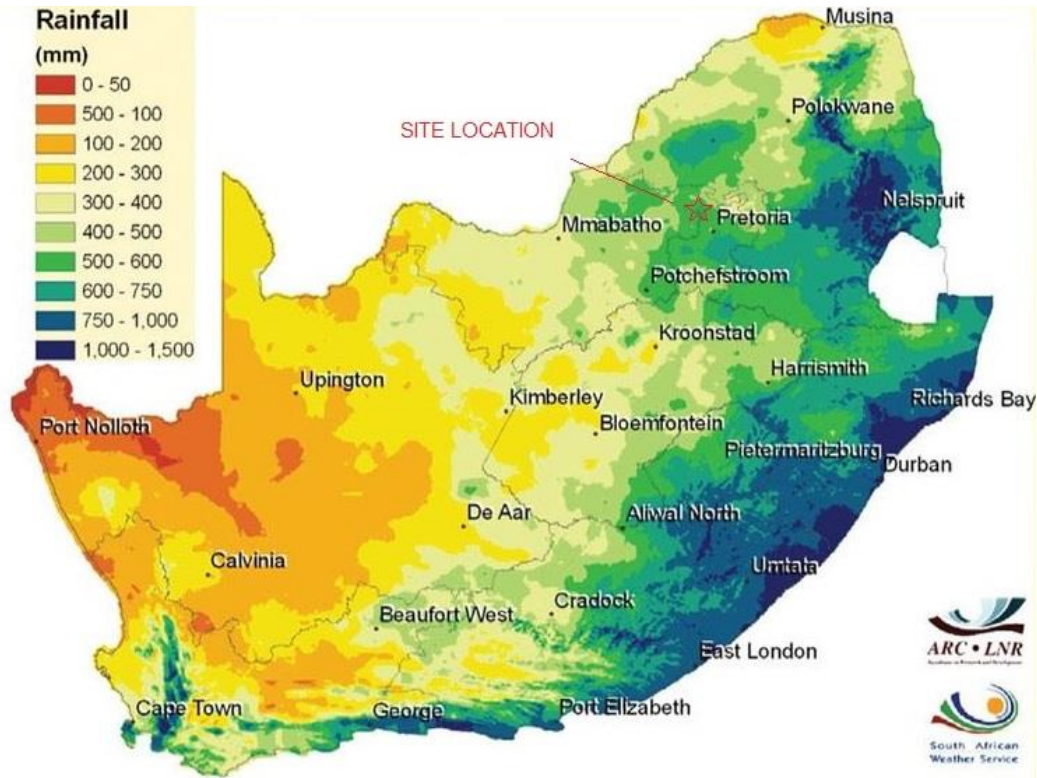


Figure 5-2: Mean annual rainfall (mm)

The DeWildt area (in which the proposed project fall) has rainfall levels of 438 mm per annum, with a standard deviation of 112 mm, according to the South African Rain Atlas (Water Research Commission, undated).

5.2.2 Topography

The proposed development is located on a terrain unit of level plains. Slopes across the area are less than 1%. The topography of the study area is flat to gently undulating.

5.2.3 Current land use and development at the site

The farm is located within an agricultural region, but most of the development site hasn't been optimally utilized of late, probably due to soil limitations.

5.2.4 Agricultural sensitivity

The study area mainly comprises soils of the Shortland soil form and the Rensburg soil form.

Deeper soils (60 cm to deeper than 1.2 m) are interspaced by shallow soils and rocky outcrops. For this reason the area is deemed to be of low agricultural potential. The impact on soils (agricultural potential and land capability) will be limited to the immediate area or site of development (local) but soil erosion, owing to increased surface water runoff construction related impacts, can have an impact on the surrounding area.

5.2.5 Wetland classification methods and preliminary results

There are areas on the property that appear to be wetlands, such area aren't natural wetlands but a result of the existing borrow pit.

5.2.6 Geology and soils

The area is underlain by mafic intrusive rocks of the Rustenburg Layered Suite of the Bushveld Igneous Complex. Rocks include gabbro, norite, pyroxenite and anorthosite. The shales and quartzite's of the Pretoria Group (Transvaal Supergroup) also contribute. Soils are mainly vertic melanic clays with some dystrophic or mesotrophic plinthic catenas (Mucina & Rutherford 2006).

5.3 Ecology and Biodiversity

The entire survey area is comprised of relatively natural Marikana Thornveld that has been slightly degraded by livestock farming, irregular fire regimes and the excavation of a large gravel pit.

Marikana Thornveld is classified as endangered and the entire survey area is located within a Critical Biodiversity Area 1 (CBA 1). The NWPG considers CBA 1's to be irreplaceable and necessary to meet conservation targets. The survey area is completely surrounded by two large public roads (N4 & R566) however there is limited connectivity with more Marikana Thornveld to the west of the survey area. A decision on whether the proposed development should be approved will depend on NWPG priorities. The question at hand will be whether the demand for clean energy should be prioritised over the necessity to protect endangered habitat types that are known to harbour species of conservation concern.

5.3.1 Flora and Fauna

5.3.1.1 Flora

Vegetation is the most physical representation of the environment. Each plant community possesses its own specific plant species composition and structure, which is the result of the environmental conditions of its habitat (climate, geology, topography, soil, drainage, water regime, etc.). This total physical environment of an area is therefore manifested in the plant species composition, named the vegetation or plant community of the area. These plant communities may, however, also be influenced by the utilisation history and management of the area. The specific potential of each plant community, with regards to habitat type for animals, carrying capacity, resilience to utilisation and drought is a direct result of the combined influence of environmental factors and past management practices. The habitat and environmental conditions control the successional development, species composition, distribution and potential of the plant communities. Each plant community (ecosystem) also has its own specific conservation potential, need and status. A thorough inventory of the plant communities and their associated habitats will therefore provide information on the conservation status of an area.

The survey area is located within the Savanna Biome of southern Africa and specifically within the Central Bushveld bioregion (SVI) (Mucina & Rutherford 2006). A bioregion is a composite terrestrial unit that is defined on the basis of broadly similar biotic and physical features. The vegetation of the proposed development area was most recently classified as belonging to a single vegetation type namely Marikana Thornveld (SVcb 6). The unit was previously classified as Sourish Mixed Bushveld VT 19 by Acocks (1953) and Clay Thorn Bushveld LR 14 by Low & Rebelo (1996).

Marikana Thornveld is currently listed as Endangered with less than 1% statutorily conserved in the Magaliesberg Nature Area and Onderstepoort Nature Reserves. More than 48% of this unit has been transformed by cultivation and built-up areas. Erosion is often low to moderate. Alien plants tend to be localised in high densities, especially along drainage lines and areas that has been subject to anthropogenic disturbance. The entire 183ha area identified for the proposed development is comprised of three vegetation units, namely:

1. Marikana Thornveld
2. Drainage line
3. Transformed area - Gravel pit



5.3.1.2 Fauna

Mammals

Most small mammals are primary consumers and represent the primary prey items of many carnivores, including raptors and medium-sized mammals. They are abundant in many ecosystems and serve many important ecological roles in terms of influencing their prey and their predators.

Reptiles

Reptiles are extremely secretive and difficult to observe even during intensive field surveys conducted over several seasons. The majority reptile species are sensitive to severe habitat alteration and fragmentation.

Amphibians

Global amphibian diversity has declined dramatically in recent decades. Amphibians are considerably more threatened than both mammals and birds, although comparisons with other taxa are confounded by a shortage of reliable data. Although habitat loss has played a significant role in this decline, recent research has focused on the effects of environmental contaminants, UV-B irradiation, emerging diseases, introduction of alien species, direct exploitation and climate change.

Avifauna

It is widely accepted that vegetation structure, rather than actual plant species, influences bird species distribution and abundance. The survey area is located within the Magaliesberg Important Birding area (IBA) which contains the Magaliesberg and Witwatersberg Mountain Ranges and the several large rivers that have their headwaters in these mountains. No major riverine or mountainous features are present on the site however several birds species that reside in these features will utilise the site for occasional foraging.

