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BASIC ASSESSMENT REPORT



Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE) to support the proposed 75 MW Solar Photovoltaic Facility (KENHARDT PV 1) on the remaining extent of Onder Rugzeer Farm 168, north-east of Kenhardt, Northern Cape Province

Prepared for:
Scatec Solar SA 330 (PTY) Ltd

DEA Reference: 14/12/16/3/3/1/1547
CSIR Report No.: CSIR/02100/SS/ER/2016/0004/B

June 2016

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Basic Assessment Process

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Prepared for:

Scatec Solar SA 330 (PTY) Ltd

Prepared by:

CSIR

P O Box 17001, Congella, Durban, 4013, South Africa

Tel: +27 31 242 2300

Fax: +27 31 261 2509

Lead Authors:

Paul Lochner, Surina Laurie and Rohaida Abed

Mapping:

Luanita van der Walt and Surina Laurie (CSIR)

report details

Title:	Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE) to support the proposed 75 MW Solar Photovoltaic Facility (KENHARDT PV 1) on the remaining extent of Onder Rugzeer Farm 168, north-east of Kenhardt, Northern Cape Province: BASIC ASSESSMENT REPORT
Purpose of this report:	<p>This Basic Assessment (BA) Report forms part of a series of reports and information sources that have been compiled during the BA Process for the development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE) to support the proposed 75 MW Solar Photovoltaic Facility (KENHARDT PV 1) on the remaining extent of Onder Rugzeer Farm 168, north-east of Kenhardt, Northern Cape Province. The purpose of this BA Report is to:</p> <ul style="list-style-type: none"> • Present the proposed project and the need for the project; • Describe the affected environment at a sufficient level of detail to facilitate informed decision-making; • Provide an overview of the BA Process being followed, including public consultation; • Assess the predicted positive and negative impacts of the project on the environment; • Provide recommendations to avoid or mitigate negative impacts and to enhance the positive benefits of the project; • Provide an Environmental Management Programme (EMPr) for the proposed project. <p>This BA Report was made available to all Interested and Affected Parties (I&APs), Organs of State and stakeholders for a 30-day review period, extending from 3 March 2016 to 5 April 2016. All comments submitted during the 30-day review of the BA Report (which was circulated during the consultation process) have been incorporated into this finalised BA Report as applicable and where necessary. This finalised BA Report has been submitted to the National Department of Environmental Affairs (DEA), in accordance with Regulation 19 (1) of the 2014 NEMA EIA Regulations, for decision-making in terms of Regulation 20 of the 2014 NEMA EIA Regulations.</p>
Prepared for:	Scatec Solar SA 163 (PTY) Ltd Contact Person: Claude Bosman / Mitchell Hodgson
Prepared by:	CSIR, P O Box 17001, Congella, Durban, 4013, South Africa Tel: +27 31 242 2300 Fax: +27 31 261 2509
Authors:	Paul Lochner, Surina Laurie and Rohaida Abed
Mapping:	Luanita van der Walt and Surina Laurie
CSIR Report Number:	CSIR/02100/SS/ER/2016/0004/B
CSIR Project Number:	EMS0102
DEA Reference Number:	14/12/16/3/3/1/1547
Date:	June 2016
To be cited as:	CSIR, 2016. Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE) to support the proposed 75 MW Solar Photovoltaic Facility (KENHARDT PV 1) on the remaining extent of Onder Rugzeer Farm 168, north-east of Kenhardt, Northern Cape Province: Basic Assessment Report. CSIR Report Number: CSIR/02100/SS/ER/2016/0004/B.

Key Changes from the BA Report that was issued for I&AP, Stakeholder and Organ of State Review from 3 March 2016 to 5 April 2016

Section of Report	Key Change
BA Report and Appendices	<ul style="list-style-type: none"> The term "BA Report" has been updated to "Finalised BA Report", where applicable. Updated the references to the appendices throughout the report.
BA Report - Section A	<ul style="list-style-type: none"> Updated Section A with additional information regarding the status and progress made on the BA (and EIA) Reports, the submission of the Application for Environmental Authorisation to the DEA, as well as DEA's acknowledgment of receipt of the BA (and EIA) Reports, and the assignment of reference numbers for the BA projects (i.e. progress made in terms of the BA Process). Updated Section A (1) (a) (1) with additional information regarding the Electromagnetic and Radio Frequency Interference Studies and the Traffic Impact Statement. Updated Section A (1) (a) (4) with a summary of the environmental sensitivities identified by the specialists (which is unchanged since the release of the BA Report in March 2016), as well as updated the section with additional information regarding the limited vegetation removal within the servitude, the widening and upgrading of the existing farm road leading to the site, as well as additional information regarding the status of feedback from the municipality (in terms of the supply of services). Updated Section A (1) (b) with additional information regarding the widening and upgrading of the existing farm road leading to the site. It must be noted that the listed activities as included in the Application for Environmental Authorisation that was submitted to the DEA in March 2016 have not changed. Updated Section A (2) with additional information regarding the alternatives and the 2014 EIA Regulations (based on the comment from the DEA on the BA Report in April 2016). Section A (10) has been updated based on the status of feedback from the municipality (in terms of the supply of services). Updated Section A (11) in terms of the applicability of legislation (including the Subdivision of Agricultural Land Act (Act 70 of 1970)).
BA Report - Section B	<ul style="list-style-type: none"> Updated Section B (6) with a summary of the key findings of the Electromagnetic and Radio Frequency Interference Studies, as well as the feedback from the Square Kilometre Array (SKA) Project Office, and the follow up response to the SKA Project Office in terms of commitment to the implementation of mitigation measures.
BA Report - Section C	<ul style="list-style-type: none"> Updated with details of the Public Participation Process undertaken thus far. Updated the summary of responses to the comments received during the review of the Background Information Document (and during the Scoping Phase of the EIA Projects). Updated with new comments received during the review of the BA (and EIA) Reports and provided a summary of responses to these comments raised. Updated with additional information regarding the release of the BA (and EIA) Reports for comment. Updated with a description of feedback received from the South African Heritage Resources Agency (SAHRA) and the Square Kilometre Array (SKA). Updated with the status of feedback from the Department of Agriculture, Forestry and Fisheries (DAFF). Updated with a description of consultation with the Department of Water and Sanitation (DWS) and the Northern Cape Department of Environment and Nature Conservation.
BA Report - Section D	<ul style="list-style-type: none"> Updated Table 7 with the status of the projects being considered in the assessment of cumulative impacts (including DEA Reference Numbers). Updated with additional mitigation measures based on the comments/recommendations received from I&APs, Stakeholders and Organs of State during the review of the BA Report (regarding recommendations from the SKA in terms of compiling an Electromagnetic Control Plan for the PV EIA Projects and testing the mitigation measures in a laboratory for the Kenhardt PV 2 EIA Project, as well as the comments from the DAFF regarding limiting the removal of vegetation within the servitude of the transmission line).
BA Report - Section E	<ul style="list-style-type: none"> Updated with additional mitigation measures based on the comments/recommendations received from I&APs, Stakeholders and Organs of State during the review of the BA Report (regarding recommendations from the DAFF (in terms of vegetation removal in the transmission line servitude), as well as the SKA Project Office (in relation to the impact on the SKA), and SAHRA (in terms of impacts on heritage features).
Appendix A	<ul style="list-style-type: none"> Updated the table of contents of the appendices and the references to the appendices. Updated the sensitivity map (Appendix A.3) and the co-ordinates (Appendix A.4) to clearly show the corridor of the proposed transmission line extending and connecting to the Eskom Nieuwehoop Substation on Portion 3 of the Gemsbok Bult Farm 120.
Appendix D.3	<ul style="list-style-type: none"> Change reference to "Portion 2 of Boven Rugzeer 169" to "Portion 4 of Onder Rugzeer 168". Please note that this is not a major amendment, the original routing of the corridor as noted in the BA Reports that was released for comment in March 2016 remains unchanged.
Appendix D.8	<ul style="list-style-type: none"> Updated with additional information regarding the widening and upgrading of the existing farm road leading to the site.
Appendix E	<ul style="list-style-type: none"> Updated with additional newspaper advertisement and proof of placement for the release of the BA (and EIA) Reports (Appendix E.1).

Section of Report	Key Change
	<ul style="list-style-type: none"> ▪ Updated with correspondence sent and proof of correspondence to I&APs, Stakeholders and Organs of State for the release of the BA (and EIA) Reports (this includes letters, emails, courier waybills, additional follow up emails, and comment and registration forms) (Appendix E.2). ▪ Updated some of the responses to the comments raised by I&APs during the review of the Background Information Document in Appendix E.3.1 and during the review of the Scoping Reports in Appendix E.3.2. ▪ Updated with new comments received from I&APs, Stakeholders and Organs of State during the review of the BA (and EIA) Reports and provided responses to these comments raised (Appendix E.3.3). ▪ Updated the database of I&APs, Stakeholders and Organs of State to reflect stages of consultation, commenting, as well as additions to the database (Appendix E.5). ▪ Updated with copies of comments received from I&APs, Stakeholders and Organs of State based on the review of the BA (and EIA) Reports during the 30-day review period (Appendix E.6).
Appendix G	<ul style="list-style-type: none"> ▪ Updated Section 1 with additional information regarding the status and progress made on the BA (and EIA) Reports, the submission of the Application for Environmental Authorisation to the DEA, as well as DEA's acknowledgment of receipt of the BA (and EIA) Reports, and the assignment of reference numbers for the BA projects. ▪ Updated Section 1.1 with a summary of the sensitive areas identified by the specialists (which is unchanged since the release of the BA Report in March 2016), as well as additional information regarding the widening and upgrading of the existing farm road leading to the site. ▪ Updated Table 1 in Section 1.2 with the expertise and qualifications of the BA team. ▪ Updated Table 4 in Section 2.1 with compliance with the 2014 EIA Regulations. ▪ Updated with comments/recommendations received from I&APs, Stakeholders and Organs of State based on the review of the BA (and EIA) Reports (regarding recommendations to manage the impacts on indigenous vegetation, impacts on protected trees, impacts on heritage features, and impacts on the SKA). ▪ Updated sensitivity map to clearly show the corridor of the proposed transmission line extending and connecting to the Eskom Nieuwehoop Substation on Portion 3 of the Gemsbok Bult Farm 120.
Appendix H	<ul style="list-style-type: none"> ▪ Updated the Curriculum Vitae of the Environmental Assessment Practitioner.
Appendix J	<ul style="list-style-type: none"> ▪ Included a copy of the Application for Environmental Authorisation (Appendix J.4) and the DEA acknowledgement of receipt of the Application Form and BA Reports (Appendix J.5).

Note from the CSIR: If sections are not mentioned in the above table (i.e. Appendices B, C, D.1, D.2, D.4, D.5, D.6, D.7, D.9, F, and I), this means that either there have been no changes or no major changes to these sections (for example, the findings of the specialist studies and impact assessments have remained unchanged since the release of the BA Reports in March 2016, only date changes on the cover pages have been effected where necessary).

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executive summary

Introduction, Background and Environmental Assessment Process

Scatec Solar SA 163 (PTY) Ltd is proposing to develop three 75 Megawatt (MW) Solar Photovoltaic (PV) power generation facilities and associated electrical infrastructure (including transmission lines for each 75 MW facility) on the remaining extent of Onder Rugzeer Farm 168, approximately 80 km south of Upington and 20-30 km north-east of Kenhardt within the !Kheis Local Municipality, Northern Cape Province. The proposed 75 MW Solar PV facilities will connect (via the transmission lines and associated electrical infrastructure) to the Eskom Nieuwehoop Substation, which is currently being constructed on the remaining extent of Portion 3 of Gembok Bult Farm 120. The proposed transmission lines and electrical infrastructure will be constructed within a single electrical infrastructure corridor.

In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the 2014 NEMA Environmental Impact Assessment (EIA) Regulations promulgated in Government Gazette 38282 and Government Notice (GN) R982, R983, R984 and R985 on 8 December 2014, a **full Scoping and EIA Process** is required for the construction of the three Solar PV facilities. The proposed 75 MW Solar PV facility projects (requiring a Scoping and EIA Process) are referred to as:

- Kenhardt PV 1;
- Kenhardt PV 2; and
- Kenhardt PV 3.

In October 2015, separate Applications for Environmental Authorisation (EA) were submitted to the Competent Authority (i.e. the National Department of Environmental Affairs (DEA)) for each proposed **Scoping and EIA** project (i.e. the Solar PV facilities). The Applications for EA were acknowledged by the DEA on 23 October 2015 and the following reference numbers were assigned to the Kenhardt PV (**Scoping and EIA**) projects:

- Kenhardt PV 1 - DEA Reference: 14/12/16/3/3/2/837;
- Kenhardt PV 2 - DEA Reference: 14/12/16/3/3/2/838; and
- Kenhardt PV 3 - DEA Reference: 14/12/16/3/3/2/836.

The Scoping Reports for the abovementioned PV projects were released separately to Interested and Affected Parties (I&APs) for review in September 2015 during the Scoping Phase. In November 2015, the finalised Scoping Reports were submitted to the DEA, in accordance with Regulation 21 (1) of the 2014 NEMA EIA Regulations, for decision-making in terms of Regulation 22 of the 2014 NEMA EIA Regulations. The DEA accepted the finalised Scoping Reports on 8 December 2015, which marked the end of the Scoping Phase, after which the EIA Process moved into the impact assessment and reporting phase. The EIA Reports were then compiled for the Kenhardt PV 1, PV 2 and PV 3 projects and were made available to I&APs for a 30-day comment period (extending from 3 March 2016 to 5 April 2016), together with the Basic Assessment Reports. Subsequent to the 30-day comment period, and in order to meet the timeframes for the Scoping and EIA Process as stipulated in the 2014 NEMA EIA Regulations, the finalised EIA Reports for the Kenhardt PV 1, PV 2 and PV 3 projects were compiled (with the inclusion of comments raised by I&APs, Stakeholders and Organs of State during the 30-day review period), and submitted to the DEA in April 2016 for decision-making in terms of Regulation 24 of the 2014 NEMA EIA Regulations. The DEA acknowledged receipt of the finalised EIA Reports for the Kenhardt PV 1, PV 2 and PV 3 projects on 19 April 2016.

