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

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

REPORT 1 OF 2

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Phakanani ENVIRONMENTAL

ENVIRONMENTAL IMPACT ASSESSMENT

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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 within the Madibeng Local Municipality, North West Province.
Authors:	Phakanani Environmental Mr. Tsunduka Hatlane (MSc) Mr. Hluke Baloyi (Hons)
Sub-Consultants:	Specialist Ecological Consultant Manna Group Architects Terra Soil Science cc CWT Consulting (Water Technology) ENVASS (Environmental Assurance) Galago Environmental Tech IQ Consulting Engineers Palaeontology Dr. JF Durand (Private) Vhubvo Archaeo-Heritage Consultants (HIA) Urban Econ (Social) Animal Behaviour Consulting
Client:	Zolograph Investments (RF) Proprietary Limited
Report Status:	Final Environmental Impact Assessment Report
Submission Date:	August 2016

PURPOSE OF THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Zolograph Investments (RF) Proprietary Limited (Zolograph) 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 De Wildt 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 ˜4%) 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:** The site is located in close proximity to the Xstrata Eland Platinum Mine and the De Wildt substation. The proximity of the substation will minimise the need for a long power line connection. This is preferred from an environmental and technical perspective.

The nature and extent of the De Wildt 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 Environmental Impact Report. The Scoping phase of the EIA process as approved by the competent authority identified potential issues associated with the proposed project 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 Competent Authority and stakeholders with sufficient information to make an informed decision regarding the proposed project. Stakeholders and I&APs were given an opportunity to comment on the Draft EIAr that was circulated for 30days (commenting period). This Final EIA Report has incorporated all issues and responses prior to

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

DEA REQUIREMENTS FOR THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

COMMENTS BY DEA ON THE SCOPING REPORT

As part of facilitating the S&EIR process a Scoping report was submitted to the Department of Environmental Affairs, of which the Scoping report was accepted by DEA dated 04 March 2016.

Phakanani Environmental has compiled a table below which summarises the DEA requirements as outlined in the acceptance of the scoping Report.

Comments and requirements by DEA on Scoping Report

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).	i. All comments received from I&APs are included in Appendix 4f 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 form part of this Final EIAr. Please refer to chapter 4, section .4.2.3

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 state and I&APs prior to the submission of the EIAr to the Department.	Noted. Comment noted, issues raised by Organs of State and I&APs have been collated to form part of this Final EIAr
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
In addition, the following information is required for the EIAr:		Please refer to chapter 6 of the EIAr and section 3.1 of the EIAr
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.	Please refer to chapter 6 of the EIAr and section 3.1 of the EIAr
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 .	The amended form template on latest format have been downloaded, filled, signed and subjected to 30 days PPP with Draft EIAr.
iv.	The EIAr must provide an assessment of the impacts and mitigation measures for each of the listed activities applied for.	Please refer to chapter 6
v.	The listed activity/ies represented in the EIAr and the application form must be the same and correct.	The aspect addressed in the amended application form
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	Noted. Please refer to section 3.1 due to the CBA status of the site listing notice GN R985

	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.	listed activity have been included in the amended form.
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.	Please refer to chapter 6
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.	Please refer to chapter 6
ix.	This Department requires comments from the Department of Agriculture to be included in the EIAr	Please refer to appendix 4f
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.	Please refer to the traffic impact study report in appendix 6g
xi.	Should in-house specialist be used for any specialist study, then the specialist study must be peer reviewed by external specialists.	Noted
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.	Please refer to chapter 6
xiii.	An Avifaunal Assessment must be conducted as part of the EIAr. The terms of reference (ToR) for the study must include, *inter alia* the following: • Determine the impacts that the proposed activity (including the powerline) may have on avifauna; • Must cover at a minimum the summer and winter seasons;	Please refer to appendix 6f, avifauna report

	• 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.	
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.	Please refer to section 2.4
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.	Please refer to section 2.9
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.	Please refer to section 2.9
xvii.	The EIAr must provide the following: - 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: ➢ Power lines; ➢ Internal roads infrastructure; and; ➢ All supporting onsite infrastructure such as laydown area, guard house and control room etc	Please refer to chapter 1 and 2
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.	Please refer to chapter 1 and 2. (the project is 1st of it's kind within the Brits – De Wildt area)

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.	Please refer to section 2.1
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	Please refer to appendix 2 and 4
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.	
xxii.	The inclusion of all received comments and response thereto in the comments and response report	Please refer to appendix 4f
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.	
xxiv.	The EIAr must provide a layout which depicts the entire facility, i.e. the solar and grid connection infrastructure	Please refer to chapter 2 and appendix 3
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.	Please refer to chapter 4, section 4.2
xxvi.	A copy of the final site layout map. All available biodiversity information must be used in the 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: • 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;	Please refer to appendix 3(c & d)

• 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		
	xxvii. An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.	Please refer to chapter 8 (figure 8-1)
	xxviii. A map combining the final layout map superimposed (overlain) on the environmental sensitivity map.	Please refer to chapter 8, (figure 8-1)
	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. The shapefile must be submitted in a zip file using the EIA application reference number as the title. **Postal Address**: Department of Environmental Affairs Private Bag X447 Pretoria	Noted, this will be submitted in a zipped file on a CD

	0001 **Physical Address**: Department of Environmental affairs Environmental House 473 Steve Biko, Arcadia, Pretoria 0001 For Attention: Muhammad Essop Integrated Environmental Authorisations Strategic Infrastructure Developments Telephone Number (012) 399 9406 Email Address: MEssop@environment.gov.za	
	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.	Noted
	ii. The final layout map.	Please refer to appendix 3 of the EIAr and appendix 7 of the EMPr
	iii. Measures as dictated by the final site layout map and micro-sitting.	Please refer to EMPr

	iv.	An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.	Please refer to appendix 3 of the EIAr and appendix 7 of the EMPr
	v.	A map combining the final layout map superimposed (overlain) on the environmental sensitivity map.	Please refer to appendix 3 of the EIAr and appendix 7 of the EMPr
	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.	Please refer to appendix 2 of the EMPr
	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.	Please refer to appendix 2 and 4
	ix.	An open space management plan to be implemented during the construction operation of the facility.	Please refer to chapter 4 of the EMPr
	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 and late afternoon	Please refer to appendix 6g of the EIAr, traffic impact study

		commute time and avoid using roads through densely populated built-up areas so as not to disturb existing retail and commercial operations.	
	xi.	A transportation plan for the transport of components, main assembly cranes and other large pieces of equipment.	Please refer to the traffic impact study, appendix 6g
	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.	Please refer to appendix 5 of the EMPr
	xiii.	A fire management plan to be implemented during the construction and operation of the facility.	Please refer to appendix 1 of the EMPr
	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.	Please refer to appendix of the EMPr
	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.	Please refer to appendix 1 of the EMPr (emergency response plan)
	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.	Please refer to appendix 5 of the EMPr
	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.		Noted

	The EIAr must include a **cumulative impact assessment** of the facility if there are other similar facilities in the region. The specialist studies e.g. biodiversity, visual, noise etc. must also assess the facility in terms of potential cumulative impacts.	Please refer to chapter 7 of the EIAr
	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. 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. 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. In addition to the above, the Department may undertake a site inspection prior to or upon receipt of the final EIAr. 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 0f	Noted

	1999. Comments from SAHRA and /or the provincial department of heritage must be provided in the EIAr.	

Comments by DEA on the Draft EIA Report

As part of facilitating the S&EIR process a consultative EIA report was submitted to the Department of Environmental Affairs for comments as part of the public participation process for the S&EIR process. Comments received from DEA, dated 21 June 2016.

Phakanani Environmental has compiled a table below which summarises the DEA requirements as outlined per the comments.

Comments and requirements by DEA on the Draft EIA Report

NO.	INFORMATION REQUIREMENTS	CROSS REFERENCE IN THIS EIA REPORT
i	The environmental assessment practitioner (EAP) must ensure that the exact threshold related to the listed activities are specified in both the application form and the final EIAr	Please refer to section 3.1 of the EIAr. The additional listed activity about the land being a CBA under L3 were included and subjected to 30 days PPP with the draft EIAr.
ii	It is noted that the Provincial Authority in the application form is incorrect (i.e. Department of Local Government and Traditional Affairs). As such, the application form must be amended to include the correct provincial authority	The necessary amendments have been made to the application form. The amendment application is attached and have been subjected to public participation for 30days with the amended draft EIAr.

iii	Please note that the Department's application from template has been amended and can be downloaded from the following link https://www.environment.gov.za/documents/forms	Noted, the attached amendment application form was downloaded from the link.
iv	Coordinate for the proposed site as well as the substation and powerline must be provided with the final EIAr. Coordinates must be provided in the format DDMMSS	Please refer to chapter 2, section 2.9
v	It is noted that the proposed development alignment traverses a Critical Biodiversity Area (CBA 1), an endangered vegetation type (Marikana Thornveld), an Important Birding Area (IBA) and two vegetation units that have high conservation value. As such, you are requested to provide the Department with a detailed motivation as to why only one site alternative was considered	Please refer to chapter 2, section 2.4 of the EIAr
vi	The FEIAr must include a full description of the process undertaken to identify, assess and rank the impacts of the activity and associated structure and infrastructure on the preferred location through the life of the activity, including - a description of all environmental issues and risk that were identified during the environmental impact assessment - an assessment of the significance of each issue and risks and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures	Please refer to chapter 6 of the EIAr
vii	In terms of Appendix 3 of the EIA Regulations, 2014, the report must include an undertaking under oath or affirmation by the EAP in relation to: - the correctness of the information provided in the report; - the inclusion of comments and inputs from stakeholder and interested and affected parties (I&APs); - the inclusion of inputs and recommendations from the specialist reports where relevant; - any information provided by the EAP to I&APs	Please refer to chapter 11 of the EIAr

viii	In terms of Appendix 4 of the EIA Regulations, 2014, the environmental management programme (EMPr) must include an environmental awareness plan describing the manner in which : - The applicant intends to inform his or her employees of any environmental risk which may result from their work; and - Risk must be dealt with in order to avoid pollution or degradation of the environment	Please refer to the EMPr, appendices
ix	Please ensure that all issues raised and comments received during the circulation of the EIAr from registered I&APs and organs of state which have jurisdiction (including this Department's Biodiversity Section) in respect to the proposed activity are adequately addressed and included in the final EIAr	Although the report has been submitted and addressed to the Biodiversity section for comments to date no comments received.
x	Proof of correspondence with the various stakeholders must be included in the final EIAr. Should you be unable to obtain comments, proof should be submitted to the Department of the attempts that were made to obtain the comments	Please refer to appendix 4f of the EIAr.
xi	The public participation process must be conducted in terms of regulation 39, 40, 41, 42, 43 and 44 of the EIA Regulations, 2014	Please refer to section 4.2.3 and appendix 4 of the EIAr
xii	Proof that the notice of Environmental Impact Assessment process was advertised in print media must be included in the final EIAr. Alternatively, motivation as to why this was not done must be provided.	Please refer to appendix 4b of the EIAr
xiii	Recommendations provided by specialist reports must be considered and used to inform the layout plan and Environmental Management Plan (EMPr)	Noted, as a result the sensitive areas along the stream, the flood line, trees that require removal permits, access point position and archeological points have been marked on the map.

xiv	A socio-economic study must form part of the Final EIAr and must include inter alia, the following terms of reference (ToR) - Clearly describe the potential social issues associated with the proposed facility; - Assess the socio-economic profile of the region and the social characteristics of the receiving environment; - Comparison of similar large scale projects and applying the lessons learnt to the proposed project; - Analyze the potential socio-economic impacts of the proposed project and provide a description and the significance rating for the construction, operational and decommissioning phases; - Meet with relevant stakeholder and document their socio-economic concerns; - Provide implementable guidelines for limiting or mitigating negative impacts and optimizing benefits of the proposed development	Please refer to appendix 6j of the EIAr
xv	All specialist reports that were done in-house must be externally peer reviewed before submission of the final EIAr. The peer review must address the following; - Acceptability of the ToR; - Is the methodology clearly explained and acceptable; - Evaluate the validity of the findings (review data evidence); - Discuss the mitigation measures and recommendations; - Evaluate the appropriateness of the reference literature - Is the article well-written and easy to understand; and - Identify any short coming	Noted, however all the specialist are out sourced
xvi	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	Please refer to chapter 2, section 2.9 of the EIAr

	required is listed under point 2 of the EIA information required for solar energy facility as requested in the acceptance of the final Scoping Report (SR)	
xvii	Please note that the final EIAr must comply with all the conditions of the acceptance of the scoping report signed 04 March 2016 and must address all comments contained in this comments letter.	Noted, refer to the checklist of comments under Table 1-1 above.
xviii	The final EIAr must provide the final EMPr and final layout plan with information as requested in the accetance of the SR	Please refer to chapter 8, figure 8-1
xix	A copy of the final layout plan must comply with point xxvi of the acceptance of the scoping report signed on 04 March 2016	
xx	You are further reminded that the final EIAr to be submitted to this Department must comply with all the requirements in terms of the scope of assessment and content of the EIAr in accordance with appendix 3 of the EIA Regulations, 2014	Noted
xxi	Further note that in terms of Regulation 45 of the EIA Regulations 2014, this application will lapse if the applicant fails to meet any of the timeframes prescribed in terms of these Regulations, unless an extension has been granted in terms of these Regulations	Noted

Comments by DEA on the 2nd Draft EIA Report

As part of facilitating the S&EIR process a consultative 2nd EIA report was submitted to the Department of Environmental Affairs for comments as part of the public participation process for the S&EIR process. Comments received from DEA, dated 18 August 2016.

Phakanani Environmental has compiled a table below which summarises the DEA requirements as outlined per the comments.

Comments and requirement by DEA on 2nd draft EIAr

NO.	INFORMATION REQUIREMENTS	CROSS REFERENCE IN THIS EIA REPORT
i	This Department that all concerns raised by Birdlife South Africa be addressed	Please refer to chapter 4, section 4.3
ii	Detailed cumulative impact assessment must be provided in the EIAr for all specialist studies conducted	Please refer to chapter 6 of the EIAr
iii	The final EIAr must include a full description of the process undertaken to identify, assess and rank the impacts of the activity and associated structure and infrastructure on the preferred location through the life of the activity, including - a description of all environmental issues and risk that were identified during the environmental impact assessment - an assessment of the significance of each issue and risks and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures	Please refer to chapter 6 of the EIAr

iv	It is noted that the Socio-Economic study submitted with the revised EIAr is a Desktop level assessment. Therefore, you are requested to conduct a full socio-economic study and this must be included in the final EIAr	The final socio-economic study has been included in this report under appendix 6j
v	In terms of Appendix 3 of the EIA Regulations, 2014, the report must include an undertaking under oath or affirmation by the EAP in relation to: - the correctness of the information provided in the report; - the inclusion of comments and inputs from stakeholder and interested and affected parties (I&APs); - the inclusion of inputs and recommendations from the specialist reports where relevant; - any information provided by the EAP to I&APs	Please refer to chapter 11 of the EIAr

EXECUTIVE SUMMARY

This 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 160 ha. The application has been lodged with Department of Environmental Affairs (DEA) and the file reference number for the 50MW development is *14/12/16/3/3/2/850.*

The project entails the development 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) Future construction of an 88KV transmission line and other associated infrastructures (buildings, tracks, etc.), this will form part of a different application should this primary source be considered.
c) Construction of an evacuation substation
d) Construction of internal road with a width of 4.5m

The public participation process

The direct mailing list for this EIA consists of stakeholders, and the general public. These include all those I&APs that expressed an interest during the site notice placement and newspaper advert publication. The public participation process aims to involve the public as well as relevant stakeholders in the EIA process as a whole and to award them an opportunity to make pertinent contributions. The following processes were undertaken:

- ✓ Adverts in the local newspaper alerting public of the project and different stages of the process
- ✓ Site notices placed on site alerting public of the project
- ✓ Direct mailing list to stakeholders
- ✓ Meeting held with stakeholders, adjacent landowners and interested and affected parties.

Identified impacts:

Impacts identified during the EIA phase include the following:

- disturbance of flora and fauna;
- Water pollution;
- Soil and groundwater pollution;
- noise pollution;
- visual impacts;
- traffic impacts;
- waste generation;
- socio-economic impacts; and
- Health, safety and Security.

The evaluation of the above mentioned impacts is made in **section 6** of the report below. This section elaborates further on the impacts, source of the impacts as well as the proposed mitigation measures.

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 conclusions have been drawn from the specialist studies undertaken. The following table shows what each specialist study have recommended.

Study	Recommendations
Noise impact study	Should complaints be received, the proposed methodology (Section 6.4.1) in the Noise Baseline assessment report should be followed to assess the noise generating activities of the development.
Ecological Impact study	Adequate erosion preventative mechanisms must be implemented throughout the construction phase. Erosion resulting from the development should be appropriately rehabilitated preventing further habitat deterioration. Stormwater runoff must be correctly managed during all phases of the development. Special care needs to be taken during the construction phase to prevent surface stormwater containing sediments and other pollutants from the onsite drainage lines and wetland. A surface runoff and stormwater management plan must be put in place. The total sealing of walkways, pavements, drive ways and parking lots should not be permitted in the free space system. These should form part of and be contained within the areas

	earmarked for development. This would aid in the minimising of artificially generated surface stormwater runoff. The use of insecticides, herbicides and other chemicals should not be permitted within 200m of an open space system. An integrated pest management programme, where the use of chemicals is considered as a last option, should be employed. However, if chemicals are used to clear invasive vegetation and weedy species or for the control of invertebrate pests, species-specific chemicals should be applied and in the recommended dosages. General spraying should be prohibited and the application of chemicals as part of a control programme should not be permitted to take place on windy days. Outside lighting should be designed to minimize impacts, both directly on especially rare or endangered invertebrate species and indirectly by impacts on populations of prey species. All outside lighting should be directed away from sensitive areas. The drainage line (unit 2) should be subject to as little disturbance as possible. This drainage line forms part of the Crocodile River catchment but the gravel pit (unit 3) blocks the drainage line from delivering storm water into this catchment. An attempt should be made to refill unit 3 so that the ecological function of unit 2 can be restored.
Avifauna Study	It is recommended that the Solar photovoltaic (PV) solar farm type be used since this will have the least impact on avifaunal species. Where possible the construction of the solar farm should take place in the area that has already been disturbed or degraded by past and present human activities. Construction in dense woodland area, especially along drainage lines should be avoided, as many avifaunal species are associated with trees that grow along these conduits. Construction should not take place near large trees which serves as nesting or roosting sites for raptors and vultures – large trees are a limited resource in dry areas. Post-construction monitoring of bird abundance and movements and fatality surveys should span 2-3 years to take inter-annual variation into account. However, if significant problems are found or suspected, the post-construction monitoring should continue as needed in conjunction with adaptive management, taking into account the risks related to the particular site and species involved.
Heritage impact assessment	That the developer be allowed to proceed with the planning of the project, subject to adopting the recommendation mention above. From a cultural heritage resources perspective, it is recommended that South African Heritage Resources Agency (SAHRA) approve the project to proceed on condition that the suggested recommendation measures are successfully adhered to. This report is void with approval from SAHRA or relevant provincial authority.

soil, agricultural potential, land type and land use study	The areas should not be backfilled or graded apart from the internal roads as this will cause more scouring unless the backfill is compacted and covered with vegetation before the first storm run-off.
Visual Impact study	Trees and shrubs should be planted especially along the boundaries so as to reduce the visual impact on surrounding neighbours. The landscaping must be a combination of indigenous plants consisting of low ground covers, shrubs and lawn. The development proposal has indicated that a 2.1m high hedge will be placed around the boundary of the proposed development. The 3-dimensional visualisations have shown that this will soften the outer boundary of the development. This will also form an obstruction to the viewers possibly seeing the solar farm development. However, at certain parts of the landscape, especially the viewpoints on higher ground to the north and north-east of the site, the development will be visible. External lighting must be minimized. No spot lights should be allowed. Choice of colour, lighting and positioning should be properly planned. The outward features of the solar power farm should be taken into consideration as they need to blend in with the surrounding environment in order to minimise visual impacts.
Wild animal behavior	The antelope should be monitored on a regular basis to ensure that the disturbances to their environment are being mitigated in such a way as to minimise any negative impact on their welfare. Such changes are however not always possible to perceive from cursory visual observations. It has been shown that faecal cortisol levels are a reliable indicator of stress in various animals (Möstl & Palme, 2002). It is recommend that these levels are measured once per month starting as soon as possible – this allows for a baseline level to be established and also controls for the possibility that cortisol levels may currently be elevated due to rutting season. On-going faecal cortisol level measuring as well as visual observation of the antelope should provide reliable evidence as to the welfare of the animals, during construction and operation of the PV solar park. **Where no active mitigation is suggested it is recommended that monitoring still occurs to ensure that the areas identified as "low risk" remain in that category.* The disturbances as listed will impact on the welfare of the antelope as the situation stands. This could lead to chronic stress as well as physiological effects such as declines in reproductive success. The mitigation measures suggested should minimise this impact and on-going monitoring will provide a means to quantify the efficacy of these measures.
Paleontology	From a palaeontological perspective there are no restrictions on development in the study area. For this reason no additional studies, such as a desk top study or full palaeontological survey are necessary.

Traffic Impact Study	i. The proposed DeWildt 50 MW PV solar plant development be authorised, including the construction of a new access to the site. ii. Approval must be obtained from the North West Provincial Department of Public Works and Roads for the proposed access to the site. iii. Provision should be made in the Environmental Management Plan to employ points-men to regulate traffic at the intersection of M21 and R566 during the AM peak period and at the access to the site during the PM peak period, should this prove to be required. iv. The design of the access to the site on the R566 must be submitted to the North West Provincial Department of Public Works and Roads for approval and must take all expected vehicle types, including public transport vehicles, delivery vehicles and abnormal trucks for its delivery of heavy plant and equipment into account. v. Special care must be given to the design of access control and storage areas at the entrance to the site to avoid any impact on traffic operations on the R566. vi. Arrangements must be made for transportation of employees to and from the site. vii. Law enforcement authorities should be requested to implement improved visual policing and law enforcement to eliminate the violation of traffic signs at the intersection of M21 and R566.
Storm Water and floodline	The PV stands can be erected provided the foundations of the stands are designed to withstand the forces shown on **Table 8** of the storm water report**.** Please note that the buffer area borders between the drainage paths and the valuable infrastructure are detailed in **Addenda 7 & 8** of the storm water report.The areas should not be backfilled or graded as this will cause more scouring unless the backfill is compacted and covered with vegetation before the first storm run-off. The possible drainage paths must be treated by constructing small flow check structures as detailed in **Addendum 8** of the storm water report.
Social Impact Study	The review of key national and provincial energy policies and strategic developmental documents indicated that the development of energy from renewable sources is strongly supported at both levels. The same can be said about the local municipality, which officials expressed their support for such a renewable project as it is in line with the LMs objective of transforming into a greener economy. Upon examination of potential socio-economic impacts, it was found that the positive impacts of job creation, economic stimulation, and social development outweigh negative impacts such as the potential stress on social delivery, economic infrastructure, and change in the sense of place. Overall, based on the current developmental path of the North West Province and the Madibeng area, the proposed development is well suited for the

	location. The current land uses for the directly and indirectly affected land portions show little to no economic activity and is therefore poised for further economic development.

The recommendations of the above specialists have led to the layout plan to be revised and not to affect any identified sensitives areas.

Environmental statement

With consideration to the identified impacts, their magnitude and significance after the proposed mitigation measures, the project can be managed appropriately to lessen its environmental impact. In line with Section 31 (m) of NEMA the environmental practitioner recommend for this activity and all applied activities as per amended application form should be authorised. Phakanani Environmental believes that sufficient information is available for DEA to take a decision. The fundamental decision is whether to allow development which brings socio-economic advantages and is consistent with planning and certain development and social responsibility and upliftment policies, but which may impact on an area.

It is therefore recommended that the development be authorised on condition that the development should adhere to mitigation measures, provided in the Environmental Management Plan. No intrusion/ footprint outside the servitudes of the given area are allowed and no further expansion of the study area is allowed without the relevant permits.

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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 if 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
CBO	COMMUNITY BASED ORGANISATION
CPV	CONCENTRATED PHOTOVOLTAIC
CSIR	COUNCIL FOR SCIENTIFIC & INDUSTRIAL RESEARCH
CSP	CONCENTRATED SOLAR POWER
DAFF	DEPARTMENT OF AGRICULTURE, FORESTRY, AND FISHERIES
DEA	DEPARTMENT OF ENVIRONMENTAL AFFAIRS
DOE	DEPARTMENT OF ENERGY
DWS	DEPARTMENT OF WATER AND SANITATION
EA	ENVIRONMENTAL AUTHORISATION
EAP	ENVIRONMENTAL ASSESSMENT PRACTITIONER
EIA	ENVIRONMENTAL IMPACT ASSESSMENT
EIAR	ENVIRONMENTAL IMPACT ASSESSMENT REPORT
EMF	ENVIRONMENTAL MANAGEMENT FRAMEWORK
EMPr	ENVIRONMENTAL MANAGEMENT PROGRAMME
EMS	ENVIRONMENTAL MANAGEMENT SYSTEM
ESS	ENVIRONMENTAL SCOPING STUDY
ESR	ENVIRONMENTAL SCOPING REPORT
EWT	ENDANGERED WILDLIFE TRUST
GIS	GEOGRAPHIC INFORMATION SYSTEMS
GN	GOVERNMENT NOTICE
GHI	GLOBAL HORIZONTAL IRRADIATION
GW	GIGAWATT
HD	HISTORICALLY DISADVANTAGED

I&AP	INTERESTED AND AFFECTED PARTIES
IDP	INTEGRATED DEVELOPMENT PLAN
IPP	INDEPENDENT POWER PRODUCER
IRP	INTEGRATED RESOURCE PLAN
KV	KILOVOLT
MW	MEGAWATT
NERSA	NATIONAL ENERGY REGULATOR OF SOUTH AFRICA
NGO	NON-GOVERNMENTAL ORGANISATIONS
PCS	POWER CONSERVATION STATION
PDP	PROVINCIAL DEVELOPMENT PLAN
PPA	POWER PURCHASE AGREEMENT
PPP	PUBLIC PARTICIPATION PROCESS
PV	PHOTOVOLTAIC
READ	RURAL ENVIRONMENT & AGRICULTURAL DEVELOPMENT (NORTH WEST PROVINCE)
REDZ	RENEWABLE ENERGY DEVELOPMENT ZONES
REIPPPP	RENEWABLE ENERGY INDEPENDENT POWER PRODUCER PROCUREMENT PROGRAMME
S&EIR	SCOPING AND ENVIRONMENTAL IMPACT REPORTING
SAHRA	SOUTH AFRICAN HERITAGE RESOURCES AGENCY
SANRAL	SOUTH AFRICAN NATIONAL ROADS AGENCY
SARERD	SOUTH AFRICAN RENEWABLE ENERGY RESOURCE DATABASE
SEA	STRATEGIC ENVIRONMENTAL ASSESSMENT
SDF	SPATIAL DEVELOPMENT FRAMEWORK
SIP	STRATEGIC INTEGRATED PROJECTS
TDP	TRANSMISSION DEVELOPMENT PLAN
TEF	TECHNICAL EVALUATION FORM
TOR	TERMS OF REFERENCE
UNFCCC	UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

VAC	VISUAL ABSORPTION CAPACITY
WESSA	WILDLIFE AND ENVIRONMENT SOCIETY OF SOUTH AFRICA
WULA	WATER USE LICENCE APPLICATION

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 De Wildt 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 13 km east of Brits and 50km west of Pretoria.

From a regional perspective, the greater Brits-De Wildt area is also 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.

1.1 Background

Zolograph Investments (RF) Proprietary Limited is currently assessing the feasibility of developing a Solar 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 aforementioned ownership structure may change but only with the consent of The Department of Energy.

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, De Wildt that will suit the requirements for a power generating complex (i.e. a PV solar park).

Zolograph Investments (RF) Proprietary Limited was awarded Preferred Bidder Status in respect of the 50MW AC photovoltaic De Wildt Solar Park during the additional allocation of the Department Of Energy ("DOE")'s Fourth Bid Window of the Renewable Energy Power Producer Procurement Programme ("REIPPPP"). Being awarded Preferred Bidder status means that the Project Company and its bid submission has been shortlisted to enter into a power purchase agreement ("PPA") with the national utility, Eskom Holdings SOC Limited ("Eskom"). This PPA will be backed by National Treasury. The DOE has since announced the expected Financial Close dates for the Project- this would be the date on which the PPA would be signed as well as all financial agreements closed out with the Company's senior lenders.

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 and an evacuation IPP substation that will transmit electricity from the 50MW power station to the national grind (De Wildt 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 will be lodged once the environmental authorisation for the 50MW as the primary application has been concluded. The 88KV transmission line application will include an Eskom substation, this will however not overlap with the IPP evacuation substation.