5.4 Socio-economic growth and development priorities

In terms of future National economic development goals the need to accelerate growth and service delivery is high. The State strives to provide a better life for all residents through:

- ☀ “Creating conditions for economic growth and sustainability
- ☀ Improving access to basic services



- ☀ Promoting social upliftment through improved education, skills development and job opportunities
- ☀ Ensuring cooperative, transparent and democratic governance through community participation and involvement
- ☀ Create a healthy and safe environment and
- ☀ Improving sport and recreation facilities”

The development perspective section of the IDP focused on economic development and job creation provide a further set of aims as follows:

- ☀ “To develop and diversify the local economy on a sustainable manner to increase the overall competitive advantage thereof.
- ☀ The focus is on the development and diversification of the following three sectors – agriculture, manufacturing and tourism
- ☀ To stimulate local economic development to reverse the current trends of decline and lack in diversity of the economy “the growth economic pie”
- ☀ To providing assistance, training and information to entrepreneurs in the area to enable them to develop and manage their businesses in an economically viable manner
- ☀ To address local factors that affect economic growth – factors that make conducting business in the area attractive and effortless as possible. This includes an attractive physical and commercial environment
- ☀ To act on the development opportunities originating from the various corridors running through the area, as well as other business zones and development zones.”

5.5 Heritage and Historical Background

No archaeological objects were observed on site, should any archaeological material be unearthed accidentally during the course of construction, SAHRA should be alerted immediately and construction activities be stopped within a radius of at least 10m of such indicator. The area should then be demarcated by a danger tape. Accordingly, a professional archaeologist or SAHRA officer should be contacted immediately. It is the responsibility of the Environmental officer and the contractor to protect the site from publicity (i.e., media) until a mutual agreement is reached. It is mandatory to report any incident of human remains encountered to the South African Police Services, SAHRA staff member and professional archaeologist.



5.5.1 Paleontology (Fossils)

'Paleontological' means any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

The igneous basement rocks underlying the Dewildt site are entirely unfossiliferous.



6 ASSESSMENT OF POTENTIAL IMPACTS

The purpose of this Section is to present a synthesis of the key issues and potential impacts that have been identified thus far in the EIA process. These issues and impacts have been identified via the environmental status quo of the receiving environment (environmental, social-economic and heritage features present on the project sites), a review of environmental impacts from other similar solar projects and input from specialists that form part of the EIA team. The Terms of References (ToR) for the specialist studies have been developed (based on the relevant issues and impacts discussed within this section) are incorporated into the Plan of Study for the EIA. They are inherently temporary in duration, but may have longer lasting effects e.g. pollution of a sensitive area during construction, could have effects that may last long after construction is over. Construction phase impacts could potentially include:

- Impacts on water resources;
- Impacts on agricultural potential and soils;
- Disturbance of flora and fauna;
- Impacts on avifauna;
- Increase in traffic volumes in the vicinity of the construction site;
- Windblown dust;
- Impact on heritage resources;
- Noise pollution;
- Litter/waste pollution; and
- Impact on tourism activities.

Based on the temporary duration of the construction phase, negative impacts of construction can be readily predicted and mitigated. However, wherever relevant, specialist studies would consider construction phase impacts, and in certain cases, would be focused on construction phase impacts e.g. impacts on flora and fauna are mainly construction phase impacts.

It should be noted that a comprehensive Environmental Management Programme (EMPr) would be developed and implemented to regulate and minimise the impacts during the construction and operational phase.

6.1 Operational Phase Impacts

Given their long term nature, operational phase impacts will come under close scrutiny in the EIA phase. The specialist studies will identify and assess the implications of these impacts and include



measures to minimise predicted impacts. The assessment of potential impacts will help to inform Phakanani in selection of preferred alternatives to be submitted to the Department of Environmental Affairs (DEA) for consideration and approval. In turn, DEA's decision on the environmental acceptability of the proposed project and the setting of any conditions will be informed by the specialist studies, amongst other information to be contained in this Environmental Impact Report.

It is normal practice that, should the proposed PV solar park and associated infrastructure be authorised, the development and implementation of an operational EMP is required. The operational EMP is designed to mitigate negative impacts associated with the operational phase of the project and will be informed by the mitigation measures proposed by the specialists and their recommendations.

6.2 Biodiversity (Flora and Fauna)

The following impacts on biodiversity could potentially occur:

- Direct impacts:
 - Destruction of threatened flora species;
 - Destruction of protected tree species;
 - Direct impacts on threatened fauna species;
 - Direct impacts on common fauna species; and
 - Destruction of sensitive/ pristine regional habitat types.

- Indirect Impacts:
 - Floristic species changes within the development area;
 - Faunal interactions with structures, servitudes and personnel; and
 - Impacts on surrounding habitat/ species.

Classification of Impacts		Potential Impacts
Direct	Destruction of threatened flora species	This impact is regarded a direct impact as it results in the physical damage or destruction of Red Data or Threatened species or areas that are suitable for these species, representing a significant impact on the biodiversity of a region. Threatened species, in most cases, do not contribute significantly to the biodiversity of an area in terms of sheer numbers as there are generally few of them, but a high ecological value is placed on the presence of such species in an area as they are frequently an indication of pristine habitat conditions. Conversely, the presence of pristine habitat conditions can frequently be accepted as an indication of the potential presence of species of conservation importance. Red Data species are particularly sensitive to changes in their environment, having adapted to a narrow range of specific habitat requirements. Habitat changes, mostly a result of human interferences and activities, are one of the greatest reasons for these species having a threatened status. Surface transformation activities within habitat types that are occupied by flora species of conservation importance will definitely result in significant and permanent impacts on these species and their population dynamics. Effects of this impact are usually permanent and recovery or mitigation is generally not perceived as possible
	Destruction of protected tree species	Tree species included in the National List of Declared Protected trees (as promulgated by the National Forests Act, 1998 (No 84 of 1998)) are known to occur in the general region and impacts will be unavoidable, stemming from physical habitat disturbance. As a result of the distribution patterns of these species the level of impact on these species (in terms of conservation status) is not as severe.
	Direct impacts on common fauna species	The likelihood of this impact occurring is relatively low as a result of the ability of animal species to migrate away from direct impacts. The tolerance levels of common animal species occurring in the study area is of such a nature that surrounding areas will suffice in habitat requirements of species forced to move from areas of impact. It is also unlikely that the conservation status of common animal species will be affected as a result of direct and indirect impacts of construction on these species and their habitat.
	Destruction of sensitive/pristine regional habitat types	The loss of pristine natural regional habitat (primary vegetation) represents loss of habitat and biodiversity on a regional scale. Sensitive habitat types include mountains, ridges, rivers, streams and localised habitat types of significant physiognomic variation and unique species composition. These areas represent centres of a typical habitat and contain biological attributes that are not frequently encountered in the greater surrounds. A high conservation value is attributed to the floristic communities and faunal assemblages of these areas as they contribute significantly to the biodiversity of a region. Furthermore, these habitat types are generally isolated and are frequently linear in nature, such as rivers and ridges. Any impact that disrupts this continuous linear