More specifically, in terms of the NEMA and the 2014 NEMA EIA Regulations promulgated in Government Gazette 38282 and GN R982, R983, R984 and R985 on 8 December 2014, three **Basic Assessment** (BA) Processes have been conducted for the proposed construction of the transmission lines and electrical infrastructure, which are required to ensure that the abovementioned proposed Kenhardt PV 1, PV 2 and PV 3 facilities are connected to the Eskom Nieuwehoop Substation (i.e. the national grid). These BA Projects are referred to as (together with the corresponding assigned DEA Reference Numbers):

- Kenhardt PV 1 - Transmission Line (i.e. this project) - DEA Reference: 14/12/16/3/3/1/1547;
- Kenhardt PV 2 - Transmission Line - DEA Reference: 14/12/16/3/3/1/1546; and
- Kenhardt PV 3 - Transmission Line - DEA Reference: 14/12/16/3/3/1/1545.

The BA Reports and Applications for EA for the abovementioned project were submitted to the DEA for comment via courier (together with the EIA Reports) on 22 March 2016. Proof of courier is included in Appendix E.2 of the finalised BA Report and the letter of acknowledgment and receipt from the DEA is included in Appendix J.5 of the finalised BA Report. The letter of acknowledgment of the BA Reports and Applications for EA was received from the DEA via email on 1 April 2016, which also provided the abovementioned reference numbers that have been allocated to the BA Projects. A copy of the Application for EA for the Kenhardt PV 1 - Transmission Line project is included in Appendix J.4 of the finalised BA Report.

This BA Report is only focussed on the proposed **Kenhardt PV 1 - Transmission Line** project.

Scatec Solar SA 163 (PTY) Ltd consists of various subsidiary companies. The subsidiaries that fulfil the role of the Project Applicant are noted below for the proposed 75 MW Solar PV and transmission line projects:

- Scatec Solar SA 330 (PTY) Ltd - Project Applicant for Kenhardt PV 1 and Kenhardt PV 1 - Transmission Line (i.e. this project);
- Scatec Solar SA 350 (PTY) Ltd - Project Applicant for Kenhardt PV 2 and Kenhardt PV 2 - Transmission Line; and
- Scatec Solar SA 370 (PTY) Ltd - Project Applicant for Kenhardt PV 3 and Kenhardt PV 3 - Transmission Line.

As noted above, Scatec Solar SA 330 (PTY) Ltd (hereinafter referred to as Scatec Solar) is the Project Applicant for this proposed transmission line and electrical infrastructure project (referred to as **Kenhardt PV 1 - Transmission Line**).

In accordance with Regulation 12 (1) of the 2014 NEMA EIA Regulations, the Applicant has appointed the Council for Scientific and Industrial Research (CSIR) to undertake the separate EIA and BA Processes in order to determine the biophysical, social and economic impacts associated with undertaking the proposed activity. The BA Team also includes various specialists that have been appointed to undertake specialist studies to contribute to the BA Process. These specialist studies are included in Appendix D of the finalised BA Report.

Since the three proposed 75 MW Solar PV facilities, as well as the associated electrical infrastructure and transmission lines are located within the same geographical area and constitute the same type of activity, an integrated Public Participation Process (PPP) has been undertaken for the proposed projects. However, as noted above separate Applications for EA were lodged with the DEA in September 2015 for each Kenhardt PV facility (requiring the **Scoping and EIA Process**), with amended Applications for EA submitted to the DEA in April 2016 together with the finalised BA Reports. As also described above, separate Applications for EA were lodged with the DEA in March 2016 (together with the BA and EIA Reports for comment) for each transmission line and electrical infrastructure project that requires a BA Process. Furthermore, separate reports (i.e. BA, Scoping and EIA Reports) were compiled for each project. As noted above, the BA Reports were released to I&APs, Stakeholders and Organs of State for a 30-day period (extending from 3 March 2016 to 5 April 2016) for review together with the EIA Reports (for the Kenhardt PV 1, PV 2 and PV 3 projects). The BA (and EIA) Reports were made available in the Kenhardt and Groblershoop public libraries.

Electronic versions of the BA (and EIA) Reports were also available on the following project website: <http://www.csir.co.za/eia/ScatecSolarPV/>. Written notifications, hard copies and/or CDs containing the document were sent to key stakeholders, including authorities, to inform them of the release of the BA (and EIA) Reports for the 30-day comment period.

All comments received have been included in this finalised BA Report as applicable and where necessary. This finalised BA Report has been submitted to the DEA, in accordance with Regulation 19 (1) of the 2014 NEMA EIA Regulations, for decision-making in terms of Regulation 20 of the 2014 NEMA EIA Regulations.

The abovementioned integrated PPP approach, as well as the general approach to the Scoping and EIA Projects and the BA Projects, were discussed with and approved by the DEA at a pre-application meeting, which was held on 17 September 2015. Appendix J.2 of the finalised BA Report includes a copy of the agenda and notes of the meeting, as well as the presentation given by the CSIR at the pre-application meeting.

Project Applicant

Scatec Solar is an integrated Independent Power Producer (IPP) that is focused on making solar energy a sustainable and affordable source on a global scale. Scatec Solar was founded in 2001 and holds its headquarters in Norway. The company develops, builds, owns and operates a number of solar power plants internationally and within Africa. The company is growing significantly and is currently planned to provide a combined 207 MW of power in the United States, Honduras and Jordan. In addition, Scatec Solar collectively delivers more than 219 MW of power in the Czech Republic, South Africa and Rwanda. Specifically linked to investment within South Africa, Scatec Solar has been involved in the following major solar energy projects:

- The Linde Solar Plant (40 MW) is located in the Northern Cape and is considered to be the first of the large-scale PV plants in production from the second round of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).
- The Dreunberg Solar Plant (75 MW) is the only REIPPPP Solar PV Project to be located in the Eastern Cape.
- The Kalkbult Solar Plant (75 MW) is located in the Northern Cape and was the first REIPPPP project to be connected to the grid and operational in South Africa.

Scatec Solar was awarded another further 258 MW in the Fourth Round of the REIPPPP. Dyason's Klip 1, Dyason's Klip 2 and Sirius PV Project One were all anticipated to obtain Financial Closure in Quarter 4 of 2015.

Linked to enhancing its operations within South Africa, the proposed 75 MW Solar PV facilities will make use of PV solar technology to generate electricity from the sun's energy (which, as noted above, has been assessed as part of separate Scoping and EIA Processes). The Applicant is proposing to develop three facilities with a possible maximum installed capacity of 100 MW Direct Current (DC) which produces 75 MW Alternating Current (AC) of electricity from PV solar energy. As noted above, the electricity produced will be transmitted to the Eskom Nieuwehoop Substation via transmission lines (this component is the subject of this BA Process). Once a Power Purchase Agreement (PPA) is awarded, the proposed Kenhardt PV 1 facility will generate electricity for a minimum period of 20 years. It is proposed that Scatec Solar will implement the Self-Build Option for the additional electrical infrastructure to be constructed (which has been assessed separately as part of this BA Process). Following the construction phase, the proposed transmission line and electrical infrastructure will either be transferred into the ownership of Eskom or remain in the ownership of Scatec Solar.

Project BA Team

As mentioned above, the CSIR has been appointed to undertake the separate EIA and BA Processes. The project team, including the relevant specialists, are indicated in the table below:

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN
Environmental Assessment Practitioners		
Paul Lochner	CSIR	Technical Advisor and Quality Assurance (EAPSA) Certified
Surina Laurie	CSIR	Project Leader (<i>Pr. Sci. Nat.</i>)
Rohaida Abed	CSIR	Project Manager (<i>Pr. Sci. Nat.</i>)
Specialists		
Simon Bundy	Sustainable Development Projects cc	Ecological Impact Assessment (including Terrestrial Ecology, Aquatic Ecology and Avifauna)
Henry Holland	Private	Visual Impact Assessment
Dr. Jayson Orton	ASHA Consulting (Pty) Ltd	Heritage Impact Assessment (Archaeology and Cultural Landscape)
Dr. John Almond	Natura Viva cc	Desktop Palaeontological Impact Assessment
Julian Conrad	GEOSS	Geohydrological Assessment
Johann Lanz	Private	Soils and Agricultural Potential Assessment
Rudolph du Toit	CSIR	Social Impact Assessment
P. S. van der Merwe and A. J. Otto	MESA Solutions (PTY) Ltd	Electromagnetic Interference and Radio Frequency Interference Surveys

Project Description

The following proposed transmission line and electrical infrastructure connectivity options have been considered in the separate BA Processes for the three transmission line projects (i.e. Kenhardt PV 1 - Transmission Line, Kenhardt PV 2 - Transmission Line and Kenhardt PV 3 - Transmission Line):

- Construction of a separate 132 kV transmission line from the proposed Kenhardt PV 1, Kenhardt PV 2 and Kenhardt PV 3 facilities to the Eskom Nieuwehoop Substation that is currently being constructed on Farm Gemsbok Bult (remaining extent of Portion 3 of Farm 120); or
- Construction of separate 22/33 kV transmission lines to connect the Kenhardt PV 2 and Kenhardt PV 3 projects to the proposed Kenhardt PV 1 on-site substation which will link via a 132 kV line to the Eskom Nieuwehoop Substation; or
- Construction of one 132 kV transmission line from the Kenhardt PV 1 project to the Eskom Nieuwehoop Substation and connect the Kenhardt PV 2 and Kenhardt PV 3 facilities together via medium voltage transmission lines to either the on-site substation of Kenhardt PV 2 or PV 3, followed by the construction of one 132 kV transmission line from the on-site substation to the Eskom Nieuwehoop Substation.

All transmission lines and connectivity options (as described above) will be constructed within a single electrical infrastructure corridor. The corridor will extend between 300 m and 1000 m wide. This corridor was assessed for the proposed transmission lines and associated electrical infrastructure (for all three Kenhardt PV Transmission Line projects) to ensure that the line routing and placement of the structures avoid sensitive areas that have been identified by the specialists (as indicated in Appendix D of the finalised BA Report).

A large corridor area was considered and assessed by the specialists in order to ensure that any development constraints or environmental sensitivities can be avoided in the final siting and location of the proposed transmission line. Based on the findings of the specialist studies, an environmental sensitivity map has been produced (and included in Appendix A of this finalised BA Report, as well as the Environmental Management Programme (EMPr) included in Appendix G of this finalised BA Report). This map shows the sensitivities on site (terrestrial, aquatic, and sensitive heritage features) within the corridor that was assessed. Based on this map, the preferred location

and routing for the Kenhardt PV 1 transmission line avoids the sensitive features that were identified by the specialists within the corridor. Specifically, Aloe consociates, a dolerite koppie, a pan and minor drainage lines were identified within the larger corridor by the specialists.

Based on the boundaries of the corridor and the constraints of the environmental sensitivities as noted above, the preferred routing has been preliminarily determined for this project, which is included in Appendices A and B of this BA Report, as well as the EMPr included in Appendix G of this BA Report. It is important to note that should the routing change subsequent to the issuing of an EA (should such authorisation be granted), any alternative layout or revisions to the layout occurring within the boundaries of the corridor would not be regarded as a change to the scope of work or the findings of the impact assessments undertaken during the BA Phase. This is based on the understanding that the specialists have assessed the larger area and have identified sensitivities, which have been avoided in the siting of the proposed infrastructure. The corridor is considered to be a "box" in which the project components can be constructed at whichever location (within the boundary of the corridor) without requiring an additional assessment or change in impact significance. Any changes to the layout within the boundaries of the corridor following the issuing of the EA (should it be granted) will therefore be considered to be non-substantive.

This Kenhardt PV 1 - Transmission Line project includes the following:

- A 132 kV overhead transmission line will be constructed between the Kenhardt PV 1 facility and the Eskom Nieuwehoop Substation. The proposed transmission line is estimated to extend approximately 4 km in length. The proposed transmission line will extend from the remaining extent of Onder Rugzeer Farm 168 to the remaining extent of Portion 3 of Gemsbok Bult Farm 120. The transmission line will span over the Remainder of Boven Rugzeer 169 and Portion 4 of Onder Rugzeer Farm 168. The proposed transmission line is expected to have concrete foundations and steel tower structures (i.e. pylons). The line will consist of either self-supporting suspension structures or guyed monopoles. The towers will all have a maximum height of 30 m. The span lengths are estimated to range between 200 m and 300 m. The servitude for the 132 kV power line will be 52 m wide.
- Associated electrical infrastructure at the Eskom Nieuwehoop Substation will be constructed in order to ensure that the substation is capable of receiving the additional electricity that is generated by the proposed Kenhardt PV 1 facility. This infrastructure includes, but is not limited to, feeders, Busbars, transformer bay and extension to the platform at the Eskom Nieuwehoop Substation. Discussions have been initiated with the Project Applicant and Eskom to determine the requirements of connecting to the Nieuwehoop Substation.
- On-site substation (with a capacity of 80 MVA) will also be constructed. The on-site substation building is expected to extend approximately 12 m in height, with a maximum footprint of 20 000 m² (2 ha). It is important to note that all high voltage infrastructure leading up to the Point of Connection (i.e. Scatec Solar's section of the proposed collector/on-site substation) will be covered by the separate EIA Process (i.e. for Kenhardt PV 1). High voltage infrastructure extending from the Point of Connection (i.e. Eskom's section of the proposed collector/on-site substation) up to the line bay at the Eskom Nieuwehoop Substation may be handed over to Eskom and has been assessed separately as part of this BA Process (i.e. Kenhardt PV 1 - Transmission Line).
- The proposed project will also include the construction of a gravel road below the proposed 132 kV transmission line. The proposed gravel road will follow the route of the transmission line and will extend approximately 4 km to 9 km in length and less than 6 m in width.

In terms of access, the proposed project site can be accessed via an existing gravel road (an unnamed farm road) and the existing Transnet Service Road (private). Both access routes are considered and included in the proposed project. The R27 extends from Keimoes (in the north) to Vredendal in the south. The R27 is 6 m wide and falls within a 45 m road reserve. This National Road is designed for minimum daily traffic exceeding 1000 vehicle units. The Transnet Service Road can be accessed from the R27. The existing gravel road (an unnamed farm road) can be accessed

from the R383 Regional Road also via the R27 National Road. The Transnet Service Road and unnamed farm road are both (in some sections) wider than 8 m, however in certain sections; the unnamed farm road is believed to be about 2-3 m wide. A further access road (which is not expected to exceed 6 m in width) will be constructed from either the Transnet Service Road or the unnamed farm road to the proposed Kenhardt PV 1, 2 and 3 facilities (as shown in the preliminary layout in Appendix A of this finalised BA Report). This specific road construction has been assessed separately as part of the separate EIA Processes.