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	TOJQ00000000043700028

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;
- temporary lay-down area or batching plant.
- 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 evacuation substation and the existing De Wildt Substation (*will form part of a separate application*)
- 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

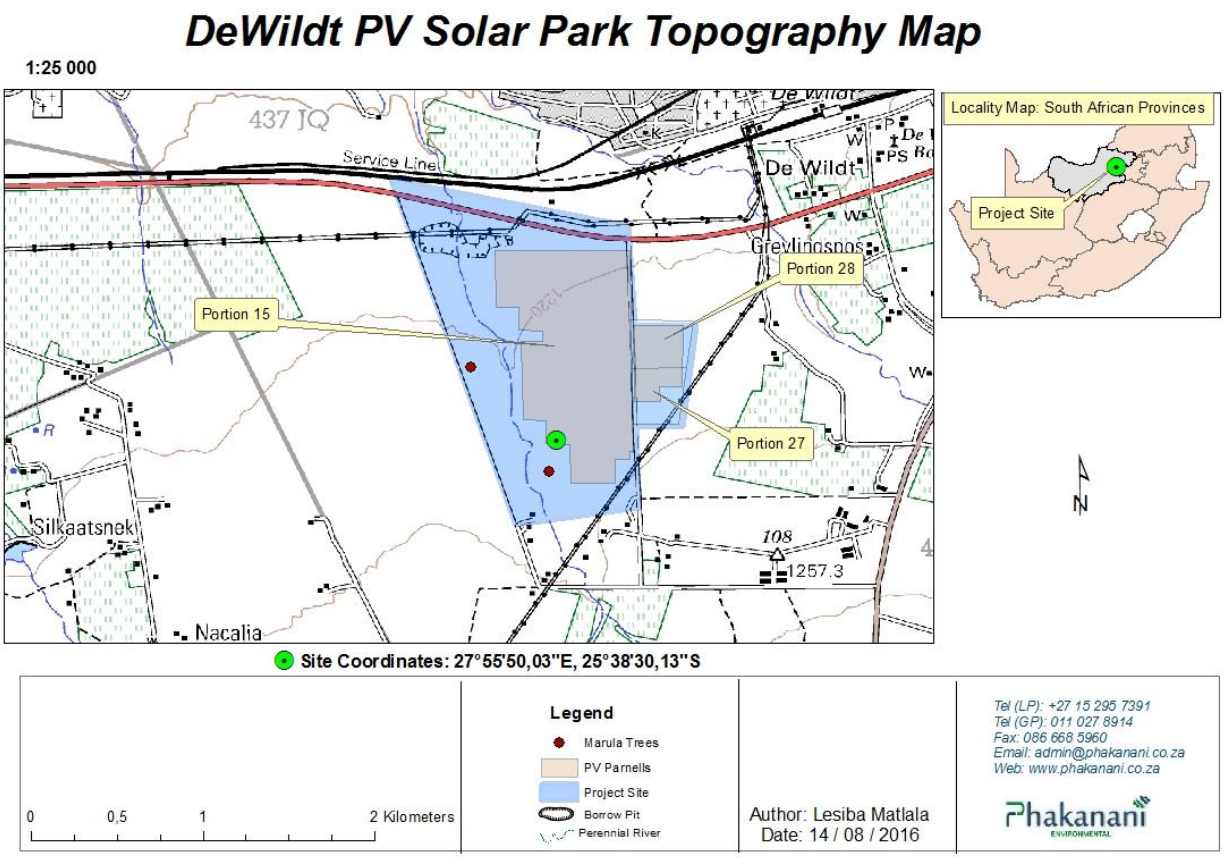


Figure 1-1: Locality map

The overarching objective for the Solar Facility is to maximise electricity generation 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:

- <u>Ecologically sensitive areas on the site:</u> The majority of the site consists of CB1 Marikana Thornveld considered to be of moderate sensitivity with respect to the surrounding

environment. 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 west 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 within the foot print of the project site.

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 (**Error! eference source not found.**). 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 and draft EIA report, the proposed project was generally well received by the recipient community, interested and affected parties, and stakeholders. Two 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. One of the objections led to us engaging the animal behavioral specialist inputs on the impacts assessment.

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 2014 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 March 2016. 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, 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 twice provided stakeholders with an opportunity to verify that issues that they raised through the EIA Process had been captured and adequately considered. This final EIA Report submission to the DEA has incorporated 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.

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 EAP is Tsunduka Hatlane who is leading the team has more than 12 years' experience in environmental assessment and management studies, primarily in the leadership and integration functions. Expertise of the EAP Full CV (**Appendix 1**). 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 De Wildt 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 inputs and 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

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
Elena Broughton	Urban Econ	Social Impact Study
C J Coetzer (Pr. Eng)	Water Tech: CWT Consulting	Storm Water and floodline

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 Provincial Development Plan (PDP) 2030 places much emphasis on addressing key challenges around regional unemployment and poverty among others. The PDP envisages to reduce the Province's 2010 unemployment rate of 24%, to 14 and 6% by 2020 and 2030, respectively. An additional 815 000 jobs would be required in order for the province to realise the aforementioned 2030 target (North West Planning Commission , 2013).

Government has identified 18 infrastructure projects to take place in South Africa in the next 10-20 years, this includes generation of Green Energy (SIP 8) in support of the South African economy.

The agricultural and mining sectors are identified as the Province's two priority sectors, vital in expanding the North West economy. The PDP stipulates the need to expand agriculture production, with emphasis on well supported small-scale farming, communal farmers, commercial farmers, and cooperatives. Furthermore, there are other key sectors also identified in the PDP, through which the Province will expand its economy, and these include:

- Specific manufacturing sub-sectors
- Renewable energy supplier industry
- Construction and infrastructure
- Tourism (including arts and culture)
- SMME development and financial sector inclusion and development

Renewable energy infrastructure is incorporated as part of the construction and infrastructure sector. The PDP acknowledges that renewable energies, especially solar- and waste/biomass-to-energy initiatives, will play an increasingly important role. Renewable energy is envisaged to contribute a much greater share of provincial energy supply mix in the future, with the Province aiming to increase renewable energy consumption to 37% by 2030, and also to increase access to electricity from the recorded 84% in 2011, to 95% by 2030 (North West Planning Commission , 2013). The need for more independent power producers and promoting the use of solar power in

the Province is also explicitly stated as part of the envisaged action items to support investments in renewable energy infrastructure. The western part of the North West is mentioned as having the greatest potential for solar energy; however, the lack of a mainline transmission grid in that part of the province is also identified as a possible constraint to the roll-out of major solar power projects.

A Renewable Energy Strategy for the North West Province (2012) has also been developed. The Strategy was developed in response to the need for the North West Province to participate meaningfully within the renewable energy sector of South Africa. Solar energy (including photovoltaics as well as solar water heaters), municipal solid waste, hydrogen and fuel cell technologies, bio-mass, and energy efficiency are identified as the technologies with the most potential and a competitive strength for the North West Province (North West Province Department of Economic Development, Environment, Conservation and Tourism , 2012). With respect to solar energy, the Dr. Ruth S. Mompati and Ngaka Modiri-Molema District Municipalities are identified as municipalities in the Province with considerable potential. However, as earlier alluded, the Strategy also clearly states that a roll-out of solar projects in some parts of these two district municipalities might be a challenge, mainly as a result of grid connection constraints. Nevertheless, there are still other parts of the province that are also believed to be good for solar energy projects, for example the Bojanala Platinum East, where the proposed project is to be located, is clearly stated as a high priority for photovoltaics (North West Province Department of Economic Development, Environment, Conservation and Tourism , 2012).

The above mentioned suggest that the proposed project is in alignment with the provincial development priorities. Although much emphasis is placed on the agricultural and mining sectors, the development of a viable renewable energy sector including solar energy technologies is also explicitly stated and prioritised for the North West Province.

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 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.

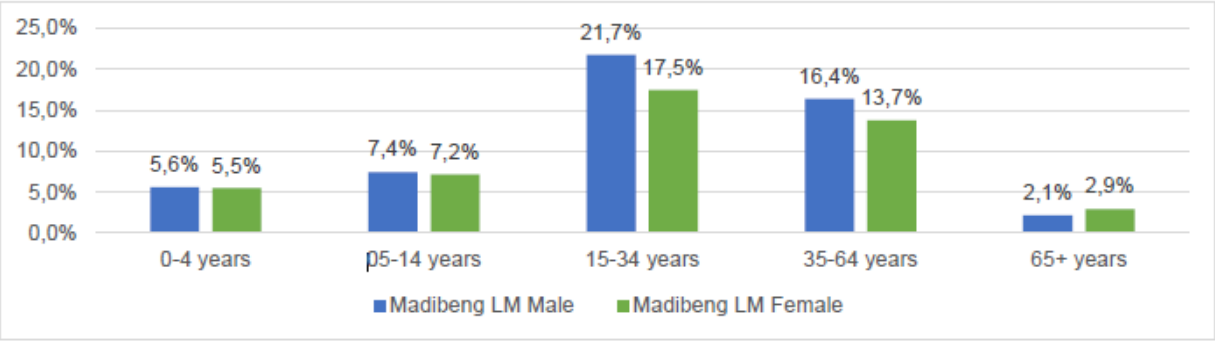
The proposed Solar Facility is located in an area of high global horizontal irradiation (up to 2280 kWh/m² annually), therefore from a regional site selection perspective, this region is considered to be preferred for solar energy development. From a local perspective, the site has specifically been identified by Zolograph Investments (RF) Proprietary Limited 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 a high potential for solar renewable energy generation; with high solar radiation levels and the availability of vast tracts of land.

The Madibeng LM is home to approximately 477 380 people, with a total of 160 724 households (Stats SA, 2016). The population has increased by 38.4% between 2001 and 2011 (from 345 036 in 2001). Over half of the population in the municipality lives in formal (brick house) dwellings (51.7%); the rest include 0.7% of people who live in tribal or traditional areas, and 39.4% of people who live in informal dwellings (Stats SA, 2016). The large proportion of people living in the urban area can be explained by the ease of access to opportunities and services within the larger urban centres, in this case Brits, Ga-Rankuwa, and the rest of Pretoria.

The Madibeng LM's population is very young, with 64.8% of people being less than 35 years old. This is however, on par with national figures, i.e. 66.7% of South Africans are less than 35 years old.

Table 2-1: Age and gender profile in the Madibeng LM (Stats SA, 2016)



The youth (age 15-34) make up the majority of the people living in the Madibeng LM with 39.2% of the population falling in said age group. This is followed by the group between the ages of 35 and 64, which accounts for 30.1% of the Madibeng LM population

The municipal area is adversely affected by the high rate of HIV/AIDS. The number of HIV-positive people living in the LM equates to 13.6% of the total population, which is slightly higher than provincial and national averages. It must also be noted that HIV/AIDS-related deaths account for more than half the deaths that occur in the LM. This can be attributed to a number of factors such as higher proportions of migrant workers (miners and farm workers), high rates of poverty, unemployment and teenage pregnancies. The LM has endeavoured to improve the effects of HIV/AIDS by improving the distribution of ARV's and working together with the Dr George Mukhari hospital to improve health service delivery in the LM. It must also be noted that the responsibility of the upkeep and expansion of health facilities lies with the department of health and not with the LM.

Crime remains persistent in the LM especially in the settlements close to Ga-Rankuwa. This was confirmed by the land owners living close to the proposed site that stated that the closer you move to the settlements the higher the probability of theft. This however is limited to theft as no violent crimes against land owners had been reported during the site visit. The LM acknowledges the higher crime rates in these areas and is attempting to rectify the situation but the problem seems to be rooted in higher levels of unemployment, especially after the closure of the Eland Platinum Mine. Higher unemployment has also lead to social ills such as alcohol abuse in the settlements close to the mine. The LM has also indicated that main contributors to the drug and alcohol problems in the communities are foreign nationals.

The review of key national and provincial energy policies and strategic developmental documents indicated that the development of energy from renewable sources is strongly needed and desirable. From a local perspective the settlements closest to the proposed site are struggling with employment after the closure of the Eland Platinum Mine; thus creating a need for investment into the local economy and creation of employment is needed. The proposed project will create about 450 employment opportunities half of which could be filled by workers coming from the local community and 30 temporary jobs, of which 20 will be made available for the local labour. Furthermore, the project will implement various SED and ED initiatives during its operation, which will likely positively impact on the access and quality of local social services and creation of opportunities for establishment and growth of local small businesses.

Upon examination of potential socio-economic impacts, it was found that the positive impacts of job creation, economic stimulation, and social development outweigh negative impacts such as the potential stress on social delivery, economic infrastructure, and change in the sense of place. The project will provide added security to adjacent land landowners as there will be 24 security surveillance around the project site. Considering the above mentioned, the project will add value to the community and to the Province at large.

2.2 Receptiveness of the site to development of a PV Facility

The De Wildt Solar PV facility is proposed to be constructed outside of the De Wildt Urban edge. Portions 15, 27 and 28 of the farm Schietfontein 437 JQ has not been considered for an alternative land use. This area is enclosed by major activity such as mining and a semi industrial site that is situated further east of the project site.

Zolograph Investments (RF) Proprietary Limited 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 ~160 ha.
- Grid connection considerations: Grid connection will be easy due to the close proximity of the De Wildt Substation and two transmission lines crossing the site of 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 one of the better areas for solar irradiation in South Africa, and the world (Figure 2-1). Global horizontal irradiation (GHI) for the De Wildt region varies between 2250 and 2300kWh/m^2/annum. The GHI for the Solar PV Facility site is in the region of approximately 2280kWh/m^2/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 De Wildt 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.

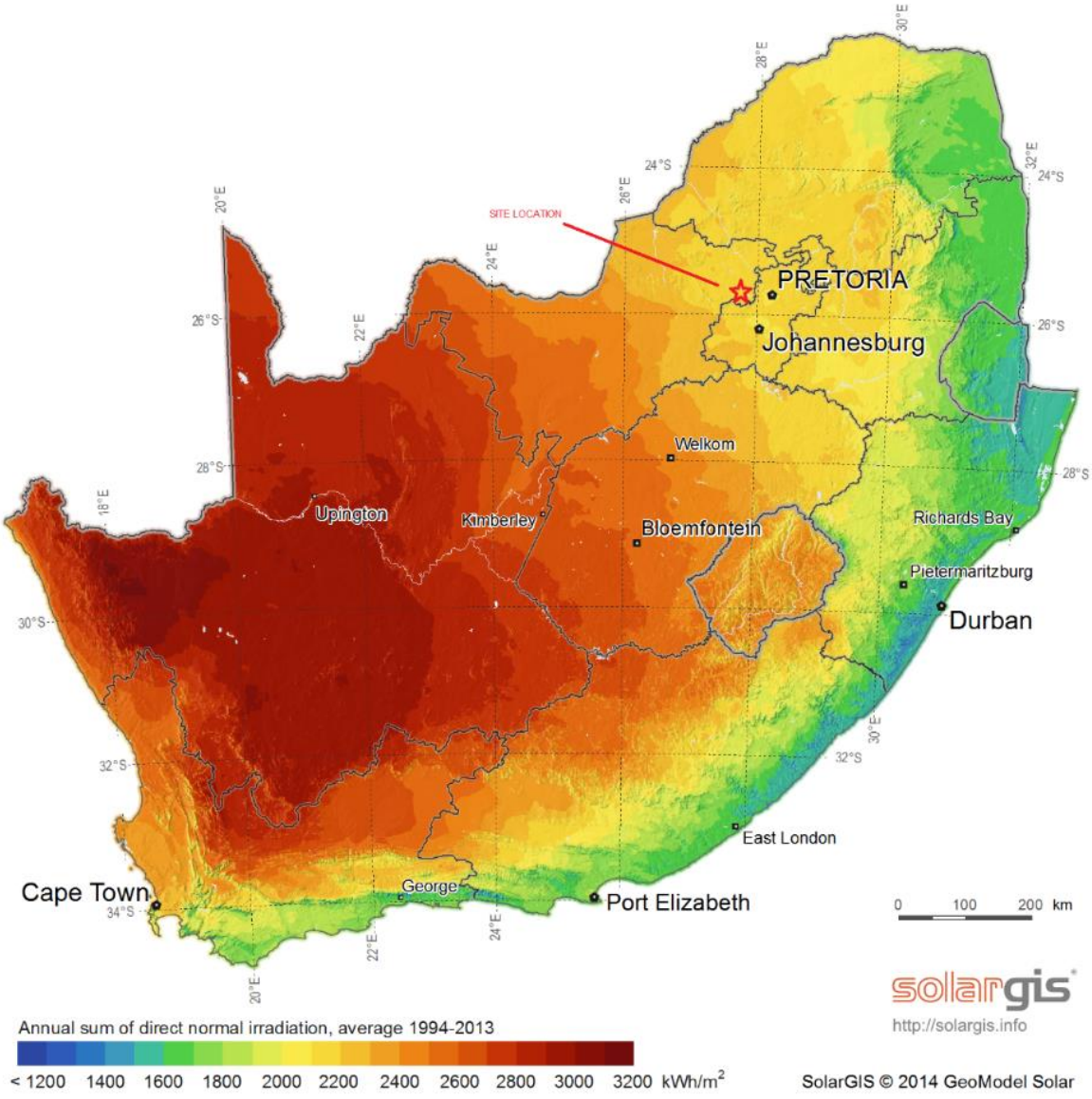


Figure 2-1: Annual incoming short wave radiation for South Africa (Courtesy of CSIR)

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 center are favourable, and reduce the losses associated with power transmission.

The current preferred route is short (200m) and therefore minimizes environmental impact. Any other alternative would include a longer line which could result in greater environmental impacts and would increase potential environmental degradation. Furthermore, such an alternative would potentially also include the crossing of water resources which the project is trying to avoid. The proposed interconnection has undergone and passed Eskom's Technical Evaluation Forum ("TEF") and a Budget Quote has been issued for the Project.

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).

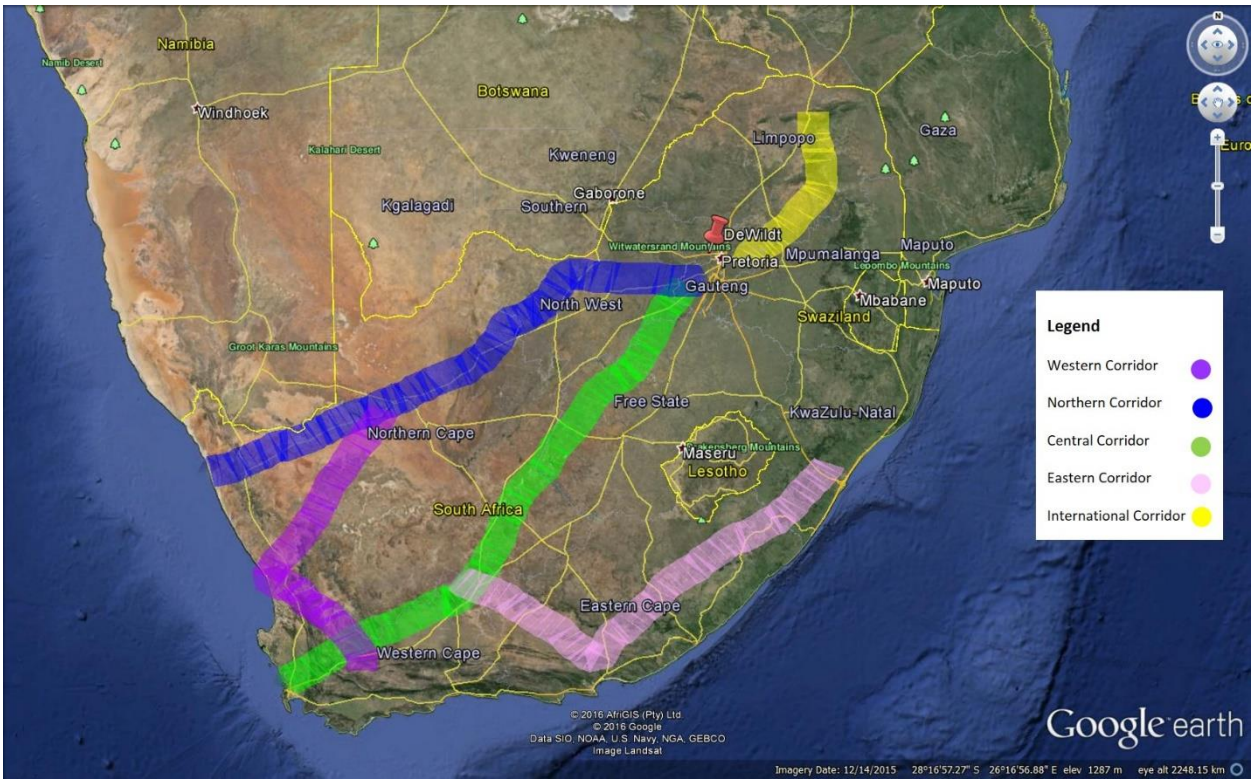


Figure 2-2: Eskom "Critical Power" Corridors

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 establishment of the solar PV plant is expected to create skilled and unskilled jobs during the construction period. Approximately 450 employment opportunities will be created on-site, which will be available for a duration of about 17 months. It is expected that about half of these jobs will be made available for the local labour, i.e. individuals residing in the nearby communities such as Ga-Rankuwa. Besides the employment that will be temporarily created by the construction of the facility directly, an increase in labour demand as a result of production and consumption induced effects is also expected.

According Census 2011 data, the Madibeng Local Municipality had 31 180 unemployed individuals in 2011. The number of unemployed individuals in the settlements that are in close proximity to the proposed project, equates to 5 751. About 50%, or 225 job opportunities will be made available to individuals from within the municipality; however, it is believed that a greater number of workers could potentially be sourced from the local communities.

Importantly, it should be iterated that the local area has experienced a sharp decline in employment in the mining sector. The proposed project would therefore allow to offset some of this negative impact and provide temporary opportunities for employment of the labour that is likely to have certain construction-relate skills coming from the mining background.

The local expenditure on the procurement of goods and services required for the construction of the proposed De Wildt solar park will result in production and consumption induced impacts, which in turn will lead to the creation of new employment opportunities or retention of existing jobs in the industries forming part of the project's domestic supply chain. Therefore, the employment benefits during the construction phase will not be limited to the local area but will expand to the rest of the country (Appendix 6j)

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 Investments (RF) Proprietary Limited 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 Investments (RF) Proprietary Limited 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. Furthermore, site preference was based on the following:

1) portion 15 site was previously approved by DEA, that is why there has been focus on this site as most preferable;
2) Eskom and the DOE have already been approached about the site location and have provided their support;
3) NERSA licence has been obtained for the site based on the previous permitting;
4) Preferred Bidder status was obtained for the site based on the previous permitting which related to the Portion 15 site location.

Although not of an environmental nature, it is worth noting that it is crucial that the Zolograph Investments Proprietary Limited obtains its consent within the DOE's timelines so as not to lose its Preferred Bidder status. Reapplying to Eskom to approve a new route as well as performing new specialist studies would substantially delay the Project. Zolograph further stands to loses the R10 000 000 Preferred Bidder Bond that has been granted in favour of the DOE as security, not to mention the advisor fees incurred to date.

Zolograph also wishes to note that the purpose of the development of this renewable energy Project is to ensure sustainable development in accordance with the National Development Plan and Integrated Resource Plan. The development and construction of the Project contributes towards the fulfilment of the above-mentioned Government targets and the reduction of CO_2

emissions. It is furthermore noted that the Project will also assist by feeding much-needed electricity into the South African grid. The energy being provided by the Project will assist in alleviating the current energy constraints being experienced in the country

Based on the findings as described in this EIAr, Zolograph Investments (RF) Proprietary Limited 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 2280 kWh/m^2/annum.
- Topography: A surface area with favorable topography facilitates the work involved in construction and maintenance of the PV facility.
- Site extent: The larger farm portion is approximately ˜160 ha in total i.e. the sum of portions 15, 27 and 28, technically it is estimated that based on the technology earmarked for this project, the project requires approximately 3ha to generate 1MW of electricity. Hence the total of approximately 160 ha is sufficient for the installation of the facility allowing for avoidance of site sensitivities such as the drainage line west of the property on portion 15. The development footprint of the facility would comprise about ˜87% of the total extent of the farm portions.
- Site access: The site can be accessed via the R566 road between Brits and De Wildt via Rosslyn road.
- Grid access: Grid connection is within close proximity. There are currently transmission line crossing along the northern boundary of the project site leading to the De Wildt substation. This will provide easy access to the national grid and as a result mininizng the environmental impact of the development. Development on any other site may 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. The area is considered to have a low agricultural potential and hasn't been ploughed in more than 10 years. The area is used by the land owner for cattle grazing, it is worth noting that 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. There is an intention to have sheep grazing underneath the panels during operation to avoid total loss of agricultural potential. There is no other portion in the area that is derelict and can cater for 160 ha to enable the generation of 50MW.

2.4.2 Layout and Design Alternatives

The 50MW Solar Facility and associated infrastructure will have a development footprint of up to 160 ha which is 87% of the available total land size of almost 160 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 EIA Phase potentially environmentally sensitive areas have been identified and considered in detail through site-specific specialist studies. The layout of the proposed Solar Facility occupies the 87% of the full extent of areas in order to avoid the identified high sensitive area along the drainage line leavening it in its pristine state. 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 high 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 Alternative 1: 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: considering the limitations discussed in (section 2.4.1), there isn't any alternative footprint design that would be able to efficiently utilize the available land space taking into consideration the available technology that will be used for the project.

- Preferred Grid connection Alternative 1:

  It is due process under in terms of section 24 of the National Environmental Management Act, 107 of 2008 to submit more than 1 location alternative for the proposed development when applying for an environmental authorisaiton from the Department of Environmental

Affairs ("DEA"). It is however only possible for the Zolograph to consider a single route for the proposed interconnection that will interconnect the Project into the national grid, due to the following reasons:

Eskom as the national utility has the final authority to approve any proposed interconnection lines of projects submitted into the REIPPPP. Zolograph can therefore make suggestions as to proposed interconnection alternatives, however only Eskom has the knowledge to know where best any energy feeding into the grid can be absorbed. Zolograph had previously, in 2013 prior to its bid submission, approached Eskom with two alternatives, the one currently proposed as well as another alternative to connect to the existing 88Kv line that passes through the south-east corner of the site. This alternative interconnection to the south-east was rejected by Eskom due to capacity and load issues. Eskom then issued a cost estimate letter to the Project Company for the interconnection as included in the layout plan of this report (Appendix 3c)

- Grid connection Alternative 2: No alternative grid connection point has been considered stating the above mentioned. Access Road(s) - The proposed project site is accessible via theR566 road, Brits to Rosslyn road.

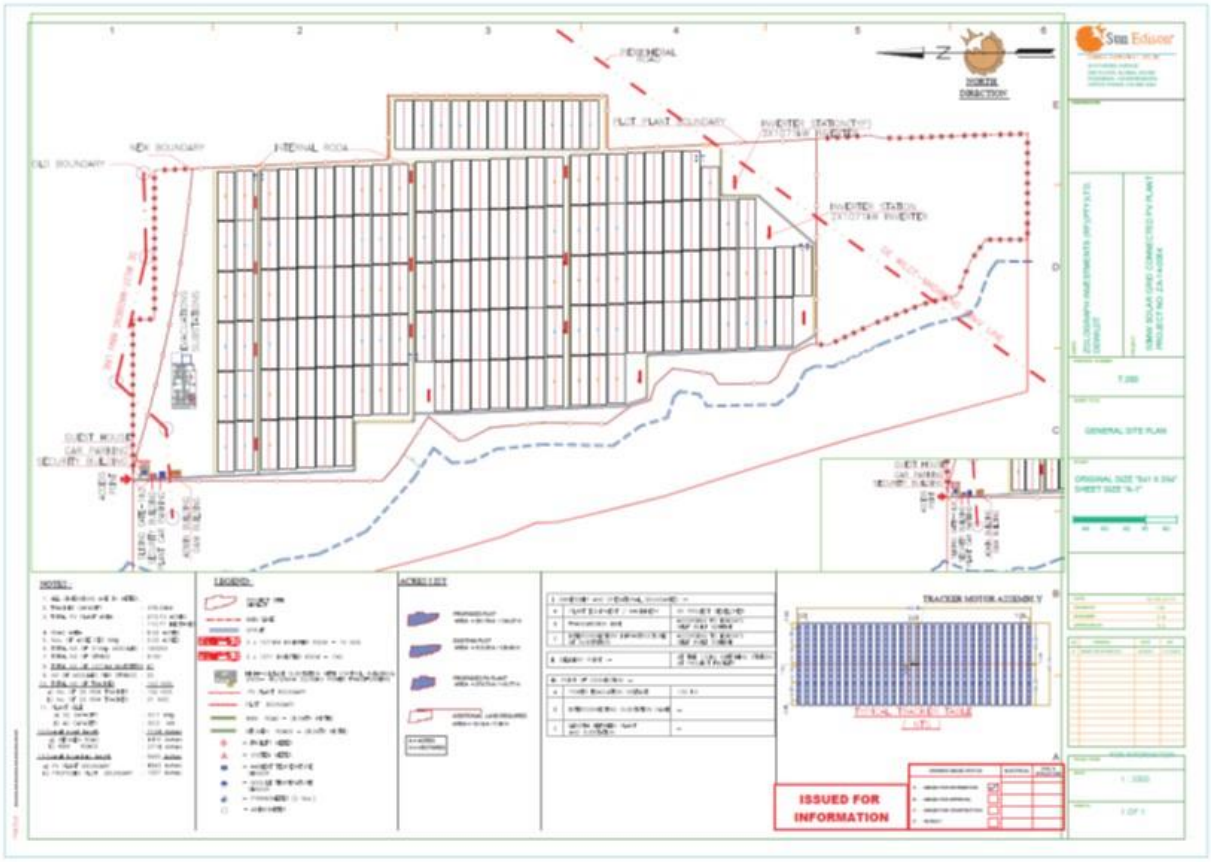


Figure 2-3: Layout plan

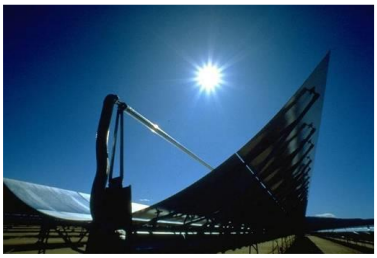
2.4.3 Technology Alternatives

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 PV mount systems 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).

Two solar technologies are discussed below for comparison purposes, however the project will only employee the PV solar technology for the project. 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 2-2: Technology alternative

TECHNOLOGIES	ADVANTAGES	DISADVANTAGES
CSP - Parabolic Trough Technology 	• 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.	• Relatively low thermal efficiency; • Requires significant site grading with gradient <3%.
CSP - Central Receiver Technology 	• 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%);	• Central receiver technology needs to proceed from conceptual to demonstration to commercial development. Currently less experience with commercial deployment than trough technology;

	• 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^{o}C compared to 400^{o}C). Thermal energy at higher temperatures can be converted to electricity more efficiently and can be more cheaply stored for later use.	• Central receiver design is a challenge – specifically in seismic zones.