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		nature will risk fragmentation and isolation of existing ecological units, affecting the migration potential of some fauna species adversely, pollinator species in particular.
Indirect	Floristic species changes within the development area	The transformation of shrubland habitat during the construction process will inevitably result in the establishment of habitat types that are not considered representative of the region. As a result of the severity of habitat manipulation, development areas are frequently invaded by species that are not normally associated with the region (exotic and invasive species). In addition, many species that are not necessarily abundant in the region will increase in abundance as a result of more favourable habitat conditions being created as a result of habitat manipulation activities (encroacher species). This effect is more pronounced in the floristic component, but changed habitat conditions in the habitat will inevitably imply changes in the faunal component that occupies the habitat. If left unmitigated, this risk will result in decreased habitat, increased competition and lower numbers of endemic biota, the genetic pool of species might eventually be influenced by the introduction of non-endemic species. Different faunal assemblages and plant communities have developed separate gene structures as a result of habitat selection and geographical separation and the introduction of individuals of the same species that might be genetically dissimilar to the endemic species might lead to different genetic selection structures, eventually affecting the genetic structure of current populations and assemblages.
	Faunal interactions with structures, servitudes and personnel	Alteration of habitat conditions within the development area does not necessarily imply a decrease in faunal habitation. These areas are frequently preferred by certain fauna species. The establishment of a dominant grass layer generally results in increased presence of grazer species, which might lead to an unlikely, but similar increase in predation within these areas. The presence of personnel within the servitude during construction and maintenance periods will inevitably result in contact with animals. While most of the larger animal species are likely to move away from human contact, dangerous encounters with snakes, scorpions and possibly larger predators always remain likely. Similarly, the presence of humans within areas of natural habitat could potentially result in killing of animals by means of snaring, poaching, road kills, poisoning, trapping, etc.
	Impacts on surrounding habitat/species	Surrounding areas and species present in the direct vicinity of the study area could be affected by indirect impacts resulting from construction and operation activities. This indirect impact could potentially include all of the above impacts, depending on the sensitivity and status of surrounding habitat and species as well as the extent of impact activities.



6.3 Soils and Agricultural Potential

The following have been identified as potential impacts on agricultural resources and productivity. All the soil and agriculture impacts are local in extent i.e. they are confined to the site.

- ☀ Loss of agricultural land use due to direct occupation by the infrastructural footprint of the development for the duration of the project (all phases). This will take affected portions of land out of agricultural production;
- ☀ Soil erosion by wind or water due to alteration of the land surface characteristics. Alteration of surface characteristics may be caused by construction related land surface disturbance, vegetation removal, panel surfaces and the establishment of hard standing areas, surfaces and roads. Erosion will cause loss and deterioration of soil resources and may occur during all phases of the project;
- ☀ Loss of topsoil due to poor topsoil management (burial, erosion, etc.) during construction related soil profile disturbance (levelling, excavations, road surfacing etc.) and resultant decrease in that soil's capability for supporting vegetation;
- ☀ Generation of alternative land use income through rental for energy facility. This will provide farming enterprises with increased cash flow and rural livelihood, and thereby improve the financial sustainability of farming on site; and
- ☀ Cumulative impacts due to the regional loss of agricultural resources and production as a result of other developments on agricultural land in the region.

The significance of the soil and agricultural impacts may be reduced by the limited agricultural capability of the area, although loss of potentially arable land will have higher significance than land that is only suitable for grazing.

6.4 Visual Impacts

DeWildt is a service centre for the surrounding agricultural community and is located within 10 km of the proposed development sites. It is a small town on the provincial road west of Brits

6.4.1 Construction phase

There are various aspects of the construction phase that will contribute to the visual impact caused by the development:

- ☀ Areas will be cleared of vegetation for the solar field, equipment laydown areas and buildings, although regrow is encouraged following construction and only cut back to limit shading;



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- ☀ Construction activities and equipment associated with construction of the development, including access roads and buildings;
- ☀ An increase in traffic can be expected on rural roads, particularly large construction and freight vehicles (this will be temporary in nature and limited to the construction period.);
- ☀ The nightscape will potentially be affected by security and construction lighting at night;
- ☀ Dust generation during the construction phase will draw attention to the development over a wide area (i.e. increase the visibility of construction activities), however such dust generation will be mitigated; and

Key issues during the construction phase are:

- ☀ Potential visual intrusion of construction activities on the existing views of sensitive visual receptors in the rural landscape.
- ☀ Potential visual intrusion of a large area cleared of vegetation on the existing views of sensitive visual receptors.
- ☀ Potential visual impact of night lighting during the construction phase on the nightscape of the region.

6.4.2 Operational phase

A number of elements of the photovoltaic solar plants will potentially intrude on the existing views of visual receptors. In particular the very large solar fields (1.5- 3 m high solar panels potentially covering an area of up to 183 hectares), tall structures such as substations and overhead distribution lines connecting the plant with the national power grid at DeWildt substation.

Key issues related to the operational phase of the development are:

- ☀ Potential landscape impact of introducing a large solar plant into a rural agricultural landscape;
- ☀ Potential visual intrusion of a large solar field on the existing views of sensitive visual receptors in DeWildt
- ☀ Potential visual intrusion on views and viewpoints on game farms and private nature reserves in the region surrounding the proposed sites;
- ☀ Potential impact of night lighting of the development on the surrounding nightscape;

- ☀ Potential cumulative visual impact of photovoltaic solar plants and a large substations on the existing rural agricultural landscape; and
- ☀ Potential cumulative visual impact of the photovoltaic solar plant and a substations on the existing views and viewpoints of sensitive visual receptors in the region.
- ☀ The desktop study of potential visual impacts suggests that the main contributions to the significance of the visual impact for this project will centre on the solar field, on-site substation, collector substation and energy storage facility during the operational phase of each plant.

6.5 Terrestrial Ecology

Solar energy facilities require relatively large areas of land for the placement of PV panels and associated infrastructure. Issues relevant to the impacts on the ecology of the area include impacts on biodiversity, impacts on sensitive habitats, impacts on ecosystem functions, secondary and cumulative impacts on the ecology of the region and impacts on the economic use of the vegetation.

Activities associated with the proposed De Wildt PV Solar Park that could potentially have an impact on the terrestrial ecology (i.e. flora and fauna) of the area include:

- ☀ Clearing of threatened vegetation for construction for the solar facilities and associated infrastructure;
- ☀ Establishment and construction of an internal road access network;
- ☀ Construction of distribution and transmission lines;
- ☀ Storage of chemicals and materials required for construction and operation of machinery/vehicles;
- ☀ Operation of construction camps; and
- ☀ Cleaning PV panels and management of site.

The proposed facility layout will be assessed with regard to potential construction and operation impacts on the terrestrial environment, with the following key issues being assessed:

1. Loss of natural vegetation

Construction of infrastructure will lead to a direct loss of vegetation, which leads to a localized or more extensive reduction in overall vegetation. Should the vegetation already be transformed to some extent, the loss can lead to increased vulnerability of the vegetation and habitats and an

elevation in the conservation status (for example from least threatened to vulnerable). As a result of an area being cleared of vegetation, there may be an increase in surface water runoff and erosion into streams and rivers.

2. Habitat fragmentation – loss of biodiversity

Continuous development leads to greater habitat fragmentation, with progressively smaller patches of habitat created as a result. As the proportion of suitable habitats decreases, area and isolation effects start influencing the population size of resident species. Habitat fragmentation also has the potential to affect plant reproduction, for example, by affecting pollinators, the neighborhood of potential mates, the availability of resources, and microclimate. The fragmentation of sensitive habitats which contain threatened, protected and/or endemic species further reduces the area they are able to occupy as well as their population sizes. As a result fragmentation leads to a decline in the numbers of these species and an eventual loss of biodiversity.

3. Impacts on species of special concern

Plant species are affected through vegetation clearing as well as an overall loss of habitat. For species that are not threatened or classified as species of special concern, a loss of individuals or localized populations is not likely to alter the overall conservation status of the species. However, a loss of individuals or populations of threatened species (which is the case for a large portion of the site) could lead to a change in the conservation status of a species (reducing its chance of survival) and could even result in extinction.

4. Impacts on Wildlife

Impacts on wildlife due to construction activities is considered to be a matter of high concern due to the stress that the animals may experience. Other impacts relating to construction is related to direct mortality of animals by collision with vehicles, and the less-direct but equally important potential impact on seasonal or daily movements of animals.