Discussions have been initiated and held with Transnet and the Project Applicant regarding the potential use of the Transnet Service Road and associated specific requirements. Transnet have informed the Project Applicant of their requirements that need to be met should the Transnet Service Road be used to gain access to the site. These requirements will be considered in the design where required, and the details of the agreement will be finalised outside of this BA Process.

However, should the Transnet Service Road not be used for access, then the unnamed farm gravel road will be used. In order to make use of the unnamed farm road and to ensure easy access to and mobility of large trucks, the unnamed farm road, however, will need to be upgraded and widened by more than 6 m (where required). Exact specifications of the widening and upgrading of the unnamed farm gravel road will be confirmed during the detailed design phase. It is expected that the upgrading and widening of the unnamed farm road will result in crossings of major and minor drainages lines on site. The details of these crossings will be determined during the detailed design phase. The Ecological Impact Assessment (Appendix D.1 of this finalised BA Report) has recommended a 32 m buffer around the major drainage lines within the study area. The existing unnamed farm road runs over the Rugseers River. Therefore the potential upgrade and widening of the existing farm road will be undertaken within 32 m of a water course. However, it is important to note that the 2014 NEMA EIA Regulations allow for development within watercourses or within 32 m of water courses by way of listed activities, which if triggered, need to be assessed as part of a BA or an EIA. Section A of the finalised BA Report includes the listed activities that are applicable to the proposed project and have been included in the Application for EA, including those that will result in activities and construction work within 32 m of water courses (i.e. Activity 12 (x) and (xii) of GN R983; Activity 19 (i) of GN R983; and Activity 18 (a) (ii) and (ii) of GN R985). Therefore, it is understood that the widening and upgrading of the unnamed farm road is permitted to take place in terms of the EIA Regulations (should the project receive EA).

The project can be divided into the following three main phases:

- Construction Phase;
- Operational Phase; and
- Decommissioning Phase.

Each activity undertaken as part of the above phases may have environmental impacts and has therefore been assessed by the specialist studies (Appendix D of the finalised BA Report). It is important to note that for the operational phase, the transmission line will result in impacts on avifauna and the surrounding environment; however requirements for water, sewage management and waste disposal do not apply.

The main factors that determined the location of the transmission line are indicated below:

- Location of the Kenhardt PV 1 facility;
- Location of the Nieuwehoop Substation; and
- The most cost-effective route and distance between the Kenhardt PV 1 facility and the Nieuwehoop Substation.

The location and property on which the proposed transmission line and associated electrical infrastructure will be constructed is largely dependent on the location of the proposed 75 MW Kenhardt PV 1 facility. The overall aim of this proposed project is to provide the necessary electrical infrastructure to ensure that the proposed 75 MW Kenhardt PV 1 facility is equipped and

enabled to transmit the generated electricity (from the Solar PV Plant) to the Eskom Nieuwehoop Substation. The location and property on which the proposed transmission line and associated electrical infrastructure will be constructed is also dependent on the location of the Eskom Nieuwehoop Substation. The location of the Nieuwehoop Substation influences and determines the location of the construction of the proposed associated electrical infrastructure at the substation (including but not limited to an additional feeder bay, Busbars, transformer bay and extension to the platform at the substation).

Based on the above, alternatives for the site and location of the proposed project are not applicable in this regard.

Need for the BA

As noted above, in terms of the 2014 NEMA EIA Regulations, a BA Process is required for the proposed project. The need for the BA is triggered by, amongst others, the inclusion of Activity 11 (i) listed in GN R983 (Listing Notice 1):

- *“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”.*

Section A (1) (b) of this finalised BA Report contains the detailed list of activities contained in R983 and R985 which are triggered by the various project components and thus form part of this BA Process.

The purpose of the BA is to identify, assess and report on any potential impacts the proposed project, if implemented, may have on the receiving environment. The Environmental Assessment therefore needs to show the Competent Authority, the DEA; and the project proponent, Scatec Solar, what the consequences of their choices will be in terms of impacts on the biophysical and socio-economic environment and how such impacts can be, as far as possible, enhanced or mitigated and managed as the case may be.

Impact Assessment

Seven specialist studies were carried out as part of the BA Process. These included:

- Ecological Impact Assessment (including Terrestrial Ecology, Aquatic Ecology and Avifauna);
- Visual Impact Assessment;
- Heritage Impact Assessment (Archaeology and Cultural Landscape);
- Desktop Palaeontological Impact Assessment;
- Geohydrological Assessment;
- Soils and Agricultural Potential Assessment; and
- Social Impact Assessment.

It should be noted that the Social Impact Assessment specialist study was subject to a peer review process by an external reviewer (Ms. Liza van der Merwe, a private consultant), as requested by the DEA (as part of the acceptance of the Scoping Reports). This external review report is included as an appendix to the Social Impact Assessment (Appendix D.7 of this report). A Traffic Impact Statement was also compiled by the Environmental Assessment Practitioner (EAP), however it serves as a general description of the existing and predicted traffic associated with the proposed project and does not classify as a specialist study in terms of Appendix 6 of the NEMA EIA Regulations. Furthermore, this statement considered the full development (i.e. the development of the three Solar PV Facilities (which are the subjects of separate EIA Processes) and the associated electrical infrastructure).

In addition, an Electromagnetic Interference and Radio Frequency Interference Survey Technical Study was commissioned by the Project Applicant to determine the impact of the proposed project on the Square Kilometre Array (SKA), as requested by the SKA Project Office. This report is not a standard specialist study in terms of Appendix 6 of the EIA Regulations, as it is a detailed, technical report which provides a cumulative topographical analysis of the proposed PV projects in the Astronomy Geographic Advantage Area and was undertaken to determine appropriate mitigation and management measures to reduce the risk of a detrimental impact on the SKA project.

Ecological Impact Assessment:

An Ecological Impact Assessment (Appendix D.1 of the BA Report) has been undertaken in order to provide supporting information (relating to ecological features and associated impacts) in terms of the proposed construction of the transmission line and associated infrastructure. The assessment included desktop evaluations, as well as site evaluations of the land within the proposed transmission line corridor. The investigations looked specifically at habitat form and structure and the relationship of such form and structure to the surrounding geology and geomorphology. The assessment sought to identify the ecological status of the land within the route and identify key biophysical drivers. Such information was then considered in respect of any changes to the prevailing habitat that may arise as a consequence of the establishment of the proposed transmission line.

The site is considered to fall within a xeric environment (dry or semi desert) and as such, is subject to significant seasonal to daily fluctuations in meteorological and physical factors which influence the prevailing ecology. In addition to the above, anthropogenic interventions associated with both the presence of livestock on the land in question, as well as indirect influences arising from the establishment of infrastructure (roads and rail) have served to alter other bio physical factors, including surface hydrology and the nature and composition of habitat.

The Ecological Impact Assessment established that the proposed powerline corridor serving the Eskom Nieuwehoop Substation traverses lands presently set aside for the grazing of livestock. The corridor includes two Aloe consocieties (*Aloe dichotoma* and *A claviflora*) of limited extent, which are linked to specific physical drivers. The routing of the transmission line must avoid the Aloe consocieties identified. The assessment notes that this may be achieved, preferably by locating the final route proximal to the existing railway line/roadway, or less favourably by spanning over the consocieties. Mitigation and management measures proposed are that the actual powerline lie either to the south or north of the identified consocieties and where applicable, towers be suitably positioned at points distal from these communities. The relocation of these specimens is possible; however this method should be avoided. Towers should be spaced adequately to avoid the necessity for relocation. A 60 m buffer should be implemented around the Aloe consocieties.

In terms of aquatic ecology, the Wolfkopseloop drainage feature that is inundated on an intermittent basis (periods greater than a year) lies to the north of the site and forms the most significant surface feature. As a significant hydro-geomorphological feature, a buffer of 32 m has been applied to this feature, where it intersects with the subject site. Wider buffers are considered to be inappropriate, given the nature of the terrain in question and the nature of the development. Surface drainage along the proposed transmission line corridor traverses a number of minor drainage lines which serve the Wolfkopseloop drainage feature. As is common to this region, minor drainage lines are influenced by the variability and intensity of rainfall and other factors, in particular the movement of livestock. Such drainage lines have been identified and should be given consideration in the final layout and design of the transmission line. However, these morphological features do not have to be avoided. It is important to note that minor drainage lines occur within the section of the corridor that intersects with the Kenhardt PV 1 and PV 2 areas.

The following main impacts were identified in the Ecological Impact Assessment:

Construction Phase:

- Alteration of habitat structure and composition in and around towers and possibly through the stringing phase of the project;
- Changes in the geomorphological state of drainage lines; and
- Exotic weed invasion.

Operational Phase:

- Changes in avian behaviour within increased perch and predation opportunities arising for raptors, which in turn have indirect impacts on prey species in the general locale;
- Bird collisions and mortalities arising from electrocution of birds perching on site and possibly direct collisions with the transmission line; and
- Exotic weed invasion as a consequence of regular and continued disturbance of route.

Decommissioning Phase:

- A reversion back to the present seral stage, where continued grazing by livestock and herbivory by game will arise.
- A reversion of present faunal population states within the subject route.
- Exotic weed invasion as a consequence of abandonment of route and cessation of weed control measures.

Cumulative Impacts:

- Extensive alteration of habitat structure and composition over an extensive and wide area where an increase in powerlines arise;
- Increased change in the geomorphological state of drainage lines on account of long term and extensive change in the nature of the catchment; and
- Exotic weed invasion as a consequence of regular and continued disturbance across an extensive area of the transmission line route.

Overall, the above impacts identified in the Ecological Impact Assessment (Appendix D.1 of this BA Report) are predicted to be of a moderate to low significance without the implementation of mitigation measures. No impacts were assessed as being of high significance after the implementation of mitigation.

The following main mitigation measures were identified in the Ecological Impact Assessment specialist study:

- Design Phase: The detailed design should consider and incorporate habitat and features into the routing of the proposed transmission line.
- Design Phase: The detailed design and confirmation of the proposed tower positions along the proposed transmission line route should assist with the avoidance of specific vegetation associates and forms (where applicable). Identify and avoid the two Aloe consociates (*Aloe dichotoma* and *A claviflora*) identified within the electrical infrastructure corridor as part of the Ecological Impact Assessment (Appendix D.1 of this BA Report).
- Design and Construction Phases: Avoidance, where possible of the minor drainage lines and any additional significant plant species that may be identified and incorporate other features along the route into the design. Avoidance of excessive clearance of vegetation within the proposed transmission line corridor, particularly around towers.
- Construction Phase: A second assessment of the route should be undertaken in or around February to March (subsequent to the issuing of an EA and the completion of the detailed engineering) in order to identify any additional plant specimens of significance that may be evident along the route. Undertake plant rescue operations, where such specimens may be relocated/removed (i.e. search and rescue) or avoided (with the relevant permits and approvals in place) prior to the commencement of construction.
- Construction Phase: Appoint a suitable Specialist/Contractor to undertake Search and Rescue operations as required, prior to the commencement of the construction phase.
- Construction Phase: Implement exotic weed control. An initial pre-construction clearance of all exotic vegetation on route should be undertaken to reduce the possibility of further exotic weed invasion. Continued exotic weed control measures should be implemented during the construction phase that aligns with an exotic vegetation management plan or an alien eradication plan.
- Design and Operational Phases: Management of avifauna impacts along the powerline route by the establishment of bird flight diverters and the use of appropriate tower design; and

- Construction, Operational and Decommissioning Phases: General land management practices to avoid excessive erosion, dust emissions and possible sources of pollution to ground and surface water resources.

Visual Impact Assessment:

A Visual Impact Assessment specialist study was conducted (included in Appendix D.2 of this BA Report) for the proposed transmission line connecting the proposed Kenhardt PV 1 Solar PV Facility to the Nieuwehoop Substation.

The landscape surrounding the proposed route has a rural agricultural character which has been transformed by extensive stock farming and large scale infrastructure in the form of the Sishen-Saldanha ore railway line and Eskom Nieuwehoop Substation.

The following sensitive visual receptors will potentially be affected by the introduction of the proposed 132 kV powerline into the landscape:

- Residents and viewpoints on farms surrounding the proposed development site. These are highly sensitive visual receptors since they have an active interest in their surrounding landscape; and
- Motorists using the R383 and the Transnet Service Road (i.e. Loop 14) adjacent to the ore railway line. Motorists are classified as low sensitivity visual receptors since they pass through the landscape and their attention is mostly focused on the road.

The Visual Impact Assessment confirmed that for the proposed transmission line which will support the Kenhardt PV 1 project, there are unlikely to be highly sensitive visual receptors that will be highly exposed to the power line.

The specialist study notes that visual intrusion will be low for visual receptors on surrounding farms since the landscape is already transformed by structures similar to those of the proposed power line. Motorists using the gravel road adjacent to the Sishen-Saldanha railway line will experience low visual intrusion since their views are already severely impacted by the railway line and substation.

The following main impacts were identified in the Visual Impact Assessment:

Construction Phase:

- Potential visual intrusion of construction activities on views of sensitive visual receptors.

Operational Phase:

- Potential landscape impact of the proposed 132 kV powerline on a rural agricultural landscape; and
- Potential visual intrusion of the proposed 132 kV powerline on the views of sensitive visual receptors.

Decommissioning Phase:

- Potential visual intrusion of decommissioning activities on views of sensitive visual receptors.

Cumulative Impacts:

- Cumulative impact of solar energy generation projects and large scale electrical infrastructure on the existing rural-agricultural landscape; and
- Cumulative visual impact of solar energy generation projects and large scale electrical infrastructure on existing views of sensitive visual receptors in the surrounding landscape.

The specialist study notes that the cumulative landscape impact of various solar energy projects and their associated electrical infrastructure in the surrounding landscape will have a slight consequence since the landscape character has been extensively altered by the railway line and Nieuwehoop Substation. The significance of the cumulative impact is very low since the landscape is rapidly changing due to the introduction of large scale and highly visible rail and electrical infrastructure. The significance of the cumulative visual impact on existing views of sensitive visual

receptors is rated as very low due to the existing and new structures which have severely limited potential scenic views in the region.

Overall, the above impacts identified as part of the Visual Impact Assessment (Appendix D.2 of this finalised BA Report) are predicted to be of a very low to low significance without and with the implementation of mitigation measures. No impacts were assessed as being of high significance after the implementation of mitigation.