TECHNOLOGIES	ADVANTAGES	DISADVANTAGES
CSP – Linear Fresnel Technology 	• 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.	• 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.
Photovoltaic Technology (Preferred) 	• 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;	• 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

	• 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.	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; • 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.

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 not implemented. 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 De Wildt 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 a single axis 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 160 ha 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 2-3) 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;
- Foundation of the tracking PV arrays
- 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 200m 88kV power line that will tap into the existing national grid that crosses the northern boundary of the project site.;
- 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 streets and fencing around the development area.

Table 2-3: 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	Actual size in hectares

TOJQ00000000043700015 (Portion 15)	166.3 ha
TOJQ00000000043700027 (Portion 27)	8.8 ha
TOJQ00000000043700028 (Portion 28)	8.7 ha
Total Project development site	183.8 ha
Actual project development footprint	160 ha
Remaining extent left in its pristine state untouched (inclusive of drainage line)	23.8 ha (Located on the western boarder from the stream) Appendix 3
Proposed technology	Static photovoltaic
Contracted capacity	50MW
Height of installed panels from ground level	~3 meters
Access road	Site is accessible directly off the R566 road
Width and length of internal roads	Internal road – length: ~3000m, width: 4m,
On-site substation	± 80m x 120m
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, however reference is not made to a specific type of cell, inverter or tracker as the most technological efficient solution at the time will be chosen within the requirements and conditions of the EA process.

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 000m^3 over a ± 18 month construction period and a maximum of approximately 5 000 m^3 per annum for a 20-25-year operational lifespan of the Solar Facility (for maintenance/cleaning of panels).

Water availability: Zolograph Investments (RF) Proprietary Limited will source water from boreholes to meet the water requirement of the PV solar project (i.e. boreholes exist on site within 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 a (taking water from a water resource) is triggered by the proposed project in terms of the NWA. A water use licence application (WULA) 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. 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 450 employment opportunities, of the opportunities 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 De Wildt area. The majority of the employment opportunities, specifically the low and semi-skilled opportunities, are likely to be available to residents of in De Wildt 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 high.

Within the site itself, access will be required from existing R566 road for construction purposes (and limited access for maintenance during operation). Internal access roads of up to 4m in width

will be required. New internal 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.

2.8.2.1 *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) 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.

2.8.2.2 *Establishment of Laydown Areas on Site*

Temporary laydown (5 ha) 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.

2.8.2.3 *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: Typical Frame, structural details

The construction of a substation and panels layout footprint 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.

2.8.2.4 *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.

2.8.2.5 *Construction of power line*

A power line will be 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 (this will form part of a separate application).

2.8.2.6 *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 20-25 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 30 full-time employment positions, 20 of which will preferentially be from local communities.

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 dissembled 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.

2.8.4.1 *Site Preparation*

Site preparation activities will include confirming the integrity of the access as recommended by the traffic impact specialist report to the site to accommodate the required decommissioning equipment.

2.8.4.2 *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.

2.8.4.3 *Future plans for the site and infrastructure after decommissioning*

The plant capacity would have degraded by ±15% over 20-25 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).

2.9 Technical summary of project

Site boundary coordinates	*A. 27˚ 55'18.51"E ; 25˚37'40.95"S* *B. 27˚56'03.35"E ; 25˚37'49.47"S* *C. 27˚56'4.68"E ; 25˚38'07.33"S* *D. 27˚56'16.38"E ; 25˚38'08.49"S* *E. 27˚56'05.07"E ; 25˚38'27.76"S* *F. 27˚56'13.85"E ; 25˚38'27.46"S* *G. 27˚56'05.05"E ; 25˚38'49.09"S* *H. 27˚55'42.07"E ; 25˚38'46.39"S*
Project evacuation substation coordinates	27˚55'40.94"E ; 25˚37'54.59"S

Type of technology	Photo Voltaic (PV) Solar
Height of PV panels	3m
Area of PV Array	Stationary mounted
Number of inverters required	3
Area occupied by inverter/transformer station/substation	± 6m x 20m
Area occupied by both permanent and construction laydown area	~ 5 ha
Area occupied by buildings	~5 ± 500m^2
Length of internal roads	Internal road – length: ~3000m, width:
Width of internal roads	4m
Proximity to grid connection	200m
Height of fencing	2-3m
Type of fencing	Trees will be planted around the boundary plus the construction ClearVu Invisible Wall fence

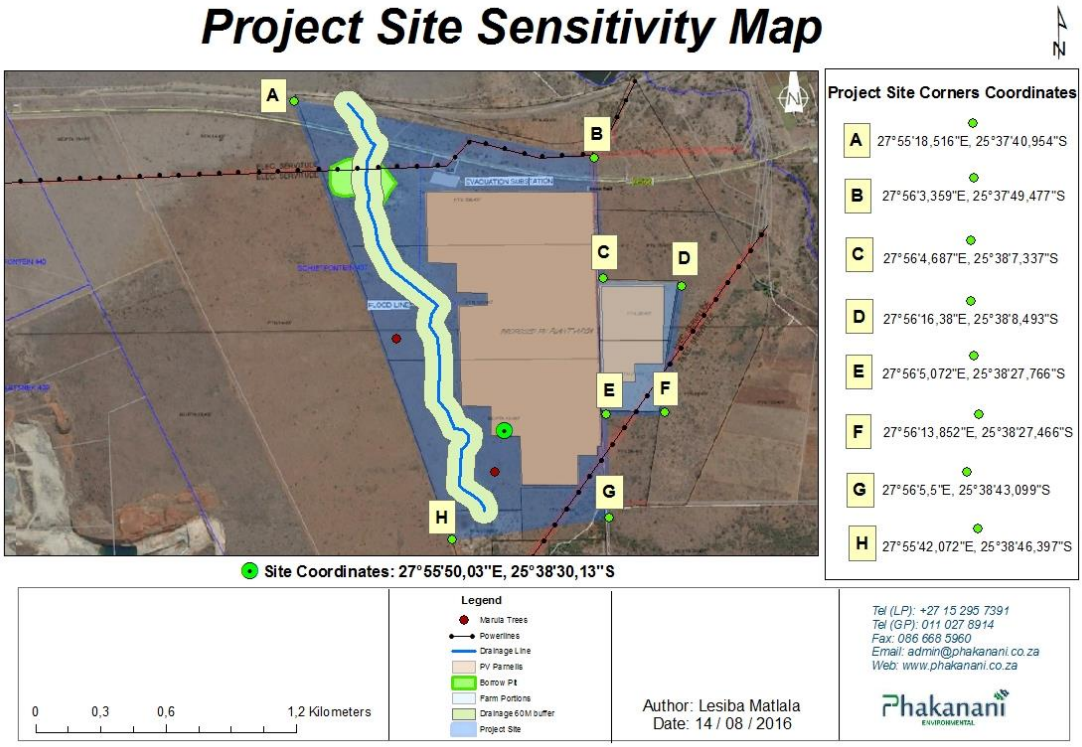


Figure 2-6: Sensitivity map

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 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.

Table 3-1: Listed activities triggered by the proposed Solar Facility

Number and date of the relevant notice Activity No (s) in terms of the relevant notice:	*Description of each listed activity as per project description*
GN R. 983 Item 11: (i): " The development of facilities or infrastructure for the transmission and distribution of electricity- (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts"	The construction of the project evacuation substation infrastructure that will be associated with a transmission line that will feed into the existing overhead national grid Eskom power line along the northern boundary of the project site.
R 983 Listing Notice 1, Activity 28(ii): *Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development:* *(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare*	Total area of land to be developed for the facility is 160 hectares.
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.	The development of a PV facility and associated infrastructure (substation) with a capacity of 50MW.

R 984 Listing Notice 2, Activity 15: *The clearance of an area of 20 hectares or more of indigenous vegetation*	The clearing of ~160 hectares of indigenous vegetation will be undertaken during construction of the facility.
GN R. 985 Item 4(e)i: The development of a road wider than 4 metres with a reserve less than 13.5 metres.	Construction of internal roads (4.5m wide) within a critical biodiversity area (CBA-1)
R 985 Listing Notice 3, Activity 12(a)i: *The clearance of an area of 300m^2 or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan*	The clearing of ~160 ha of indigenous Marikina Bushveld vegetation (CBA-1 vegetation) will be undertaken during construction of the facility.

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 CO^2 (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 December2020.

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.

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, Zolograpgh proposes the establishment of the Solar Facility to add new capacity to the national electricity grid. Zolograph Investments (RF) Proprietary Limited will be required to apply for a generation license from NERSA, as well as a power purchase agreement (PPA) 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 Investments (RF) Proprietary Limited 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.

Zolograph Investments (RF) Proprietary Limited has been awarded a preferred bidders appointment by DoE. A preferred bidder is 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, please refer to (**Appendix 2d**).

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 the project 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.

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)
- 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 the table below.

Table 3-2: Relevant legislative permitting requirements applicable to the proposed solar development

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
National Legislation			
National Environmental Management Act (Act No 107 of 1998)	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. 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. 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.	DEA – lead authority. READ- commenting authority.	The final EIA report is to be submitted to the DEA and Provincial Environmental Departments in support of the application for authorisation.
National Environmental Management Act (Act No 107 of 1998)	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.	DEA (as regulator of NEMA).	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.
Environment Conservation Act (Act No 73 of 1989)	National Noise Control Regulations (GN R154 dated 10 January 1992)	DEA – lead authority. READ- commenting authority. Local Authorities	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.
National Water Act (Act No 36 of 1998)	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.	Department of Water and Sanitation (DWS)	A water use license (WULA) 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.
Minerals and Petroleum Resources Development Act (Act No 28 of 2002)	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). 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) 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.''.	DMR	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. A Section 53 application has been submitted to the relevant DMR office.

National Environmental Management: Air Quality Act (Act No 39 of 2004)	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 of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards. Section 32 makes provision for measures in respect of dust control. Section 34 makes provision for: i. the Minister to prescribe essential national noise standards – (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 – (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.	DEA – air quality Local Municipality - Noise	No permitting or licensing requirements applicable for air 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.
National Heritage Resources Act (Act No 25 of 1999)	Section 38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including • 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. 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	DEA where heritage assessment is a component of the EIA » SAHRA – National heritage sites (grade 1 sites) as well as all historic graves and human remains.	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.

	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 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.		
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	• 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	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 6a The project site falls within an area categorized .under CBA-1 (Marikana Thornveld) There are 2 protected trees that were identified during the ecological survey (Marula) of which a permit will be applied for at a later stage

	• DEA published Regulations on Alien and Invasive Species (AIS) in terms of the National Environmental Management: Biodiversity Act, on Friday 1st August2014. 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		
Conservation of Agricultural Resources Act (Act No 43 of 1983)	• 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: • 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.	DAFF	• 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.
National Forests Act (Act No. 84 of 1998)	» 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,	DEA	A permit or license will be required for any destruction of protected tree species and/or indigenous tree species within a natural forest.

	transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister'. » Forests: Prohibits the destruction of indigenous trees in any natural forest without a licence.		
National Veld and Forest Fire Act (Act 101 of 1998)	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.	DAFF	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
Hazardous Substances Act (Act No 15 of 1973)	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. » 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;	Department of Health	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.

	» Group IV: any electronic product; » Group V: any radioactive material. The use, conveyance or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.		
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	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 – » 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: » The containers in which any waste is stored, are intact and not corroded or in any other way rendered unlit 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)	» 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 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. » 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. » 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.	Provincial Department of Transport (provincial roads) South African National Roads Agency Limited (national roads)	An abnormal load/vehicle permit may be required to transport the various components to site for construction. 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).

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:

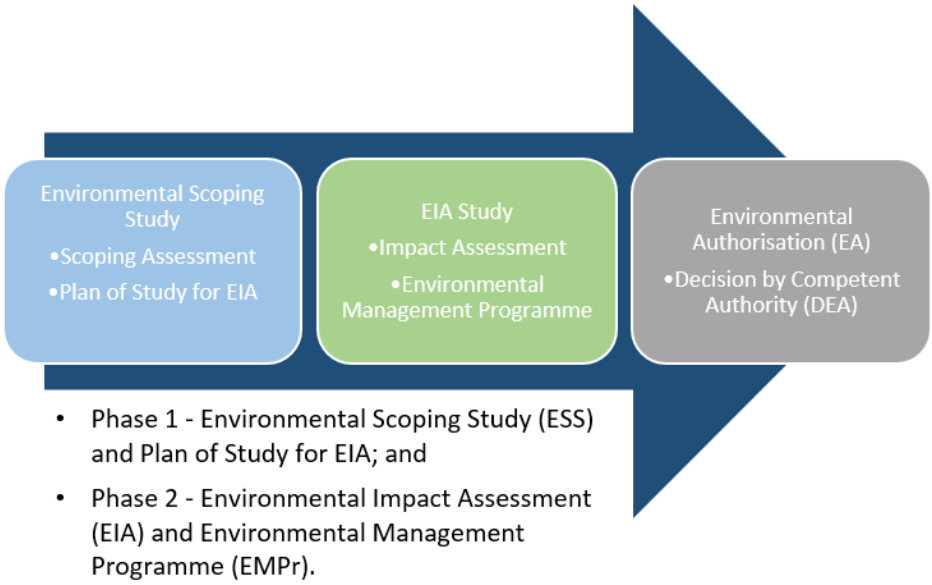


Figure 4-1: Environmental studies flowchart

4.1 Scoping Phase

A draft Scoping Report was released for public review in Jan-Feb 2016 for a 30-day commenting 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

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, appointment of 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.

This 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.
- Preparation of a Final 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 competent authorities (i.e. DEA) 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.
- Submission of a Draft EIA Report to DEA following the 30-day public review period was conducted
- Notification and Consultation with Organs of State (refer to Table 4-2) that may have jurisdiction over the project was conducted.

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 was released for a 30-day public review period from 19 May 2016 – 20 June 2016: The comments received from I&APs have been captured and addressed within this report for consideration by the authorities for decision-making.
- A notification for an extension was submitted and approved by DEA. The draft EIA was further subjected for public participation on the 20th July 2016.

The following key public participation tasks were undertaken in terms of the requirement of Chapter 6 of the EIA Regulations of December 2014:

- 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 councilor 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

- the I&APs registry was open and maintained throughout the EIA process.
- the Draft EIA Report was made available for Public Review
- comments received were collated and addressed accordingly

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

4.2.3.1 *Placement of Site Notices*

Site notices were placed on-site on the 16 October 2015 (Table 4-1) and proof of this is included in (Appendix 4c)

Table 4-1: Site notice location

Site notice	Latitude	Longitude
1	25°37'46.23"S	27°55'27.82"E
2	25°37'52.83"S	27°56'3.28"E

4.2.3.2 *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 4-2below).

Table 4-2: Key stakeholder groups identified during the EIA Process

STAKEHOLDERS
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 (SKA)
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
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
SAMANCOR

All relevant stakeholder and I&AP information has been recorded within a database of affected parties, please refer to (Appendix 4a). 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.

- Public meeting: a public meeting was conducted on the 07th September 2015, please refer to (Appendix 4g) for the meeting register and minutes of the meeting.
- Newspaper Advertisements During the scoping phase: a newspaper advert was placed to notify and inform the public of the proposed project, the availability of the Draft Scoping Report for public review. This advert was placed in the following newspapers:
    i. The Brits Pos (December 2015)

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

i. The Brits Pos (May 2016)

4.2.4 Identification and Recording of Issues and Concerns

Issues and comments raised by I&AP's over the duration of the EIA process have been collated and addressed in this report. The Comments and Response Report includes responses from members of the EIA project team and/or the project proponent. This is included in (Appendix 4f)

4.2.5 Assessment of Issues Identified through the Scoping Process

Issues which required investigation within the EIA Phase, as well as the specialists involved in the assessment of these impacts are indicated in (Table 4-3) below.

Table 4-3: 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
Elena Broughton	Urban Econ	Social Impact Study

4.2.6 Assumptions and Limitations

The following assumptions and limitations were 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.
- 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.

4.3 Comments and responses (Public Participation)

Below is a list of comments and responses to registered interested and affected parties

NO	ISSUE/COMMENT	ISSUES RAISED BY	Summary of response from EAP
1.	**Endangered Wildlife Trust:** We have no comment	Lourens Leeuwner	Acknowledged
2.	**Eskom:** No objections to the project. However the project needs to meet the requirements of Eskom sent to Phakanani (please refer to appendix 4d)	John Geeringh: Senior Consultant Environmental management	Acknowledged
3.	**North West Department of Rural, Environment and Agricultural Development (READ):** Following the review of the draft EIR the Department **has no objection** to the approval of activity. The department brings the following to the attention of the applicant: a) The Department recommends solar photovoltaic technology with tracking system based on the fact that it provides a clean energy and during electricity generation with the PV panels, there is no harmful greenhouse gas emission (it is environmentally friendly) and the tracking photovoltaic system solar panels are rotating around a defined axis to follow the sun's movement. b) Any complaint that may arise from the public during the construction and operation phases of this project must be attended to as soon as possible and addressed to the satisfaction of the party concerned. c) General waste during construction phase must be collected and disposed of at a licensed landfill site. d) Any archaeological remains uncovered during the development of the activity must immediately be reported to the South African Heritage Resources Agency and not be further disturbed. e) All the recommendations and mitigation measures contained in the Specialist Reports and Environmental Management Programme (EMPr) must be considered, adopted and adhered to during all phases of the development.	Ms. Portia Krisjan (Director: Environmental Quality Management)	Comments noted
4.	**Department of Agriculture, Forestry & Fisheries, Directorate**: Land Use and Soil management in terms of Conservation of Agricultural Resources Act, 1983 (Act no 43 of 1983) (CARA), have no objection on the proposed development mentioned, based on the following: - The soil must be protected against erosion especially when focusing on the activities mentioned on the ecological document of the proposed development which includes the compaction, possibly the stripping and stockpiling of soil for the construction purpose. - Where concrete foundations are used, proper mitigation measures should be employed to ensure slow release to ensure slow release of water to the water course, in order to avoid severe soil erosion.	H M Mashele (land use and Soil Management)	It is noted that the Department of Agriculture, Forestry and Fisheries has no objections regarding the establishment of the proposed project.

	- The topsoil should be stockpiled only in designated areas to be used during rehabilitation phase. - All mitigation measures to be employed should be aimed at addressing all cumulative and regional negative impacts of the proposed activity.		
5.	**Department of Mineral Resources:** i) Please ensure that there is proper consultation with the land owners (Barplats etc). Submit the proof of consultation to this Department, with the land use agreement signed by both parties.	Livhuwani Kutame	Please refer to consent letters from the land owner (are Frederick Johannes Strauss and Lynette Strauss) in appendix 2c.
6.	**Birdlife SA:** Thank you for the opportunity to comment on the above report. We apologise for our late input. Birdlife South Africa is pleased that the impact assessment included an avifaunal specialist study. Although this is noted elsewhere in the EIA, the avifaunal specialist omits to mention that the site is located within the Magaliesberg Important Bird and Biodiversity Area. We would have therefore preferred the avifaunal assessment to have been more rigorous (i.e. be based on systematic data collection and multiple site visits). In future, please refer to BirdLife South Africa's draft Best Practice Guidelines for Birds and Solar Energy, which can be used to guide the scope of impact assessment and monitoring. The EIA also fails to mention the Magaliesberg Protected Natural Environment or Magaliesberg Biosphere Reserve. These omissions should be corrected. The avifaunal study also includes what we presume to be "cut and paste errors" (e.g. repeated reference to "lack of suitable mangrove habitat") and it refers to a position statement, with no reference to whose position statement it is. Despite the shortcomings of the avifaunal study, the location within a Critical Biodiversity Area, and the location within an Important Bird and Biodiversity Area, the site is fragmented and degraded, and we support the specialist's overall recommendations and conclusion that there are no red flags to developing within the proposed footprint. However, a significant concern is the potential impact of the transmission line associated with the proposed development. We understand that this is being dealt with in a separate process. Poorly designed and poorly located transmission lines can kill vultures if they collide with the infrastructure, or if they are electrocuted. In order to ensure that the birds from the Magaliesberg Vulture colony and rehabilitation center are not affected we urge that the Endangered Wildlife Trust's Wildlife Energy Programme and VulPro are consulted with regards to the appropriate route and design of the proposed new transmission line.	Samantha Raslton-Paton Birds and renewable Energy manager Simon Gear Policy and Advocacy manager	Comments noted The Avifaunal specialist consultant has taken into account the comments from Birdlife SA (email communication attached in appendix 4), and has amended the report accordingly. (Appendix 6f) Furthermore with regards to the transmission line a separate study will be conducted for the EA application which will be applied for with the Department of Environmental Affairs at a later stage
7.	**SACAA:** i) Good day Aluwani, please indicate what is needed from SACAA back to you. Our current documentation on this development indicates Transmission consent outstanding. Please provide the information below,	Lizelle Stroh	The De Wildt 50MW PV project was previously granted an EA by DEA prior to the publication of the 2014 regulations. At that

	There is a SACAA process whereby permission is applied for wrt obstacles which could pose an aviation hazard. More information can be obtained at http://www.caa.co.za. Click on information for industry 'Obstacles' on the LHS. Forms, Part 139-27 and submit on the form itself. • Kindly provide a .kml (Google Earth) file reflecting the footprint of the proposed development site including the proposed overhead electric power line route that will evacuate the generated power to the national grid. • Also indicate the highest structure of the project & the overhead electric power transmission line. • Note that there may be other wind farms and PV farms in the area. Unique names are preferable. • Please always use the proposed PV farm name in the Subject box when corresponding via email with this office and indicate the name & address which should appear on the CAA approval/decline letter. • There is an assessment fee of R770 per application. • For billing purposes: company name VAT nr. and postal details. • Kindly ensure that all the above data is forwarded. Incomplete data causes unnecessary delays.		time SACAA had given positive consent for the project to continue. The EA then lapsed before construction could commence post 2014 which meant that the project had to be reapplied for in terms of the published 2014 regulations. Phakanani requested for SACAA to update the letter of consent to reflect a recent date as the scope of work hadn't changed from the previous application
8.	SAHRA: i) The SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit does not accept the submitted Heritage report by Magoma, 2015 based on the following: No map depicting the layout of the development has been supplied; No track logs showing the completed site visit were included in the report; and It is unclear whether the proposed grid connections were surveyed. SAHRA APM Unit accepts the Palaeontological Scoping report and agrees that no further studies in terms of palaeontological resources are required. Further comments will be issued once the Heritage component of the case is fully compliant.	Natasha Higgitt Heritage Officer South African Heritage Resources Agency	An amended heritage report has been updated on the SAHRA website. Track logs were previously submitted to SAHRA but the file was ended up being corrupt and was unable to show on SAHRA side. A revised report has been submitted to SAHRA inclusive of a track map and a revised layout plan also clarity regarding the flag noted onsite.
9.	Eskom North West: Acknowledged having received the Draft Environmental Impact report.	Mpho Sebole	No comments have been received to date from Eskom North West

ADJACENT LAND OWNER			
No.	**ISSUE/COMMENTS**	**ISSUED RAISED BY**	**RESPONSES**
	Adjacent Landowner:		
1.	Mr Nel comments are summarised below: 1. The project will affect the sense of the place 2. Emission will impact negatively on adjacent farm owners and on the fauna and flora and on the game (antelope) that is kept on 6.5 ha of his property. 3. The noise generated during the construction phase would potentially threaten the health and survival of his game breeding program. 4. The transmission line will cause visual impact	Mr Harry Nel Email: jeppenel@yahoo.co.uk Cell: 082 338 8285	A wild animal behaviorist specialist was appointed in order to assess the impact that the proposed 50MW PV solar park may have on the antelope The findings of the specialist were that the impact on the project on Mr Nel's Antelope will be minimal provided that the mitigation measures mentioned in the animal behaviorist report are adhered to. Mr. Nel then opted to sell his land to the developer
I&APs			
1	1. Mr Hans Van Rensburg has objections on the project, stating the following reasons: The project will cross through his property and hence affecting his property, please refer to comments below: "…it was subsequently confirmed to him, that Eskom is proceeding with the ANDERSON DINALEDI 400KW POWER LINE. He however indicated that though his objecting the project his open to any to any positive suggestions / negotiations in mind: "The project however will generate power and will have to make use of the National Grid's Power Lines. When doing that, it is directly going to affect me as the National Grid Powerlines is running over my premises (Portion 90, 91 and 76, a portion of portion 44 of the farm Schietfontein; 437 JQ) As the owner(s) thereof, we were already informed by Eskom, that the current 88KV lines is upgraded to 400KV lines and that such developments is directly going to affect us".	Mr Hans Van Rensburg (Private) Email: hansvr@labapro.co.za Tell: (012) 546 3874 Cell: 082 551 5971	• The project proponent is Zolograph Investments (RF) (Pty) Ltd and not ESKOM • The proposed transmission line is a 88kv which will loop-in loop-out to the existing National Grid Power Lines that run across portion 15 of Schietfontein 437-JQ, it is restricted to only portion 15 (please refer to the layout plan Appendix 3 of EIAr). • The extent of the servitude line for the transmission line will be about 200m restricted to portion 15 Considering the information provided and with the information at my disposal, the transmission line will not transverse through your property as indicated in your comments (section 3.1) dated 07 August 2015. The 400kv upgrade mentioned in your email seems to be a different project from the PV solar project. The solar project intends on connecting to the national grid line that crosses along the northern boundary of portion 15 (please refer to below email), which does not run across your property (the application of the transmission line will form part of a separate application) For future reference, the interconnection of the Project to the national grid has been approved by Eskom and no mention of any upgrades was suggested.

	2. Even after clarifying the project scope to Mr Han Van Rensburg, he had the following comments: "…The project however will generate power and will have to make use of the National Grid's Power Lines. When doing that, it is directly going to affect me as the National Grid Powerlines is running over my premises (Portion 90, 91 and 76, a portion of portion 44 of the farm Schietfontein; 437 JQ) As the owner(s) thereof, we were already informed by Eskom, that the current 88KV lines is upgraded to 400KV lines and that such developments is directly going to affect us".		It is important to note that the application of the 88kv will form part of a separate application and is not part of the 50MW PV solar park as this forms part of the basis for Mr Rensburg's objections.
2	Carmen Barends from Regional Content Researcher requested to be registered as an interested party to the project	Carmen Barends (Regional Content Researcher) Email: carmenb@l2b.co.za Tel: (033) 343 1130	The EIAr was forwarded to Carmen for perusal

5 DESCRIPTION OF THE RECEIVING ENVIRONMENT

This section of the 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.

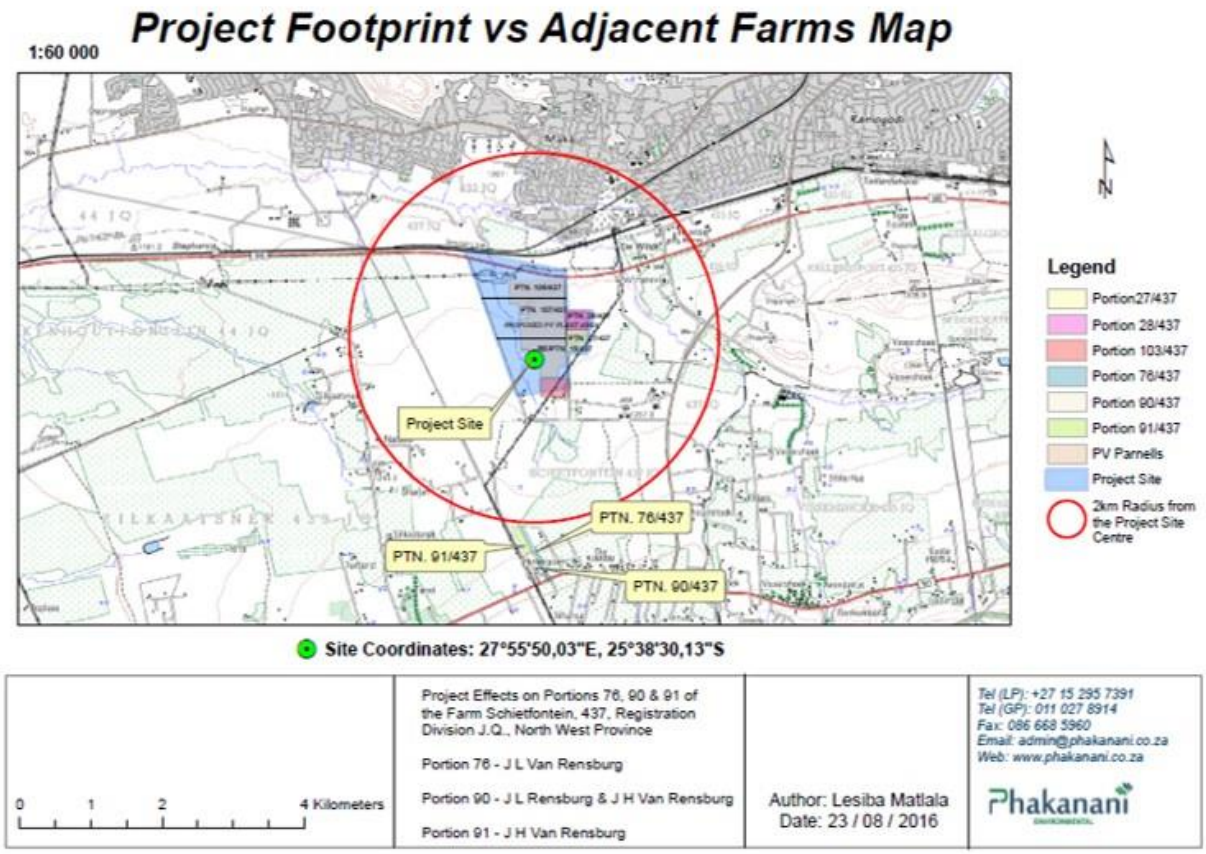


Figure 5-1: Farm portions (15, 27 and 28)

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.