5. Establishment of declared weeds and alien invader plants

Areas where the soil has been disturbed through construction activities will be prone to invasion by alien invasive plant species. There is the risk that alien species could possibly invade the proposed project sites, and if left uncontrolled, be allowed to spread onto surrounding farmland.

6.6 Heritage Resources

6.6.1 Archaeology

No archaeological objects were observed during the survey, it is however advice that these often happen underground, as such should any archaeological material be unearthed accidentally during the course of construction, SAHRA should be alerted immediately and construction activities be stopped within a radius of at least 10m of such indicator. The area should then be demarcated by a danger tape. Accordingly, a professional archaeologist or SAHRA officer should be contacted immediately.

It is the responsibility of the Environmental officer and the contractor to protect the site from publicity (i.e., media) until a mutual agreement is reached. It is mandatory to report any incident of human remains encountered to the South African Police Services, SAHRA staff member and professional archaeologist. Any measure to cover up the suspected archaeological material or to collect any resources is illegal and punishable by law under Section 35(4) and 36(3) of the National Heritage Resources Act, Act 25 of 1999. The proponent should induct field worker about archaeology, and steps that should be taken in the case of exposing archaeological materials.

6.6.2 Built environment and the cultural landscape

Historical resources are primarily associated with farmsteads, although most are likely to be fairly recent, perhaps dating to the late 19th or early 20th centuries. The cultural landscape and visual impacts are not likely to be of high significance.

6.7 Socio-economic

The key socio-economic issues include:

- ☀ Potential impacts on eco-tourism (e.g. due to visual impact on sense of place);

- ☀ Creation of temporary jobs during construction;
- ☀ Skills training for local workers during construction;
- ☀ Creation of long-term jobs during operations and skills training; and
- ☀ Potential for sourcing materials locally (during both construction and operations).

6.8 Fire, explosion, and release of toxic gas risks

Proper installation in accordance with the design specifications of the energy facility will ensure that these risks are negligible.

6.9 Air Quality and Dust

The air quality of the area is generally influenced by the mining operations in the area. During the construction phase some of the vegetation will be destroyed by machinery on site, although vegetation clearing of the whole site will not occur. As a result, certain areas of bare soil will be exposed to winds that will generate dust is likely to be generated (this will be enhanced by the movement of construction vehicles on site). The generation of dust is expected to be short term and restricted primarily to the construction phase of development. Standard dust control interventions used in civil construction projects must be applied in order to minimize the impact of dust on surrounding receptors. It must also be noted that the presence of dust reduces the effectiveness of the PV panels during operation and it is therefore in the operator's best interests to minimize dust emanating from the proposed project sites during the operational phase of the development.

6.10 Water usage

Water will be required during the construction phase of development predominantly for human consumption (i.e. workers on the site will need water for drinking and ablution facilities). In addition, the maintenance of solar panels will require water for the washing of panels during the operational phase of development. It is anticipated that cleaning will take place on a quarterly basis depending on annual rainfall, however, the cleaning regime may need to be revised should site conditions make the cleaning regime more onerous i.e. more frequent. The project applicant intends to source the required water from ground water abstraction.

Dry water courses and drainage lines occurring within the proposed project sites, run the risk of being impacted on by the proposed projects.

6.11 Waste generation

Solid waste will be generated during the construction phase of development and is likely to consist of biodegradable waste (i.e. cleared vegetation), general waste (paper, packaging, plastics, food waste) and construction related waste such as metal off cuts, etc. During the operational phase, general waste is expected to be generated from food wastes, packaging, paper, etc. Solid waste that might be produced during routine maintenance must be disposed of at the closest registered landfill. There is no known solid waste that could be classified as hazardous in terms of the National Environmental Management: Waste Act (Act No. 59 of 2008) (NEMWA). The associated impact is therefore considered negligible provided that an appropriate waste management plan is efficiently implemented.

The proposed project that form of the DeWildt PV Solar Park Project will need to undergo routine maintenance which will necessitate the use of gear oils, hydraulic oils, grease and other lubricants.

Accidental spillage of small amounts of oil for machinery maintenance or from vehicles may contaminate the soil. Management and mitigation measures to ensure optimal use and recycling of material and to minimize the possibility of soil pollution on site will be included in the EMP. Waste may also be generated by the energy storage facilities during maintenance or replacement of the batteries. This waste disposal requirements will depend on the technology being used and will be included within the projects' EMPs.

Waste water will also be generated from human activities (e.g. hand washing on the site), and water used for construction purposes (e.g. for washing tools). Sewage will also be generated on site (portable ablutions). The sewage will be collected from site by an authorised service provider. Refer to Appendix 5 – waste management plan in terms of Zolograph's standards.

6.12 Noise emissions

The operation of the proposed DeWildt PV Solar Park Project will not generate any significant sources of noise. In essence the operation will be silent. Noise will be generated mainly from temporary maintenance and non-routine operations. The potential impacts of these temporary activities on noise emission is not known at this stage, however it is most likely that the noise level will be under the threshold of acceptable emission targets.

A potential key issue is noise generated by the construction activities, workers and vehicles on the site. The town of DeWildt is the nearest large scale receptor(s). It is predicted that any level noise resulting from construction activities will be negligible. However care needs to be taken on the impact that the noise may have on wildlife.

6.13 Traffic generation

The main access road that will be used is the R566. A detailed traffic study has been commissioned, it is anticipated that the report will be complete by the 12th May 2016. Once available, the report will be submitted to DEA in support of the EIAR

6.14 Decommissioning Phase Potential Risks Associate

The key issues regarding decommissioning are:

- ☀ Generation of waste;
- ☀ Potential termination of the employment opportunities associated with the solar energy facility; and
- ☀ Necessity to rehabilitate or restore the solar energy facility development footprint.

6.14.1 Generation of waste

At this stage, it can be assumed that the generation of waste is a potential direct impact. The removal of the supporting infrastructure (e.g. the energy storage facility, cabling, fencing and control rooms, etc.) will generate waste. Recommendation regarding the management of decommissioning wastes will be included in the EMP, e.g. where feasible, waste must be re-used or recycled. For example, steel support structures may be suitable for re-use elsewhere or recycled to form new products. The amount of waste will be limited and is not expected to significantly reduce the capacity of the closest operational landfill.

Potential termination of the employment opportunities associated with the solar energy Facility

With respect to socio-economic aspects, the jobs that were offered within the solar energy facility will be terminated. At the approach of the decommissioning phase, staff employed at the facility and contracted service providers must be given adequate notice so that they may seek alternative employment.

Necessity to rehabilitate or restore the solar energy facility development footprint

With respect to ecology and vegetation issues, the development footprint must be returned to an ecological functional state. The strategy for rehabilitating or restoring the development footprint will be developed in the course of the EIA.

6.15 Cumulative impacts

The cumulative impacts will be assessed by considering impacts of the solar facilities (should the project be authorized) will have during construction, operational and decommissioning phases on the receiving environment consisting of the biophysical, heritage and socio-economic environment. Cumulative impacts associated with these types of projects may include inter alia:

- ☀ Temporary increase in traffic generation;
- ☀ Avifaunal collisions and mortalities;
- ☀ Habitat destruction and fragmentation;
- ☀ Loss of agricultural land;
- ☀ Removal of vegetation;
- ☀ Increase in stormwater run-off and erosion;
- ☀ Increase in water requirements;
- ☀ Job creation;
- ☀ Social upliftment; and

Contribution of renewable energy into the National Grid/benefit

- ☀ Solar offers businesses a way to cut their carbon emissions and do their bit for the environment
- ☀ Businesses will be less impacted by the continuous electricity price rises or the impending carbon tax
- ☀ Job creation across the construction and operations sectors

7 ASSESSMENT OF CUMULATIVE IMPACTS

Cumulative impacts in relation to an activity are defined in the Environmental Impact Assessment Regulations (GN R953) as meaning “the impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area”.