Overall, the proposed transmission line will fit in with the landscape as it exists now as well as with plans for the future of the surrounding landscape. The overall significance of the visual impact of the proposed 132 kV powerline is low.

The following main mitigation measures were identified in the Visual Impact Assessment specialist study:

- Construction Phase: Adopt standard mitigation measures associated with construction activities.
- Construction Phase: Night time construction should be avoided where possible.
- Construction Phase: Night lighting of the construction sites should be minimised within requirements of safety and efficiency.
- Operational Phase: Towers should be similar to those in existing landscape.
- Decommissioning Phase: Rehabilitation of cleared and disturbed areas.
- Decommissioning Phase: Working at night should be avoided, where possible.
- Decommissioning Phase: Night lighting of reclamation sites should be minimised within requirements of safety and efficiency.

Heritage Impact Assessment (Archaeology and Cultural Landscape):

A Heritage Impact Assessment (HIA) was undertaken as part of the BA Process (included in Appendix D.3 of this finalised BA Report). The HIA is a means of identifying any significant heritage resources before development begins so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue impacts to the heritage resources. This HIA report aims to fulfil the requirements of the heritage authorities such that a comment can be issued for consideration by the DEA who will review the finalised BA Report and grant or withhold authorisation.

The HIA established that the study area is relatively flat, although gently undulating terrain occurs in places. A pan occurs at the northern end of the proposed corridor, while a small rocky koppie occurs in the southern part of the corridor. Vegetation is low and sparse with ground visibility being excellent.

Archaeological material in the form of background scatter was located across much of the general area but impacts to this material would be of very low significance. No archaeological sites or graves were found along the alignment of the proposed transmission line corridor but sites may be expected in association with the pan and koppie which, because of a change to the project, were not covered by the survey. Although sites of high significance are unlikely to occur, these two areas should be avoided with buffers of 75 m radius from the centre of the pan and 120 m radius from the summit of the koppie as a precautionary measure. The landscape was identified as a heritage resource but, because of the presence of electrical and other infrastructure in the area, the significance of new impacts is considered to be very low and no mitigation is suggested.

The following main impacts were identified in the HIA:

Construction Phase:

- Damage to or destruction of archaeological resources and graves; and
- Impacts to the cultural and natural landscape.

Operational Phase:

- Impacts to the cultural and natural landscape.

Decommissioning Phase:

- Impacts to the cultural and natural landscape.

Cumulative Impacts:

- Damage to or destruction of archaeological resources and graves; and
- Impacts to the cultural and natural landscape.

Overall, the above potential impacts to archaeological resources and graves identified in the HIA (Appendix D.3 of this finalised BA Report) are rated as being of very low significance, while the impacts to the landscape are also rated with a very low significance (without the implementation of mitigation measures). Aside from avoiding the pan and koppie, no mitigation measures are suggested.

The following main mitigation measures were identified in the HIA:

- Design and Construction Phase: The pan and koppie should be avoided with buffers of 75 m from the centre of the pan and 120 m from the summit of the koppie.
- Construction Phase: The construction crew should be informed of the possibility of encountering graves and should be encouraged to report any suspicious-looking stone features prior to disturbance.
- Construction Phase: If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

The South African Heritage Resources Agency (SAHRA) approved the HIA and Palaeontological Impact Assessment (as well as the recommendations included within), and they also recommended (as part of their review of the HIA) that if any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, the SAHRA APM Unit must be alerted. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit must be alerted immediately. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required. This recommendation has been included in the EMPr (Appendix G of this finalised BA Report).

Palaeontological Impact Assessment:

A desktop Palaeontological Impact Assessment was undertaken as part of the BA Process (included in Appendix D.4 of this finalised BA Report) to provide an assessment of potential impacts on local palaeontological (i.e. fossil) heritage within the transmission line corridor between the proposed Kenhardt PV 1 facility and the Eskom Nieuwehoop Substation.

The specialist study notes that the corridor for the proposed transmission line is underlain at depth by Precambrian basement rocks (c. 1-2 billion years old) assigned to the Namaqua-Natal Province. These ancient igneous and high-grade metamorphic rocks - mainly granites and gneisses of the Keimoes Suite and Jacomynspan Group - crop out at surface in small areas and are entirely unfossiliferous. The desktop study also confirmed that no previously recorded areas or sites of exceptional fossil heritage sensitivity or significance have been identified within the study area as a whole.

The following main impacts were identified in the Palaeontological Impact Assessment:

Construction Phase:

- Potential loss of palaeontological heritage resources through disturbance, damage or destruction of fossils and fossil sites (including associated geological contextual data) through surface clearance and excavation activities during the construction phase.

Cumulative Impacts:

- Potential cumulative loss of palaeontological heritage resources through disturbance, damage or destruction of fossils and fossil sites (including associated geological contextual data) through surface clearance and excavation activities during the construction phase of proposed transmission line in the context of several alternative energy projects planned within the broader Kenhardt region and other key electrical infrastructure developments within a 20 km radius of the proposed project site.

Due to the inferred scarcity of scientifically important fossil remains within the study areas, as well as the small scale of excavations for electrical pylon footings concerned, the overall impact significance of the transmission line (during the construction phase) is assessed as very low (before and after mitigation). No significant impacts on fossil heritage are anticipated during the operational and decommissioning phases of the proposed transmission line project. The study further concluded that the cumulative impacts on fossil heritage resource posed by the transmission line, in the context of several alternative energy and other infrastructural developments planned in the region is of very low significance. No impacts were assessed as being of high significance after the implementation of mitigation.

The following main mitigation measures were identified in the Palaeontological Impact Assessment:

- Construction Phase: All substantial bedrock excavations (into sedimentary rocks) should be monitored for fossil material by the responsible Environmental Control Officer (ECO). Should significant fossil remains - such as vertebrate bones and teeth, plant-rich fossil lenses, petrified wood or dense fossil burrow assemblages - be exposed during construction, the responsible ECO should safeguard these, preferably *in situ*. The SAHRA should be alerted as soon as possible, so that appropriate action can be taken by a professional palaeontologist. Undertake monitoring of all substantial excavations into sedimentary rocks for fossil remains and safeguard any finds *in situ*.
- Construction Phase: Appoint a professional palaeontologist to record and sample any chance fossil finds. Mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as associated geological data (e.g. stratigraphy, sedimentology, taphonomy) by a professional palaeontologist. The palaeontologist concerned with mitigation work will need a valid fossil collection permit from SAHRA and any material collected would have to be curated in an approved depository (e.g. museum or university collection).

Geohydrological Assessment:

A Geohydrological Impact Assessment was undertaken as part of the BA Process (included in Appendix D.5 of this finalised BA Report) to determine the impact of the proposed project on the surrounding geohydrology and any geohydrological features, as well as to recommend mitigation measures to reduce the significance of potential negative impacts.

A desktop study was conducted based on existing maps and reports of the geology and geohydrology. Groundwater data, including groundwater level and groundwater quality data, was obtained from the National Groundwater Archive (NGA) for the area surrounding the proposed area. This was followed by a detailed fieldwork component to inform the Geohydrological Assessment.

Geologically, the study area for the proposed Kenhardt PV 1 transmission line corridor is overlain by wind-blown sand (Qg) of the Gordonina Formation. Bedrock is expected to be Jacomyns Pan Formation (which consists of weathered metamorphic rock types). According to regional groundwater maps the entire study area does host an "intergranular and fractured" aquifer (i.e.

the wind-blown sands and river alluvium as well as fractures within the bedrock constitute an aquifer) with an average borehole yield of 0.1 L/s to 0.5 L/s. Using Electrical Conductivity (EC) as a groundwater quality indicator, the regional groundwater maps indicate that the EC ranges from 300 - 1 000 mS/m within the study area and the area is classified as having a low vulnerability to surface based contaminants.

The following main impacts were identified in the Geohydrological Assessment:

Construction Phase:

- Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages; and
- Potential impact on the groundwater as a result of the construction of the storage yards and temporary construction labour accommodation site camps.

Decommissioning Phase:

- Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages.

No impacts on geohydrology were identified for the operational phase of the proposed transmission line development. Overall, the above impacts are predicted to be of a very low significance with the implementation of mitigation measures.

The following main mitigation measures were identified in the Geohydrological Assessment:

- All vehicles and other equipment (generators etc.) must be regularly serviced to ensure they do not spill oil. Vehicles should be refuelled and parked on paved (impervious) areas. If liquid product is being transported it must be ensured this does not spill during transit.
- Emergency measures and plans must be put in place and rehearsed in order to prepare for accidental spillage.
- Diesel fuel storage tanks must be above ground in a bunded area.
- Vehicle and washing areas must also be on paved surfaces and the by-products correctly managed.

Soils and Agricultural Potential Assessment:

A Soils and Agricultural Potential Assessment (included in Appendix D.6 of this finalised BA Report) was undertaken as part of the BA Process to identify and assess all potential impacts of the proposed development on agricultural resources including soils and agricultural production potential, and to provide recommended mitigation measures, monitoring requirements, and rehabilitation guidelines for all identified impacts.

The study determined that the proposed development is located on land zoned and used for agriculture. South Africa has very limited arable land and it is therefore critical to ensure that development does not lead to an inappropriate loss of land that may be valuable for cultivation. This assessment has found that the proposed site is on land which is of very low agricultural potential and is not suitable for cultivation.

The following main impacts were identified in the Soils and Agricultural Potential Assessment:

Construction and Decommissioning Phases:

- Degradation of veld vegetation beyond the direct footprint of the proposed transmission line corridor due to construction and decommissioning phase disturbance and potential trampling by vehicles.
- Loss of topsoil due to poor topsoil management (burial, erosion, etc.) during construction and decommissioning related soil profile disturbance (levelling, excavations etc.) and resultant decrease in that soil's capability for supporting vegetation.
- Loss of agricultural land use due to direct occupation by the infrastructural footprint of the proposed development for the duration of the project (all phases). This will take affected portions of land out of agricultural production.

- Soil erosion by wind or water due to the alteration of the land surface characteristics. Alteration of surface characteristics may be caused by construction related land surface disturbance, vegetation removal, and the establishment of excavations and surfaces for the proposed pylon bases. Erosion will cause loss and deterioration of soil resources and may occur during all phases of the project.

Operational Phase:

- Loss of agricultural land use due to direct occupation by the infrastructural footprint of the proposed development for the duration of the project (all phases). This will take affected portions of land out of agricultural production.
- Soil erosion by wind or water due to the alteration of the land surface characteristics. Alteration of surface characteristics may be caused by construction related land surface disturbance, vegetation removal, and the establishment of excavations and surfaces for the proposed pylon bases. Erosion will cause loss and deterioration of soil resources and may occur during all phases of the project.

Cumulative Impacts:

- Cumulative impacts due to the regional loss of agricultural land resources as a result of other developments on agricultural land in the region.

The study noted that there are three factors that influence the significance of all potential agricultural impacts. The first is that the actual footprint of disturbance of the proposed power line is very small in relation to available, surrounding land. The second is that the impact of a power line on the kind of agricultural activity (grazing) along the proposed development is very minimal, as this can continue in the presence of a power line with negligible disturbance. The third is that the site has very low agricultural potential, limited by severe climatic moisture availability constraints and shallow, rocky soils.

Because of the above factors, there will be a very low significance overall impact of the proposed development on agricultural production and resources and also a very low significance cumulative impact. No agriculturally sensitive areas occur within the assessed corridor. The land capability is classified as Class 7 - non-arable, low potential grazing land. The site has a low grazing capacity of 31 - 40 hectares per large stock unit. All impacts were assessed as having very low significance (without the implementation of mitigation measures).

The following main mitigation measures were identified in the Soils and Agricultural Potential Assessment:

- Construction and Decommissioning Phases: Control dust through appropriate dust suppression methods.
- Construction and Decommissioning Phases: Strip and stockpile topsoil before disturbance and re-spread it on the surface as soon as possible after disturbance.
- Construction and Decommissioning Phases: Manage any sub-surface spoils from excavations in such a manner that it will not impact on agricultural land.
- Construction and Decommissioning Phases: Minimise road footprint and control vehicle access on designated roads only.
- Operational Phase: Implement an effective system of stormwater run-off control.

Social Impact Assessment:

A Social Impact Assessment (included in Appendix D.7 of the finalised BA Report) was undertaken as part of the BA Process to investigate the potential social disruptors and associated social impacts likely to result from the proposed project. In this regard, the assessment focuses on the town of Kenhardt and not the individual land parcels on which the proposed projects will be developed, as most, if not all, of the anticipated social impacts will be experienced in the urban area nearest to the proposed developments (i.e. Kenhardt). Social disruptors and impacts under investigation are those which are most likely to significantly influence social and cultural concerns, values, consequences and benefits to communities.

The following main impacts were identified in the Social Impact Assessment:

Construction and Operational Phases:

- Influx of jobseekers;
- Increases in social deviance;
- Increases in incidence of HIV/AIDS infections;
- Expectations regarding jobs;
- Local spending;
- Local employment; and
- Human development resulting from the proposed Economic Development Plan.

Decommissioning Phase:

- Job losses at the end of the project life-cycle.

Cumulative Impacts:

- Cumulative impacts as a result of exacerbated in-migration.

The overall significance rating of the negative socio-economic impacts associated with the proposed project is low to moderate; whereas the overall significance rating of the positive socio-economic impacts associated with the proposed development is moderate.

It should be accepted that the development of the proposed project is likely to result in some form of negative social impact to the local community. However, such a negative impact needs to be weighed against the potential benefit likely to result from the same development. Given the overall medium significance negative impact of the project, as compared to the overall medium-high significance positive impact of the project; it can be concluded that the prospective socio-economic benefits of the proposed project outweighs the socio-economic losses/impacts. In addition, the local vulnerability context strongly suggests that acceptable, though declining, levels of Social and Human capital is present within the Kenhardt community, which should assist with the mitigation of potential negative socio-economic impacts resulting from the proposed project. Conversely, very limited Financial capital is available in the local community, which in turn adds to the erosion of existing Social and Human capital. Accordingly, there appears to be a clear need to invest in the development of Financial capital within the Kenhardt community in order to restore some level of balance between asset classes which in turn should facilitate more options to local community members in terms of viable livelihood strategies.