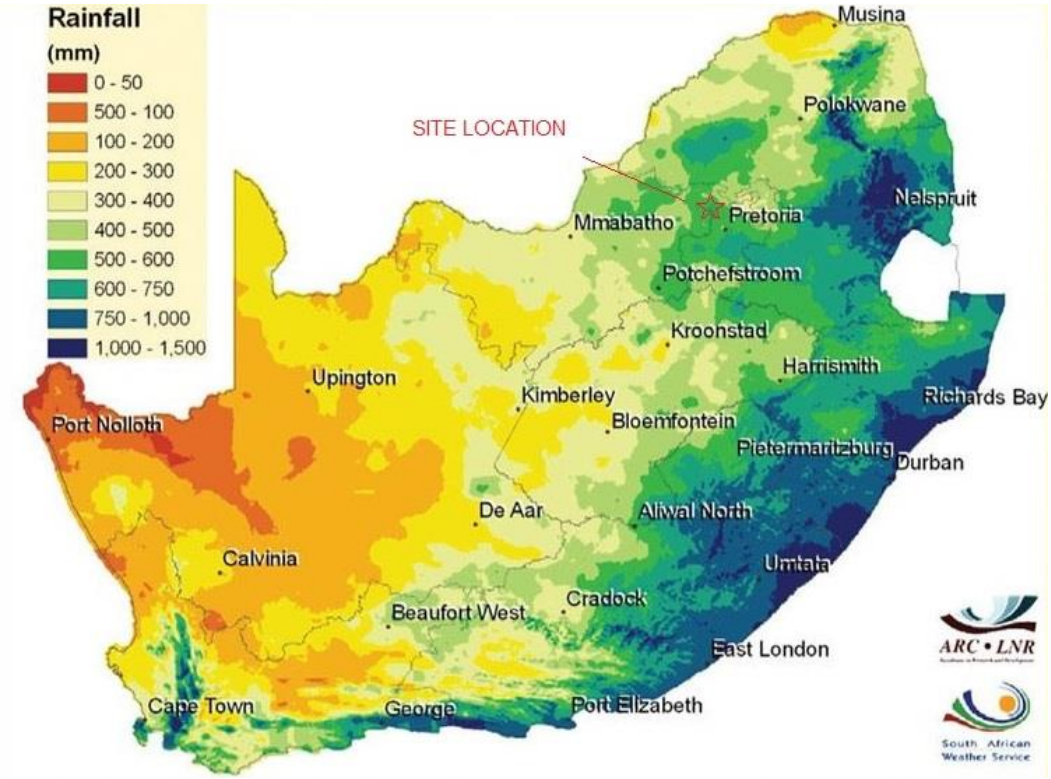


Figure 5-2: Mean annual rainfall (mm)

The De Wildt 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 is˜4%. 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 draught limitations. Only cattle grazing is currently exercised by the land owner Mr. Strauss. Other areas in close proximity to the proposed project site are mining sites. There is a huge borrowpit which is not rehabilitated on the northwestern. Agricultural sensitivity

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, please refer to (Appendix 6c).

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. Mitigation measures must be put in place to combat the latter, please refer to (Appendix 6c).

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 quartzites 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 Marikana Thornveld that has been 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 North West Conservation Plan considers CBA 1's to be irreplaceable and necessary to meet conservation targets. The surveyed project area is completely surrounded by two large public roads (N4 & R566), the Eland platinum Mine along the western boundary and a light industrial area east of the project site.

Considering what prevails on site, the Marikana Thornveld is not pristine anymore, it has been transformed due to human activity. The project site location has no connectivity potential that will enable the Marikana Thronveld to thrive and flourish. There are major roads on the south end and

northern border of the proposed project site, a mine on the entire western boundary and a light industrial area along the eastern boundary of the proposed project site. This portion is revegetating since it has been derelict since the owner stopped ploughing around the year 2002, please refer to (Figure 5-3).

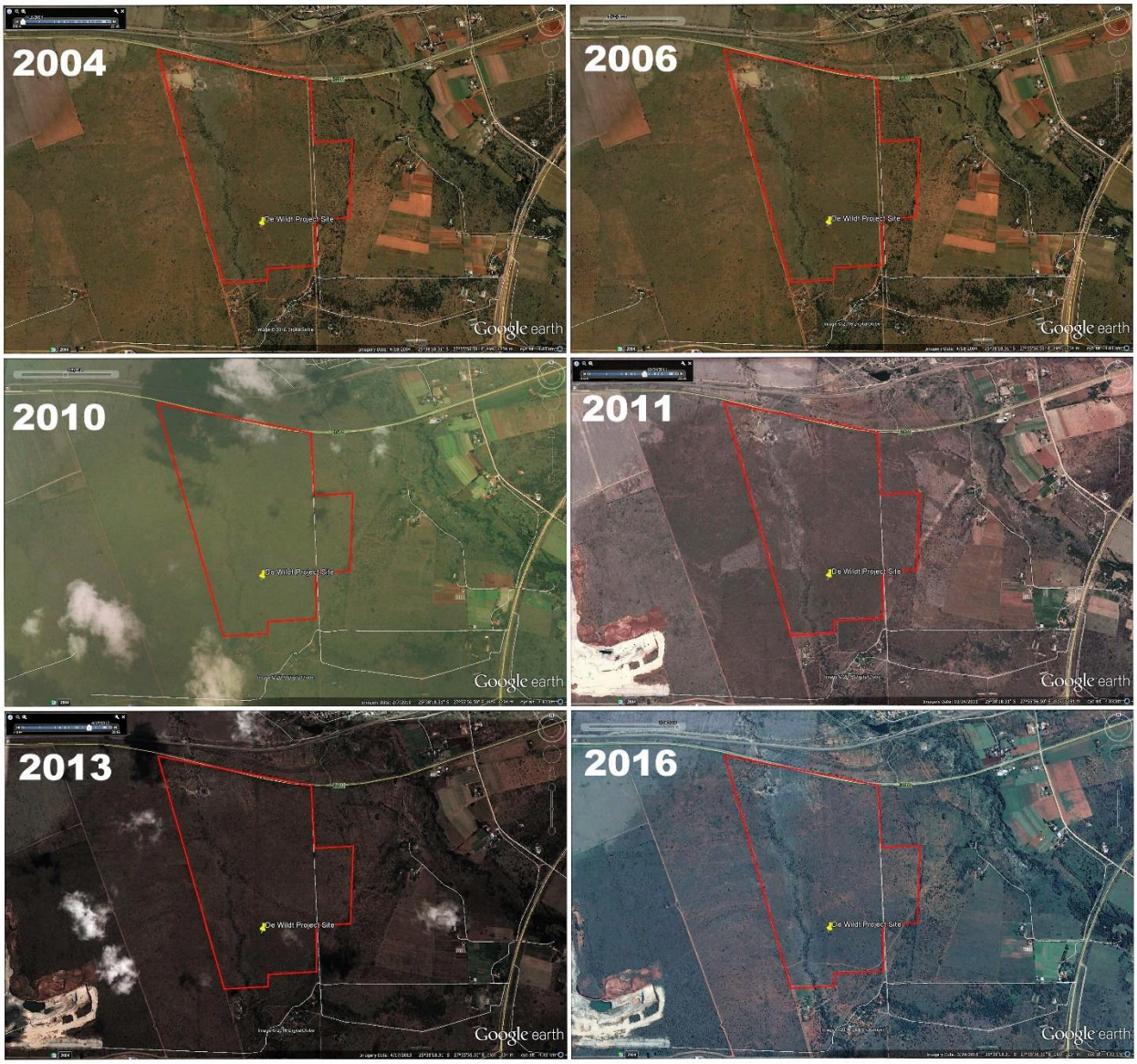


Figure 5-3: Project site google time scale image (2004-2016)

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 160 ha area identified for the proposed development is comprised of three units, namely:

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

Two plant species of conservation concern were observed in this unit. Nationally protected trees require a permit in order to relocate or cut down.

Table 5-1: Plant species of conservation concern observed

PLANT NAME	CONSERVATION STATUS
Sclerocarya birrea	Nationally protected
Berchema zeyheri	Nationally protected

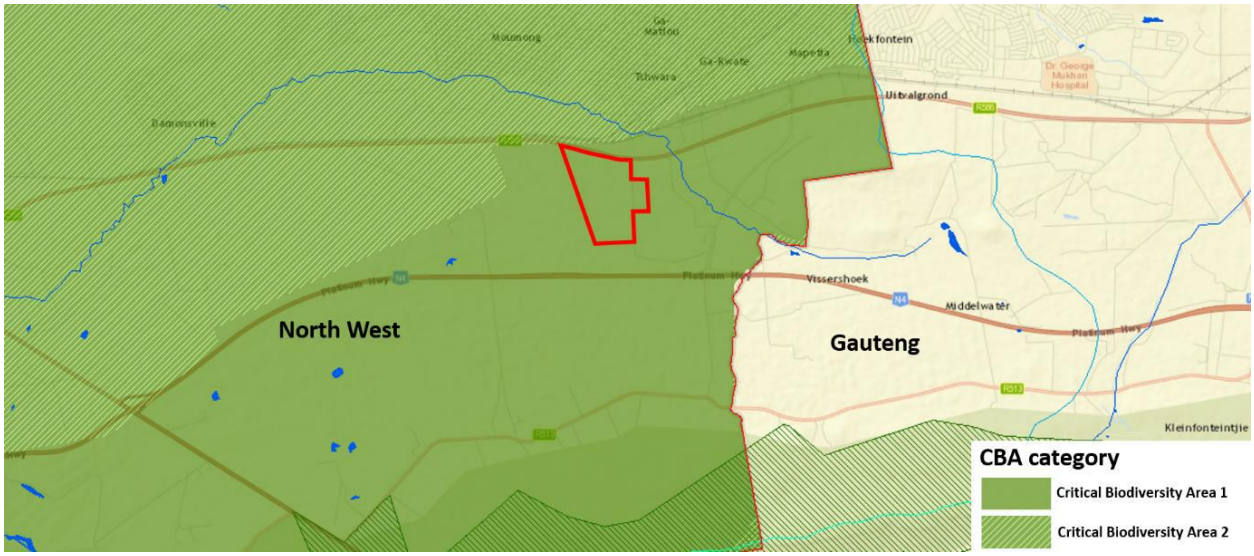


Figure 5-4: Location of the proposed development area within the North West Conservation Plan, 2 nationally protected tree species occuring within project site.

5.3.1.2 *Fauna*

5.3.1.2.1 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.

5.3.1.2.2 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.

5.3.1.2.3 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.

5.3.1.2.4 Avifauna

It is widely accepted that vegetation structure, rather than actual plant species, influences bird species distribution and abundance. The survey area is located near 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 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 De Wildt site are entirely unfossiliferous. SAHRA has approved of the Paleontology report that was submitted, please refer to (Appendix 4d)

6 ASSESSMENT OF POTENTIAL IMPACT

This chapter serves to assess the significance of the positive and negative environmental impacts (direct, indirect, and cumulative) expected to be associated with the development of the proposed Solar Facility and associated infrastructure. This assessment has considered the construction of a 50 MW facility and all related and ancillary infrastructure, including:

- 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,
- offices and workshop areas for maintenance and storage;
- temporary laydown areas; and

The proposed the Solar Facility will have a development footprint of approximately 160 ha, within which the solar field and other associated infrastructure is included. The development of the facility will comprise the following phases:

- Pre-Construction / Construction – will include pre-construction surveys; site preparation; establishment of the access road, electricity generation infrastructure, power line servitudes, construction camps, laydown areas, transportation of components/construction equipment to site; and undertaking site rehabilitation including implementation of a stormwater management plan.
- Operation – will include operation of the facility and the generation of electricity which will be fed into the national grid via the on-site substation and an overhead power line. The operation phase of the Solar Facility is expected to be in excess of 20 - 25 years.
- Decommissioning – depending on the economic viability of the plant, the length of the operational phase may be extended. At the end of the plant life, decommissioning will include site preparation; disassembling of the components of the facility; clearance of the site and rehabilitation. Note that impacts associated with decommissioning are expected to be similar to those associated with the construction activities. Therefore, these impacts are not considered separately within this chapter.

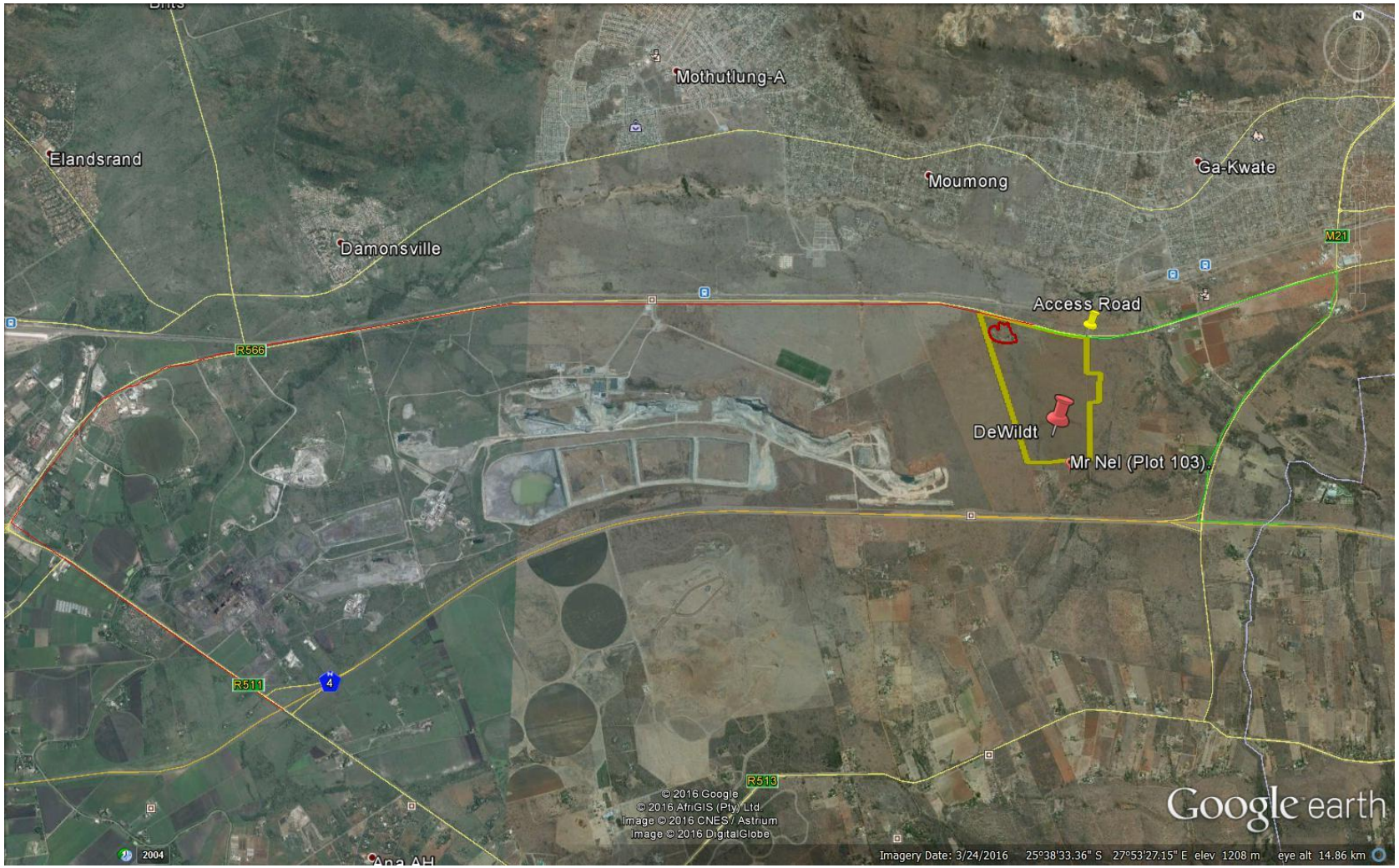


Figure 6-1: Alternative evaluation map

6.1 EVALUATION AND DESCRIPTION CRITERIA OF IMPACTS

The accumulated knowledge and the findings of the environmental investigations form the basis for the prediction of impacts. Once a potential impact has been determined during the scoping process, it is necessary to identify which project activity will cause the impact, the probability of occurrence of the impact, and its magnitude and extent (spatial and temporal). This information is important for evaluating the significance of the impact, and for defining mitigation and monitoring strategies. The aspects and impacts identified will therefore be described according to the following:

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:

6.1.1 Extent scale

The spatial extent for each aspect, receptor and impact will be defined. The geographical coverage description will take account of the following factors:

- The physical extent/distribution of the aspect, receptor and proposed impact; and
- The nature of the baseline environment within the area of impact.

For example, the impacts of noise are likely to be confined to a smaller geographical area than the impacts of atmospheric emissions, which may be experienced at some distance. The significance of impacts also varies spatially. Many will be significant only within the immediate vicinity of the site or within the surrounding community, whilst others may be significant at a local (municipal) or regional level.

Local	1
Area specific	2
Whole site/plant/solar PV park	3
Regional/neighboring areas	4
National	5

6.1.2 Duration scale

Duration refers to the length of time that the aspect may cause a change either positively or negatively on the environment. The environmental assessment will distinguish between different time periods by assigning a rating to duration based on the following scale:

Very short duration (0-1yr)	1
Short duration (2-5 years)	2
Medium-term (5–15 years)	3
Long term (> 15 years)	4
Permanent	5

6.1.3 Magnitude scale

The magnitude of an environmental aspect is determined by the degree of change to the baseline environment, and includes consideration of the following factors:

- The reversibility of the impact;
- The sensitivity of the receptor to the stressor;
- The impact duration, its permanency and whether it increases or decreases with time;
- Whether the aspect is controversial or would set a precedent; and
- The threat to environmental and health standards and objectives.

Small / vert low and will have no effect on the environment	1
Minor / low and will not result in an impact on processes	2
Moderate and will cause a slight impact on processes	3
High	4
Very high	5

6.1.4 Probability scale

The probability of the impact occurring refers to how often the aspect impacts or may impact either positively or negatively on the environment. After describing the probability the findings will be indicated on the following scale:

Very improbable (probably will not happen)	1
Improbable (some possibility, but low likelihood)	2
Probable (distinct possibility)	3

Highly probable (most likely)	4
Definite	5

6.1.5 Significance scale

- The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as very-low, low, medium-low, medium-high, high and very high

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)
- Greater than 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area)
- 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:

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

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

Measures to avoid, reduce or manage impacts consistent with best practice will be proposed and the effectiveness of such measures assessed in terms of their ability to avoid, remove an impact entirely, render it insignificant or reduce its magnitude. In assessing the significance of the impact, natural and existing mitigation will be taken into account. Natural and existing mitigation measures are defined as natural conditions, conditions inherent in the project design and existing management measures that alleviate (control, moderate or curb) impacts. In addition, the significance of impacts will be assessed taking into account any mitigation measures that are proposed.

An Environmental Management Plan (EMPr) has been prepared and is attached as an appendix. This plan specifies the methods and procedures for managing the environmental aspects of the proposed development. Monitoring requirements are also be detailed within the plan, particularly for those environmental aspects that give rise to potentially significant impacts

6.2 Alternatives Assessment

The establishment of renewable energy generating plant is considered a strategic project that seeks to facilitate the sustainability of energy supply within the country. No alternative site has been considered for the project due to constraints on substantial land availability within the De Wildt area. The applicant only has access to the preferred site. The area under consideration falls under a (CBA 1) situated in close proximity to an operating mine on the western wing boundary of the project site and is situated between the busy R566 and N4. Taking these aspects into and also the evaluation of the Ecologist, the site is considered to have a low connectivity potential for the preservation of the Marikana Thornveld.

The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects are considered. The details pertaining to each alternative considered, as well as the technical preference are provided below:

6.2.1 Development footprint:

- Preferred development footprint –This layout is technically preferred. There is however a drainage line that traverses the western margin of portion 15 of the project site, the footprint of the project will not temper with the drainage line. The drainage line has been avoided and an appropriate buffer has been established.
- Alternative development footprint – There isn't any alternative foot print considered as the PV module will require the full extent of the property with the exemption of the outlined high sensitive areas along the drainage line and the land portion west of the drainage line. Another factor of concern taken into consideration for not having considered an

alternative footprint is the potential for the shadowing effect with having to considered an alternative layout design hence an alternative footprint couldn't be feasible

6.2.2 Access roads:

The proposed project site is accessible via the major R566 national road found in the broader study area, which connects Brits and Pretoria in a west-east direction. The identified site is accessible from the R566 via a number of existing connecting roads.

The access road alternatives being considered for the project are as follows:

- Preferred Access Road 1 (green route in Figure 6.1): this is the most technically preferred access road. This route connects the site via the R566 from the N4. The R566 route runs across the northern margin of the project site then

- Preferred Access Road 2 (red in Figure 6.1): this is also a technically preferred access road. The route is approximately 16km in length and connects the site via the R511 – R566 route

6.2.3 Grid connection:

Only a single route for the proposed interconnection that will interconnect the Project into the national grid was considered, due to the following reasons:

- Eskom as the national utility has the final authority to approve any proposed interconnection lines of projects submitted into the REIPPPP. The Zolograph can therefore make suggestions as to proposed interconnection alternatives, however only Eskom has the knowledge to know where best any energy feeding into the grid can be absorbed. Zolograph had previously, in 2013 prior to its bid submission, approached Eskom with two alternatives, the one currently proposed as well as another alternative to connect to the existing 88Kv line that passes through the south-east corner of the site. This alternative interconnection to the south-east was rejected by Eskom due to capacity and load issues. Eskom then issued a cost estimate letter to the Project Company for the interconnection as included in the EIA report.

- The current preferred route is short (200m) and therefore minimizes environmental impact. Any other alternative would include a longer line which could result in greater environmental impacts and would increase potential environmental degradation. Furthermore, such an alternative would potentially also include the crossing of water resources which the project is trying to avoid.

- The proposed interconnection has undergone and passed Eskom's Technical Evaluation Forum ("TEF") and a Budget Quote has been issued for the Project. This is quite a lengthy, costly and detailed process which if restarted again, will delay Financial Close of the Project which may render the Project unfeasible.

- The preferred interconnection route has already been assessed by the required environmental specialists. Should the location of the interconnection line now be shifted, this would mean that Financial Close would be delayed as new assessments would have to be performed. The new assessments would also have significant cost impact.

- Although not of an environmental nature, it is worth noting that it is crucial that the Company obtains its consent within the DOE's timelines so as not to lose its Preferred Bidder status. Reapplying to Eskom to approve a new route as well as performing new specialist studies would substantially delay the Project. The Zolograph further stands to loses the R10 000 000 Preferred Bidder Bond that has been granted in favour of the DOE as security, not to mention the advisor fees incurred to date.

- Zolograph wishes to note that the purpose of the development of this renewable energy Project is to ensure sustainable development in accordance with the National Development Plan and Integrated Resource Plan. The development and construction of the Project contributes towards the fulfilment of the above-mentioned Government targets and the reduction of CO_2 emissions. It is furthermore noted that the Project will also assist by feeding much-needed electricity into the South African grid. The energy being provided by the Project will assist in alleviating the current energy constraints being experienced in the country.

It is important to note that the powerline alternative will be assessed through a stand-alone Basic Assessment process

Potential impacts pertaining to the project development footprint, access roads and grid connection are assessed in the sections below, and a comparative assessment of these alternatives is provided.

6.3 Potential Impacts on Ecology (Flora, Fauna and Ecosystems)

The 50MW PV facility has a development footprint of 160 ha, of which most of it will be covered in PV panels. Negative impacts on ecological resources will be due to loss of habitat which may have direct or indirect impacts on individual species. Potential impacts and the relative significance

of the impacts are summarized below, refer to (**Appendix 6a & 6f -** Ecology and Avifauna Reports for more details).

6.3.1 Results of the Ecological Study

The proposed development alignment traverses a Critical Biodiversity Area (CBA 1), an endangered vegetation type (Marikana Thornveld). The area is considered to have a low to moderate conservation potential. Uncontrolled development in and around these vegetation units is expected to impact on the associated Red Data species, populations, assemblages or communities.

Two plant species of conservation concern were observed in this unit (Table 5-1).

The proposed site has been degraded through livestock farming practices, the Marikana Thornveld vegetation unit has low to moderate species richness.

There is however a drainage line considered ecologically significant (ecological functioning), that transverse north-south through the proposed project site. The drainage line is situated within portion 15 of the farm Schietfontein 437 JQ. The drainage line area is excluded from the development footprint of the project, and would not be directly impacted on. However specific measures to prevent human impact will be implemented. The drainage line is a natural corridor and retaining this area open would facilitate the movement of fauna through the area.

6.3.2 Description of Ecological Impacts

The following impacts are identified as the major impacts associated with the development of both the facility and the associated infrastructure which are assessed, for the preconstruction, construction and operational phases of the development.

- **Impacts on vegetation:** It is confirmed that the area falls under CBA-1, however considering the immediate surrounding environment the Marikana Thornveld is considered to have a low sensitivity with a low conservation potential. The area has a low conservation potential considering the active mine west of the project site and the two major roads that lie north (R566) and south (N4) of the project site respectively.

- **Soil erosion and associated degradation of ecosystems:** The large amount of disturbance created during construction will leave the site vulnerable to soil erosion. There is considered fairly flat which reduces the risk of soil erosion. In addition, the large amount of hardened surface created by the development will generate significant amounts of runoff during occasional storm events and this will also pose a potential erosion hazard to those areas receiving the runoff.

- Direct impacts on fauna: Construction and operational phase noise, pollution, disturbance and human presence will be detrimental to fauna. Sensitive and shy fauna would move away from the area as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some mammals or reptiles such would be vulnerable to illegal collection or poaching during the construction phase as a result of the large number of construction personnel that are likely to be present though no tortoises were observed on site during the ecological survey.

- Impacts on Broad-Scale Ecological Processes and Loss of Landscape Connectivity: As there are no other renewable energy developments in the area, the project will set presidency within the area. The significance of this impact is considered to be low due to the significant disturbance around the project area from human activities.

- Reduced ability to meet conservation obligations and targets: The loss of protected vegetation types on a cumulative basis in respect of the entire area may impact the countries' ability to meet its conservation targets. The receiving vegetation types in the study area are classified as CBA-1 types that are moderately intact. The development of the site would result in the loss of 160 ha of habitat which can be considered least significant considering the current degraded state of the area and the low connectivity and conservation potential of the area. Parts of the site is used for dumping which affects the area negatively.

6.3.3 Impact table summarizing the significance of impacts on ecology during the construction, operation and decommissioning phases (with and without mitigation)

The development area of the development footprint consists of the Marikana Thornveld considered to be of moderate to low sensitivity. The impacts assessed below apply to the preferred development site, access road and grid connection infrastructure for the Solar Facility.

6.3.3.1 *Planning and Construction Phase Impacts:*

Nature: Impacts on vegetation and CBA-1 areas will occur due to vegetation clearing and disturbance associated with the construction of the facility.
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Medium-High (4)	Medium (3)
Probability	Likely Probable (4)	Probable (3)
Significance	**Medium (36)**	**Medium-Low (24)**
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Impacts on protected plant species can to some extent be mitigated through avoidance, but some impact on vegetation and habitat is inevitable and cannot be avoided.	

Mitigation

» Preconstruction walk-through of the facility in order to locate species of conservation concern that can be translocated.

» Vegetation clearing to commence only after walk through has been conducted and necessary permits obtained.

» Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.

» ECO to provide supervision and oversight of vegetation clearing activities near sensitive areas.

» Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared.

» All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed.

» Temporary lay-down areas should be located within the development footprint or within areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use.

Cumulative Impacts

The potential for cumulative impacts is low given that the project sets precedence in the immediate area. However, the affected vegetation types are widespread with a low conservation potential and the direct loss would not be highly significant. There is a slight visual impact and increased security status impact as land will be utilised.

Residual Impacts

Some residual habitat loss may result from the development, equivalent to the operational footprint of the facility.

Nature: Disturbance, transformation and loss of habitat will have a negative effect on resident fauna during construction.

Relevant Listed activities:
GNR 983 Activity: 11(i), 28 (ii)
GNR 984 Activity 1, 15
GNR 985 Activity 4(e)i, 12(a)i

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Medium (6)	Medium (4)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	**Medium (36)**	**Low (28)**
Status	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Impacts on vegetation can to some extent be mitigated through avoidance, but some impact on vegetation and habitat is inevitable and cannot be avoided.	

Mitigation

» All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.

» Any fauna threatened by the construction activities should be removed to safety by the ECO or appropriately qualified environmental officer.
» Regular dust suppression during construction, especially along access roads which are used frequently.
» No construction activity should be allowed at the site between sunset and sunrise.
» All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.
» All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.

Cumulative Impacts

During the construction phase, the activity would contribute to cumulative fauna disturbance and disruption in the area, but the impact would be of local extent and not of high significance with mitigation.

Residual Impacts

There will be some residual impact as the facility will persist past the construction phase.

Nature: Increased erosion risk as a result of soil disturbance and loss of vegetation cover as well as increased runoff generated by PV area and access roads.		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Medium (5)	Low (3)
Probability	Highly Probable (4)	Improbable (2)
Significance	**Medium (32)**	**Low (12)**
Status	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources	Yes	No
Can impacts be mitigated?	Yes	
Mitigation » Dust suppression and erosion management should be an integrated component of the construction approach. » Disturbance near to drainage lines should be avoided and sensitive drainage areas near to the construction activities should demarcated as no-go areas. » A low cover of vegetation should be left wherever possible within the construction footprint to bind the soil, prevent erosion and promote post-disturbance recovery of an indigenous ground cover.		
Cumulative Impacts Cumulative erosion impacts are likely to very low after mitigation		
Residual Impacts If erosion at the site is controlled during construction, then there will be very little residual impact.		

6.3.3.2 *Operational Phase*

Nature: The operation and presence of the facility may lead to disturbance or persecution of fauna.
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Medium-Low (4)	Low (3)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Low (24)**
Status	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	To some extent, but not that part related to the presence and operation of the facility.	

Mitigation

» No unauthorised persons should be allowed onto the site.