There has been a steady increase in renewable energy developments recently in South Africa as legislation is evolving to facilitate the introduction of Independent Power Producers (IPPs) and renewable energy into the electricity generation mix. The Department of Energy has, under the REIPPP Programme released requests for proposals to contribute towards Government’s renewable energy target of 3725 MW and to stimulate the industry in South Africa.

In a parallel process, a Strategic Environmental Assessment process is underway in order to identify geographical areas most suitable for the rollout of wind and solar photovoltaic energy projects and the supporting electricity grid network. The aim of the assessment is to designate REDZs within which such development will be incentivised and streamlined. The proposed Solar Facility is within one of the identified geographical areas / focus area most suitable for the rollout of the development of solar energy projects within the North West Province. Coupled to the Renewable Energy SEA, Eskom’s Electricity Grid Infrastructure SEA is also underway. The area where the Solar Facility is proposed is currently within the corridor planned to be strengthened by Eskom. It, therefore, follows that as the Solar Facility falls in an identified renewable energy node, and that projects of a similar nature are expected to be developed within the same node. The initiatives being put in place by Government to streamline the placement/location of energy projects will naturally attract projects to nodes or areas, and tolerance for cumulative impact within these nodes is required to take cognisance of these external driving factors.

Due to the growth in interest in renewable energy developments in South Africa, it is important to follow a precautionary approach in accordance with NEMA to ensure that the potential for cumulative impacts are considered and minimised where required and possible. This chapter considers whether the proposed PV project’s potential impacts become substantially more significant when considered in combination with the other known or proposed solar energy facility projects within the area.

7.1 Assessment of Potential Cumulative Impacts

A cumulative impact, in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

Significant cumulative impacts that could occur due to the development of solar energy facilities and associated infrastructure in proximity to each other include impacts such as:

- Visual impacts
- Socio-economic impacts
- Loss of vegetation and impacts on ecology, including fauna and avifauna
- Impacts to soil and agricultural potential
- Impacts on heritage resources
- Surface water resources

The cumulative effect or impacts are presented as follows:

- Cumulative impacts potentially occurring due to the cumulative effects of the Solar Facility added to all other industrial

7.2 Cumulative Impacts of Renewable Energy Facilities in the Region

The area surrounding Dewildt is associated with heavy mining activity. East of the property is a semi industrial area.

7.2.1 Visual impacts

The construction of a solar project together with the associated infrastructure will increase the cumulative visual impact of industrial type infrastructure within the region.

The proposed development falls within in the REDZs 7 area, and is located adjacent a chrome mine west of the property which might negate some impact, the cumulative impacts associated with PV facilities are largely linked to the visual impact on the areas sense of place and landscape character. The construction of the Solar Facility will increase the cumulative visual impact of industrial type infrastructure within the region.

Cumulative visual impacts as a result of the establishment of the solar facility will be to an acceptable level. Given the vastness of the area, the significance of the impact on the areas sense

place and character is likely to be moderate. The cumulative impact on the areas landscape character will also be reduced by the concentration of mining activity around the area. The cumulative visual impact could be reduced to low significance with the implementation of recommended mitigation measures.

7.2.2 Socio-economic impacts

The proposed Solar Facility and the establishment of other solar energy facilities has the potential to result in significant positive cumulative impacts for the local municipalities, specifically with the creation of a number of socio- economic opportunities for the province, which in turn, will result in a positive social benefit. Positive cumulative impacts include creation of employment, skills development and training opportunities (construction and operational phase), creation of downstream business opportunities and stimulation of the local property market. The significance of this impact is rated as a high positive with enhancement. Benefits to the local, regional and national economy through employment and procurement of services could be substantial should many renewable energy facilities proceed. This benefit will increase significantly should critical mass be reached that allows local companies to develop the necessary skills to support construction and maintenance activities and that allows for components of the renewable energy facilities to be manufactured in South Africa.

However, the establishment will also create a number of potential challenges for the local and district municipalities. These challenges are linked to provision of services and infrastructure. These challenges will need to be addressed by the municipalities to ensure that the benefits associated with the renewable energy sector are maximised for the benefit of the broader community.

7.2.3 Ecological Processes (flora and fauna)

The area is classified under CB-1, Marikana Thornveld and is considered sensitive. The solar energy. Cumulative ecological impacts include:

- Excessive clearing of slow growing trees, could significantly impact local and regional population dynamics, as well as microhabitats and resources associated with these species available to other fauna and flora species. Clearing of such trees, must be kept to the absolute minimum, and large vigorous specimens should be a priority for conservation and exclusion from development footprints.
- Excessive clearing of vegetation and landscaping will influence runoff and stormwater flow patterns and dynamics, which could cause excessive accelerated erosion of plains, small

ephemeral to larger intermittent drainage lines, rivers and this could also have detrimental effects on the Crocodile Catchment.

- Rehabilitation and re-vegetation of all surfaces disturbed or altered during construction is desirable. Runoff from sealed surfaces or surfaces that need to be kept clear of vegetation to facilitate operation of a development needs to be monitored regularly to ensure that erosion control and stormwater management measures are adequate to prevent the degradation of the surrounding environment.
- Large-scale disturbance of indigenous vegetation creates a major opportunity for the establishment of invasive species and the uncontrolled spread of alien invasives into adjacent rangelands.

Cumulative negative impacts on ecology related to transformation of land, disturbance and habitat loss may occur during construction as well as impacts on fauna and flora. The significance of this impact is expected to be of a medium significance with mitigation for each project, through sound environmental management during construction and operation and by formal conservation and active management of the natural areas on site. This will result in the negative impacts on ecosystems on each site being managed to acceptable levels, with acceptable loss, and therefore in keeping with the principles of sustainable development. With the implementation of good environmental management practice during the life cycle of each project, cumulative impacts on ecology as a result of the establishment of similar facilities will be to an acceptable level.

7.2.4 Avifauna

The proposed Solar Facility is located close to an operating chrome mine. The combined effect of the solar facility will have an effect on habitat loss and disturbance to bird species. These impacts are particularly important. The results from on-site surveys within this site and immediate area have shown low species diversity and abundance.

Therefore, it is important to view the proposed development in the broader context. The study site is not considered unique and is not considered critical for the conservation of Red Data species, and there are no known breeding sites in this area; therefore the cumulative impacts on avifauna as a result of the establishment of similar facilities will be to an acceptable level.

7.2.5 Soil and Agricultural Potential

The cumulative impact in terms of loss of agricultural land is unlikely to be significant due to the limited land take and in most cases agricultural activities would be allowed to continue following completion of construction activities. The cumulative impact is offset by major limitations to agriculture in the area due to the aridity and lack of access to water, as well as the shallow soils prevailing in the area. Generally, land is only suitable for low intensity small stock farming and the cumulative impact is therefore expected to be low.

Overall cumulative impacts on soils due to other proposed projects in the area are regarded as having low significance. This is because area region has soil of low agricultural potential.

7.2.6 Heritage Resources

On physical heritage alone, there is no justifiable reason for not supporting the proposal as archaeological items weren't found during the site investigation. Archaeological sites are non-renewable and impact on any archaeological context or material will be permanent and destructive. It still remains important for each facility to observe mitigation measures and to incorporate any sensitive heritage features into the layout plans where possible. Given the scarcity of significant fossil remains in the region, cumulative impacts are likely to be minor.

7.2.7 Cumulative impacts of portions 15, 27 and 28 of farm Schietfontein 437 JQ

The potential for cumulative impacts, should the development of the PV facility be realised, are likely to be largely contained to within the boundaries of Portions 15, 27 and 28 of the Farm Schietfontein 437 JQ, and with the application of the necessary mitigation measures. This is deduced based on the following:

- The development footprints of the two proposed 50 MW projects are aligned with areas of disturbed ecological sensitivity and largely outside of the identified high to very high sensitive areas (which are in limited extent on the site).
- Visual impacts of developing two new 50MW plants adjacent to one another will be of low-medium significance.
- Social – benefit to people in the area and increased opportunities for employment and spin-offs may occur. This is favourable.