The following main mitigation measures were identified in the Social Impact Assessment:

Construction and Operational Phases:

- Develop and implement a Workforce Recruitment Plan;
- Reserve employment, where practical, for local residents;
- Clearly define and agree upon the Project Affected People (PAP);
- Develop a database of PAP and their relevant skills and experience, or use an existing legitimate database of skills and expertise;
- Develop and implement a Stakeholder Engagement Plan;
- Delivery on the Economic Development Plan must be contractually binding on the proponent;
- Procure goods and services, where practical, within the study area;
- Obtain regularly required goods and services from as large a selection of local service providers as possible;
- The proponent should engage with local NGOs, CBOs and local government structures in the Kenhardt community to identify and agree upon relevant skills and competencies required;
- Such skills and competencies should then be included in the Economic Development Plan; and
- Where possible, align the Economic Development Plan with Local Municipality's IDP.

Decommissioning Phase:

- The proponent should comply with relevant South African labour legislation when retrenching employees;
- Scatec Solar should also consider appropriate succession training of locally employed staff earmarked for retrenchment during decommissioning; and
- All project infrastructures should be decommissioned appropriately and thoroughly to avoid misuse.

Traffic Impact Statement:

A Traffic Impact Statement (TIS) was produced by the CSIR to show the amount of traffic that can be expected during the construction and operational phases of the proposed development of the proposed Kenhardt PV 1, Kenhardt PV 2, and Kenhardt PV 3 solar energy projects (i.e. separate EIA Processes), as well as the proposed Kenhardt PV 1 - Transmission Line (i.e. this BA Process), Kenhardt PV 2 - Transmission Line, and Kenhardt PV 3 - Transmission Line projects near Kenhardt in the Northern Cape. The TIS focuses on the regional setting in which these projects are proposed and the roads that will be utilised for these projects.

The following main impacts were identified in the TIS:

Construction, Operational and Decommissioning Phases:

- Increase in traffic generation;
- Accidents with pedestrians, animals and other drivers on the surrounding tarred/gravel roads;
- Impact on air quality due to dust generation, noise and release of air pollutants from vehicles and construction equipment; and
- Decrease in quality of surface condition of the roads.

Cumulative Impacts:

- Cumulative impact of traffic generation of three projects and related projects.

Overall, the above impacts identified as part of the TIS (Appendix D.8 of this finalised BA Report) are predicted to be of a moderate to low significance without and with the implementation of mitigation measures. No impacts were assessed as being of high significance after the implementation of mitigation.

The following main mitigation measures were identified in the TIS:

Construction, Operational and Decommissioning Phases:

- Should abnormal loads have to be transported by road to the site, a permit needs to be obtained from the Provincial Government Northern Cape (PGNC) Department of Public Works, Roads and Transport.
- Provide a Transport Traffic Plan to SANRAL.
- Ensure that roadworthy and safety standards are implemented at all times for all construction activities.
- Adhere to all speed limits applicable to all roads used.
- Implement clear and visible signalisation indicating movement of vehicles and when turning off or onto the Transnet Service Road to ensure safe entry and exit.
- Implement management strategies for dust generation e.g. apply dust suppressant on the Transnet Service Road, exposed areas and stockpiles.
- Construction activities will have a higher impact than the normal road activity and therefore the road should be inspected on a weekly basis for structural damage.
- A Road Maintenance Plan should be developed for the section of the Transnet Service Road that will be used.
- Ensure that the road network is maintained in a good state for the entire operational phase.

Cumulative Topographical Analysis of the proposed PV projects in the Astronomy Geographic Advantage Area

MESA Solutions (Pty) Ltd (MESA Solutions) was appointed by Scatec Solar to undertake a topographical analysis of the terrain profiles between various PV project locations (assessed separately as part of EIA Processes), as well as the associated infrastructure, in the Astronomy Geographic Advantage (AGA) area and the closest and core-site SKA telescopes. A total of three Scatec Solar sites (Kenhardt PV 1 to PV 3), as well as ten Mulilo sites (Boven PV1 to PV4; Gemsbok PV1 to PV6) in close proximity (as described in Section D of the finalised BA Report), have been considered in this cumulative assessment.

It should however be noted that depending on how many solar facilities are constructed on site, the cumulative impact will differ. For example, if all 13 proposed facilities are constructed, then the exceedance of emissions from the three Scatec Solar Kenhardt facilities (i.e. the facilities under consideration in the EIA Process) above the required protection level, taking into account their locations, will be 38 dB towards the closest SKA Telescope. However, if only the three Kenhardt facilities are constructed, the cumulative effect reduces, and so the exceedance above the required protection level reduces to 31.6 dB towards the closest SKA Telescope.

The full report, dated 10 February 2016, is included in Appendix D.9 of this finalised BA Report. This technical report aims to inform the potential impact that the proposed project will have on the SKA project and to determine suitable mitigation measures to manage the risk (if any) posed to the SKA project by the development of this project.

From the results it is found that:

- Radiated emissions at levels below that of CISPR 11/22 Class B are required (especially in the case of the closest telescope).
- Negligible terrain loss exists between majority of sites and closest SKA telescope.
- Based on the measured plant emission Radio Frequency Interference (RFI) and maximum allowed emission levels, the required mitigation or surplus attenuation varies based on plant location and frequency. However, mitigation measures will have to be applied based on the highest required level. The required 50 dB of shielding at Boven PV1 at 942 MHz, for example, would require significant attention to detail to achieve.

The study concluded that it is strongly recommended that the following mitigation practises be incorporated into the plants design:

- The inverter units, transformers, communication and control units for an array of panels all be housed in a single shielded environment.
- For shielding of such an environment ensure RFI gasketting be placed on all seams and doors and RFI Honeycomb filtering be placed on all ventilation openings.
- Cables to be laid directly in soil or properly grounded cable trays (not plastic sleeves).
- The use of bare copper directly in soil for earthing is recommended.
- Assuming a tracking PV plant design, care will have to be taken to shield the noise associated with the relays, contactors and hydraulic pumps of the tracking units.
- All data communications to and from the plant to be via fibre optic.

The SKA Project Office has reviewed the technical report compiled by MESA Solutions. As part of their review, the SKA Project Office recommended (in a letter dated 23 March 2016 and included in Appendix E.6 of this finalised BA Report) that an appropriate Electromagnetic Control (EMC) Plan should be developed to identify specific mitigation measures that will be implemented for the Kenhardt PV 1, PV 2 and PV 3 facilities (for which separate EIA Processes have been undertaken). The SKA Project Office further recommended that in particular, the measures implemented for Kenhardt PV 2 (separate EIA Process followed and EIA Report produced) should be tested and proven within a laboratory environment prior to the commencement of construction.

The mitigation measures provided as part of the MESA Solutions study will assist in ensuring adherence to the South African Radio Astronomy Services (SARAS) protection level threshold.

Scatec Solar have allocated project budget and have committed to adhere to the provisions stipulated within the correspondence from the SKA dated 23 March 2016. The EMC Plan will be provided to the SKA for comment and authorisation during the pre-construction design phase. Refer to Appendix E.2 of this finalised BA Report for a letter from the Project Applicant to the DEA stating its commitment to the implementation of the mitigation measures and recommendations of the SKA Project Office.

EAP's Recommendation

This BA Report has investigated and assessed the significance of the predicted, potential positive and negative direct, indirect and cumulative impacts associated with the proposed Kenhardt PV 1 - Transmission Line project. No negative impacts have been identified within this BA that, in the opinion of the EAPs who have conducted this BA Process, should be considered "fatal flaws" from an environmental perspective, and thereby necessitate substantial re-design or termination of the project.

Based on the findings of the specialist studies, the proposed project is considered to have an overall low negative environmental impact and an overall medium positive socio-economic impact.

The proposed project will be undertaken within the electrical infrastructure corridor. This corridor area was considered and assessed by the specialists in order to ensure that any development constraints or environmental sensitivities can be avoided in the final siting and location of the proposed transmission line. Based on the findings of the specialist studies, an environmental sensitivity map has been produced (and included in Appendix A of the finalised BA Report, as well as the EMPr included in Appendix G of the finalised BA Report), which shows the sensitivities on site (terrestrial, aquatic, and sensitive heritage features) within the larger corridor that was assessed. Based on the boundaries of the corridor and the constraints of the environmental sensitivities, a routing for the Kenhardt PV 1 transmission line within has been preliminarily determined for this project, which is included in Appendices A and C of the finalised BA Report, as well as the EMPr included in Appendix G.

This BA considered the nature, scale and location of the proposed development as well as the wise use of land (i.e. is this the right time and place for the development of this proposed project). When considering the timing of this project, the IRP2010 proposes to secure 17 800 MW of renewable energy capacity by 2030. In August 2011, the Department of Energy (DOE) launched the REIPPPP and invited potential IPPs to submit proposals for the financing, construction, operation and maintenance of the first 3 725 MW of various renewable energy project (including solar and wind). In terms of the REIPPPP, the submitted proposals are then evaluated. Currently, the two main evaluation criteria for compliant proposals are price and economic development with a point allocation of 70/30 (DOE, 2013), with other selection criteria including technical feasibility and grid connectivity, environmental acceptability, black economic empowerment, community development, and local economic and manufacturing propositions. The bidders whose responses rank the highest (according to the aforementioned criteria) will have the greatest potential to be appointed as "Preferred Bidders" by the DOE. The first procurement phase of the DOE's REIPPPP includes five bidding windows. Scatec Solar intends to bid these projects in the 2016 bidding process (i.e. Round 5) to be potentially selected as an IPP. The proposed Kenhardt PV 1 - Transmission Line project is required as part of the bidding process to confirm that the proposed Kenhardt PV 1 facility is enabled and equipped with the necessary infrastructure to connect to the national grid.

Overall the proposed transmission line project will fundamentally support and enable the functioning of the proposed Kenhardt PV 1 facility and to ensure that it is allowed to contribute to the abovementioned renewable energy targets proposed by the DOE.

On a provincial level, the Northern Cape Province is currently facing considerable constraints in the availability and stability of electricity supply. This is a consequence of South Africa's electricity generation and supply system being overstretched, and the reliance of the Northern Cape, as many other South African provinces, on the import of power to service its energy needs.

The development of solar energy is important for South Africa to reduce its overall environmental footprint from power generation (including externality costs), and thereby to steer the country on a pathway towards sustainability. On a municipal planning level, the proposed project does not go against any of the objectives set within the !Kheis Municipality Draft IDP 2012-2017. The proposed project will be in line with/supportive of the IDP's objective of creating more job opportunities and it will enable the proposed Kenhardt PV 1, PV 2 and PV 3 facilities to be constructed and to function optimally. The proposed transmission line project will assist in local job creation during the construction phase of the project (and ultimately enable job creation as a result of the proposed Kenhardt PV 1, PV 2 and PV 3 facilities), if approved by the DEA. It should however be noted that employment during the construction phase will be temporary.

Taking into consideration the findings of the BA Process, it is the opinion of the EAP, that the project benefits outweigh the costs and that the project will make a positive contribution to sustainable infrastructure development in the Kenhardt region. The proposed project will play a key role in enabling and facilitating the construction of the proposed 75 MW Kenhardt PV 1 which will add electricity to the national grid. Provided that the specified mitigation measures are applied effectively, it is recommended that the proposed project receive EA in terms of the EIA Regulations promulgated under the NEMA.

Section 24 of the Constitutional Act states that "everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that prevents pollution and ecological degradation; promotes conservation; and secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

Based on this, this BA was undertaken to ensure that these principles are met through the inclusion of appropriate management and mitigation measures and monitoring requirements. These measures will be undertaken to promote conservation by avoiding the sensitive environmental features present on site and through appropriate monitoring and management plans to, inter alia, monitor the impacts on birds and protection of SCC potentially present within this area (refer to the EMPr in Appendix G of this finalised BA Report).

In order to ensure the effective implementation of the mitigation and management actions, an EMPr has been compiled and is included in Appendix G of the finalised BA Report. The mitigation measures necessary to ensure that the project is planned and carried out in an environmentally responsible manner are listed in the EMPr. The EMPr is a dynamic document that should be updated as required and provides clear and implementable measures for the proposed project.

glossary

AC	Alternating Current
ADT	Average Daily Traffic
AGIS	Agricultural Geo-Referenced Information System
BA	Basic Assessment
BGIS	Biodiversity Geographic Information System
BID	Background Information Document
CA	Competent Authority
CBA	Critical Biodiversity Area
CPV	Concentrated Photovoltaic
CSP	Concentrated Solar Power
CSIR	Council for Scientific and Industrial Research
DAFF	National Department of Agriculture, Forestry and Fisheries
DEA	National Department of Environmental Affairs
DEA&DP	Western Cape Department of Environmental Affairs and Development Planning
DC	Direct Current
DM	Siyanda District Municipality
DMR	National Department of Minerals Resources
DOE	Department Of Energy
DOT	National Department of Transport
DSR	Draft Scoping Report
DWA	National Department of Water Affairs
EA	Environmental Authorization
EAP	Environmental Assessment Practitioner
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
EMI	Electromagnetic Interference
EMPr	Environmental Management Programme
ESA	Ecological Support Area
FEPA	Freshwater Ecosystem Protection Areas
FSR	Final Scoping Report
GA	General Authorization
GG	Government Gazette
GIS	Geographical Information Systems
GN R	Government Notice Regulation
HPM	Hydraulic Plant Module
I&AP	Interested and Affected Party
IEM	Integrated Environmental Management
ICB	Iron Chromium Battery
IDP	Integrated Development Plan
IPP	Independent Power Producer
IRP	Integrated Resource Plan
kWh	Kilowatt Hours
LSA	Later Stone Age
Mf	Friesdale Charkonite
Mja	Jacomys Pan Formation

Mks	Klip Koppies Granite
MSA	Middle Stone Age
MW	Megawatts
NBA	South African National Parks
NEMA	National Environmental Management Act (Act 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act
NERSA	National Energy Regulator of South Africa
NFEPA	National Freshwater Ecosystems Protected Areas
NHRA	National Heritage Resources Act (Act 25 of 1999)
NPAES	National Protected Expansion Strategy
NWA	National Water Act (Act No. 36 of 1998)
PES	Present Ecological State
PPA	Power Purchasing Agreement
PV	Photovoltaic
REDZs	Renewable Energy Development Zones
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RFI	Radio Frequency Inteference
S&EIR	Scoping and Environmental Impact Reporting
SABAP2	South African Bird Atlas Project
SAHRA	South African Heritage Resources Agency
SANRAL	South African National Roads Agency Limited
SANS	South African National Standards
SANBI	South African National Biodiversity Institute
SARERD	South African Renewable Energy Resource Database
SDF	Spatial Development Framework
SKA	Square Kilometre Array
TDS	Total Dissolved Solids
ToR	Terms of Reference
WASA	Wind Atlas of South Africa
WMA	Water Management Area
WULA	Water Use License Application