» Undesirable and problem fauna such snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location.

» The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden.

» If parts of the site must be lit at night for security purposes, this should be done with low-UV type lights (such as most LEDs), which do not attract insects.

» All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.

» All vehicles accessing or on the site should adhere to a low speed limit (20km/h max) to avoid collisions with susceptible species such as snakes and tortoises.

Cumulative Impacts

The development would contribute towards habitat loss for fauna in the area. Considering the various other activities occurring around the project site (i.e. mining activities) the cumulative impacts are potentially high. However, there is currently still a large amount of intact habitat in the area which can be used by fauna and no highly significant impacts are likely.

Residual Impacts

If alien species at the site are controlled, then there will be very little residual impact.

***Nature*:** Alien plants are likely to invade the site as a result of the large amounts of disturbance created during construction

Relevant Listed activities:
GNR 983 Activity: 11(i), 28 (ii)
GNR 984 Activity 1, 15

GNR 985 Activity 4(e)i, 12(a)i

	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Medium-term (3)
Magnitude	Medium (5)	Low (3)
Probability	Probable (4)	Improbable (3)
Significance	**Medium (40)**	**Low (21)**
Status	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	

Mitigation

» Due to the disturbance at the site as well as the increased runoff generated at the site, alien plant species are likely to be a long-term problem at the site and a long-term control plan will need to be implemented.
» Rehabilitation of cleared areas with indigenous species after construction to reduce alien invasion potential.
» Regular monitoring for alien plants within the development footprint.
» Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible

Cumulative Impacts

The development would contribute towards the disturbance of fauna and flora leading to potential of alien species invasion habitat loss for fauna in the area. Considering the various other activities occurring around the project site (i.e. mining activities) the cumulative impacts are potentially high. However, there is currently still a large amount of intact habitat in the area which can be used by fauna and no highly significant impacts are likely.

Residual Impacts

If alien species at the site are controlled, then there will be very little residual impact.

Nature: Increased erosion risk as a result of soil disturbance, loss of vegetation cover and increased runoff generated by roads and other hardened surfaces.

Relevant Listed activities:
GNR 983 Activity: 11(i), 28 (ii)
GNR 984 Activity 1, 15
GNR 985 Activity 4(e)i, 12(a)i

	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)

Duration	Long-term (4)	Medium-term (3)
Magnitude	Medium (5)	Low (3)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (40)**	**Low (21)**
Status	Negative	Negative
Reversibility	Low	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	

Mitigation

» All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk.

» Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance.

» All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.

» A cover of indigenous species should be established in disturbed areas in order to bind the soil and prevent erosion.

Cumulative Impacts

Cumulative impacts are likely to very low after mitigation

Residual Impacts

If erosion at the site is controlled, then there will be no residual impact

Nature: Impacts on vegetation and protected plant species will occur due to vegetation clearing and disturbance associated with the construction of the facility.

Relevant Listed activities:
GNR 983 Activity: 11(i), 28 (ii)
GNR 984 Activity 1, 15
GNR 985 Activity 4(e)i, 12(a)i

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Medium-High (6)	Medium (5)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (44)**	**Medium-Low (30)**

Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Impacts on protected plant species can to some extent be mitigated through avoidance, but some impact on vegetation and habitat is inevitable and cannot be avoided.	
Mitigation		
» Preconstruction walk-through of the facility in order to locate species of conservation concern that can be translocated. » Vegetation clearing to commence only after walk through has been conducted and necessary permits obtained. » Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc. » ECO to provide supervision and oversight of vegetation clearing activities near sensitive areas. » Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared. » All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed. » Temporary lay-down areas should be located within the development footprint or within areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use.		
Cumulative Impacts The potential for cumulative impacts is high given the abundance of activity in the immediate area. However, the affected vegetation types are widespread and the direct loss would not be highly significant.		
Residual Impacts Some residual habitat loss will result from the development and expansion of already existing activities.		

6.3.4 Comparative Assessment of Alternatives

<u>Access road:</u>

All of the proposed alternative routes, are existing road, both options will require the access area to the site to be upgraded. In terms of impacts arising existing access reduce the ecological impacts. The access point will have to be constructed to the required specifications of an access

road, minimizing the potential erosion risks to a certain degree. Considering the fact that both roads are already existing, both alternative will be used as suitable to reduce traffic congestion

Aspect	Alternative 1 (Preferred) Access Road 1	Alternative Access Road 2
Ecology	Acceptable – **preferred alternative** » Utilise existing road » Limited new impacts	Acceptable – » Utilise existing road » Limited new impacts

Grid connection:

An alternative grid connection point was not considered in this report, please refer to (2.4.2) and (6.2.3).

6.3.5 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the severity of ecological impacts of the PV facility can be reduced to low, or avoided. The Solar Facility can be developed and ecological impacts managed by taking the following into consideration:

- Although there are some sensitive features within the wider site, the layout of the site was developed following mapping of sensitive features at the site. As such, the layout avoids the major sensitive feature of the drainage line. The presence of CBA-1 vegetation within the development footprint the conversation value is considered low

- The majority of the development area including associated linear infrastructure and grid connection alternative consists of the Marikana Thornveld considered to be of moderate to low sensitivity. The development of the project would result in the loss of habitat and species.

The drainage line has been excluded from the development footprint and would not be directly impacted by the development.

6.4 Potential Impacts on Avifauna

6.4.1 Results of the Avifaunal Study

A large portion of the study area has been assessed as being of Low and Medium sensitivity from an avifaunal perspective (Figure 6-2). Furthermore, it is unlikely that the construction of the solar farm will have a negative effect on any of the avifaunal species if control measure and stated mitigation measures are implemented.

High sensitivity avifaunal habitats are associated with the drainage line habitat which traverses the study area. Although this contributes a small portion of the area, they are ecologically significant and represent an important habitat for avifaunal activity and attract many species. It is important to maintain the connectivity of the drainage lines within the area and protect them from degradation.

It is important that mitigation measures are implemented to ensure that edge effects of the development do not occur. The development footprints occur within the low to moderate sensitive areas.

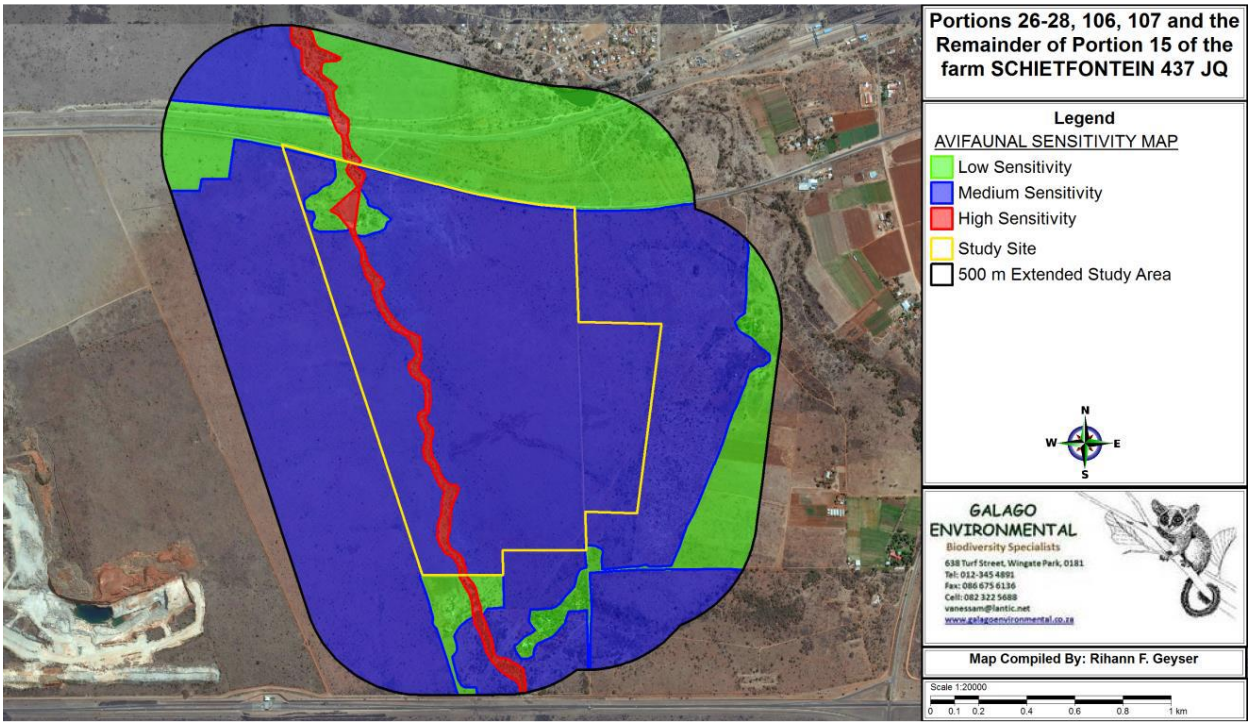


Figure 6-2: Avifaunal sensitivity map (source Galago Environmental)

6.4.2 Description of Avifaunal Impacts

The following impacts are identified as the major impacts associated with the development and which are assessed, for the preconstruction, construction and operational phases of the development site alternatives as well its associated infrastructure (Appendix 6f).

- Impact on local bird community due to habitat destruction: Habitat destruction and the subsequent displacement of species are impacts that can be associated with solar energy facilities. Due to the land requirements of the proposed photovoltaic solar facility (~160 ha), this will result in the loss of avian micro-habitats located within the development site. The nature of the development means that the majority of the site will be transformed. The impact on avifaunal species will mostly be local in extent, and will not have a significant effect on regional or national populations. The habitat is already largely transformed and fragmented.

- Impact on local bird communities due to disturbance: The disturbance of avifauna during the construction and operation of the solar facility may occur. Species sensitive to disturbance are ground-nesting species resident within the development footprint. Disturbance can also influence the community structure of avifauna within close proximity to the development as certain species will be displaced and forced to find alternative territories. Avian species with small territories are particularly susceptible as a large portion of their territory may be replaced by the facility. Disturbance could have a negative impact on the breeding activities of various species, particularly if this occurs during a sensitive period in the breeding cycle.

The proposed project location within an agricultural habitat close to the main road (R566). Therefore, species within this landscape often experience disturbance. As a result, disturbance of birds by the proposed solar facility is anticipated to be of moderate significance. The relatively small scale of the development (in relation to the large agricultural landscape) is unlikely to have a significant impact on avifauna. However, species are particularly sensitive to disturbance during the breeding season and this must be borne in mind during both the construction and operational (maintenance) phases.

- Electrocution of birds on substation/switching infrastructure: Since there is live hardware in the substation yard, there is a potential for birds to bridge the gap between a phase and earth resulting in electrocution. However, very few electrocutions have been recorded on distribution substations. The impact assessment found the impact of electrocution on substation infrastructure to be of low significance once mitigation in the form of bird friendly structures and bird deterrent measures have been put in place.

- Electrocution of birds on overhead powerline - Electrocution of birds on associated overhead power lines is an important cause of mortality for a variety of large bird species in South Africa. There are existing powerlines running west-east along the northern and southern boundary of portion 15 respectively and electrocution of avifauna species hasn't been observed. It is of the professional opinion of the avifaunal specialist that powerline electrocution of bird species can be avoided if mitigation measure are well implemented. The impact assessment found the impact of electrocution to be of moderate significance, and low significance after the mitigation in the form of bird friendly structures are implemented.

- Collisions with solar panel infrastructure: The solar energy facility is comprised of reflective paneling occupying a large area. Avifaunal species can be disorientated by the reflected light, and consequently be displaced from an area more extensive than just the developed footprint of the facility. Conversely, certain bird species may be attracted to the solar arrays. It is considered that water-birds often mistake the reflective surface for an expanse of water body, and attempt to land on the panels which may result in injuries from colliding with the solar infrastructure. This impact has not been recorded on any installed facilities in South Africa to date.

- Collisions with the power: Collisions are the biggest single threat posed by power lines to birds in Southern Africa. Avian species most susceptible and impacted upon are those species which are heavy-bodied with limited maneuverability (as a result of high wing loading), which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines. (Van Rooyen 2004, Anderson 2001).

- Use of solar infrastructure by avian species: Certain avian species are quick to seize a novel opportunities for nesting, roosting and perching. In this landscape there aren't many large trees. It is likely then that certain avifaunal species are likely to use certain parts of the proposed photovoltaic facility (panels or power line tower structures) for nesting, roosting and perching. Small raptors may use structures for perching during foraging bouts. These impacts typically create operational complications for the facility, which require management actions and maintenance.

6.4.3 Impact tables summarising the significance of impacts on avifauna (with and without mitigation)

The impacts assessed below apply to the preferred development site, access road for the Solar Facility, and the grid connection infrastructure.

Nature: Impact on local bird community due to habitat destruction from the construction of the solar PV plant over an area of 160 ha, which is considered total loss in terms of natural habitat		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i		
	Without mitigation	**With mitigation**
Extent	Low (1)	Low (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Very high (5)	High (4)
Probability	Definite (5)	Definite (5)
Significance	**High (50)**	**Medium (45)**
Status	Negative	Negative
Reversibility	Possible	Possible
Irreplaceable loss of resources	None	None
Can impacts be mitigated	Yes	Yes
Mitigation measures: » All construction and maintenance activities must be carried out according to the generally accepted environmental best practice and the temporal and spatial footprint of the development should be kept to a minimum. In particular, care must be taken in the vicinity of the drainage lines and existing roads must be used as much as possible for access during construction. » The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area. » Provide adequate briefing for site personnel. » Any bird nests that are found during the construction period must be reported to the Environmental Control Officer (ECO). » The above measures must be covered in a site specific EMPr and controlled by an ECO.		

Cumulative impacts:

The loss of habitat on-site has the potential to add to the cumulative impacts that habitat loss in the region is having on avifauna. However, ±160 ha in the context of the amount of similar habitat in the region is a negligible amount.

Residual impacts:

Localised loss or displacement of avifauna species.

Nature: Impact on local bird community due to habitat destruction from the construction of the associated grid connection infrastructure (Substation and Powerline)

Relevant Listed activities:
GNR 983 Activity: 11(i), 28 (ii)
GNR 984 Activity 1, 15
GNR 985 Activity 4(e)i, 12(a)i

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Definite (5)
Significance	**Medium (60)**	**Medium (50)**
Status	Negative	Negative
Reversibility	Possible	Possible
Irreplaceable loss of resources	None	None
Can impacts be mitigated	Yes	Yes

Mitigation measures:

» All construction and maintenance activities must be carried out according to the generally accepted environmental best practice and the temporal and spatial footprint of the development should be kept to a minimum. In particular, care must be taken in the vicinity of the drainage lines and existing roads must be used as much as possible for access during construction.

» The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area.

» Provide adequate briefing for site personnel.

» Any bird nests that are found during the construction period must be reported to the Environmental Control Officer (ECO).

» The above measures must be covered in a site specific EMPr and controlled by an ECO

Cumulative impacts:

The loss of habitat on-site has the potential to add to the cumulative impacts that habitat loss in the region is having on avifauna. However, ±160 ha in the context of the amount of similar habitat in the region is a negligible amount.

Residual impacts:

Localised loss or displacement of avifauna species.

Nature: Impact on local bird community due to disturbance on site and in surrounding area from the construction of the solar PV plant and associated infrastructure (including Substation and Powerline)

Relevant Listed activities:
GNR 983 Activity: 11(i), 28 (ii)
GNR 984 Activity 1, 15
GNR 985 Activity 4(e)i, 12(a)i

	Without mitigation	**With mitigation**
Extent	Local (2) Infrastructure: Local (1)	PV: Local (2) Infrastructure: Local (1)
Duration	Short duration (2)	Short duration (2)
Magnitude	PV: Very high (5) Infrastructure: High (4)	PV: High (4) Infrastructure: Moderate(3)
Probability	Definite (5)	Highly possible (4)
Significance	PV: **Medium (45)** Infrastructure: **Medium (35)**	PV: **Medium (32)** Infrastructure: **Low (24)**
Status	Negative	Negative
Reversibility	Possible	Possible
Irreplaceable loss of resources	None	None
Can impacts be mitigated	Yes	Yes

Mitigation measures:

» Strict control must be maintained over all activities during construction, in line with an approved Construction EMPr.
» The construction camps must be as close to the site as possible
» Contractors and working staff should stay within the development footprint and movement outside these areas including avian micro-habitats must be restricted.
» Driving must take place on existing roads and a speed limit of 20km/h must be implemented on all roads running through the study area during all phases.

Cumulative impacts:

Development around the project site has a cumulative impacts on birds, however limited due to the species which occur in the area.

Residual impacts:

Localised loss or displacement of avifauna species.

Nature: Impact on local bird community due to disturbance on site and in surrounding area from the operation of the solar PV plant and associated infrastructure (including Substation and Powerline)

Relevant Listed activities:
GNR 983 Activity: 11(i), 28 (ii)
GNR 984 Activity 1,

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Highly possible (4)	Highly possible (4)
Significance	**Medium (48)**	**Low (36)**
Status	Negative	Negative
Reversibility	Possible	Possible
Irreplaceable loss of resources	None	None
Can impacts be mitigated	Yes	Yes

Mitigation measures:

» Strict control must be maintained over all activities during construction, in line with an approved Construction EMPr.
» The construction camps must be as close to the site as possible
» Contractors and working staff should stay within the development footprint and movement outside these areas including avian micro-habitats must be restricted.
» Driving must take place on existing roads and a speed limit of 20km/h must be implemented on all roads running through the study area during all phases.

Cumulative impacts:

Development around the project site has a cumulative impacts on birds, however limited due to the species which occur in the area.

Residual impacts:

Localised loss or displacement of avifauna species.

***Nature*:** Impact on local bird communities due to collision with solar panel infrastructure:

Relevant Listed activities:
GNR 983 Activity: 11(i), 28 (ii)
GNR 984 Activity 1,

	Without mitigation	**With mitigation**
Extent	Low (2)	Low (1)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Improbable (2)
Significance	**Medium (36)**	**Low (22)**
Status	Negative	Negative
Reversibility	No	No
Irreplaceable loss of resources	Yes – bird fatalities	Yes – bird fatalities
Can impacts be mitigated	Yes	Yes

Mitigation measures:

» It is recommended that the Solar photovoltaic (PV) solar farm type be used since this will have the least impact on avifaunal species.
» Where possible the construction of the solar farm should take place in the area that has already been disturbed or degraded by past and present human activities.
» Construction in dense woodland area, especially along drainage lines should be avoided, as many avifaunal species are associated with trees that grow along these conduits.
» Construction should not take place near large trees which serves as nesting or roosting sites for raptors and vultures – large trees are a limited resource in dry areas.
» Solar arrays should not be constructed in areas close to roosting and breeding sites of significant populations of threatened, endemic, rare or range-restricted avifaunal species, as their flight paths might be across the solar farm.
» Ideally, the solar facility should be designed from concept stage to feed into existing power lines or should be used locally and therefore be independent of the grid.
» New lines should be constructed in such a way that they have a minimal impact on the birds by using bird-friendly designs and appropriate devices for marking the wires.
» New power lines should follow existing roads wherever possible.
» The amount of vegetation that is cleared should be kept to the minimum so as to limit habitat loss.
» Grazing or careful mowing should be used to retard the regrowth of vegetation and not chemical herbicides.
» The vegetation under the solar panels should be kept short at all times to prevent fires and to prevent avifaunal from breeding or nesting on the ground.
» The technology that is used can be chosen to minimise impact on birds, as reflective surfaces which are parabolic (curved) will reduce the extent of sky reflection, relative to flat heliostats. It should be ensured that trough receivers utilise evacuated glass tubes or similar technology to reduce heat loss. This will mean lower surface temperatures which will not burn birds.
» The plant should either be upgraded or decommissioned after the normal 20 year expected lifespan.
» The cables of high voltage powerlines connecting the solar farm with the Schietfontein grid, especially the thin earth-wires or lines above large powerlines that could form part of the site should be fitted with bird diverters such as tags to prevent birds

from colliding with the powerlines. This should not only be done at the direct vicinity of the study site but along the entire route that the powerlines will follow to their destination.

» Strict control must be maintained over all activities during construction, in line with an approved Construction EMPr.
» The construction camps must be as close to the site as possible
» Contractors and working staff should stay within the development footprint and movement outside these areas including avian micro-habitats must be restricted.

Cumulative impacts:

Development around the project site has a cumulative impacts on birds, however limited due to the species which occur in the area.

Residual impacts:

Localised loss or displacement of avifauna species.

Nature: The electrification of birds on associated substation/switching infrastructure.

Relevant Listed activities:
GNR 983 Activity: 11(i), 28 (ii)
GNR 984 Activity 1

	Without mitigation	**With mitigation**
Extent	Low (1)	Low (1)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Minor (2)
Probability	Improbable (2)	Very improbable (1)
Significance	**Low (18)**	**Low (7)**
Status	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources	Yes – bird fatalities	Yes- Bird fatalities
Can impacts be mitigated	Yes	Yes

Mitigation measures:

» It is recommended that the Solar photovoltaic (PV) solar farm type be used since this will have the least impact on avifaunal species.
» Where possible the construction of the solar farm should take place in the area that has already been disturbed or degraded by past and present human activities.
» Construction in dense woodland area, especially along drainage lines should be avoided, as many avifaunal species are associated with trees that grow along these conduits.

» Construction should not take place near large trees which serves as nesting or roosting sites for raptors and vultures – large trees are a limited resource in dry areas. » Solar arrays should not be constructed in areas close to roosting and breeding sites of significant populations of threatened, endemic, rare or range-restricted avifaunal species, as their flight paths might be across the solar farm. » Ideally, the solar facility should be designed from concept stage to feed into existing power lines or should be used locally and therefore be independent of the grid. » New lines should be constructed in such a way that they have a minimal impact on the birds by using bird-friendly designs and appropriate devices for marking the wires. » New power lines should follow existing roads wherever possible. » The amount of vegetation that is cleared should be kept to the minimum so as to limit habitat loss. » Grazing or careful mowing should be used to retard the regrowth of vegetation and not chemical herbicides. » The vegetation under the solar panels should be kept short at all times to prevent fires and to prevent avifaunal from breeding or nesting on the ground. » The technology that is used can be chosen to minimise impact on birds, as reflective surfaces which are parabolic (curved) will reduce the extent of sky reflection, relative to flat heliostats. It should be ensured that trough receivers utilise evacuated glass tubes or similar technology to reduce heat loss. This will mean lower surface temperatures which will not burn birds. » The plant should either be upgraded or decommissioned after the normal 20 year expected lifespan. » The cables of high voltage powerlines connecting the solar farm with the Schietfontein grid, especially the thin earth-wires or lines above large powerlines that could form part of the site should be fitted with bird diverters such as tags to prevent birds from colliding with the powerlines. This should not only be done at the direct vicinity of the study site but along the entire route that the powerlines will follow to their destination. » Strict control must be maintained over all activities during construction, in line with an approved Construction EMPr. » The construction camps must be as close to the site as possible » Contractors and working staff should stay within the development footprint and movement outside these areas including avian micro-habitats must be restricted.
Cumulative impacts: There are a number of substation/switching infrastructure in the vicinity. With mitigation, it is considered unlikely that the addition of the proposed substation/switching infrastructure will significantly add to the cumulative impact of electrocution events in the region.
Residual impacts: Localised loss or displacement of avifauna species.

6.4.4 Comparative Assessment of Alternatives

Access road: All of the proposed alternative routes, are existing road, both options will require the access area to the site to be upgraded. In terms of impacts arising existing access reduce the ecological impacts. The access point will have to be constructed to the required specifications of an access road, minimizing the potential erosion risks to a certain degree. Considering the fact that both roads are already existing, both alternative will be used as suitable to reduce traffic congestion

Aspect	Alternative Access Road 1	Alternative Access Road 2
Avifauna	Acceptable – **preferred alternative** » Utilise existing road » Least disturbance and displacement for avifauna	Less preferred – » Crosses major drainage line and close to a high sensitivity avifaunal area

Grid connection: An alternative grid connection point was not considered in this report, please refer to (2.4.2) and (6.2.3).

6.4.5 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the severity of avifaunal impacts of the PV facility can be reduced to low, or avoided. The Solar Facility can be developed and impacts on avifauna managed by taking the following into consideration:

- Construction of the preferred on-site substation and associated overhead power line, ensuring a limited threat to the birds occurring in the vicinity of this infrastructure is likely to pose a low risk, considering that there are powerline currently existing, running across the proposed site

- A post construction avifauna monitoring programe may need to be initiated at the site.

6.5 Potential Impacts on Heritage & Paleontology on Sites

As areas are developed and landscapes are modified, heritage resources, including paleontological resources, are threatened. As such, both the environmental and heritage legislation require that development activities must be preceded by an assessment of the impact undertaken by qualified professionals.

The geology of the area is dominated by igneous rocks of the Bushveld Igneous Complex. Sedimentary rocks of a fossiliferous nature are absent from the study area. Due to the improbability of fossils occurring in the study area it is recommended that the project should be exempted from further paleontological studies.

Potential heritage impacts and the relative significance of the impacts are summarised below.

6.5.1 Results of the Heritage Survey

The study was not able to identify any material of significance in the proposed area, this could be that there are no archaeological sites within the proposed area or, it could be as a result of bush encroachment, wherein materials could be hidden. It is the recommendation of the archeologist that the project should continue under the following conditions:

- An archaeologist must be assigned during bush clearing to further assess the area. This will ensure that no chance archaeological/ and or graves are compromised/ disturbed by the proposal. However, as aforesaid, chances of encountering archaeological sites in these portions are considered low.

Although no archaeological objects were observed during the survey, the client is reminded 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. In the meantime, 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 developer should induct field worker about archaeology, and steps that should be taken in the case of exposing archaeological materials.

6.5.2 Description of the heritage impacts

Paleontological resources: The study area is situated south the R566 between Pretoria (Tshwane) in the east and Brits to the west. Geomorphologically it lies within the western limb of the Bushveld Complex and is bordered in the south by the Magaliesberg Mountains. The Magaliesberg mountain range has an east-westerly orientation and is a geological feature associated with the formation of the Bushveld Igneous Complex. The northern border of the Cradle of Humankind lies to the south of the Magaliesberg, west of Pretoria while patches of the Ecca Group occur to the east of Pretoria north and south of the Magaliesberg. The Cradle of Humankind is well known for its karstified dolomites of the Malmani Subgroup of the Transvaal Supergroup containing thousands of Plio-Pleistocene fossils, including those of the ancestors of humankind. The Ecca

Group of the Karoo Supergroup contain vast amounts of Permian leaf imprints of plants such as *Glossopteris*.

The study area is dominated by igneous rocks which do not preserve fossils. The nearest known fossil sites are situated kilometers to the south and the east of the study area.

Heritage: The North West region possesses a heritage dating to the dawn of humankind, sites such as the Cradle of Humankind World Heritage site signify the depth of the history represented in the North West and Gauteng Province. The Magaliesberg area, like most of North West region has a culture history that goes back to Stone Age periods (also see Deacon and Deacon, 1997). The San left behind a large amount of archaeological evidence including hunting camps marked with stone tools and rock art (Deacon and Deacon 1999). These date back to Earlier Stone Age and may date between 1, 5 million to 250 000 years ago. A good case study ESA sites is the Taung and Sterkfontein World Heritage site shared between the North West and Gauteng Province. The sites yielded evidence of earliest human evolution dating to between 1.5 million years and 250 000 years old. As such the sites are referred to as the cradle of humankind. In line with cultural history chronology the large hand axes and cleavers were replaced by smaller stone tools of the Middle Stone Age (MSA) which consists of flake and blade industries.

The Later Stone Age is characterised by sites of San hunter-gatherers and Khoi pastoralists. Despite their estimated ubiquitous, LSA sites pose bigger challenge to identify in situ because they are spread on open lands most of which are concealed by vegetation and buried underground. Most LSA sites are represented by few stone tools and few fragments of bone (Deacon and Deacon 1999). However the most notable LSA sites that yielded most evidence are those that survived in rock shelters and caves associated with mountain ranges. Magaliesburg Mountains have yielded large collections of LSA sites. The caves and rock shelters exhibit occupational deposits left behind by generations of LSA hunters. The deposits are well preserved consisting of living deposits and rock art paintings along the walls (Deacon and Deacon 1999). About 2000 years ago, evidence of pastoralism started emerging in LSA sites associated with the Khoi pastoralists. The Khoikhoi pastoralists predate the Bantu farmers by centuries. They introduced food production in Southern Africa. They are credited for introducing the first domesticated animals (sheep, goats and cattle and the use of ceramics vessels in Southern Africa (Deacon and Deacon 1999).

The Iron Age of the North West region dates back to the 4th century AD when the Early Iron Age proto-Bantu-speaking farming communities began arriving in this region, which was then occupied by hunter-gatherers. These EIA communities are archaeologically referred to as the Olifantspoort, Buispoort, Thabeng and Uitkomstfacies of the Urewe EIA Tradition (Huffman 2007). The Iron Age communities occupied the foot-hills and valley lands introducing settled life, domesticated livestock, crop production and the use of iron (Huffman 2007).

The area around North West is well known for its vast treasure of archaeological Iron Age settlement that that are scattered between Brits and Rustenburg and to the Pilanesberg. Bokfontein closer to Wolhuterskop yielded Uitkomst pottery from a stone walled site (Huffman 2007). The areas to the southwest of Pilanesberg, such as Pilwe and the Matlapeng Mountains, were not only extensively occupied by the Batlokwa, but were also inhabited by two Batlhako who settled and controlled the area before the arrival of both the Bakgatla and Batlokwa. By 1050 AD Sotho-Tswana Bantu-speaking groups associated with the Late Iron Age called the Blackburn sub-branch of the Urewe Tradition had arrived in the western regions of South Africa, including modern day North West, migrating from the central African region of the Lakes Tanganyika and Victoria (Huffman 2007). According to archaeological data available, the Blackburn facies ranged from AD 1050 to 1500 (*ibid.* p.155). The North West regions saw the development of the LIA Ntsuanatsatsi, Uitkomst and Rooibergfacies between AD 1350 and 1750. This Iron Age archaeological facies represent North West migration by LIA Tswana speaking groups (Huffman 2007). The Late Iron Age Tswana communities indirectly engaged in the Indian Ocean Trade exporting ivory and importing consumables such as cloth and glass beads. The exporting point was Delagoa. This brought the Tswana speaking community in touch with the Indo-Asian and first Europeans (Portuguese). It was the arrival of the Dutch and the English traders that opened up Delagoa Bay to more trade with the international traders (Huffman 2007).