Based on the above, the cumulative impacts associated with the construction and operation of the Solar Facility on Portions 15, 27 and 28 of the Farm Schietfontein 437 JQ are considered to be acceptable provided that environmental impacts are mitigated to suitable standards by strict control and implementation of EMPs for each project.

7.3 Conclusion regarding Cumulative Impacts

Cumulative impacts and benefits on various environmental and social receptors will occur to varying degrees with the development of the renewable energy facility. The degree of significance of these cumulative impacts is difficult to predict without detailed studies based on more comprehensive data/information on each of the receptors and the site specific developments. This however, is beyond the scope of this study.

The alignment of renewable energy developments with South Africa's National Energy Response Plan and the global drive to move away from the use of non-renewable energy resources and to reduce greenhouse gas emissions is undoubtedly positive. The economic benefits of renewable energy developments at a local, regional and national level have the potential to be significant.

Considering the findings of the specialist assessments undertaken for the project, the cumulative impacts for the proposed Solar Facility are considered minimal

8 CONCLUSIONS AND RECOMMENDATIONS

Zolograph is proposing the development of the Dewildt Solar Facility PV Facility as well as all associated infrastructure on a site to be located within Portions 15, 27 and 28 of the farm Schietfontein 437 JQ. The proposed project development site is located approximately 20 km west of Brits and 50 km east of Pretoria, in the Madibeng Local Municipality (Bojanala Platinum District Municipality) in the North West.

The Solar Facility PV Facility will have a contracted capacity of 50MW which will accommodate several arrays of photovoltaic (PV) panels and associated infrastructure. The project will comprise of the following typical infrastructure which is included in the scope of this EIA:

- » mounting structures to support the PV panels;
- » on-site inverters to step up the power and a substation to facilitate the connection between the Solar Facility and the Eskom electricity grid;
- » a new 88kV power line between the on-site substation
- » cabling between the project components, to be laid underground where practical;
- » offices and workshop areas for maintenance and storage;
- » temporary laydown areas; and
- » internal access roads and fencing around the development area.

The purpose of the proposed facility is to add new capacity for generation of power from renewable energy to the national electricity supply (which is short of generation capacity to meet current and expected demand), and to aid in achieving the goal of a 30% share of all new power generation being derived from independent power producers (IPPs), as targeted by the Department of Energy (DoE). In response to the need, AEP Solar Facility (Pty) Ltd, as an IPP, is proposing the construction and operation of this PV Solar facility.

Need and desirability: Solar PV is one of the most cost-effective, reliable and proven approaches for generating solar power. These systems have no moving parts, emit no emissions and create no waste. PV facilities are considered to be a sustainable power solution for both the short and long-term. Solar power has numerous advantages over fossil-fuelled power generation and other renewable technologies, including the fuel source, sunlight, is delivered to the site for free; there is no waste, and therefore there is no need to contain or store waste products; and solar PV has the benefit of not requiring large amount water during the power production cycle. In locations

such as Dewildt, there is a significant positive ecological and practical advantage to utilising a power generation technology that does not require large amount of water resources.

Project Site selection: The Project is proposed to be situated on Portions 15, 27 and 28 of the farm Schietfontein which was identified through the Scoping process as being suitable from an environmental perspective for a project of this nature. The larger project area was identified by the Developer as suited to the development of the project due to the availability of the solar resource, proximity to a viable grid connection, support from the local municipality and landowner. Based on the outcomes of the Scoping evaluation, some areas of the larger study area were excluded (as potential no-go areas) and potentially more suitable areas were selected for further investigation through the EIA.

For the Solar Facility, a focus areas of approximately 183ha was recommended for the development within the area of the farm Schietfontein 437 JQ. Although this focus area infringes on high sensitivity areas, loss would be considered acceptable and would contribute to allowing for a contiguous development area and lowering the overall development impact. This area excludes any areas of significant biodiversity and do not contain any areas considered to be no-go areas.

Therefore, a funnel-down approach to site identification was followed in order to allow environmental sensitivity to inform the siting and preliminary layout design of the proposed project. This was further informed during the EIA by way of the specialist field investigations. Therefore, the approach adopted during site selection allowed for the avoidance of site sensitivities (following the mitigation hierarchy) by the project development footprint. The project site falls within the identified geographical areas / focus area most suitable for the rollout of the development of solar energy projects.

Assessment Area: Through the Scoping process undertaken, an area of focus which is environmentally preferred for the development of a PV project. The area represents the portion of the farms with the greatest potential for development of a PV facility after taking into consideration the sensitivity identified on the farm portions making up the larger site.

A 'funnel-down approach' in the consideration of the larger site focuses the detailed specialist studies in the EIA Phase to the portion of the site with reduced environmental sensitivities. In order to reduce the potential for on-site environmental impacts associated with each facility, the identified sensitive areas have been avoided as far as reasonably possible. The extent of the demarcated area far exceeds the required development footprint for a PV facility (183ha required) and therefore it is possible to accommodate the PV development at the site with low impact on sensitive features. .

An EIA process, as defined in the NEMA EIA Regulations, is a systematic process of identifying, assessing, and reporting environmental impacts associated with an activity. The EIA process forms part of the planning of a project and informs the final design of a development. In terms of the EIA Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA, Act No. 107 of 1998), AEP Solar Facility (Pty) Ltd requires authorisation from the National Department of Environmental Affairs (DEA) for the construction of the Solar Facility. In terms of sections 24 and 24D of NEMA, as read with the EIA Regulations of R982, R983, R984 and R985, a Scoping and an EIA Phase have been undertaken for the proposed project. As part of this EIA process comprehensive, independent environmental studies have been undertaken in accordance with the EIA Regulations. The following key phases have been undertaken in the EIA Process.

- » Notification Phase - organs of state, stakeholders, and interested and affected parties (I&APs) were notified of the proposed project using adverts, site notices, and stakeholder letters. Details of registered parties have been included within the I&AP database for the project.
- » Scoping Phase – identification of potential issues associated with the proposed project and environmental sensitivities, as well as the extent of studies required within the EIA Phase were defined.
- » EIA Phase – potentially significant biophysical and social impacts and identified feasible alternatives have been comprehensively assessed through specialist investigations. Appropriate mitigation measures have been recommended as part of a draft Environmental Management Programme (EMPr) (refer to Appendix 5).

The Conclusions and Recommendations of this EIA for Solar Facility are the result of the assessment of identified impacts by specialists, and the parallel process of public participation. The public consultation process has been extensive and every effort has been made to include representatives of all stakeholders in the study area. A summary of the recommendations and conclusions for the proposed Solar Facility is provided in this Chapter.

8.1 Evaluation of the Proposed Project

The preceding chapters of this report together with the specialist studies contained within Appendices 6 provide a detailed assessment of the potential impacts that may result from the proposed project. This chapter concludes the EIA Report for Solar Facility by providing a summary of the conclusions of the assessment of the proposed site for the development of the PV solar energy facility. In so doing, it draws on the information gathered as part of the EIA process and

the knowledge gained by the environmental specialist consultants and presents an informed opinion of the environmental impacts associated with the proposed project.

From the conclusions of the detailed EIA studies undertaken, sensitive areas within the development footprint area were identified and flagged for consideration and avoidance by the facility layout. Alternative project development footprints, access roads and grid connection solutions have been considered in relation to the identified environmental sensitivities.

The most significant environmental impacts identified and assessed to be associated with the proposed Solar Facility include:

- » Impacts on ecology and habitats occurring on the site.
- » Impacts on heritage resources.
- » Impact on avifauna.
- » Impacts on the local soils, land capability and agricultural potential of the site.
- » Visual impacts mainly due to the solar panels and partly due to other associated infrastructure (power line, access road etc.).
- » Social and economic impacts.