Summary of where requirements of Appendix 1 of the 2014 NEMA EIA Regulations (GN 982) are provided in this BA Report

<u>Appendix 1</u>	<u>YES / NO</u>	<u>SECTION IN BAR</u>
<p>Objective of the basic assessment process</p> <p>2) The objective of the basic assessment process is to, through a consultative process-</p> <ul style="list-style-type: none"> a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context; b) identify the alternatives considered, including the activity, location, and technology alternatives; c) describe the need and desirability of the proposed alternatives, d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on the these aspects to determine- <ul style="list-style-type: none"> (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and (ii) the degree to which these impacts- <ul style="list-style-type: none"> (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to- <ul style="list-style-type: none"> (i) identify and motivate a preferred site, activity and technology alternative; (ii) identify suitable measures to avoid, manage or mitigate identified impacts; and (iii) identify residual risks that need to be managed and monitored. 	<p>Yes</p>	<p>Legislation and Policy - Section A (2)</p> <p>Alternatives - Section A (2)</p> <p>Need and Desirability - Section A (1), Section A (2) and Section A (10)</p>
<p>Scope of assessment and content of basic assessment reports</p> <p>3) (1) A basic assessment report must contain the information that is necessary for the</p>	<p>Yes</p>	<p>Section A (1) and Appendix H</p>

<u>Appendix 1</u>	<u>YES / NO</u>	<u>SECTION IN BAR</u>
competent authority to consider and come to a decision on the application, and must include: (a) details of: (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;		
(b) the location of the activity, including: (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Yes	Sections A (1), (2) and (3), and Appendix A
(c) a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or, if it is- (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Yes	Section A (1) and Appendix A
(d) a description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for; and a description of the activities to be undertaken including associated structures and infrastructure;	Yes	Section A
(e) a description of the policy and legislative context within which the development is proposed including- (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Yes	Section A (1) and Appendix D
f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Yes	Section A (1), Section A (2) and Section A (10)
(g) a motivation for the preferred site, activity and technology alternative;	Yes	Section A (2)
(h) A full description of the process followed to reach the proposed preferred alternative within the site, including: (i) details of all the alternatives considered;	Yes	Refer to Section A (2) of the finalised BA Report for a description of the alternatives considered, and a justification for the inapplicability of certain alternatives.

<u>Appendix 1</u>	<u>YES / NO</u>	<u>SECTION IN BAR</u>
(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Yes	Refer to Section C of the BA Report for a description of the Public Participation Process undertaken.
(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Yes	Refer to Section C and Appendix E of this BA Report for a description of the issues raised by I&APs during the Public Participation Process.
(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Yes	Refer to Section A (2) of the finalised BA Report for a description of the alternatives considered. Site alternatives are not applicable as it is dependent on the location of the proposed Kenhardt PV 1 facility and the Eskom Nieuwehoop Substation.
(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Yes	Refer to Section A (2) of the finalised BA Report for a description of the alternatives considered, and a justification for the inapplicability of certain alternatives. Note that a complete impact assessment is included in Section D of this BA Report, with specialist studies (and impact statements and technical reports) included in Appendix D of the finalised BA Report. The specialists assessed the worst case by studying the entire electrical infrastructure corridor, whilst the transmission line will only be constructed within a portion thereof. Location, site and routing alternatives are not applicable as it is dependent on the location of the proposed Kenhardt PV 1 facility and the Eskom Nieuwehoop Substation.
(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Yes	
(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Yes	
(viii) the possible mitigation measures that could be applied and level of residual risk;	Yes	
(ix) the outcome of the site selection matrix;	Yes	
(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	Yes	
(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity.	Yes	Section A (2)
(i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including-	Yes	Section D and Appendix D


<u>Appendix 1</u>	<u>YES / NO</u>	<u>SECTION IN BAR</u>
(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;		
(j) an assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;	Yes	Section D and Appendix D
(k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Yes	Section D and Section E
(l) an environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Yes	Section D and Section E, and Appendix A, Appendix C, Appendix D and Appendix G
(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr;	Yes	Section D and Section E, and Appendix E and Appendix G
(n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Yes	Section D and Section E, and Appendix E and Appendix G
(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Yes	Appendix D

<u>Appendix 1</u>	<u>YES / NO</u>	<u>SECTION IN BAR</u>
(p) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Yes	Section E
(q) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	X	Not Applicable
(r) an undertaking under oath or affirmation by the EAP in relation to: (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties; and	Yes	Appendix H
(s) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	X	Not Applicable
(t) any specific information that may be required by the competent authority; and	Yes	Social Impact Assessment Peer Review (Appendix A of Appendix D.7) and Electromagnetic Interference and Radio Frequency Interference Studies in Appendix D.9
(u) any other matters required in terms of section 24(4)(a) and (b) of the Act.	X	Not Applicable

BASIC ASSESSMENT REPORT

BASIC ASSESSMENT REPORT

Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE) to support the proposed 75 MW Solar Photovoltaic Facility (KENHARDT PV 1) on the remaining extent of Onder Rugzeer Farm 168, north-east of Kenhardt, Northern Cape Province: **BASIC ASSESSMENT REPORT**



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environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

(For official use only)

File Reference Number:
Application Number:
Date Received:

Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2014 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
2. This report format is current as of **08 December 2014**. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority
3. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
4. Where applicable **tick** the boxes that are applicable in the report.
5. An incomplete report may be returned to the applicant for revision.
6. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.
7. This report must be handed in at offices of the relevant competent authority as determined by each authority.
8. No faxed or e-mailed reports will be accepted.
9. The signature of the EAP on the report must be an original signature.
10. The report must be compiled by an independent environmental assessment practitioner.
11. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
12. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
13. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.
14. Two (2) colour hard copies and one (1) electronic copy of the report must be submitted to the competent authority.
15. Shape files (.shp) for maps must be included in the electronic copy of the report submitted to the competent authority.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section? YES NO

If YES, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I.

1. PROJECT DESCRIPTION

a) Describe the project associated with the listed activities applied for

1. INTRODUCTION, BACKGROUND AND ENVIRONMENTAL AUTHORISATION PROCESS

Scatec Solar SA 163 (PTY) Ltd is proposing to develop three 75 Megawatt (MW) Solar Photovoltaic (PV) power generation facilities and associated electrical infrastructure (including transmission lines for each 75 MW facility) on the remaining extent of Onder Rugzeer Farm 168, approximately 80 km south of Upington and 20-30 km north-east of Kenhardt within the !Kheis Local Municipality, Northern Cape Province. The proposed 75 MW Solar PV facilities will connect (via the transmission lines and associated electrical infrastructure) to the Eskom Nieuwehoop Substation, which is currently being constructed on the remaining extent of Portion 3 of Gemsbok Bult Farm 120. The proposed transmission lines and electrical infrastructure will be constructed within a single electrical infrastructure corridor.

In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the 2014 NEMA Environmental Impact Assessment (EIA) Regulations promulgated in Government Gazette 38282 and Government Notice (GN) R982, R983, R984 and R985 on 8 December 2014, a **full Scoping and EIA Process** is required for the construction of the three Solar PV facilities. The proposed 75 MW Solar PV facility projects (requiring a Scoping and EIA Process) are referred to as:

- Kenhardt PV 1;
- Kenhardt PV 2; and
- Kenhardt PV 3.

In October 2015, separate Applications for Environmental Authorisation (EA) were submitted to the Competent Authority (i.e. the National Department of Environmental Affairs (DEA)) for each proposed **Scoping and EIA** project (i.e. the Solar PV facilities). The Applications for EA were acknowledged by the DEA on 23 October 2015 and the following reference numbers were assigned to the Kenhardt PV (**Scoping and EIA**) projects:

- Kenhardt PV 1 - DEA Reference: 14/12/16/3/3/2/837;
- Kenhardt PV 2 - DEA Reference: 14/12/16/3/3/2/838; and
- Kenhardt PV 3 - DEA Reference: 14/12/16/3/3/2/836.

The Scoping Reports for the abovementioned PV projects were released separately to Interested and Affected Parties (I&APs) for review in September 2015 during the Scoping Phase. In November 2015, the finalised Scoping Reports were submitted to the DEA, in accordance with Regulation 21 (1) of the 2014 NEMA EIA Regulations, for decision-making in terms of Regulation 22 of the 2014 NEMA EIA Regulations. The DEA accepted the finalised Scoping Reports on 8 December 2015, which marked the end of the Scoping Phase, after which the EIA Process moved into the impact assessment and reporting phase. The EIA Reports have been compiled for the Kenhardt PV 1, PV 2 and PV 3 projects and were made available to I&APs for a 30-day comment period (extending from 3 March 2016 to 5 April 2016), together with the Basic Assessment Reports. Subsequent to the 30-day comment period, and in order to meet the timeframes for the Scoping and EIA Process as stipulated in the 2014 NEMA EIA Regulations, the finalised EIA Reports for the Kenhardt PV 1, PV 2 and PV 3 projects were compiled (with the inclusion of comments raised by I&APs, Stakeholders and Organs of State during the 30-day review period), and submitted to the DEA in April 2016 for decision-making in terms of Regulation 24 of the 2014 NEMA EIA Regulations. The DEA acknowledged receipt of the finalised EIA Reports for the Kenhardt PV 1, PV 2 and PV 3 projects on 19 April 2016.

More specifically, in terms of the NEMA and the 2014 NEMA EIA Regulations promulgated in Government Gazette 38282 and GN R982, R983, R984 and R985 on 8 December 2014, three **Basic Assessment** (BA) Processes was conducted for the proposed construction of the transmission lines and electrical infrastructure, which are required to ensure that the abovementioned proposed Kenhardt PV 1, PV 2 and PV 3 facilities are connected to the Eskom Nieuwehoop Substation (i.e. national grid). These BA Projects are referred to as (together with the corresponding assigned DEA Reference Numbers):

- Kenhardt PV 1 – Transmission Line (i.e. this project) - DEA Reference: 14/12/16/3/3/1/1547 ;
- Kenhardt PV 2 – Transmission Line - DEA Reference: 14/12/16/3/3/1/1546; and
- Kenhardt PV 3 – Transmission Line - DEA Reference: 14/12/16/3/3/1/1545.

The BA Reports and Applications for EA for the abovementioned projects were submitted to the DEA for comment via courier (together with the EIA Reports) on 22 March 2016. Proof of courier is included in Appendix E.2 of the finalised BA Report and the letter of acknowledgment and receipt from the DEA is included in Appendix J.5 of the finalised BA Report. The letter of acknowledgment of the BA Reports and Applications for EA was received from the DEA via email on 1 April 2016, which also provided the abovementioned reference numbers that have been allocated to the BA Projects. A copy of the Application for EA for the Kenhardt PV 1 – Transmission Line project is included in Appendix J.4 of the finalised BA Report.

This BA Report is only focussed on the proposed **Kenhardt PV 1 – Transmission Line** project.

Figure 1 below shows the overall locality of the three proposed 75 MW Solar PV facility projects and the electrical infrastructure corridor (within which the transmission lines and electrical infrastructure will be constructed to support each Solar PV project).

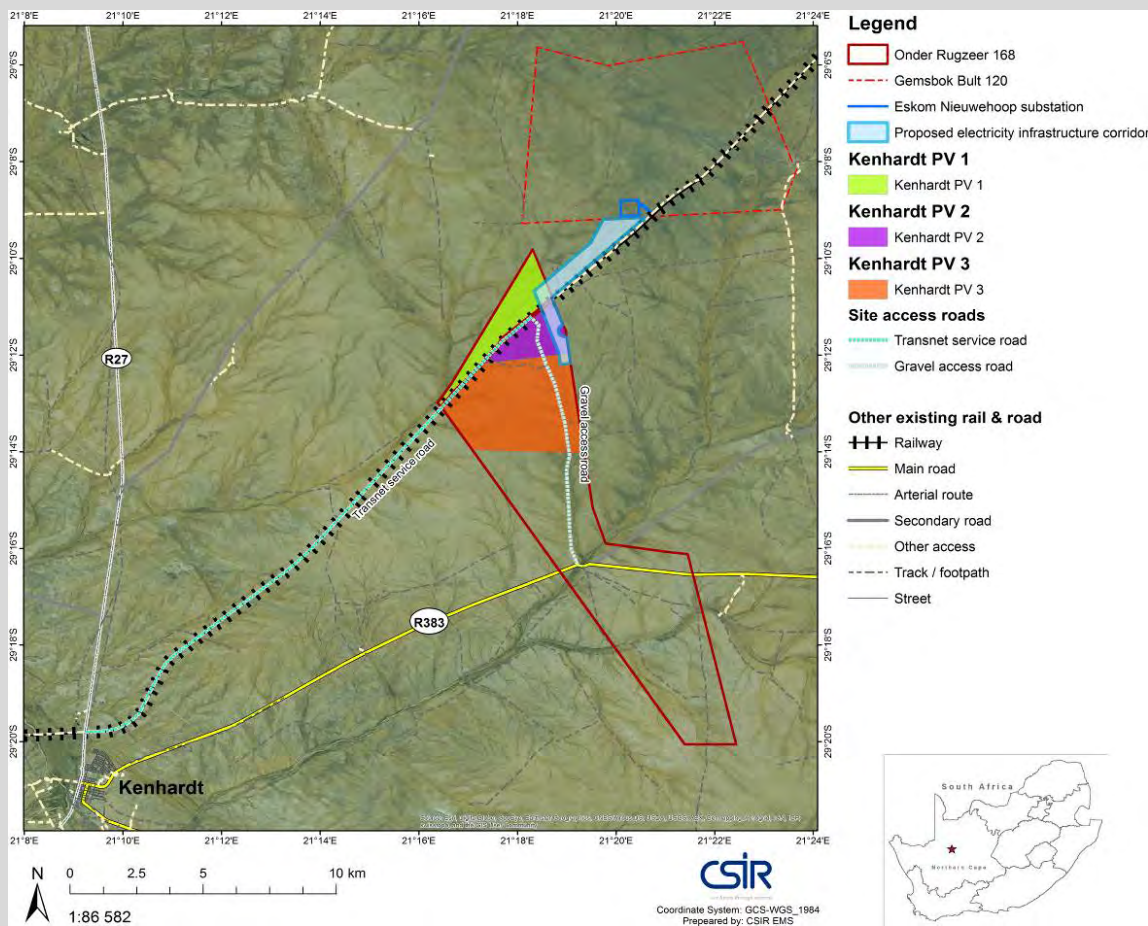


Figure 1: Locality of the three proposed 75 MW PV Facilities and Electrical Infrastructure Corridor

Scatec Solar SA 163 (PTY) Ltd consists of various subsidiary companies. The subsidiaries that fulfil the role of the Project Applicant are noted below for the proposed 75 MW Solar PV and transmission line projects:

- Scatec Solar SA 330 (PTY) Ltd - Project Applicant for Kenhardt PV 1 and Kenhardt PV 1 – Transmission Line (i.e. this project);
- Scatec Solar SA 350 (PTY) Ltd - Project Applicant for Kenhardt PV 2 and Kenhardt PV 2 – Transmission Line; and
- Scatec Solar SA 370 (PTY) Ltd - Project Applicant for Kenhardt PV 3 and Kenhardt PV 3 – Transmission Line.