Although no archaeological objects were observed during the survey, the client is reminded 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.

6.5.3 Impact tables summarising the significance of impacts on heritage resources (with and without mitigation)

The impacts assessed below apply to the development site, access road and grid connection infrastructure for the Solar Facility.

Nature: During the construction phase activities resulting in disturbance of surfaces and/or subsurfaces for PV plant, access roads and grid connection may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (1)	Low (1)
Probability	Unlikely (2)	Most unlikely (1)
Significance	**Medium (14)**	**Low (7)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: No preconstruction mitigation needed. No artefact of significance were observed on site. Although no archaeological objects were observed during the pre-construction survey, the client is reminded 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.		
Cumulative impacts: Archaeological sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.		
Residual Impacts: Depletion of archaeological record of the area.		

Nature: During the construction phase activities resulting in disturbance of surfaces and/or subsurfaces for PV plant, access roads and grid connection may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects***.***		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (3)	Low (1)
Probability	Most Likely (4)	Likely (3)
Significance	**Medium (40)**	**Low (21)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes

Can impacts be mitigated?	Yes	
Mitigation: It is recommended that should any material of archaeological significance be discovered, the site should be demarcated and excluded from the development until an accredited archaeologist can study the discovery		
Cumulative impacts: Archaeological sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.		
Residual Impacts: Depletion of archaeological record of the area**.**		

6.5.4 Comparative Assessment of Alternatives

Access road:

All of the proposed alternative routes, are existing road, both options will require the access area to the site to be upgraded. In terms of impacts arising existing access reduce the ecological impacts. The access point will have to be constructed to the required specifications of an access road, minimizing the potential erosion risks to a certain degree. Considering the fact that both roads are already existing, both alternative will be used as suitable to reduce traffic congestion

Aspect	**Alternative (Preferred) Access Road 1**	**Alternative Access Road 2**
Heritage and Palaeontology	Acceptable – **preferred alternative** » Avoids heritage features	Acceptable – » Avoids heritage features

Grid connection:

An alternative grid connection point was not considered in this report, please refer to (2.4.2) and (6.2.3).

6.5.5 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the severity of impacts of the PV facility can be reduced to low, or avoided. The Solar Facility can be developed.

Although no archaeological objects were observed during the survey, the client is reminded 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. In the meantime, 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.

6.6 Potential Noise impact

Construction and operational activities of the proposed development, will most probably lead to the generation of noise. Generated noise can become a nuisance (or health risk) when it is not properly managed and mitigated. The noise can be a concern to the proposed development and the surrounding land users.

As various activities can contribute to noise generation, it is important to determine the extent of noise generated by the proposed activities. This can in turn lead to the management and mitigation of noise generating activities by means of implementing different measures with the aim of preventing the noise generated from being perceived as a nuisance.

6.6.1 Results of the soil impact study

During the day time assessment, three exceedances of the limit occurred, at NM1, NM7 and NM8. The noise measured exceeded the limit of 70 dB with a value of 59.3 up to 70.6 dB. The remaining monitoring points indicated lower ambient noise in the range of 44.8 dB up to 48.6 dB. The point exceeding the limit is situated along the R566 and are more than likely to exceed the limit continually with different vehicles travelling on the road (Appendix 6e).

During the night time assessment, exceedances occurred at all of the eight monitoring points. The greatest of these occurred at NM1, NM7 and NM8, which is again the monitoring points directly adjacent to the R566 road. The remainder of

monitoring points indicated lower ambient noise levels very similar to those measured during the day time with minor increases.

Table 6-1: Monitoring Point conditions / characteristics

Monitoring point	Conditions / Characteristics
NM1	Site access entrance on the R566, on the north eastern boundary. Various types of vehicles utilizing the road.
NM2	Site boundary to the East with very little noise generating activities. Low ambient noise levels, typical to the Thornveld.
NM3	Site boundary to the southeast with very little noise generating activities. Low ambient noise levels, typical to the Thornveld. This point is the closest to a sensitive receptor.
NM4	Southern site boundary with very little noise generating activities. Low ambient noise levels, typical to the Thornveld. This point is also situated close to a sensitive receptor.
NM5	South-western site boundary with very little noise generating activities. Low ambient noise levels, typical to the Thornveld. This point is also situated close to a sensitive receptor.
NM6	Site boundary to the West with very little noise generating activities. Low ambient noise levels, typical to the Thornveld.
NM7	North-western site boundary, directly adjacent to the R566. Various vehicles moving past this point. Ambient noise levels much higher due to the vehicle movement.
NM8	The northern site boundary, directly adjacent to the R566. Various vehicles moving past this point. Ambient noise levels much higher due to the vehicle movement.

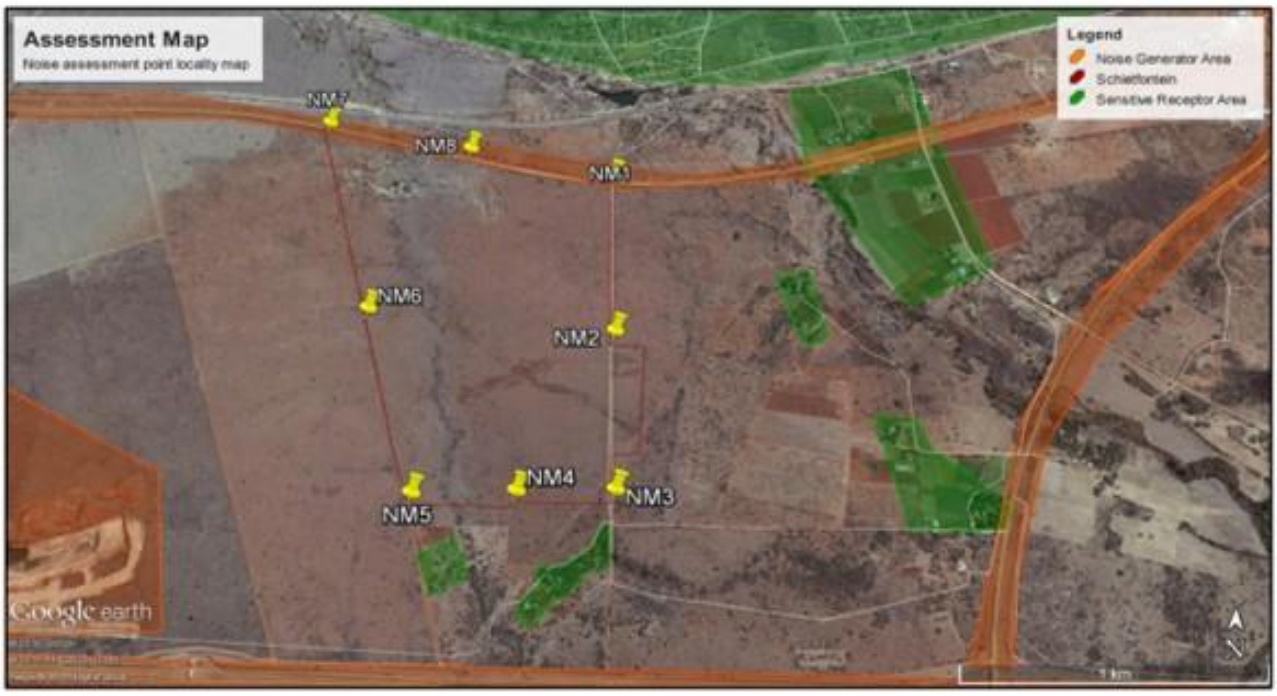


Figure 6-3: Noise assessment map

6.6.2 Description of noise impact

As can be reasonably expected, the proposed activities will give rise to a certain amount of noise generated, possibly exceeding the set limits. However the zoning of the area should be changed to Industrial. The sensitive receptors identified in the noise impact study (Appendix 6e) could possibly be affected by the proposed development,

The impact however should be the highest during the construction phase due to various equipment installation and industrial equipment use and less so during the operational phase where construction is ceased.

Typical activities associated with construction activities often generate noise and will be perceived as an annoyance, however these will be limited to the construction phase and very limited to maintenance during the operational phase.

The general noise measured from a PV plant, measured at 10 m is 60 dB reducing with distance away from the site. This is approximately equal to the noise generated by a large air conditioner. In addition, when the sun is not shining, no power can be generated, further reducing the noise that can be expected during the evening ("Solar PV inverter decibel levels: Do solar farms make noise? - Solar Choice", 2016).

From studies conducted ("Inverter Noise Emissions from a solar PV application", 2016) on existing PV installations, specifically the inverter as the main noise generator, at a distance of approximately 15 m away from the source, the noise measured was at around 65 dB. At 65 m, the noise measured was 52 dB and at approximately 110 m away from the source, the noise was measured at 47 dB. Please refer to (Appendix 6e).

The noise generated from the operational phase is not perceived to be a nuisance due to the distance of the receivers away from the proposed development.

Therefore the noise expected from the general operation of the activity is expected to be acceptable and the noise in line with the ambient noise of the proposed site.

6.6.3 Impact tables summarising the significance of noise impacts (with and without mitigation)

The impacts assessed below apply to the preferred development site, access road for the Solar Facility, and the grid connection infrastructure.

Nature: Noise impact during the construction phase.		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i		
	Without mitigation	**With mitigation**
Extent	Area specific (2)	Local (2)
Duration	Medium-term (1)	Short (1)
Magnitude	High (3)	Minor (2)
Probability	Definite (4)	Probable (3)
Significance	**Medium (24)**	**Low (15)**
Status	Negative	Less Negative
Can it be reversed	No	Yes
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	
Mitigation: General		

Regular monitoring of noise generating activities should occur. This will serve as the core of noise mitigation as it will enable the determination of problem areas. If deemed necessary, the points indicating exceedances in the current study could be re-measured.
» Personal Protective Equipment to all persons working in areas where high levels of noise can be expected.
» Major noise generating activities can be restricted to between 06h00 and 18h00 on Monday to Friday, and 06h00- 13h00 on Saturdays and Sundays.
» Placement of noise generating activities can be planned as far away as possible from affected areas and/or persons.
» Installation of acoustic enclosures for equipment to stop noise at the source.
» Ensure that all staff on the proposed activity is provided with "noise sensitivity" training to ensure noise generation is limited.
» The efficiency of noise mitigation measures should be assessed on a regular basis.
» No amplified music should be allowed on the site.
» Good public relations are essential. The information provided to stakeholders should be factual and not set unrealistic expectations.
» A clear line of communication should be in place where complaints can be lodged and response can be provided on.
» A clear commitment should be made on accommodating the local communities in preventing noise as far as possible. and
» Should any complaints regarding noise be received from the adjacent community / staff, a baseline noise assessment and subsequent noise monitoring should be conducted.
» Limit vehicle movement to daylight hours.
» All vehicles to be fitted with low noise and frequency hooters.
» Ensure that vehicles are fitted with noise reduction measured such as mufflers, etc.
» Ensure that vehicles on the site are serviced on a regular basis to ensure that noise suppression mechanisms are effective.
» Regular inspections and maintenance of equipment, vehicles and machinery to prevent unnecessary noise. and
» All vehicles should be switched off when not in use.

Construction

» A noise prevention barrier should be erected in areas where noise can travel to sensitive receptors. This barrier should be placed as close to the noise generating activity as possible.
» All construction equipment and machinery should be serviced on a regular basis.
» All construction equipment and machinery should be fitted with noise reduction technology to prevent noise generation as far as possible.
» All construction activities should be limited to daylight hours alone. Generally work should not be allowed on Sundays and Public Holidays.
» All noise generating activities/installations should be planned and placed as far away from sensitive receptors as possible.
» Should this not be possible, noise barriers should be installed at various positions around these noise generators.
» All equipment should be switched off when not in use.
» No workers should be allowed to stay on the site.
» Site workers must comply with the Provincial Noise Regulations.
» Appropriate directional and intensity settings are to be maintained on all hooters and sirens. and
» Excessively noisy machinery must only be used during regular operating hours and not after hours where possible.

Cumulative Impacts:

Noise may arise owing to increase in activity, particularly during the construction phase and also due to the mining and semi industrial activities occurring in close proximity to the proposed project site.

Residual Impacts:

Minor – Localised noise

6.6.4 Comparative Assessment of Alternatives

Access road:

All of the proposed alternative routes, are existing road, both options will require the access area to the site to be upgraded. In terms of impacts arising existing access reduce the ecological impacts. The access point will have to be constructed to the required specifications of an access road, minimizing the potential erosion risks to a certain degree. Considering the fact that both roads are already existing, both alternative will be used as suitable to reduce traffic congestion

Aspect	Alternative (Preferred) Access Road 1	Alternative Access Road 2
Heritage and Palaeontology	Acceptable – **preferred alternative** » Avoids heritage features	Acceptable – » Avoids heritage features

Grid connection:

An alternative grid connection point was not considered in this report, please refer to (2.4.2) and (6.2.3).

6.7 Impacts on Soils, Land-Use and Agricultural Potential

The 50MW PV facility has a development footprint of 160 ha. Negative impacts on soils and agricultural resources will be due to loss during construction activities. Potential impacts and the relative significance of the impacts are summarised below (refer to Appendix 6c – Soil and Agricultural Potential Report for more details).

6.7.1 Results of the Soils Survey

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.

6.7.2 Description of Impacts on Soils

The following impacts are identified as the major impacts associated with the development and which are assessed, for the preconstruction, construction and operational phases of the development site as well its associated infrastructure.

Impacts on vegetation cover and soil stability: The development would require vegetation clearance of approximately 160 ha. These impacts will occur during the preconstruction and construction phase of the development.

Increased Erosion Risk: The large amount of disturbance created during construction would leave the site vulnerable to soil erosion. The PV panels are situated on relatively flat ground, the access roads, underground cables and overhead lines will need to traverse some steeper areas. Erosion is a major concern, special consideration should be given to any construction.

As a result of loss of agricultural land, the developer is encouraged to use the solar park area to graze sheep or goat

6.7.3 Impact tables summarising the significance of impacts on soils and land use (with and without mitigation)

The impacts assessed below apply to the preferred development site, access road for the Solar Facility, and the grid connection infrastructure.

Nature: Soil erosion on impacted sites of development during foundation construction and post construction phase due to decreased vegetation cover and increased water run-off.		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i		
	Without mitigation	**With mitigation**
Extent	Area specific (2)	Local (1)
Duration	Medium-term (3)	Short (2)
Magnitude	High (4)	Minor (2)
Probability	Definite (5)	Probable (3)

Significance	**Medium (45)**	**Low (15)**
Status	Negative	Less Negative
Can it be reversed	No	Yes
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	

Mitigation:

The loss of agricultural land is a long term loss and there are no mitigation measures that can be put in place to combat this loss. This loss extends to the post-construction phase. The area is, however, of low agricultural potential.

During construction, stripped soil should be stockpiled. Soil erosion and hard setting of the stockpiled material may occur. This can be mitigated by:

» Ensuring that the slope of the stockpiled material is such that surface runoff is minimal;

» Additions of stabilising agents such as organic material or vegetative cover.

Stockpiling of soil must be for a minimum period. Stockpiled soil can be used in the construction of berms, swales etc. to ensure that soil erosion does not cause major degradation of the surrounding land.

» Care must be taken with the ground cover during and after construction on the site.

» If it is not possible to retain a good plant cover during construction, technologies should be employed to keep the soil covered by other means, i.e. straw, mulch, erosion control mats, etc., until a healthy plant cover is again established. Care should also be taken to control and contain storm water run-off.

» Rehabilitate construction sites by using indigenous grasses.

» Minimise activity on steep slopes / the side of slopes.

» Implement effective erosion control measures and Erosion Management Plan.

» Keep to existing roads, where practical, to minimise impact on undisturbed ground.

» Ensure stable slopes of stockpiles/excavations to minimise slumping.

» Stockpiles should not exceed 2m in height.

» Stockpiles not used in three (3) months after stripping must be seeded to prevent dust and erosion, only if natural seeding does not occur.

» Limit soil disturbance to dry season.

Cumulative Impacts:

Soil erosion may arise owing to increased surface water runoff. Sediment load in the surface water may be high and soil erosion is a concern. This will be compounded by the proposed development.

The cumulative impact of soil erosion from all development in the area is considered low if mitigating measures are adhered to.

Residual Impacts:

Minor – Localised movement of sediment. Slow regeneration of soil processes

Nature: Loss of land with high agricultural potential and land capability due to the direct occupation of the facility and construction of new access roads

Relevant Listed activities:

GNR 983 Activity: 11(i), 28 (ii)

GNR 984 Activity 1, 15

GNR 985 Activity 4(e)i, 12(a)i

	Without mitigation	**With mitigation**
Extent	On site (1)	On site (1)
Duration	Permanent (5)	Long term - lifetime of the project (4)
Magnitude	Moderate (3)	Low (2)
Probability	Improbable (2)	Very improbable (1)
Significance	**Low (18)**	**Low (7)**
Status	Negative	Negative
Can it be reversed	No	Yes
Irreplaceable loss of resources	Yes	No
Can impacts be mitigated?	Yes	

Mitigation:

» Rehabilitate construction sites by using indigenous grasses or prior vegetative cover.

» Implement effective erosion control measures and Erosion Management Plan.

» Keep to existing roads, where practical, to minimise impact on undisturbed ground, virgin soils or agricultural land.

» Stockpiles should not exceed 2m in height and should be periodically inspected by the Environmental Control Officer.

» Cooperate with land owners in recommissioning farm land if necessary.

Cumulative Impacts:

Soil erosion may arise due to altered surface water runoff. Adequate management and erosion control measures should be implemented or valuable nutrient rich soil may be lost.

Residual Impacts:

Minor – Loss of grazing land throughout the area

Nature: Dust generation - The movement of vehicles and the effects of construction activities will increase the amount of dust generated in the area.

Relevant Listed activities:
GNR 983 Activity: 11(i), 28 (ii)
GNR 984 Activity 1, 15
GNR 985 Activity 4(e)i, 12(a)i

	Without mitigation	**With mitigation**
Extent	Local (2)	On site (1)
Duration	Medium (3)	Short (2)
Magnitude	High (4)	Moderate (3)
Probability	Definite (5)	Probable (3)
Significance	**Medium (45)**	**Low (18)**
Status	Negative	Negative

Can it be reversed	No	No
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	

Mitigation:

» Use dust suppression methods/material/chemicals

» Care should also be taken to control and contain storm water run-off.

» Minimise activity on steep slopes / the side of slopes.

» Implement effective erosion control measures and Erosion Management Plan.

» Keep to existing roads, where practical, to minimise impact on undisturbed ground.

» Ensure stable slopes of stockpiles/excavations to minimise slumping.

» Stockpiles should not exceed 2m in height and must be handled with dust suppressants.

» Stockpiles not used in three (3) months after stripping must be seeded to prevent dust and erosion, only if natural seeding does not occur.

Cumulative Impacts:

The cumulative impact of dust generation in the area is considered medium taking into consideration the active mine adjacent to the property

Residual Impacts:

Minor

Nature: The construction of power lines on the site and the risk of erosion and land degradation.

Relevant Listed activities:
GNR 983 Activity: 11(i), 28 (ii)
GNR 984 Activity 1, 15
GNR 985 Activity 4(e)i, 12(a)i

	Without mitigation	**With mitigation**
Extent	Local (2)	On site (1)
Duration	Short (2)	Very short (2)
Magnitude	Moderate (3)	Minor (2)
Probability	Definite (5)	Probable (3)
Significance	**Medium (35)**	**Low (15)**
Status	Negative	Neutral
Can it be reversed	No	Yes
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	

Mitigation: » Limit the footprint of the power line to the area and select stable foundations to construct on. » Rehabilitate construction sites by using indigenous grasses and decrease increase runoff potential. » Minimise activity on steep slopes / the side of slopes. » Implement effective erosion control measures and Erosion Management Plan. » Keep to existing roads, where practical, to minimise impact on undisturbed ground. » Ensure stable slopes of stockpiles/excavations to minimise slumping.
Cumulative Impacts: The cumulative impact of the construction is low because the power line is restricted to the area .
Residual Impacts: Minor

6.7.4 Comparative Assessment of Alternatives

Access Road:

All of the proposed alternative routes, are existing road, both options will require the access area to the site to be upgraded. In terms of impacts arising existing access reduce the ecological impacts. The access point will have to be constructed to the required specifications of an access road, minimizing the potential erosion risks to a certain degree. Considering the fact that both roads are already existing, both alternative will be used as suitable to reduce traffic congestion

Aspect	Alternative 1 Preferred Access Road 1	Alternative 2 Access Road 2
Soil and agricultural impacts	Acceptable – » Utilise existing road » Limited soil loss and erosion risk	Acceptable – » Utilise existing road » Limited soil loss and erosion risk

Grid connection:

An alternative grid connection point was not considered in this report, please refer to (2.4.2) and (6.2.3).

6.7.5 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the severity of impacts of the PV facility can be reduced to low, or avoided. The Solar Facility can be developed and impacts on soils and agricultural resources managed by taking the following into consideration:

- The development of the solar facility will have low negative impacts on soils, agricultural resources and productivity.
- The significance of all agricultural impacts is influenced the current land use which is limited to grazing and has very severe limitations to agricultural potential.
- The area is dominated by shallow soils without the properties needed to support sustainable agriculture.
- The project should be developed with the use of good soil management measures during all phases of development of the project.

6.8 Assessment of impact on water resources

The solar facility has a development footprint of 160 ha, and the development has been planned to avoid major drainage lines. Negative impacts on the surface water resources will be due to infringements of these resources. Potential impacts and the relative significance of the impacts are summarized below:

6.8.1 Result of the water resource assessment

No flow have been observed in water courses at the site during any surveys conducted. This assessment is therefore based on a broad evaluation of the natural vegetation found within region and at site, and how localized surface and ground water systems functioned in the formation of any recognisable water system

6.8.2 Description of the impacts on the Water Resources

The impacts identified during the survey are associated with the loss of vegetation as a result of the proposed development during the construction phase (Appendix 6d).

6.8.3 Impact table summarising the significance of impacts on water resources during the construction and operation phases (with and without mitigation)

Nature: loss of ground cover vegetation during the construction phase and increased water run-off.		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i		
	Without mitigation	**With mitigation**
Extent	Area specific (2)	Local (1)
Duration	Medium-term (4)	Short (4)
Magnitude	High (4)	Moderate (3)
Probability	Definite (5)	Probable (3)
Significance	**Medium (50)**	**Low (24)**
Status	Negative	Negative
Can it be reversed	No	No
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	
Mitigation: » The proposed layout has been developed to avoid the significant water courses while avoiding as many of the smaller drainage lines as possible. No further mitigation is possible. » The areas should not be backfilled or graded as this will cause more scouring unless the backfill is compacted and covered with vegetation before the first storm run-off. The project should also try capture and recycle any form of run-off created by the daily operations.		
Cumulative Impacts: None		
Residual Impacts: Possible impact on the remaining catchment due to changes in run-off characteristics in the development site.		

Nature: Increase in sedimentation and erosion within the development footprint		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15		
	Without mitigation	**With mitigation**

Extent	Area specific (2)	Local (1)
Duration	Medium-term (4)	Short (4)
Magnitude	High (4)	Moderate (3)
Probability	Definite (5)	Probable (3)
Significance	**Medium (50)**	**Low (24)**
Status	Negative	Negative
Can it be reversed	Low	Low
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	
Mitigation: » Any stormwater within the site must be handled in a suitable manner, i.e. separate clean and dirty water streams around the plant, and install stilling basins to capture large volumes of runoff, trap sediments and reduce flow velocities		
Cumulative Impacts: Erosion and sedimentation of the drainage system. During flood events, the unstable material along the drainage systems will be washed away.		
Residual Impacts: During flood events, the unstable banks will then be washed away		

6.8.4 Comparative Assessment of Alternatives

Access Road:

All of the proposed alternative routes, are existing road, both options will require the access area to the site to be upgraded. In terms of impacts arising existing access reduce the ecological impacts. The access point will have to be constructed to the required specifications of an access road, minimizing the potential erosion risks to a certain degree. Considering the fact that both roads are already existing, both alternative will be used as suitable to reduce traffic congestion

Aspect	**Alternative 1 Preferred Access Road 1**	**Alternative 2 Access Road 2**
Soil and agricultural impacts	Acceptable – » Utilise existing road » Limited soil loss and erosion risk	Acceptable – » Utilise existing road » Limited soil loss and erosion risk

Grid connection:

An alternative grid connection point was not considered in this report, please refer to (2.4.2) and (6.2.3).

6.9 Assessment of Visual Impacts

The 50MW PV facility has a development footprint of 160 ha. Negative impacts on visual receptors will be during construction activities, or when the facility is in place. Potential impacts and the relative significance of the impacts are summarised below, refer to (Appendix 6b - Visual Report for more details).

6.9.1 Visual Character of the landscape

The landscape character of the proposed project site is surveyed to identify areas of similar land use and landscape character. The current land use is agricultural, with no man made features other than agricultural fences associated with low intensity grassland cattle farming.

The proposed solar PV solar development will be visible from certain viewpoints within the surrounding landscape. These include the R566 road users, residents of the surrounding farms of the proposed site, railway line and station; M21 road and areas to the east of the development site, and helicopter / birds eye-view and surrounding mountainous-top views. The 3 dimensional visualizations have also shown that distance from the observer to the development is an important consideration when assessing impact. Visual distance/observer proximity is an important factor to consider when determining the impact that the proposed development would have on the surrounding viewpoints. It is generally accepted that visual impact of a structure is reduced as the distance from that structure increases. It is generally assumed that an object will be predominantly visible from an equal distance. The proximity impact decreases exponentially with distance (MetroGIS 2007). It should be noted that the residents of De Wildt's current view can be described as being impacted upon, as their view is currently consists of neighboring farm houses, railway line, Eskom power lines, train station, Eskom sub-station, Xstrata Alloys Mine, as well as buildings utilized for industry, business and retail. As such even though they will see the development, they currently already see the developments described above. The other viewpoints listed above as being able to see the development, all can see the

developments described above. As such their views have already been impacted on to a degree and one cannot rate the visual impact the solar farm development would have on the area as high.

As such the visual impact that this development will have on surrounding areas can be rated as medium and be mitigated to low significance.

Key Observation Points (KOPs)

To define the KOPs, potential receptor locations are identified in the viewshed analysis, which are screened based on the following criteria:

- Angle of observation
- Number of viewers
- Length of time the project is in view
- Relative project size
- Season of use
- Critical viewpoints, e.g. views from communities, road crossings
- Distance from property

6.9.2 Visual Assessment

Visual Absorption Capacity - 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.

Project Visibility - The visibility of the layout options is defined as medium due to the surrounding operating mine on the western boundary of the proposed site as well as the railway just off the northern boundary of the site and the semi industrial site east of the proposed development site.

Project Exposure - The nearest receptors are the farm residents sharing a boundary along the southern margin of the proposed development site and R566 Road users, to the north of the proposed sites.

Scenic Quality - The scenic quality of the area can be defined as medium. This is due to the predominantly flat landform with limited terrain and vegetation variation, and the limited presence of water. The colour contrast generated by the khaki coloured grasses, the brown-red earth and the background hills which are more than 5km away from the proposed site does add value to the scenic quality but is fairly common in the area and scarcity is low. Cultural modifications are mainly related to agricultural grassland farming which adds to the rural sense of

place due to the lack of visible development. The Xstrata mine, west of the proposed site is clearly visible from the site and does influence the site sense of place.

Receptor Sensitivity - Other than the R566 Road, there are no tourist activities located within the foreground/ middle ground distance zone. The R566 Road may carry tourist traffic which is more sensitive to landscape modification. As the area is not associated with formal tourist attraction sites, it is unlikely that public interest is high. The presence of the Xstrata Mine creates a dominant feature in the landscape. There are no unique features associated with the site and the overall receptor sensitivity towards landscape change on the proposed sites was defined as medium to low.

Visual Resource Management Classes - Sensitivity levels are a measure of public concern for scenic quality. Evaluation of the suitability of a proposed landscape modification is undertaken by means of assessing the proposed modification against a predefined management objective assigned to each class. The USA Bureau of Land Affairs has defined four Classes that represent the relative value of the visual resources of an area:

i. Classes I and II are the most valued;
ii. Class III represents a moderate value; and
iii. Class IV is of least value.

The following recommendations were made for each class:

- Class I: No Class I areas were defined for the property.

- Class II: A Class II visual objective, which allows for low levels of landscape modifications, was assigned to the Drainage Lines. It is recommended that main drainage lines are not utilised for development to ensure continued hydrological integrity (as defined by the Ecological).

- Class III: A Class III visual objective was assigned to the Grassland on the site as well as to the power line routing, as this type of predominantly agricultural landscape is fairly common in the area and receptor sensitivity is likely to be low.

- Class IV: No Class IV areas were defined for the property.

6.9.3 Impact table summarising the significance of visual impacts (with and without mitigation)

The impacts for the development footprint is assessed in the tables below. The impact tables below apply to the Alternative, access road and grid connection infrastructure for the Solar Facility.

Nature: Change of local and surrounds visual resources due to the construction and operation of the proposed (3m to 6m high) **Preferred** development footprint, grid connection and road infrastructure.		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (3)	Low (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	Possible	Possible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: » The laydown area should be sited away from the R566 road and preferably at an area of low elevation prominence. » Trees and shrubs should be planted especially along the boundaries so as to reduce the visual impact on surrounding neighbours. »The landscaping must be a combination of indigenous plants consisting of low ground covers, shrubs and lawn. » The 3-dimensional visualisations have shown that this will soften the outer boundary of the development. This will also form an obstruction to the viewers possibly seeing the solar farm development. » However, at certain parts of the landscape, especially the viewpoints on higher ground to the north and north-east of the site, the development will be visible. » External lighting must be minimized. No spot lights should be allowed. » Choice of colour, lighting and positioning should be properly planned. » The outward features of the solar power farm should be taken into consideration as they need to blend in with the surrounding environment in order to minimise visual impacts.		