In summary, the environmental impacts associated with the proposed project, as identified through the EIA, can be summarised as follows:

8.1.1 Impacts on Ecology

As the final layout of the facility avoids the major sensitive features of the site, such as the drainage line. The abundance of species of concern within the development area is also low.

Overall and with the suggested mitigation measures implemented, the ecological impacts of the development are likely to be of moderate to low significance and no impacts of high significance are likely. As a result, there are no ecological fatal flaws or impacts that cannot be mitigated that should prevent the development from being approved.

8.1.2 Impacts on Avifauna

The proposed solar photovoltaic facility will have an impact on avifauna due to the extensive spatial requirements of the development. The study site is not considered unique and is not considered critical for the conservation of Red Data species. The impacts of the development on

avifauna are likely to be of low significance and no impacts of high significance are likely, with the implementation of mitigation measures. The facility is unlikely to have any long-term significant impacts of avifaunal species within the study area. Collisions are the biggest single threat posed by transmission power lines to birds in Southern Africa. Potential collision impacts (risk) with the proposed power line by certain species is possible. Overall, the impact assessment found this risk impacts to be of moderate significance. However, this is directly related to the length of the power line. The impact assessment found the risk of collision with the power line from the preferred substation position to be of low significance after mitigation.

8.1.3 Impacts on Soils, Land Capability and Agricultural Potential

The overall impacts of the proposed facility on agriculture and soil conditions will be low, principally because of the climatic conditions and the low agricultural and grazing potential of the site. There are farming practices (agriculture and grazing) on the site properties. The dominant climatic and prevailing soil conditions, low annual rainfall, long periods of drought and other soil-related factors lead to low agricultural potential.

8.1.4 Impact on the water resources

The overall impact on the water resources is of a moderate significance. These impacts are reduced to low significance through mitigation (primarily avoidance). The development should have limited impact on the overall status of the riparian systems within the region. The relevant Water Use Licenses for water uses (abstraction and impacting of water courses) are required to be obtained from DWA.

8.1.5 Impacts on Heritage and Paleontological Resources

No heritage resources were found during the field survey undertaken for the site. The igneous basement rocks underlying the study area at depth are entirely unfossiliferous.

8.1.6 Impacts on Visual Quality of the area

Due to the flat landscape and the limited vegetation, the Visual Absorption Capacity of the landscape is low as the site landscape offers little topographic, vegetation or structural visual

screening. The visibility of the both the layout options is defined as low. This is due to the moderately undulating terrain surrounding the proposed site as well as the higher VAC levels

The Scenic Quality of the area is defined as medium. This is due to the predominantly flat landform that offers limited terrain variation, only one or two vegetation types and the limited presence of water.

8.1.7 Social and Economic Impacts

The overall social impact is likely to be of a medium significance in terms of positive impacts, and a low significance in terms of the negative impacts. From a social perspective it is concluded that the project is supported, but that mitigation measures should be implemented and adhered to. Positive and negative social impacts have been identified. The assessment of the key issues indicated that there are no negative impacts that can be classified as fatal flaws and which are of such significance that they cannot be successfully mitigated. Positive impacts could be enhanced by implementing appropriate enhancement measures and through careful planning.

8.1.8 Assessment of Potential Cumulative Impacts

Cumulative impacts and benefits on various environmental and social receptors will occur to varying degrees with the development of several renewable energy facilities in South Africa. The degree of significance of these cumulative impacts is difficult to predict without detailed studies based on more comprehensive data/information on each of the receptors and the site specific developments. The alignment of renewable energy developments with South Africa's National Energy Response Plan and the global drive to move away from the use of non-renewable energy resources and to reduce greenhouse gas emissions is undoubtedly positive. The economic benefits of renewable energy developments at a local, regional and national level have the potential to be significant.

The Solar facility falls within the identified geographical area most suitable for the rollout of the development of solar energy projects within the North West Province. This implies that projects of the same nature will be consolidated in one area creating a node, and ultimately aiming to reduce the potential for cumulative impacts associated with such developments when spatially fragmented. It is also important to note that it is unlikely that all proposed renewable energy facilities located in the region will be built due to capacity constraints on the Eskom grid and the limits placed on renewable energy targets

8.2 Overall Conclusion (Impact Statement)

The technical viability of establishing a solar energy facility with a net generating capacity of 50 MW on a site located on Portion 15, 27 and 28 of the farm Schietfontein 437 JQ has been established by Zolograph. The positive implications of establishing the Solar Facility on the identified site include the following:

- » The potential to harness and utilise solar energy resources within the North West Province
- » The project will assist the South African government in reaching their set targets for renewable energy.
- » The project will assist the South African government in the implementation of its green growth strategy and job creation targets.
- » The project will assist the district and local municipalities in reducing level of unemployment through the creation of jobs and supporting local business
- » The National electricity grid in the North West Province will benefit from the additional generated power.
- » Promotion of clean, renewable energy in South Africa
- » Creation of local employment, business opportunities and skills development for the area.

The findings of the specialist studies undertaken within this EIA to assess both the benefits and potential negative impacts anticipated as a result of the proposed project conclude that there are no environmental fatal flaws that should prevent the proposed project from proceeding, provided that the recommended mitigation and management measures are implemented. The significance levels of the majority of identified negative impacts have been reduced by implementing the mitigation measures recommended by the specialist team during the EIA process, and this specifically included the consideration of the facility layout in relation to sensitivities identified. The avoidance of areas of sensitivity is illustrated by the facility layout drawing included as (Figure 8-1). The project has considered constraints, and is considered to meet the requirements of sustainable development. Environmental specifications for the management of potential impacts are detailed within the draft Environmental Management Programme (EMPr) for the Solar Facility included within Appendix 5.

With reference to the information available at this planning approval stage in the project cycle, the confidence in the environmental assessment undertaken is regarded as acceptable provided all measures are taken to protect and preserve surrounding environment.

8.3 Overall Recommendation

Global climate change is widely recognised as being one of the greatest environmental challenges facing the world today. How a country sources its energy plays a big part in tackling climate change. As a net off-setter of carbon, renewable energy technologies can assist in reducing carbon emissions, and can play a big part in ensuring security of energy supply, as other sources of energy are depleted or become less accessible.