As noted above, Scatec Solar SA 330 (PTY) Ltd (hereinafter referred to as Scatec Solar) is the Project Applicant for this proposed transmission line and electrical infrastructure project (referred to as **Kenhardt PV 1 – Transmission Line**).

In accordance with Regulation 12 (1) of the 2014 NEMA EIA Regulations, the Applicant has appointed the Council for Scientific and Industrial Research (CSIR) to undertake the separate EIA and BA Processes in order to determine the biophysical, social and economic impacts associated with undertaking the proposed activity. The BA Project Team is led by Surina Laurie (Environmental Assessment Practitioner (EAP)), who is supported by the Project Manager, Rohaida Abed. Paul Lochner has acted as Technical Advisor for the proposed project. Surina has more than 5 years of experience in environmental assessment and management, and is a Senior EAP in the EMS group of the CSIR with a Masters degree in Environmental Management. She is a Registered Professional Natural Scientist (Registration Number: 400033/15) with the South African Council for Natural Scientific Professions (SACNASP). Surina has experience in the management and integration of various types of environmental assessments in South Africa for various sectors, including renewable energy, industry and tourism. She has also been part of advisory teams advising on financing, real estate, corporate, construction, environmental and regulatory aspects for various sponsors, developers and lenders during the DOE's first and second bidding windows in 2012 and 2013. Surina is currently undertaking several Solar PV EIAs in the Northern Cape and Free State. Surina was the Project Manager for the proposed (adjacent) Nieuwehoop Solar Development EIA projects, which have received positive EAs. Refer to Appendix H of this finalised BA Report for the Curriculum Vitae of the BA Team, which also includes a declaration of and affirmation by the EAP as required by the 2014 NEMA EIA Regulations.

The BA Team also includes various specialists that have been appointed to undertake specialist studies to contribute to the BA Process. These specialist studies are included in Appendix D of the finalised BA Report. Appendix I of this finalised BA Report includes the declarations of interest by the specialists. The team which is involved in this BA Process is listed in Table 1 below.

Table 1: The BA Team

Name	Organisation	Role/ Specialist Study
Environmental Assessment Practitioners		
Paul Lochner	CSIR	Technical Advisor and Quality Assurance (EAPSA) Certified
Surina Laurie	CSIR	Project Leader (<i>Pr. Sci. Nat.</i>)
Rohaida Abed	CSIR	Project Manager (<i>Pr. Sci. Nat.</i>)
Specialists		
Simon Bundy	Sustainable Development Projects cc	Ecological Impact Assessment (including Terrestrial Ecology, Aquatic Ecology and Avifauna)
Henry Holland	Private	Visual Impact Assessment
Dr. Jayson Orton	ASHA Consulting (Pty) Ltd	Heritage Impact Assessment (Archaeology and Cultural Landscape)
Dr. John Almond	Natura Viva cc	Desktop Palaeontological Impact Assessment
Julian Conrad	GEOSS	Geohydrological Assessment
Johann Lanz	Private	Soils and Agricultural Potential Assessment
Rudolph du Toit	CSIR	Social Impact Assessment
P. S. van der Merwe and A. J. Otto	MESA Solutions (PTY) Ltd	Electromagnetic Interference and Radio Frequency Interference Surveys

It should be noted that the Social Impact Assessment specialist study was subject to a peer review process by an external reviewer (Ms. Liza van der Merwe, a private consultant), as requested by the DEA as part of the acceptance of the Scoping Reports. This external review report is included as an appendix to the Social Impact

Assessment (Appendix D.7 of this report).

As noted above, a Traffic Impact Statement was also compiled by the EAP, however it serves as a general description of the existing and predicted traffic associated with the proposed project and does not classify as a specialist study in terms of Appendix 6 of the NEMA EIA Regulations. Furthermore, this statement considered the full development (i.e. the development of the three Solar PV Facilities (which have been subjected to separate EIA Processes) and the associated electrical infrastructure).

In addition, an Electromagnetic Interference and Radio Frequency Interference Survey Technical Study was commissioned by the Project Applicant to determine the impact of the proposed project on the Square Kilometre Array (SKA), as requested by the SKA Project Office. This report is not a standard specialist study in terms of Appendix 6 of the EIA Regulations, as it is a detailed, technical report which provides a cumulative topographical analysis of the proposed PV projects in the Astronomy Geographic Advantage Area and was undertaken to determine appropriate mitigation and management measures to reduce the risk of a detrimental impact on the SKA project.

Since the three proposed 75 MW Solar PV facilities, as well as the associated electrical infrastructure and transmission lines are located within the same geographical area and constitute the same type of activity, an integrated Public Participation Process (PPP) has been undertaken for the proposed projects. However, as noted above separate Applications for EA were lodged with the DEA in September 2015 for each Kenhardt PV facility (requiring the Scoping and EIA Process), with amended Applications for EA submitted to DEA in April 2016 together with the finalised BA Reports. As also described above, separate Applications for EA were lodged with the DEA in March 2016 (together with the BA and EIA Reports for comment) for each transmission line and electrical infrastructure project that requires a BA Process. Furthermore, separate reports (i.e. BA, Scoping and EIA Reports) were compiled for each project. As noted above, the BA Reports were released to I&APs, Stakeholders and Organs of State for a 30-day period (extending from 3 March 2016 to 5 April 2016) for review together with the EIA Reports (for the Kenhardt PV 1, PV 2 and PV 3 projects). The BA (and EIA) Reports were made available in the Kenhardt and Groblershoop public libraries. Electronic versions of the BA (and EIA) Reports were also available on the following project website: <http://www.csir.co.za/eia/ScatecSolarPV/>. Written notifications, hard copies and/or CDs containing the document were sent to key stakeholders, including authorities, to inform them of the release of the BA (and EIA) Reports for the 30-day comment period.

All comments received have been included in this finalised BA Report as applicable and where necessary. It is important to note that no comments have been received from I&APs and stakeholders during the 30-day comment period that warrants significant amendment of the specialist studies or their Terms of Reference. This finalised BA Report has been submitted to the DEA, in accordance with Regulation 19 (1) of the 2014 NEMA EIA Regulations, for decision-making in terms of Regulation 20 of the 2014 NEMA EIA Regulations.

The abovementioned integrated PPP approach, as well as the general approach to the Scoping and EIA Projects and the BA Projects, were discussed with and approved by the DEA at a pre-application meeting, which was held on 17 September 2015. Appendix J.2 of this finalised BA Report includes a copy of the agenda and notes of the meeting, as well as the presentation given by the CSIR at the pre-application meeting.

2. PROJECT APPLICANT AND OVERVIEW

Scatec Solar is an integrated Independent Power Producer (IPP) that is focused on making solar energy a sustainable and affordable source on a global scale. Scatec Solar was founded in 2001 and holds its headquarters in Norway. The company develops, builds, owns and operates a number of solar power plants internationally and within Africa. The company is growing significantly and is currently planned to provide a combined 207 MW of power in the United States, Honduras and Jordan. In addition, Scatec Solar collectively delivers more than 219 MW of power in the Czech Republic, South Africa and Rwanda. Specifically linked to investment within South Africa, Scatec Solar has been involved in the following major solar energy projects:

- The Linde Solar Plant (40 MW) is located in the Northern Cape and is considered to be the first of the large-scale PV plants in production from the second round of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).

- The Dreunberg Solar Plant (75 MW) is the only REIPPPP Solar PV Project to be located in the Eastern Cape.
- The Kalkbult Solar Plant (75 MW) is located in the Northern Cape and was the first REIPPPP project to be connected to the grid and operational in South Africa.

Scatec Solar was awarded another further 258 MW in the Fourth Round of the REIPPPP. Dyason's Klip 1, Dyason's Klip 2 and Sirius PV Project One were all anticipated to obtain Financial Closure in Quarter 4 of 2015.

Linked to enhancing its operations within South Africa, the proposed 75 MW Solar PV facilities will make use of PV solar technology to generate electricity from the sun's energy (which, as noted above, has been assessed as part of separate Scoping and EIA Processes). The Applicant is proposing to develop three facilities with a possible maximum installed capacity of 100 MW Direct Current (DC) which produces 75 MW Alternating Current (AC) of electricity from PV solar energy. As noted above, the electricity produced will be transmitted to the Eskom Nieuwehoop Substation via transmission lines (this component is the subject of this BA Process). Once a Power Purchase Agreement (PPA) is awarded, the proposed Kenhardt PV 1 facility will generate electricity for a minimum period of 20 years. It is proposed that Scatec Solar will implement the Self-Build Option for the additional electrical infrastructure to be constructed (which has been assessed separately as part of this BA Process). Following the construction phase, the proposed transmission line and electrical infrastructure will either be transferred into the ownership of Eskom or remain in the ownership of Scatec Solar.

Table 2 below indicates the proposed project components which were assessed as part of the separate EIA and BA Processes. It should be noted that a detailed project description (based on the conceptual design) is provided in Section 4 of this project description section of this BA Report for the Kenhardt PV 1 – Transmission Line project.

Table 2: Scope of the EIA and BA Processes

EIA Processes	BA Processes
<ul style="list-style-type: none"> ▪ Solar Field <ul style="list-style-type: none"> • Solar Arrays: <ul style="list-style-type: none"> - PV Modules; - Single Axis Tracking structures (aligned north-south), Fixed Axis Tracking (aligned east-west), Dual Axis Tracking (aligned east-west and north-south) or Fixed Tilt Mounting Structure; - Solar module mounting structures comprised of galvanised steel and aluminium; and - Foundations which will likely be drilled and concreted into the ground. • Building Infrastructure: <ul style="list-style-type: none"> - Offices; - Operational and maintenance control centre; - Warehouse/workshop; - Ablution facilities; - Converter/Inverter stations; - On-site substation building; and - Guard Houses. ▪ Associated Infrastructure <ul style="list-style-type: none"> • On-site substation; • 33 kV internal transmission lines/underground cables; • Underground low voltage cables or cable trays; • Access roads; • Internal gravel roads; 	<p><u>Infrastructure to be constructed within a proposed electrical infrastructure corridor:</u></p> <ul style="list-style-type: none"> ▪ Building Infrastructure <ul style="list-style-type: none"> • On-site substation building ▪ Associated Infrastructure <ul style="list-style-type: none"> • 132 kV overhead transmission line including pylon and tower infrastructure; • Associated electrical infrastructure at the Eskom Nieuwehoop Substation (including but not limited to an additional feeder bay, Busbars, transformer bay and extension to the platform at the substation); • On-site substation; • Gravel road; • Widening and upgrading of access roads; and • Temporary work area during the construction phase (i.e. laydown area).

<ul style="list-style-type: none"> • Widening and upgrading of access roads; • Fencing; • Panel maintenance and cleaning area; • Stormwater channels; and • Temporary work area during the construction phase (i.e. laydown area). 	
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3. BRIEF PROJECT MOTIVATION

The proposed projects (PV facilities and transmission lines) are considered to be important because at a national level, South Africa is facing serious electricity shortages as well as water scarcity. The proposed Kenhardt PV 1 – Transmission Line project will facilitate the supply of additional electricity to the national grid, with negligible demand for water. Importantly, the proposed transmission line project will fundamentally support and enable the functioning of the proposed Kenhardt PV 1 facility and will therefore play an important role in reducing the risk of rolling electricity blackouts, which are anticipated in South Africa’s Medium Term Risk Mitigation Plan (MTRM) for electricity from 2011 to 2016. The evolution of South Africa’s electricity sector is aligned with the global transition towards renewable sources of electricity generation. The urgency behind this evolution can be appreciated considering that South Africa is the largest emitter of greenhouse gases in Africa, accounting for as much as 42% of the continent’s total emissions, and is also estimated to rank amongst the top 20 largest emitters of greenhouse gases in the world. These emissions are largely a result of an energy-intensive economy and high dependence on coal-based electricity generation. Furthermore, water demand is high for conventional coal-based electricity generation. Consequently, the South African government is committed to increased use of renewable energy sources for electricity generation. Renewable energy is also a response aimed at advancing economic and social development through the creation of both sector-specific jobs, and jobs in economic sectors that can be sustained by the additional feed-in of electricity to the grid from renewable sources of electricity generation.

In addition to reducing the emission of greenhouse gases, the use of PV technology avoids the high levels of water consumption associated with coal-based electricity generation. This is a benefit that must be considered in the context of Eskom’s current consumption of approximately 2% of South Africa’s total fresh water resources. Accelerated climate change has the potential to impact on the availability and quantity of water in South Africa, with decreases in summer rainfall predicted in the interior and increasing instances of droughts and floods predicted for the country in general. This creates a risk for the longevity in electricity generation that is water-dependent. By comparison, solar energy projects have no direct water demand during operations, except for periodic washing of solar panels. This reduces the demand on South Africa’s water resources, while avoiding the risk of uncertainty in water supply, attributable to climate change effects.

On a provincial level, the Northern Cape Province is currently facing considerable constraints in the availability and stability of electricity supply. This is a consequence of South Africa’s electricity generation and supply system being overstretched, and the reliance of the Northern Cape, as many other South African provinces, on the import of power to service its energy needs. The development of solar energy is important for South Africa to reduce its overall environmental footprint from power generation (including externality costs), and thereby to steer the country on a pathway towards sustainability.