Cumulative impacts:

» Excessive lights at night could reduce the current dark sky sense of place that could detract from tourism opportunities in the area.

Nature: Change of local and surrounds visual resources due to the construction and operation of the proposed facility

Relevant Listed activities:
GNR 983 Activity: 11(i), 28 (ii)
GNR 984 Activity 1, 15
GNR 985 Activity 4(e)i, 12(a)i

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	high (4)	Moderate (3)
Probability	Probable (3)	Probable (3)
Significance	**Medium (30)**	**Low (27)**
Status (positive or negative)	Negative	Negative
Reversibility	Possible	Possible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes

Mitigation:

» The laydown area should be sited away from the R566 road and preferably at an area of low elevation prominence.

» Light spillage reduction management should be implemented.

» The laydown area should be sited away from the R566 road and preferably at an area of low elevation prominence.

» Trees and shrubs should be planted especially along the boundaries so as to reduce the visual impact on surrounding neighbours.

»The landscaping must be a combination of indigenous plants consisting of low ground covers, shrubs and lawn.

» The 3-dimensional visualisations have shown that this will soften the outer boundary of the development. This will also form an obstruction to the viewers possibly seeing the solar farm development.

» However, at certain parts of the landscape, especially the viewpoints on higher ground to the north and north-east of the site, the development will be visible.

» External lighting must be minimized. No spot lights should be allowed.

» Choice of colour, lighting and positioning should be properly planned.

» The outward features of the solar power farm should be taken into consideration as they need to blend in with the surrounding environment in order to minimise visual impacts.

Cumulative impacts:

» Excessive lights at night could reduce the current dark sky sense of place that could detract from tourism opportunities in the area.

Residual Risks:

» Should the mitigations be implemented, the residual risks to the dark sky sense of place would be similar to the mining night time lighting as practiced to the west of the proposed site.

Nature: Change of local and surrounds visual resources due to the construction and operation of the proposed power line infrastructure.

Relevant Listed activities:
GNR 983 Activity: 11(i), 28 (ii)
GNR 984 Activity 1, 15
GNR 985 Activity 4(e)i, 12(a)i

	Without mitigation	**With mitigation**
Extent	Local (1)	Low (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate to Minor(3)	Low (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes

Mitigation:

» Strict access control to small tracks along the route making as much use as possible of existing farm tracks for access from the road. Soil erosion management to be implemented where required. Strict litter control. Any extra soil should be shaped to appear natural and re-vegetated.

» The laydown area should be sited away from the R566 road and preferably at an area of low elevation prominence.

» Trees and shrubs should be planted especially along the boundaries so as to reduce the visual impact on surrounding neighbours.

»The landscaping must be a combination of indigenous plants consisting of low ground covers, shrubs and lawn.

» The 3-dimensional visualisations have shown that this will soften the outer boundary of the development. This will also form an obstruction to the viewers possibly seeing the solar farm development.

» However, at certain parts of the landscape, especially the viewpoints on higher ground to the north and north-east of the site, the development will be visible.

» External lighting must be minimized. No spot lights should be allowed.

» Choice of colour, lighting and positioning should be properly planned.

» The outward features of the solar power farm should be taken into consideration as they need to blend in with the surrounding environment in order to minimise visual impacts.
Cumulative impacts: » Visual massing effects created by multiple lines from multiple projects, congregating in a single location that has the potential to generate strong levels of visual intrusion.
Residual Risks: » Should the mitigations be implemented, the residual risks from soil erosion and intrusion from massing effects in prominent locations would be limited.

6.9.4 Comparative Assessment of Alternatives

Access Road:

All of the proposed alternative routes, are existing road, both options will require the access area to the site to be upgraded. In terms of impacts arising existing access reduce the ecological impacts. The access point will have to be constructed to the required specifications of an access road, minimizing the potential erosion risks to a certain degree. Considering the fact that both roads are already existing, both alternative will be used as suitable to reduce traffic congestion

Aspect	**Alternative Preferred Access Road 1**	**Alternative Access Road 2**
Visual impacts	Acceptable – » crosses between existing vineyards	Acceptable – » crosses between existing vineyards

Grid connection:

An alternative grid connection point was not considered in this report, please refer to (2.4.2) and (6.2.3).

6.9.5 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the severity of impacts of the PV facility can be reduced to low, or avoided. The Solar Facility

can be developed and impacts on visual resources managed by taking the following into consideration:

- The Visual Absorption Capacity of the landscape is low as the site landscape offers little topographic, vegetation or structural visual screening. There are no unique landscape features associated with the site, and the overall receptor sensitivity towards landscape change on the proposed sites was defined as medium to low.
- Exposure for thedevelopment footprint is defined as low. The visibility of the layout is defined as low. No fatal flaws are expected in terms of potential visual impacts.
- The overall visual impact is likely to be of a low significance with mitigations. Impact significance was assessed and it was found that the visual significance of the layout option, is likely to be low with mitigation.

6.10 Assessment of Social Impacts

Potential social impacts and the relative significance of the impacts are summarised below (refer to **Appendix 6j** - Social Impact Assessmnet Report for more details).

6.10.1 Results of the Social Study

Majority of the surrounding study area has a low number of farmsteads/buildings that are sparsely populated, the population density increases closer to the Moumong settlement. The study area is located within a mining and farming region. There is potential for the proposed development to negatively impact adjacent landowners however the benefits from the project are greater.. Adjacent landowners typically involved in the following activities:

- Prominent characteristics within the study area include:
    1. The study area is currently utilised for low density livestock farming by the landowner.

- The adjacent landowner (Mr Nel) noted along the southern margin of the proposed site, Farm Schietfontein-437 JQ portion 15, will be fenced off. The adjacent landowner is involved in game farming. The adjacent land owner of plot 103 of Schietfontein 437-JQ is currently objecting the solar park development, stating the following reasons:
    1. Thereby the solar energy development would negatively hinder his game breeding program
    2. The noise generated from the facility would affect his well being and further affect his game
    3. The project would result in an increase in crime in the area
    4. Animal habitate would be negatively affected.

In order to address Mr Nel's objections, a wild anima behaviourist was appointed in order to evaluate the impact that the proposed development would have on Mr Nel's game. The finding of the specialist suggested that the impact on the game antelope can be minimize by implimenting mitigation and monitoring measures. Please refer to (Appendix 6k) for the detaild report.

Furthermore, Mr Van Rensburg (owner of portion 76, (90 & 91, portion of portion 44))objected the project, stating that construction of the transmission line would cross his property. Investigation by the EAP and the layout plan suggest that the project will not cross over Mr Van Rensburg's property, please refer to (Appendix 4f) for deatiled comments and responses. (Appendix 3 – maps and layout plan) show a visual impression of the proposed project and the surrounding areas.

- There are no farmsteads or residents living within the study area.

- The study area is surrounded by similar agricultural land, used predominantly for, cattle and game farming.

6.10.2 Description of Social Impacts

The following impacts are identified as the major impacts associated with the development and which are assessed, for the preconstruction, construction and operational phases of the development site alternatives as well its associated infrastructure.

The key social issues associated with the construction phase include the following potential positive impacts:

- Creation of employment and business opportunities and opportunity for skills development and on-site training.
- Increase in government revenue
- Impact on skills development

The key social issues associated with the construction phase include the following potential negative impacts:

- Impacts associated with the presence of construction workers on site (impact on sense of the place).
- Threat to safety and security of farmers associated with the presence of construction workers on site.

- Increased risk of stock theft, poaching and damage to farm infrastructure associated with presence of construction workers on the site.
- Increase in social pathologies and risk to safety and personal security
- Increased risk of veld fires associated with construction-related activities.
- Impact of heavy vehicles, including damage to roads, safety, noise and dust.
- Potential loss of grazing land associated with construction-related activities.

The key social issues affecting the operational phase include the following potential positive impacts:

- Creation of employment and business opportunities. The operational phase will also create opportunities for skills development and training.
- Sustainable increase in production and GDP-R
- Improved standard of living
- Increase in government revenue
- Benefits associated with the establishment of a Community Trust.
- The establishment of renewable energy infrastructure.

The key social issues affecting the operational phase include the following potential negative impacts:

- The visual impacts and associated impact on sense of place.
- Impacts associated with the loss of agricultural land.

6.10.3 Impact tables summarising the significance of social impacts associated with the construction phase (with and without mitigation measures)

The impacts assessed below apply to the Preferred and the Alternative development site, access road and grid connection infrastructure for the Solar Facility.

Construction Phase Impacts

Direct employment and skills development

There will be significant job opportunities available for low skilled (construction, security and maintenance workers) and semi-skilled workers, which can be sourced from the local area. Construction workers could be sourced from the nearest local settlements and towns around the proposed development site in De Wildt, such as Moumong settlement, Ga-Kwate Settlement, and Mothutlung. It could be expected that some of the workers from outside the local area would form part of the construction team. Local labour should be sourced from within the local municipality

first (Madibeng Local Municipality) and if need be extend search to the district municipality (Bojanala Platinum District Municipality). Adverse impacts could occur if a large in-migrant workforce, culturally different from the local communities within Madibeng Local Municipality are employed and brought in during the construction phase. While the local labour pool may be qualified for less-skilled jobs, often local hiring will not meet the demands in professional, technical and supervisory areas. A number of specialist contractors would most likely be brought in from other areas.

Nature: Concern raised by Mr Nel (adjacent land owner) indicating that the development would negative impact on his game antelope program during construction		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i		
	Without mitigation	**With mitigation**
Extent	Local- Regional (1)	Local- Regional (1)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (3)	Moderate (2)
Probability	Probable (3)	Highly probable (2)
Significance	**Medium (18)**	**Medium (10)**
Status (positive or negative)	Negative	Negative
Reversibility	N/A	
Irreplaceable loss of resources	N/A	
Can impacts be enhanced	Yes	
Mitigation measures: » To mitigate the visual disturbance to the antelope a visual barrier along the northern boundary of the antelope's enclosure is suggested. This visual barrier should blend into the natural surroundings – the construction of such a barrier would in itself be a disturbance so this would need to be considered as well. Bearing the above points in mind the most logical visual barrier would be the existing Thornveld »To mitigate the auditory disturbance to the antelope a noise prevention barrier should be constructed along the northern boundary of the antelope's enclosure. Alternatively the visual barrier suggested could double as a noise prevention barrier. A report from Martens (1981) reported that sound attenuation of planted vegetation's can be achieved when the plantation is at least 12m wide. In this application using the indigenous Marikina Thornveld it is not known what width would be suitable as a plant noise barrier. It is suggested that this barrier be at least 12m wide, » the antelope would have to be monitored in terms of body condition and changes in ingestion behaviour.		
Cumulative impacts: Development around the project site has a cumulative impacts on the visual impression of the area..		

Residual impacts:
Localised visual disturbance.

Nature: Concern raised by Mr Nel (adjacent land owner) indicating that the development would negative impact on his game antelope program during operational phase		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i		
	Without mitigation	**With mitigation**
Extent	Local- Regional (1)	Local- Regional (1)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (3)	Moderate (1)
Probability	Probable (3)	Highly probable (2)
Significance	**Medium (18)**	**Medium (8)**
Status (positive or negative)	Negative	Negative
Reversibility	N/A	
Irreplaceable loss of resources	N/A	
Can impacts be enhanced	Yes	
Mitigation measures: » To mitigate the visual disturbance to the antelope a visual barrier along the northern boundary of the antelope's enclosure is suggested. This visual barrier should blend into the natural surroundings – the construction of such a barrier would in itself be a disturbance so this would need to be considered as well. Bearing the above points in mind the most logical visual barrier would be the existing Thornveld »To mitigate the auditory disturbance to the antelope a noise prevention barrier should be constructed along the northern boundary of the antelope's enclosure. Alternatively the visual barrier suggested could double as a noise prevention barrier. A report from Martens (1981) reported that sound attenuation of planted vegetation's can be achieved when the plantation is at least 12m wide. In this application using the indigenous Marikina Thornveld it is not known what width would be suitable as a plant noise barrier. It is suggested that this barrier be at least 12m wide, » the antelope would have to be monitored in terms of body condition and changes in ingestion behaviour.		
Cumulative impacts: Development around the project site has a cumulative impacts on the visual impression of the area..		
Residual impacts: Localised visual disturbance.		

Nature: The creation of employment opportunities and skills development opportunities during the construction phase for the country and local economy		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i		
	Without mitigation	**With mitigation**
Extent	Local- Regional (4)	Local- Regional (4)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (3)	Moderate (3)
Probability	Probable (3)	Highly probable (4)
Significance	**Medium (27)**	**Medium (36)**
Status (positive or negative)	Positive	Positive
Reversibility	N/A	
Irreplaceable loss of resources	N/A	
Can impacts be enhanced	Yes	

Enhancement measures:

» Project developer to encourage the Engineering, Procurement and Construction (EPC) Contractor to employ labour-intensive measures in construction, where feasible, to increase the number of employment opportunities for the local labour.
» The project owner should encourage the contractor to increase the local procurement practices and employ people from local communities as far as feasible to maximise the benefits to the local economy and local communities specifically.
» The project owner or its contractor should engage with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods, and services (i.e. transportation, accommodation, security, and catering) from local businesses, where feasible.
» The contractor or the project developer is to set-up a skills desk at the local municipal office and at least in the nearby community of Ga-Rankuwa to identify skills available in the community, which would assist in recruiting local labour during both construction and operation.
The proposed mitigation measures will possibly increase the positive impact in the local economy; however, this will not affect the rating.

» Project developer or EPC contractor to set up a recruitment office in the nearby town of Ga-Rankuwa and adhere to strict labour recruitment practices that would reduce the desire of potential job seekers to loiter around the site in hope to find temporary employment.
» Project developer to encourage the contractor to employ locals as far as feasible through the creation of the local skills database (through a skills desk in the local municipal office and in Ga-Rankuwa) and recruitment of suitable candidates.
» Project developer to ensure clear communication of the project information and effective public participation processes to minimise the influx of migrant job seekers.
» Contractor to set up a control gate on the service road coming to the site from R566 to control the movement of people and vehicles coming towards the project site and leading to the properties south of the site (i.e. especially Portion 102, 104, 104 and 105 of 437). This is to be done to minimise the opportunities for presence of unauthorised individuals in the area

close to the project site and the nearby properties. Setting up a control gate will need to be done in consultation with the potentially affected land owners. » During construction, contractor needs to clearly communicate the rules and regulations of working on site and moving from and to the site to all workers, sub-contractors, and suppliers. » Accommodation of workers, whether coming from outside or within the community, should be outside the project site. » Contractor to manage the presence of workers on site to ensure that they are only on site during the reasonable working hours. » Contractor to establish a proper fencing around the property to reduce the desire and the ability of workers to trespass between the construction site and adjacent properties. »Project developer and contractor to implement health awareness campaigns to curb the potential of spreading disease, use of drugs, or alcohol abuse for example. » Project developer and/or contractor is to assign a person to deal with complaints and concerns of the affected parties. » An equitable process whereby minorities and previously disadvantaged individuals (including women) are taken into account should be implemented. » Local sourcing of materials, general services to assist in providing economic, and employment opportunities for the local people. » In cases for the middle to lower skilled jobs, where the relevant skills do not exist, training should be provided to willing local community members to enable them to fill the positions.
Cumulative impacts » Opportunity to upgrade and improve skills levels in the area » Opportunity for local employment opportunities
Residual impacts » Improved pool of skills and experience in the local area » Economic growth for small-scale entrepreneurs » Temporarily employment during construction phase will result in jobs losses and struggles for construction workers to find new employment opportunities

Influx of jobseekers

The proposed development will create a range of employment possibilities and thus this will attract jobseekers. An influx of people looking for economic opportunities could result in pressure on economic and social infrastructure on the local population (rise in social conflicts and change in social dynamics). Influx of jobseekers into the area, could lead to a temporary increase in the level of crime, cause social disruption and put pressure on basic services. The small settlements closest to the proposed site (Moumong and Ga-Kwate settlements) are seen as sensitive social receptors and jobseekers coming into the area could put pressure on social infrastructure; create social problems, tensions and conflicts. The impact associated with in-migration of jobseeker includes pressure on local services and infrastructure.

Nature: Added pressure on economic and social infrastructure and increase in social conflicts during construction as a result of in-migration of jobseekers
Relevant Listed activities:

GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Short (2)	Short-(2)
Magnitude	Moderate(3)	Low (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (21)**	**Low (18)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated	Yes	

Mitigation

» A 'locals first' policy should be advertised for construction employment opportunities, especially for semi and low-skilled job categories. Enhance employment opportunities for the immediate local areas

» It is recommended that local employment policy is adopted to maximize the opportunities made available to the local labour force.

» Tender document should stipulate the use of local labour as far as possible

» Prior to construction commencing representatives from the local community (e.g. ward councillor, surrounding landowners) should be informed of details of the construction schedule and exact size of the workforce.

» Recruitment of temporary workers at the gates of the development should not be allowed. A recruitment office with a Community Liaison officer should be established in a nearby town to deal with jobseekers.

» Set up labour desk in a secure and suitable area to discourage the gathering of people at the gates of the construction site.

» A security company is to be appointed and appropriate security procedures to be implemented.

» Local community organisations and policing forums / neighbourhood watches should be informed of construction times and the duration of the construction phase. Also establish procedures for the control and removal of loiter at the construction site.

» A Community Liaison Officer should be appointed. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.

Cumulative impacts

» Additional pressure on infrastructure and municipal services in area due to additional people coming into the area.

» Possible increase in criminal activities and economic losses in area for property owners.

Residual impacts

Possibility of outside workers remaining in the area after construction is completed and subsequent pressures on local infrastructure and services.

Impacts on daily living and movement patterns

An increase in traffic due to heavy vehicles could create short-term disruptions and safety hazards for current road users. Transportation of project components and equipment to the proposed site will be transported using vehicular / trucking transport. The access road will be off the R566. The primary roads that will be used for transportation of project components and equipment will be the N4 leading to the R566. Increased traffic due to heavy vehicles could cause disruptions to the local community and increase safety hazards. The use of local roads and transport systems may cause road deterioration and congestion.

***Nature*:** Temporary increase in traffic disruptions and movement patterns during the construction phase		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Minor (2)	Minor (2)
Probability	Highly Probable (4)	Probable (3)
Significance	**Low (20)**	**Low (15)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated	Yes	
Mitigation It is recommended that a points-men be deployed at the R566-M21 intersection during the peak hours » All vehicles must be road worthy and drivers must be qualified, obey traffic rules, follow speed limits and made aware of the potential road safety issues. » Heavy vehicles should be inspected regularly to ensure their road safety worthiness. » Infrastructure such as fencing/ electric fencing along access route must be maintained in the present condition or repaired if damaged due to project activities. » Ensure roads utilised are either maintained in the present condition or restored if damaged due to project related activities. » A comprehensive employee induction programme to cover land access protocols and road safety. » A Community Liaison Officer should be appointed. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.		
Cumulative impacts Possible increased traffic and traffic disruptions impacting local community's movement patterns and increased risks for road users.		

Residual impacts
Non anticipated

Safety and security impacts

The perceived loss of security during the construction phase of the proposed project due to the influx of workers and/ or outsiders to the area (as influx of newcomers or jobseekers are usually associated with an increase in crime), may have indirect effects, such as increased safety and security risk for neighbouring properties and damage to property, increased risk of veld fire, stock theft, crime and so forth. The perception exists that construction related activities (influx of jobseekers, and construction workers and so forth) is a contributor to increased criminal activities in an area.

Nature**:** Temporary increase in safety and security concerns associated with the influx of people during the construction phase		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Low (4)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (14)**	**Low (10)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated	Yes	

Mitigation
» Working hours should be kept between daylight hours during the construction phase, and/or as any deviation that is approved by the relevant authorities. » The perimeter of the construction site should be appropriately secured to prevent any unauthorised access to the site; the fencing of the site should be maintained throughout the construction periods. » A security company and appropriate security procedures and measures are to be implemented. » Access in and out of the site should be strictly controlled by a security company. » The contractor must ensure that open fires on the site for heating, smoking or cooking are not allowed except in designated areas. » Contractor must provide adequate firefighting equipment on site and provide firefighting training to selected construction staff. » A comprehensive employee induction programme, covering land access protocols, fire management and road safety. This must be addressed in the construction EMPr as the best practice. » All vehicles must be road worthy and drivers must be qualified and made aware of the potential road safety issues and follow the speed limits. » The contractor should have personnel trained in first aid on site to deal with smaller incidents that require medical attention. » A Community Liaison Officer should be appointed as a grievance channel. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process
Cumulative impacts
Possible increase in crime levels (with influx of people) with subsequent possible economic losses
Residual impacts
None anticipated

Nuisance Impacts (noise and dust)

Impacts associated with construction related activities include noise, dust and disruption or damage to adjacent properties is a potential issue. Site clearing will increase the risk of dust and noise being generated, which can in turn impact on adjacent properties. The potential impacts can be addressed by implementing effective mitigation measures. Construction activities have the potential to create noise and dust. The primary sources of noise during construction would be from the construction equipment and other sources of noise include vehicle/truck traffic, and ground vibration. Noises levels can be audible over a large distance however are generally short in duration. Generation of dust would come from construction activities as well as trucks/ vehicles driving on the gravel access road. With the in-migration of people and construction workers into the area, this will also increase noise impacts. This impact will negatively impact social sensitive receptors. Dust mitigation measures will be implimented during construction in order to mitigate the issue of dust. The layout of the PV facility is planned to be situated approximately 5km from the N4 however it is close to the R566. The nuisance impacts from the construction activities of

the Solar Facility and associated infrastructure is expected to be negative however a low significance.

Nature: Nuisance impacts in terms of a temporary increase in noise and dust		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Minor (2)	Small (1)
Probability	Probable (3)	Probable (3)
Significance	**Low (15)**	**Low (12)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated	Yes	

Mitigation

» Regular monitoring of noise generating activities should occur. This will serve as the core of noise mitigation as it will enable the determination of problem areas. If deemed necessary, the points indicating exceedances in the current study could be re-measured.
» Personal Protective Equipment to all persons working in areas where high levels of noise can be expected.
» Major noise generating activities can be restricted to between 06h00 and 18h00 on Monday to Friday, and 06h00-13h00 on Saturdays and Sundays.
» Placement of noise generating activities can be planned as far away as possible from affected areas and/or persons.
» Installation of acoustic enclosures for equipment to stop noise at the source.
» Ensure that all staff on the proposed activity is provided with "noise sensitivity" training to ensure noise generation is limited.
» The efficiency of noise mitigation measures should be assessed on a regular basis.
» No amplified music should be allowed on the site.
» Good public relations are essential. The information provided to stakeholders should be factual and not set unrealistic expectations.
»A clear line of communication should be in place where complaints can be lodged and response can be provided on.
» A clear commitment should be made on accommodating the local communities in preventing noise as far as possible. and
» Should any complaints regarding noise be received from the adjacent community / staff, a baseline noise assessment and subsequent noise monitoring should be conducted.

» Adequate parking for all employees, contractors and subcontractors will be made available and should not impact negatively on neighbouring farmers.
» Access roads and entrances to the site should be carefully planned to limit any intrusion on the neighbouring property owners and road users and to limit any accident risks. Additional access roads should be kept to a minimum.
»Source general construction material and goods locally where available to limit transportation over long distances.
» Local labourers should be used during the construction phase to limit the inflow of outsiders to the area.

» Construction activities should not interfere with the farming activities on surrounding properties. » Compile and implement 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. » Gravel roads and cleared areas should be sprayed with an appropriate dust suppressant to limit dust creation. » Construction vehicles and those transporting materials and goods should be inspected by the contractor or a sub-contractor to ensure that these are in good working order and not overloaded. » Strict vehicle safety standards should be implemented and monitored. » All relevant permits for abnormal loads must be applied for from the relevant authority. » Appropriate road management strategies must be implemented on external and internal roads with all employees and contractors required to abide by standard road and safety procedures. » Any traffic delays because of construction traffic must be co-ordinated with the appropriate authorities. » The movement of all vehicles within the site must be on designated roadways. » Signage must be established at appropriate points warning of turning traffic and the construction site, identifying speed limits, travel restrictions, and other standard traffic control information. All signage to be in accordance with prescribed standards and must be appropriately maintained for the duration of the construction period. » Ensure that any damage to internal roads because of construction activities is repaired before completion of the construction phase. » Haul vehicles moving outside the construction site carrying material that can be wind-blown will be covered with suitable material. » Speed of construction vehicles must be restricted, as defined by the contractor. » Dust-generating activities or earthworks may need to be rescheduled or the frequency of application of dust control/suppressant increased during periods of high winds if visible dust is blowing toward nearby residences outside the site.
Cumulative impacts » Other construction activities in area will heighten the nuisance impacts, such as noise, dust and wear and tear on roads.
Residual impacts Only damage to roads that are not fixed could affect road users

Operational Phase Impacts

The solar energy facility is designed to be operational for at least ~20-25 years. The potential positive and negative social impacts which could arise as a result of the operation of the proposed project include the following:

Direct employment and skills development

The proposesd project will create about 450 employement opportunities half of which could be filled by workers coming from the local community and 30 temporary jobs, of which 20 will be made available for the local labour. Furthermore the project will implement various SED and ED initiatives during its operation, which will likely positively impact on the access and quality of local socila servies and creation of opportunities for establishment and growth of small businesses.

Given that solar energy facilities are relatively new in South Africa, a number of highly skilled personnel may need to be recruited from outside the local area. These employees would include

skilled engineers (specialised in both electrical and mechanical engineering). Employees that can be sourced from the local municipal pool include the less skilled such as safety and security staff and maintenance crew. Routine activities would include operation of the solar facility to produce power, and regular monitoring and maintenance activities to ensure safe and consistent operation. The associated infrastructure such as the proposed power line route will also contribute to a relatively small number of employment opportunities during the lifetime of the power line. Maintenance will be carried out throughout the lifespan of the solar energy facility and associated infrastructure. Typical activities during maintenance include washing solar panels routinely (in the evening) and vegetation control and maintenance around the solar energy facility and along the power line route. Employment opportunities will be created during the operation phase and this is rated as positive impact although limited.

Nature: The creation of employment opportunities and skills development opportunities during the operation phase for the country and local economy		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i		
	Without enhancement	**With enhancement**
Extent	Local- Regional (3)	Local- Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Highly probable (4)
Significance	**Low (27)**	**Medium (36)**
Status (positive or negative)	Positive	Positive
Reversibility	N/A	
Irreplaceable loss of resources	N/A	
Can impacts be enhanced	Yes	
Enhancement » It is recommended that local employment policy is adopted to maximise the opportunities made available to the local community. » The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. » Vocational training programs for employees should be established to promote the development of skills.		
Cumulative impacts » Opportunity to upgrade and improve skills levels in the area » Opportunity to reduce unemployment rates		

Residual impacts
Improved pool of skills and experience in the local area

Development of clean, renewable energy infrastructure

The use of solar irradiation for power generation is considered a non-consumptive use of a natural resource which produces zero Green House Gases (GHG) emissions. The generation of renewable energy will contribute to South Africa's electricity market. The advancement of renewable energy is a priority for South Africa. The government considers the use of renewable energy as a contribution to sustainable development (White Paper on Renewable Energy). As most of the sources are local and naturally available, its use will strengthen energy security as it will not be subjected to disruption by international crisis. Furthermore, recent policy highlights the desirability of clean, green energy and solar generated energy will play a significant role in reaching these quotas. Given South Africa's reliance on Eskom as a power utility, the benefits associated with an Independent Power Producer based on renewable energy are regarded as an important contribution.

Nature: Development of clean, renewable energy infrastructure		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i		
	Without enhancement	**With enhancement**
Extent	Local- Regional- National (4)	Local- Regional- National (4)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Highly probable (4)	Highly probable (4)
Significance	**Medium (40)**	**Medium (40)**
Status (positive or negative)	Positive	Positive
Reversibility	Yes	
Irreplaceable loss of resources	Yes (impact of climate change)	
Can impacts be enhanced	No	
Enhancement None anticipated		

Cumulative impacts Reduce carbon emissions through the use of renewable energy and contribute to reducing global warming
Residual impacts » Reduce carbon emissions through the use of renewable energy and contribute to reducing global warming » Contribution towards security of electricity supply

Benefits associated with REIPPP socio-economic development plans and community trust

The developer will establish a community trust funded by revenue generated from the sale of energy. The community trust will generate a reliable and steady income stream over a 20 year period. The trust will be used to fund development initiatives in the area and support local economic and community development. As the community trust will run for the entire operational phase of ~20 years, it allows the local municipality and communities to undertake long term planning. This provides opportunities for positive benefits to the local area. However these benefits can be enhanced.

The key issues that may be an issue for the local municipality include external workforces being brought into the area, social responsibilities not being met properly and a lack of communication with the relevant local authorities in terms of the community trust and socio-economic development plans. It is important for the developers to engage and communicate with the local municipality so that the municipality can provide guidance on what's needed in the local area for socio-economic development plans. It is also important that the correct representatives are appointed to be part of the community trust. The solar energy development is supported by the local authorities and it was noted that the development has the potential to bring in more positive impacts to the local area.