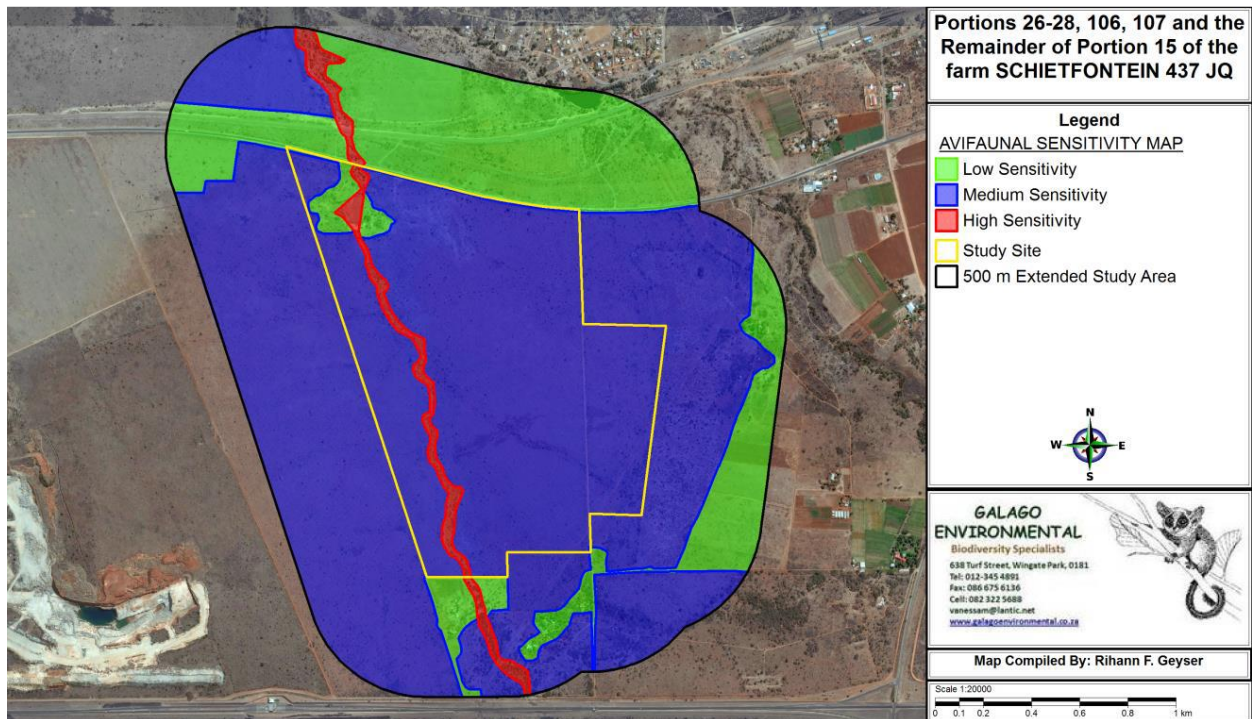


Figure 8-1: Sensitivity map

9 CONCLUSION

This report is aimed at addressing identified impacts that will result from the proposed development in respect of the activity for which authorisation is being applied for. It can be concluded that:

Based on this Report, no alternative site will be assessed. The chosen technology will render high quality products and is the most environmentally friendly methodology in comparison with other methods. The project applicant has consent from the land owner and no other site is available (which the project proponent has consent to develop on).

In terms of the Solar Energy Plant, no other technology will be used, given the fact that the project proponent will be manufacturing solar panels onsite, and will therefore use its own manufacturing products. The use of solar panels is the most sustainable option when viewed against potential environmental impacts associated with the alternatives listed below:

Possible alternative renewable energy sources include Biomass, Hydro Energy and Wind:

- a) **Biomass Energy:** Biomass energy will create additional air quality impacts in the Dewildt area and is therefore a less sustainable option.
- b) **Hydro Energy:** The proposed project site lacks any large inland water bodies which precludes the possibility of renewable energy from small/large scale hydro generation.
- c) **Wind Energy:** Wind energy requires consistent lateral air movement which North West area does not have across all seasons. Furthermore, wind energy has more noise impacts as well as impacts on bird life and greater visual impact due to the height of the wind turbines. As such, wind energy when compared to solar energy has more severe environmental impacts and is therefore a less sustainable option.
- d) **Concentrated Solar Panels (CPV):** Due to the larger volume of water required for Concentrated Solar Panels (CPV) compared to PV this technology is also a less sustainable option.

9.1 No-go alternative

South Africa currently relies almost completely on fossil fuels as a primary energy source (approximately 90%) with coal providing 75% of the fossil fuel based energy supply. Coal combustion in South Africa is the main contributor to carbon dioxide emissions, which is the main greenhouse gas that has been linked to climate change.

The Department of Energy has set a target of increasing the production of energy from renewable energy sources (mainly from biomass, wind, solar and small-scale hydro). Achieving the target will contribute to water savings and reduction the carbon foot print.

Solar energy, like all other renewable energies, is very safe and environmentally friendly. There are no emissions as the source of fuel is the sun, unlike coal-powered stations. Most areas in South Africa average more than 2 500 hours of sunshine per year, and average solar-radiation levels range between 4.5 and 6.5kWh/m² in one day.

The southern African region, and in fact the whole of Africa, has sunshine all year round. The annual 24- hour global solar radiation average is about 220 W/m² for South Africa, compared with about 150 W/m² for parts of the USA, and about 100 W/m² for Europe and the United Kingdom. This makes South Africa's local resource one of the highest in the world. The use of solar energy is the most readily accessible resource in South Africa.

The no-go option is therefore not in line with the target set out by the Department of Energy and will not contribute to the energy reserve in South Africa as well as water savings (when compared to coal fired energy generation)

9.2 Description of aspects to be assessed: Solar Panel Plant

The identification of potential impacts should include impacts that may occur during the construction, operational and decommissioning phases of the development. The assessment of impacts is to include direct, indirect as well as cumulative impacts. With respect to the Management Actions and Monitoring of the Impacts (to be included within the EMP) the following will be addressed in the impact assessment studies:

- i. If negative impacts are identified, mitigatory measures will be identified to avoid or reduce negative impacts. Where no mitigatory measures are possible this will be stated.
- ii. Quantifiable standards for measuring and monitoring mitigatory measures and enhancements will be set. This will include a programme for monitoring and reviewing the recommendations to ensure their ongoing effectiveness.

9.3 Solar Panel Environmental Impacts to be assessed by specialists

The following aspects will be assessed by specialists:

- a) Ecological impacts as a result of the clearing of vegetation: Vegetation on site to determine if detailed fauna studies are required based on the presence of natural vegetation of high conservation value
- b) Avifaunal assessment
- c) Heritage impact assessment
- d) Visual impact assessment
- e) Agricultural study
- f) Animal behaviour study
- g) Noise impact study
- h) Traffic impact study

9.3.1 Clearing of vegetation for construction: Ecological Impacts

The aim of the Assessment is to provide an overview of the Ecological Sensitivity on site. The study focuses on fieldwork and culminate in the generation of a Baseline Site Sensitivity Map, aimed at identifying potential environmentally sensitive areas / red flags, in particular, to be avoided during site development. Habitat fragmentation: Continuous development leads to greater habitat fragmentation, with progressively smaller patches of habitat created as a result. As the proportion of suitable habitats decreases, area and isolation effects start influencing the population size of resident species. Habitat fragmentation also has the potential to affect plant reproduction, for example, by affecting pollinators, the neighbourhood of potential mates, the availability of resources, and microclimate. The fragmentation of sensitive habitats which contain threatened, protected and/or endemic species further reduces the area they are able to occupy as well as their population sizes. As a result fragmentation leads to a decline in the numbers of these species and an eventual loss of biodiversity.

The ecology study provides recommendations in terms of site establishment and detailed impact identification and identification of mitigation measures are outlined.

9.3.2 Avifaunal impact assessment

In terms of Guidelines to minimise the impact on birds of Solar Facilities and Associated Infrastructure in South Africa. The displacement or the exclusion of species, particularly threatened, endemic and range-restricted species, are potentially the most significant impacts SEF facilities can have on birds. As the introduction of this technology could result in a rapid alteration of large areas of habitat, this represents a potentially new threat to species.

9.3.3 Visual impact assessment

Key issues during the construction phase are:

Potential visual intrusion of construction activities on the existing views of sensitive visual receptors in the rural landscape

Potential visual intrusion of a large area cleared of vegetation on the existing views of sensitive visual receptors.

Potential visual impact of night lighting during the construction phase on the nightscape of the region.

Key issues related to the operational phase of the development are:

Potential visual intrusion on the existing views of sensitive visual receptors Potential impact of night lighting of the development on the surrounding nightscape

9.3.4 Agriculture study

The proposed development site is considered to have a low agricultural soil potential (refer to soil study)

10 UNDERTAKING BY THE EAP

- (s) an undertaking under oath or affirmation by the EAP in relation to:
 - (i) the correctness of the information provided in the reports;
 - (ii) the inclusion of comments and inputs from stakeholders and I&APs;
 - (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and
 - (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;

I Tsunduka Hatlane, as the EAP, hereby confirms:

iv. The correctness of the information provided in this report

v. That all comments and inputs from stakeholders and I&AP's are included in this report

vi. That all information provided by the EAP to I&AP's and responses by the EAP to comments or inputs are included in this report

Signature.....

Date:..... 18 May 2016