Nature: Benefits to the local area from SED/ ED programmes and community trust from REIPPPP social responsibilities		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i		
	Without enhancement	**With enhancement**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Moderate (6)
Probability	Probable (3)	Highly probable (4)

Significance	**Low (30)**	**Medium (48)**
Status (positive or negative)	Positive	Positive
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be enhanced	No	
Enhancement » An in-depth community needs assessment (CNA) will need to be carried out to make sure that the real needs of communities are addressed (in line with the local government) and the correct representatives of the community are appointed to run the community trust » Engagement and involvement of the local municipality with social responsibility plans		
Cumulative impacts Creation socio economic development opportunities for the area		
Residual impacts Improvements in local communities through socio-economic and enterprise development		

Visual impact and sense of place impacts

The sense of place is developed over time as the community embraces the surrounding environment, becomes familiar with its physical properties, and creates its own history. The sense of place is created through the interaction of various characteristics of the environment, including atmosphere, visual resources, aesthetics, climate, lifestyle, culture and heritage. Importantly though it is a subjective matter and is dependent on community perceptions.

An impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light. The social impacts associated with the impact on sense of place relate to the change in the landscape character and visual impact from the proposed solar energy facility and associated infrastructure (power line).

***Nature*:** Visual impacts and sense of place associated with the operation phase of the solar energy facility and associated infrastructure		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (5)	Low (2)

Probability	Probable (3)	Probable (3)
Significance	**Medium (33)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated	Yes	
Mitigation » The laydown area should be sited away from the R566 road and preferably not located at elevated areas on site » Light spillage reduction management should be implemented.		
Cumulative impacts Potential impact on the current sense of place in the area due to other developments		
Residual impacts None anticipated if the visual impact will be removed after decommissioning, provided the site is rehabilitated to its original (current) status.		

Impacts associated with the loss of agricultural land

Direct occupation of land by the proposed solar energy facility has the effect of taking the impacted land out of agricultural production, through the occupation of the site by the footprint of the facility. The proposed site is located within an agricultural zone. Currently the proposed site is utilised for livestock farming, cattle grazing. The activities associated with the operation phase will result in a loss of farmland available for grazing for the operation period.

Nature: Impacts associated with loss of farmland available for potential agricultural purposes due to occupation of land by the solar energy facility		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1, 15 GNR 985 Activity 4(e)i, 12(a)i		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Highly probable (4)	Highly probable (4)
Significance	**Low (28)**	**Low (28)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	

Irreplaceable loss of resources	At footprint for the duration of the operation phase of the solar energy facility
Can impacts be mitigated	No
Mitigation None anticipated	
Cumulative impacts » The overall loss of agricultural land in the region due to other developments	
Residual impacts Overall loss of farmland, income and change in livelihood	

Construction and Operational Phase Impacts on access roads

Nature: Access road nuisance impacts in terms of temporary increase in dust and the wear and tear on the existing access road		
Relevant Listed activities: GNR 983 Activity: 11(i), 28 (ii) GNR 984 Activity 1,		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	High (8)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium (44)**	**Low (10)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated	Yes	

Mitigation » The developer would need to establish appropriate consent agreements with the impacted and adjacent landowners to ensure that the dust pollution is prevented. Possible options for dust mitigation include either: » Consider upgrading the access road to tar surfaced road for the section passing the vineyards; » Consider applying dust suppressants - There are many types and brands of chemical dust suppressants which work by binding lighter particles. Biodegradable suppressants may be applied as a surface treatment to "seal" the top of an area, or may be applied using a mixing method that blends the product with the top few inches of the land surface material; or » Reduced vehicle speeds - High vehicle speeds increase the amount of dust created from unpaved areas. Reducing the speed of a vehicle to 20km/h can reduce dust emissions by a large extent. » The contractor must ensure that damage / wear and tear caused by construction related traffic to the access road is repaired before the completion of the construction phase. » Ensure that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. » Ensure all vehicles are road worthy, drivers are qualified and are made aware of the potential dust issues. » A Community Liaison Officer should be appointed. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process. » Also refer to the traffic impact assessment for mitigation measures.
Cumulative impacts » If damage to roads is not repaired then this will affect other road users and result in higher maintenance costs for vehicles of road users » Other construction activities in area will heighten the nuisance impacts, such dust pollution and wear and tear on roads.
Residual impacts Only damage to roads that are not fixed could affect road users

6.10.4 Comparative Assessment of Alternatives

Access Road:

All of the proposed alternative routes, are existing road, both options will require the access area to the site to be upgraded. In terms of impacts arising existing access reduce the ecological impacts. The access point will have to be constructed to the required specifications of an access road, minimizing the potential erosion risks to a certain degree. Considering the fact that both roads are already existing, both alternative will be used as suitable to reduce traffic congestion

Aspect	Alternative Preferred Access Road 1	Alternative Access Road 2
Social	Acceptable – » Supported by the landowner	Acceptable – » Supported by the landowner

Grid connection:

An alternative grid connection point was not considered in this report, please refer to (2.4.2) and (6.2.3).

6.10.5 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the severity of impacts of the PV facility can be reduced to low, or avoided. The Solar Facility can be developed and impacts on the social environment managed by taking the following into consideration:

- The establishment of a Community Trust will also create an opportunity to support local economic development in the area.

- From a social perspective it is recommended to choose the Preferred Access Road 1. Should the other access road be utilized for some technical reason, the developer would need to establish appropriate agreements with the impacted landowner of that particular farm to ensure that the dust pollution is prevented and measures are put into place to reduce the risk of theft of grapes.

- Where reasonable and practical the contractors appointed by the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.

- A skills development and training programme to be developed for the construction and operational phases.

- Negative social impacts during construction and operational of the plant can be managed to acceptable levels through the implementation of mitigation measures.

6.10.6 Assessment of 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 energy facility.

A. Land use and agriculture

The current land-use is restricted to low intensity grazing of cattle. The natural grazing capacity of the larger solar farm site is low it is unlikely that the farm will become productive from this perspective in the long-term. Should the current land use activities continue, cattle farming would continue to occur indefinitely. The potential to utilise the site sustainably (due to the very low agricultural potential and stock yield) will therefore not be realised. The change of the land use for this project is therefore not considered significant. The area of 160 ha for the proposed development means that the facility would occupy the same area that could be grazed by about 7 small stock units or 10 large stock units. This is not regarded as viable commercial farming site and would be best suited to develop the facility.

B. Socio-economic impact

Social: The impacts of pursuing the No go Alternative are both positive and negative as follows:

- The benefits would be that there is no disruption from, nuisance impacts (noise and dust during construction), visual impacts and safety and security impacts. The impact is therefore neutral.
- There would also be an opportunity loss in terms of job creation, skills development and associated economic business opportunities for the local economy. Foregoing the proposed development would not necessarily compromise the development of renewable energy facilities in South Africa. However, the socioeconomic benefits for local communities would be forfeited.

New Business: New business sales that will be stimulated as a result of the establishment of the project, albeit for a temporary period, will be lost. Some of the positive spin off effects that are to ensue from the project expenditure will be localized in the communities. The local services sector and specifically the trade, transportation, catering and accommodation, renting services, personal services and business services are expected to benefit the most because of project activities during the construction phase.

Employment: About 450 direct jobs will be created during construction. At least a third of these jobs will become available for the local communities. Developing this project will create sustainability in employment.

Skills development: The establishment of the project will offer numerous opportunities for skills transfer and development. This is relevant for both on-site activities and manufacturing activities.

Municipal goals: The LED goals of the District Municipality (in terms of energy development, manufacturing growth through energy development and techno-tourism) will not be met to the extent possible should the project not be constructed.

The no-go alternative will therefore result in the above economic benefits not being realised and a subsequent loss of income and opportunities to local people. From this perspective the no-go alternative is not preferred.

C. Regional scale impact

At a broader scale, the benefits of additional capacity to the electricity grid and those associated with the introduction of renewable energy would not be realised. The North West has good solar resource in the South Africa. Although the facility is only proposed to contribute 50 MW to the grid capacity, this would assist in meeting the growing electricity demand throughout the country and would also assist in meeting the government's goal for renewable energy. The generation of electricity from renewable energy resources offers a range of potential socio-economic and environmental benefits for South Africa. These benefits include:

- **Increased energy security**: The current electricity crisis in South Africa highlights the significant role that renewable energy can play in terms of power supplementation. In addition, given that renewables can often be deployed in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality, while reducing expensive transmission and distribution losses.

- **Resource saving**: Conventional coal fired plants are major consumers of water during their requisite cooling processes. It is estimated that the achievement of the targets in the Renewable Energy White Paper will result in water savings of approximately 16.5 million kilolitres, when compared with wet cooled conventional power stations; this translates into revenue savings of R26.6 million. As an already water-stressed nation, it is critical that South Africa engages in a variety of water conservation measures, particularly due to the detrimental effects of climate change on water availability.

- **Exploitation of our significant renewable energy resource**: At present, valuable national resources including biomass by-products, solar radiation and wind power remain largely unexploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio.

- Pollution reduction: The releases of by-products through the burning of fossil fuels for electricity generation have a particularly hazardous impact on human health and contribute to ecosystem degradation.

- Climate friendly development: The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through the reduction of greenhouse gas (GHG) emissions. South Africa is estimated to be responsible for ~1 % of global GHG emissions and is currently ranked 9th worldwide in terms of per capita CO^2 emissions.

- Support for international agreements: The effective deployment of renewable energy provides a tangible means for South Africa to demonstrate its commitment to its international agreements under the Kyoto Protocol, and for cementing its status as a leading player within the international community. Employment creation: The sale, development, installation, maintenance and management of renewable energy facilities have significant potential for job creation in South Africa.

- Acceptability to society: Renewable energy offers a number of tangible benefits to society including reduced pollution concerns, improved human and ecosystem health and climate friendly development.

- Support to a new industry sector: The development of renewable energy offers the opportunity to establish a new industry within the South African economy.

The 'do nothing' alternative will do little to influence the macro-level renewable energy targets set by government due to competition in the sector, and the number of renewable energy projects being bid to the DoE. However, as the site experiences some of the best irradiation in the country and optimal grid connection opportunities are available, not developing the project would see such an opportunity being lost. The loss of the land to this project is, therefore, not considered significant. In addition the North West grid will be deprived of an opportunity to benefit from the additional generated power being evacuated directly into the Province's grid. The "Do Nothing" alternative is therefore not preferred as South Africa needs to diversify electricity generation sources, to which this project will contribute

7 ASSESSMENT OF CUMULATIVE IMPACTS

Cumulative impacts in relation to an activity can be defined 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 De Wildt is associated with heavy mining activity. East of the project site 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 the Eland Platinum Mine west of the project site 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 such as the influx of people to the site which may lead to negative impacts in the surrounding area such as theft and burglaries, trespassing on adjacent properties, development of informal trading, and littering. 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 invasive 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 the operating Xstrata Eland Platinum Mine and the De Wildt Substation. 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 proposed 50 MW project is 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 a new 50MW plants is 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 EMPrs 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 RECOMMENDATIONS

A comprehensive set of recommendations is set out in the Impact Tables as mitigation measures and its recommend that they are implemented. It is not intended to repeat them here. However there are a number of broader recommendations that need to be stated:

• A ecological rehabilitation plan needs to be prepared as part of the design phase, giving consideration to likely spoil storage sites during construction.

• the ECO needs to be on-hand during the early stages of construction, especially at the start of site clearing and excavation.

• Access arrangements need to be confirmed as soon as possible, and the EMP needs to set out clear technical and management recommendations in this regard.

• The EMPr also needs to set out clear management criteria for the control of construction workforce in relation to the local community, as well as strict traffic safety measures.

The construction process should limit obstruction to traffic flows during peak traffic hours.

Activities which will lead to excessive noise near residential areas should be limited to take place during the day.

Erosion control measures should be implemented where applicable.

Construction camp to be erected where it will have the least environmental impact.

Maintenance done on construction vehicles must be done in such a manner to prevent spillage of fuel and oils.

After the completion of construction, any possible soil compaction and spillage of substances within the construction camp must be rehabilitated.

Appointment of an Environmental Control Officer (ECO) who should report monthly to the competent authority.

All reasonable precautions must be taken to minimize noise generated on site.

Storm water management plan must be implemented in line with the recommendations of the specialist as attached herewith.

Relevant regulations relating to traffic management (especially speeding and behaviour at intersections) must be applied.

Preferential procurement and hiring practices should be implemented and monitored as part of the proposed construction of the 50MW solar power farm.

Flora shall be protected and animals found on site shall not be harmed or killed.

8.1 Overall Recommendation

An “environment” is a space where human beings subsist and interact with the biosphere, and “development” is what they do in attempting to improve their lot within that abode, and therefore, the two are inseparable. It is no secret, though, that environmental management

issues are complex, involve multi-stakeholders and solutions demand difficult choices of society, particularly rooted in the trade-offs between economic growth, social equity and ecological integrity. In addition, lay people and experts see things in the same environment differently.

It is predictable that there will be impacts on the environment caused by the proposed solar park project. It is believed that Implementing Mitigation Measures suggested in the EMP will reduce the negative environmental impacts that may be caused by this development.

The long-term success can be effectively achieved by implementing the comprehensive EMP, which addresses the measures required for the operation of this mixed development to ensure that the negative impacts are kept within acceptable levels.

9 CONCLUSION

The identification of environmental issues, and assessment thereof, has thus far not raised any 'no-go' areas or fatal flaws in the proposed development of the De Wildt solar park. There is an expected net negative impact on the physical Marikana Bushveld environment, but the potential economic benefits of the development will impact on both the local and regional area.

However, there are certain negative impacts associated with the physical and social environments that have been addressed in the EMP and carefully managed during construction. The EMP requirements are set out in the Impact Tables where all the mitigation measures on each assessment have been taken to be in the EMPR attached in Appendix 5. All the significance rating on the assessment have been rated low and medium after mitigation measures are implemented.

One area of concern raised was that of the proposed project on the neighbouring land owners, this led to assessment of the animal behaviors specialist and noise impact specialist who determined that raised impacts are manageable if their recommendations are implemented. The comments from DEA on the draft EIAR led to a delayed appointment of the social specialist as a result the comment period was extended by a month to a 30 day comment period on that specialist report and the amended application for CBA activities to be subjected to public participation and stakeholders comment.

The public consultation process has involved a wide range of stakeholders from landowners, neighbours to provincial stakeholders especially READ Department. After initial telephonic consultation with the key stakeholders (including landowners) it was agreed that a single workshop would be appropriate for all concerned. This was held and important issues gained as a

result. Despite confirmation of attendance by most of the stakeholders, the relatively poor attendance at the meeting was largely attributed to the history of the proposals.

In addition to the workshop, there were several one-on-one meetings with stakeholders and adjacent landowner Mr. Nel who could not attend despite advertising, distribution of information documentation and registered letters to landowners. The adjacent landowner objected to the development and raised issues of impacts on his animal breeding project. We commissioned the animal behavior specialist attached as Appendix 6K whose findings were that the degree of disturbance will be medium with implementation of mitigation measures outlined in the report. This adjacent have since proposed to sell his property to the developer.

It is considered that overall the level of study has been appropriate for the nature, extent and history of the project. It is considered that further detailed specialist studies will not be necessary to support the decision making process. That further detailed studies are recommended, but only for the detailed design phase, is seen to be appropriate for this study and that this approach has been adopted for similar and more extensive solar PV infrastructure studies.

The following aspects were assessed by specialists:

Specialist Study	Findings	Recommendations
Noise impact study	The report indicates that the baseline conditions for the site which is limited to excessive noise generation to the north of the proposed site in accordance with the road and vehicle movement on the R566 road. The ambient noise levels of the proposed site is currently low and the construction activities will have an impact on the current ambient noise level. However with mitigation measures implanted during the construction phase, the impact can be limited. During the operational phase of the proposed project, the noise impact is expected to be low as per previous studies conducted and will be in line with current ambient noise levels. The various noise generators and sensitive receptors must be considered when the activity authorisation is considered. Should the proposed activity be approved, the mitigation measures provided in the report should serve as a guideline for the prevention and mitigation of noise activities and should be implemented accordingly.	Should complaints be received, the proposed methodology (Section 6.4.1) in the Noise Baseline assessment report should be followed to assess the noise generating activities of the development.

Ecological Impact study	The proposed development alignment traverses a Critical Biodiversity Area (CBA 1), an Endangered vegetation type (Marikana Thornveld), an Important Birding Area (IBA) and two vegetation units that have high conservation value. Uncontrolled development in and around these vegetation units is expected to impact significantly on their associated Red Data species, populations, assemblages or communities. The sensitive habitats include: **Vegetation unit 1** Marikana Thornveld ***Reasoning***: Despite degradation through livestock farming practices, this vegetation unit has moderate species richness and remains in a relatively natural condition. Marikana Thornveld is an endangered vegetation type with less than 1% statutorily conserved. ***Conservation value***: High **Vegetation unit 2** Drainage line ***Reasoning***: This unit plays an important ecological role in the channelling of water. ***Conservation value***: High	Adequate erosion preventative mechanisms must be implemented throughout the construction phase. Erosion resulting from the development should be appropriately rehabilitated preventing further habitat deterioration. Stormwater runoff must be correctly managed during all phases of the development. Special care needs to be taken during the construction phase to prevent surface stormwater containing sediments and other pollutants from the onsite drainage lines and wetland. A surface runoff and stormwater management plan must be put in place. The total sealing of walkways, pavements, drive ways and parking lots should not be permitted in the free space system. These should form part of and be contained within the areas earmarked for development. This would aid in the minimising of artificially generated surface stormwater runoff. The use of insecticides, herbicides and other chemicals should not be permitted within 200m of an open space system. An integrated pest management programme, where the use of chemicals is considered as a last option, should be employed. However, if chemicals are used to clear invasive vegetation and weedy species or for the control of invertebrate pests, species-specific chemicals should be applied and in the recommended dosages. General spraying should be prohibited and the application of chemicals as part of a control programme should not be permitted to take place on windy days.

		Outside lighting should be designed to minimize impacts, both directly on especially rare or endangered invertebrate species and indirectly by impacts on populations of prey species. All outside lighting should be directed away from sensitive areas. The drainage line (unit 2) should be subject to as little disturbance as possible. This drainage line forms part of the Crocodile River catchment but the gravel pit (unit 3) blocks the drainage line from delivering storm water into this catchment. An attempt should be made to refill unit 3 so that the ecological function of unit 2 can be restored.
Avifauna Study	Birds attracted to the above sources may enter one or more focal points when descending and, as a result, could be burnt to death. There is little information available on the impacts of solar farms on avifaunal species within southern Africa. Apart from the Marikana Thornveld being an endangered vegetation type the construction of the solar farm will take place in an area that is of low relevance for nature conservation and outside a protected or important bird area. There are no large trees close to the study site where large raptors such as Martial Eagle and vultures (White-backed Vulture) breed. The proposed solar farm will be constructed outside any known sensitive or Red Data avifaunal migration route. The solar farm will be constructed outside any known water avifaunal flight paths. The habitat systems on site will not favour any of the mentioned Red Data avifaunal species due to a lack of suitable breeding, roosting and/or foraging habitat on and	It is recommended that the Solar photovoltaic (PV) solar farm type be used since this will have the least impact on avifaunal species. Where possible the construction of the solar farm should take place in the area that has already been disturbed or degraded by past and present human activities. Construction in dense woodland area, especially along drainage lines should be avoided, as many avifaunal species are associated with trees that grow along these conduits. Construction should not take place near large trees which serves as nesting or roosting sites for raptors and vultures – large trees are a limited resource in dry areas. Post-construction monitoring of bird abundance and movements and fatality surveys should span 2-

	surrounding the study site. The avifaunal species observed on or that are likely to occur on the study site are the more common woodland avifaunal species and species that are able to adapt to areas transformed by man.	3 years to take inter-annual variation into account. However, if significant problems are found or suspected, the post-construction monitoring should continue as needed in conjunction with adaptive management, taking into account the risks related to the particular site and species involved.
Heritage impact assessment	An archaeologist must be assigned during bush clearing to further assess the area. This will ensure that no chance archaeological/ and or graves are compromised/ disturbed by the proposal. However, as aforesaid, chances of encountering archaeological sites in these portions are considered low. Although no archaeological objects were observed during the survey, the client is reminded 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. In the mean time, 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 developer should induct field worker about archaeology, and	That the developer be allowed to proceed with the planning of the project, subject to adopting the recommendation mention above. From a cultural heritage resources perspective, it is recommended that South African Heritage Resources Agency (SAHRA) approve the project to proceed on condition that the suggested recommendation measures are successfully adhered to. This report is void with approval from SAHRA or relevant provincial authority.

	steps that should be taken in the case of exposing archaeological materials.	
soil, agricultural potential, land type and land use study	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.	The areas should not be backfilled or graded apart from the internal roads as this will cause more scouring unless the backfill is compacted and covered with vegetation before the first storm run-off.
Visual Impact study	The viewshed analyses and 3 dimensional visualizations have shown that the proposed solar farm development will be visible from certain viewpoints within the surrounding landscape. These include the R566 road users, residents of the township of De Wildt, railway line and station (northern sections, viewpoints 1); areas to the east of the development site (Viewpoint 4), developments and farms west of the development area (viewpoint 2); helicopter / birds eye-view and surrounding mountainous-top views; as well as the road users along the N4 as well as developments and areas south of the development area. The 3 dimensional visualizations have also shown that distance from the observer to the development is an important consideration when assessing impact. Visual	Trees and shrubs should be planted especially along the boundaries so as to reduce the visual impact on surrounding neighbours. The landscaping must be a combination of indigenous plants consisting of low ground covers, shrubs and lawn. The development proposal has indicated that a 2.1m high hedge will be placed around the boundary of the proposed development. The 3-dimensional visualisations have shown that this will soften the outer boundary of the development. This will also form an obstruction to the viewers

	distance/observer proximity is an important factor to consider when determining the impact that the proposed development would have on the surrounding viewpoints. It is generally accepted that visual impact of a structure is reduced as the distance from that structure increases. It is generally assumed that an object will be predominantly visible from an equal distance.	possibly seeing the solar farm development. However, at certain parts of the landscape, especially the viewpoints on higher ground to the north and north-east of the site, the development will be visible. External lighting must be minimized. No spot lights should be allowed. Choice of colour, lighting and positioning should be properly planned. The outward features of the solar power farm should be taken into consideration as they need to blend in with the surrounding environment in order to minimise visual impacts.
Wild animal behavior	Mr. Nel advised that the antelope are not accustomed to pedestrian traffic so the antelope had to be viewed per vehicle. The vehicle was driven by Mr. Nel into the 7ha enclosure. The antelope I was able to observe for a brief period (2 Impala rams, approx 4 Impala ewes, 1 X Blesbok (gender undetermined) and 2 X Springbok) appeared to be in good health and settled in their enclosure. The Springbok were in an adjacent area. An ethogram was not possible due to a moderate startle response of the antelope to the vehicle's presence. The area in which the antelope are housed is typical Marikina Thornveld, with indigenous flora. The bush is fairly thick with clear line of	The antelope should be monitored on a regular basis to ensure that the disturbances to their environment are being mitigated in such a way as to minimise any negative impact on their welfare. Such changes are however not always possible to perceive from cursory visual observations. It has been shown that faecal cortisol levels are a reliable indicator of stress in various animals (Möstl & Palme, 2002). It is recommend that these

	sight being limited to a maximum of approximately 20m in some areas. Water is provided to the antelope via a trough, which is frequently visited. The antelope feed exclusively on the flora within their enclosure during summer and supplement feed is only provided during winter. No manmade shelters are provided for the antelope. Two well established latrines were observed in typical settings. According to Mr Nel the antelope show no clear preference for any particular area in the enclosure – I could see no evidence for this either. All of the antelope are sexually mature and have bred in the past. It must be noted that the observation occurred during the rutting season, which could give rise to variations in typical behaviour. The human contact the antelope have is limited to a twice daily fence check – in these cases the antelope tend to move away from the humans into the bush.	levels are measured once per month starting as soon as possible – this allows for a baseline level to be established and also controls for the possibility that cortisol levels may currently be elevated due to rutting season. On-going faecal cortisol level measuring as well as visual observation of the antelope should provide reliable evidence as to the welfare of the animals, during construction and operation of the PV solar park. **Where no active mitigation is suggested it is recommended that monitoring still occurs to ensure that the* *areas identified as "low risk" remain in that category.* The disturbances as listed will impact on the welfare of the antelope as the situation stands. This could lead to chronic stress as well as physiological effects such as declines in reproductive success. The mitigation measures suggested should minimise this impact and on-going monitoring will provide a means to quantify the efficacy of these measures.
Paleontology	The finding of this study is that there are no fossiliferous sedimentary rocks in the study area.	From a palaeontological perspective there are no restrictions on development in the study area. For this reason no additional studies, such as a desk top study or full palaeontological survey are necessary.
Traffic Impact Study	i. The proposed access position to the site on R566 should be confirmed with the North West Provincial Department of Public Works and Roads to ensure that safe access can be provided to the solar plant site, as well as the adjacent properties to the west of	i. The proposed De Wildt 50 MW PV solar plant development be authorised, including the construction of a new access to the site. ii. Approval must be obtained from the North West Provincial

	the site and the portion of the site west of the watercourse that divides the site into a western and eastern portion. ii. High two-way traffic is experienced on route R566 during peak periods. iii. High conflicting traffic volumes are experienced at the intersection of route M21 to Ga Rankuwa and R566. iv. Significant traffic demand will be generated during the installation of the solar plant, but traffic demand during operations is expected to be very low. Traffic will include heavy trucks, as well as minibus taxis and buses. v. Although the capacity of the access on R566 and the intersection of M21 and R566 is not expected to be exceeded, long delays and a poor level of service can be expected during peak hours. vi. Due to the limited duration of the construction period, it is not considered justified to upgrade the roads to achieve levels of service that are generally required, but points-men on duty would be able to assist traffic movements that experience unacceptable delay (level of service). vii. It will be necessary to upgrade the access to the site to comply with geometric requirements of the North West Provincial Department of Public Works and Roads. viii. An option exists to amend the layout of the intersection of M21 and R566 to increase the capacity without extensive construction works. ix. The design of the access on the R566 and the access control to the site must take the expected vehicle types and the security arrangements at the entrance gate into account.	Department of Public Works and Roads for the proposed access to the site. iii. Provision should be made in the Environmental Management Plan to employ points-men to regulate traffic at the intersection of M21 and R566 during the AM peak period and at the access to the site during the PM peak period, should this prove to be required. iv. The design of the access to the site on the R566 must be submitted to the North West Provincial Department of Public Works and Roads for approval and must take all expected vehicle types, including public transport vehicles, delivery vehicles and abnormal trucks for its delivery of heavy plant and equipment into account. v. Special care must be given to the design of access control and storage areas at the entrance to the site to avoid any impact on traffic operations on the R566. vi. Arrangements must be made for transportation of employees to and from the site. vii. Law enforcement authorities should be requested to implement improved visual policing and law enforcement to eliminate the violation of traffic signs at the intersection of M21 and R566.
Storm Water and floodline	The flow velocities vary between 1m/s to around 4 m/s and the flow state is sub-critical which means that the flood levels are	The PV stands can be erected provided the foundations of the stands are designed to withstand the forces shown on **Table 8** of the

	controlled by downstream features such as the road bridge and the existing donga. **1:2 Year Return Period** Deposition of silt may occur for rainfall intensities lower the 1: 2 year return period. No erosion is expected. **1:5 Year Return Period** Deposition of silt may occur for rainfall intensities lower the 1: 5 year return period. No erosion is expected. **1:10 Year Return Period** Deposition of silt will occur for rainfall intensities above the 1: 10 year return period. No erosion is expected. **1:20 Year Return Period** No siltation or erosion is expected. **1:50 Year Return Period** No erosion is expected. No silting is expected. **1:100 Year Return Period** Some erosion may occur. The runoff emanating from the project area eventually drains to the streams and rivers shown in the **Figure 6 of the storm water report.**	storm water report**.** Please note that the buffer area borders between the drainage paths and the valuable infrastructure are detailed in **Addenda 7 & 8** of the storm water report. The areas should not be backfilled or graded as this will cause more scouring unless the backfill is compacted and covered with vegetation before the first storm run-off. The possible drainage paths must be treated by constructing small flow check structures as detailed in **Addendum 8** of the storm water report.
Social Impact Study	From a local perspective the settlements closest to the proposed site are struggling with employment after the closure of the Eland Platinum Mine; thus creating a need for investment into the local economy and creation of employment. The proposed project will create about 450 employment opportunities half of which could be filled by workers coming from the local community and 30 temporary jobs, of which 20 will be made available for the local labour. Furthermore, the project will implement various SED and ED initiatives during its operation, which will likely positively impact on the access and quality of local social services and creation of opportunities for establishment and growth of local small businesses.	The review of key national and provincial energy policies and strategic developmental documents indicated that the development of energy from renewable sources is strongly supported at both levels. The same can be said about the local municipality, which officials expressed their support for such a renewable project as it is in line with the LMs objective of transforming into a greener economy. Upon examination of potential socio-economic impacts, it was found that the positive impacts of job creation, economic

		stimulation, and social development outweigh negative impacts such as the potential stress on social delivery, economic infrastructure, and change in the sense of place. Overall, based on the current developmental path of the North West Province and the Madibeng area, the proposed development is well suited for the location. The current land uses for the directly and indirectly affected land portions show little to no economic activity and is therefore poised for further economic development.

In terms of Section 31 (m) of NEMA the environmental practitioner is required to provide an opinion as to whether the activity should or should not be authorised. Phakanani Environmental believes that sufficient information is available for DEA to take a decision. The fundamental decision is whether to allow development which brings socio-economic advantages and is consistent with planning and certain development and social responsibility and upliftment policies, but which may impact on an area.

With consideration to the identified impacts, their magnitude and significance after the proposed mitigation measures, the project can be managed appropriately to lessen its environmental impact. It is therefore recommended that the development be authorised on condition that the development should adhere to mitigation measures, provided in the Environmental Management Plan. No intrusion/ footprint outside the servitudes of the given area are allowed and no further expansion of the study area is allowed without the relevant permits.

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11 UNDERTAKING BY THE EAP

An undertaking under oath or affirmation by the EAP in relation to:

i. The correctness of the information provided in the report;
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 comments or inputs made by interested or affected parties;

I ……Tsunduka Nicholas 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:……..

Commissioner of oath Stamp