The Integrated Resource Plan (IRP) for South Africa for the period 2010 to 2030 (referred to as “IRP2010”) was released by government in 2010, and an updated report was published in 2013, which proposes to secure 17 800 MW of renewable energy capacity by 2030 (including wind, solar and other energy sources). In August 2011, the Department of Energy (DOE) launched the REIPPPP and invited potential IPPs to submit proposals for the financing, construction, operation and maintenance of the first 3 725 MW of onshore wind, solar thermal, solar PV, biomass, biogas, landfill gas or small hydropower projects. On 18 August 2015, an additional procurement target of 6300 MW to be generated from renewable energy sources was added to the REIPPPP for the years 2021 - 2025, as published in Government Gazette 39111. The additional target allocated for solar PV energy is 2200 MW.

In terms of the REIPPPP, the submitted proposals are then evaluated. Currently, the two main evaluation criteria for compliant proposals are price and economic development with a point allocation of 70/30 (DOE, 2013), with other selection criteria including technical feasibility and grid connectivity, environmental acceptability, black economic empowerment, community development, and local economic and manufacturing propositions. The bidders whose

responses rank the highest (according to the aforementioned criteria) will have the greatest potential to be appointed as "Preferred Bidders" by the DOE. The first procurement phase of the DOE's REIPPPP includes five bidding windows. Scatec Solar intends to bid these projects in the 2016 bidding process (i.e. Round 5) to be potentially selected as an IPP. The proposed Kenhardt PV 1 – Transmission Line project is required as part of the bidding process to confirm that the proposed Kenhardt PV 1 facility is enabled and equipped with the necessary infrastructure to connect to the national grid.

Overall the proposed transmission line project will fundamentally support and enable the functioning of the proposed Kenhardt PV 1 facility and to ensure that it is allowed to contribute to the abovementioned renewable energy targets proposed by the DOE.

4. PROJECT DESCRIPTION

The Locality Map included in Appendix A.1 of this finalised BA Report provides an overview of the proposed locality of the electrical infrastructure corridor. The co-ordinates of the approximate centre point of the electrical infrastructure corridor are 29° 10' 36.71" S and 21° 18' 43.23" E.

The following proposed transmission line and electrical infrastructure connectivity options have been included in the separate BA Processes for the three transmission line projects (i.e. Kenhardt PV 1 – Transmission Line, Kenhardt PV 2 – Transmission Line and Kenhardt PV 3 – Transmission Line):

- Construction of a separate 132 kV transmission line from the proposed Kenhardt PV 1, Kenhardt PV 2 and Kenhardt PV 3 facilities to the Eskom Nieuwehoop Substation that is currently being constructed on Farm Gembok Bult (remaining extent of Portion 3 of Farm 120); or
- Construction of separate 22/33 kV transmission lines to connect the Kenhardt PV 2 and Kenhardt PV 3 projects to the proposed Kenhardt PV 1 on-site substation which will link via a 132 kV line to the Eskom Nieuwehoop Substation; or
- Construction of one 132 kV transmission line from the Kenhardt PV 1 project to the Eskom Nieuwehoop Substation and connect the Kenhardt PV 2 and Kenhardt PV 3 facilities together via medium voltage transmission lines to either the on-site substation of Kenhardt PV 2 or PV 3, followed by the construction of one 132 kV transmission line from the on-site substation to the Eskom Nieuwehoop Substation.

As noted above and shown in Figure 1 above, all transmission lines and connectivity options (as described above) will be constructed within a single electrical infrastructure corridor. The corridor will extend between 300 m and 1000 m wide. This corridor was assessed for the proposed transmission lines and associated electrical infrastructure (for all three Kenhardt PV Transmission Line projects) to ensure that the line routing and placement of the structures avoid sensitive areas that have been identified by the specialists (as indicated in Appendix D of this finalised BA Report).

A large corridor area was considered and assessed by the specialists in order to ensure that any development constraints or environmental sensitivities can be avoided in the final siting and location of the proposed transmission line. Based on the findings of the specialist studies, an environmental sensitivity map has been produced (and included in Appendix A of this finalised BA Report, as well as the Environmental Management Programme (EMPr) included in Appendix G of this finalised BA Report). This map shows the sensitivities on site (terrestrial, aquatic, and sensitive heritage features) within the corridor that was assessed. Based on this map, the preferred location and routing for the Kenhardt PV 1 transmission line avoids the sensitive features that were identified by the specialists within the corridor. Specifically, Aloe consocieties, a dolerite koppie, a pan and minor drainage lines were identified within the larger corridor by the specialists. The following sensitive areas were identified by the specialists for consideration in the layout:

Ecological Sensitivities:

- The Ecological Impact Assessment established that the proposed powerline corridor serving the Eskom Nieuwehoop Substation traverses lands presently set aside for the grazing of livestock. The corridor includes two Aloe consocieties (*Aloe dichotoma* and *A claviflora*) of limited extent, which are linked to specific physical drivers. The assessment notes that the routing of the transmission line must avoid the Aloe consocieties identified

and that this may be achieved, preferably by locating the final route proximal to the existing railway line/roadway (i.e. either to the south or north of the identified consocieties), or less favourably by spanning over the consocieties. Where applicable, towers should be suitably positioned at points distal from these communities and they should be spaced adequately to avoid the necessity for relocation of these species. The relocation of these specimens is possible; however this method should be avoided. A 60 m buffer should be implemented around the Aloe consocieties.

- In terms of aquatic ecology, the Wolfkopseloop drainage feature that is inundated on an intermittent basis (periods greater than a year) lies to the north of the site and forms the most significant surface feature. As a significant hydro-geomorphological feature, a buffer of 32 m has been applied to this feature, where it intersects with the subject site. Wider buffers are considered to be inappropriate, given the nature of the terrain in question and the nature of the development. Surface drainage along the proposed transmission line corridor traverses a number of minor drainage lines which serve the Wolfkopseloop drainage feature. As is common to this region, minor drainage lines are influenced by the variability and intensity of rainfall and other factors, in particular the movement of livestock. Such drainage lines have been identified and should be given consideration in the final layout and design of the transmission line. However, these morphological features do not have to be avoided. It is important to note that minor drainage lines occur within the section of the corridor that intersects with the Kenhardt PV 1 and PV 2 areas.

Heritage Sensitivities:

- The Heritage Impact Assessment notes that no archaeological sites or graves were found along the alignment of the proposed transmission line corridor but sites may be expected in association with the pan and koppie respectively identified in the vicinity of the Nieuwehoop Substation and the proposed corridor. Although sites of high significance are unlikely to occur, these two areas should be avoided with buffers of 75 m radius from the centre of the pan and 120 m radius from the summit of the koppie as a precautionary measure.

Based on the boundaries of the corridor and the constraints of the environmental sensitivities as noted above, the preferred routing has also been preliminarily determined for this project, which is included in Appendices A and C of this finalised BA Report, as well as the EMPr included in Appendix G of this finalised BA Report. It is important to note that should the routing change subsequent to the issuing of an EA (should such authorisation be granted), any alternative layout or revisions to the layout occurring within the boundaries of the corridor would not be regarded as a change to the scope of work or the findings of the impact assessments undertaken during the BA Phase. This is based on the understanding that the specialists have assessed the larger area and have identified sensitivities, which have been avoided in the siting of the proposed infrastructure. The corridor is considered to be a "box" in which the project components can be constructed at whichever location (within the boundary of the corridor) without requiring an additional assessment or change in impact significance. Any changes to the layout within the boundaries of the corridor following the issuing of the EA (should it be granted) will therefore be considered to be non-substantive.

This Kenhardt PV 1 – Transmission Line project includes the following:

- Transmission line and tower structures;
- Associated electrical infrastructure at the Eskom Nieuwehoop Substation;
- On-site substation;
- Gravel Road;
- Access road and widening (and upgrading) of the site access road; and
- Temporary work area during the construction phase.

4.1. TRANSMISSION LINE AND TOWER STRUCTURES

A 132 kV overhead transmission line will be constructed between the Kenhardt PV 1 facility and the Eskom Nieuwehoop Substation. The proposed transmission line is estimated to extend approximately 4 km in length. The proposed transmission line from the Kenhardt PV 3 facility (which has been assessed as part of a separate BA Process) will extend approximately 9 km in length (i.e. the worst case). The proposed transmission line will extend from the remaining extent of Onder Rugzeer Farm 168 to the remaining extent of Portion 3 of Gembok Bult Farm 120. The transmission line will span over the Remainder of Boven Rugzeer 169 and Portion 4 of Onder Rugzeer

Farm 168.

The proposed transmission line is expected to have concrete foundations and steel tower structures (i.e. pylons). The line will consist of either self-supporting suspension structures or guyed monopoles. The self-supporting towers will have standard pad and plinth foundations. The guyed monopoles will consist of a central plinth for the tower masts. The stay wires will entail dead-man anchor/stay plate anchor foundations. The towers will all have a maximum height of 30 m. Figures 2 (a); 2 (b); and 2 (c) respectively indicate a monopole, a self-supporting suspension tower and a Guyed-Vee suspension tower. Insulators will be used to connect the conductors to the towers. The span lengths are estimated to range between 200 m and 300 m. The servitude for the 132 kV power line will be 52 m wide. Exact specifications will be confirmed during the detailed design phase.

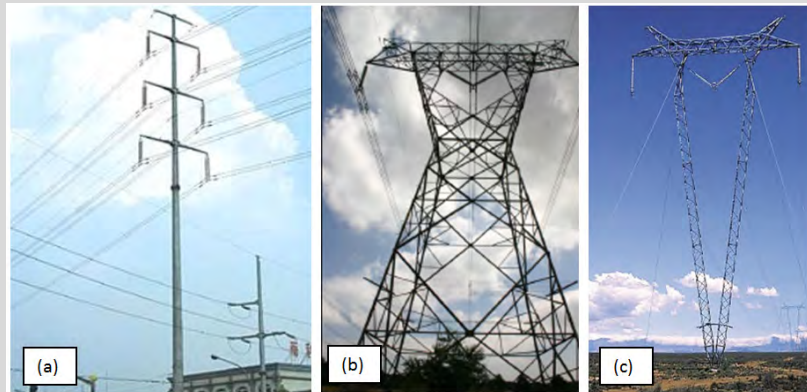


Figure 2: Different types of towers (Images: ECVV.com and Eskom)

During the construction phase, vegetation will be cleared or trimmed below the conductors and transmission line, on either side of the centre line, to allow for swing of the power line and stringing purposes. The clearing of vegetation will take place, with the aid of a surveyor and in accordance with the EMPr (and any recommendations and requirements of Eskom). It should be noted that the entire 52 m wide servitude will not be cleared of vegetation.

4.2. INFRASTRUCTURE AT THE ESKOM NIEUWEHOOP SUBSTATION

Associated electrical infrastructure at the Eskom Nieuwehoop Substation will be constructed in order to ensure that the substation is capable of receiving the additional electricity that is generated by the proposed Kenhardt PV 1 facility. This infrastructure includes, but is not limited to, feeders, Busbars, transformer bay and extension to the platform at the Eskom Nieuwehoop Substation. Discussions have been initiated with the Project Applicant and Eskom to determine the requirements of connecting to the Nieuwehoop Substation.

4.3. ON-SITE SUBSTATION

An on-site substation (with a capacity of 80 MVA) will also be constructed to support the PV facility and was therefore considered in the BA Process. The on-site substation building is expected to extend approximately 12 m in height, with a maximum footprint of 20 000 m² (2 ha). The Visual Impact Assessment (Appendix D.2 of this finalised BA Report) considered a height of 30 m for the on-site substation building, as a worst case scenario. It is important to note that all high voltage infrastructure leading up to the Point of Connection (i.e. Scatec Solar's section of the proposed collector/on-site substation) will be covered by the separate EIA Process (i.e. for Kenhardt PV 1). High voltage infrastructure extending from the Point of Connection (i.e. Eskom's section of the proposed collector/on-site substation) up to the line bay at the Eskom Nieuwehoop Substation may be handed over to Eskom and is assessed separately as part of this BA Process (i.e. Kenhardt PV 1 – Transmission Line).

4.4. GRAVEL ROAD AND ACCESS ROAD WIDENING

The proposed project will include the construction of a gravel road below the proposed 132 kV transmission line. Therefore, the proposed gravel road will follow the route of the transmission line and will extend approximately 4 km to 9 km in length and less than 6 m in width.

In terms of access, the proposed project site can be accessed via an existing gravel road (an unnamed farm road) and the existing Transnet Service Road (private). Both access routes are considered and included in the proposed project. The R27 extends from Keimoes (in the north) to Vredendal in the south. The R27 is 6 m wide and falls within a 45 m road reserve. This National Road is designed for minimum daily traffic exceeding 1000 vehicle units. The Transnet Service Road can be accessed from the R27. The existing gravel road (an unnamed farm road) can be accessed from the R383 Regional Road also via the R27 National Road. The Transnet Service Road and unnamed farm road are both (in some sections) wider than 8 m, however in certain sections; the unnamed farm road is believed to be about 2-3 m wide. A further access road (which is not expected to exceed 6 m in width) will be constructed from either the Transnet Service Road or the unnamed farm road to the proposed Kenhardt PV 1, 2 and 3 facilities (which has been assessed separately as part of the EIA Processes, and is also preliminarily indicated in Appendix A of this finalised BA Report).

Discussions have been initiated and held with Transnet and the Project Applicant regarding the potential use of the Transnet Service Road and associated specific requirements. Transnet have informed the Project Applicant of their requirements that need to be met should the Transnet Service Road be used to gain access to the site. These requirements will be considered in the design where required, and the details of the agreement will be finalised outside of this BA Process.

However, should the Transnet Service Road not be used for access, then the unnamed farm gravel road will be used. However, in order to make use of this unnamed farm road and to ensure easy access to and mobility of large trucks, the unnamed farm road will need to be upgraded and widened by more than 6 m (where required). Exact specifications of the widening and upgrading of the unnamed farm gravel road will be confirmed during the detailed design phase.

It is expected that the upgrading and widening of the unnamed farm road will result in crossings of major and minor drainages lines on site and this was therefore considered within the BA Process. The details of these crossings will be determined during the detailed design phase. The Ecological Impact Assessment (Appendix D.1 of this finalised BA Report) has recommended a 32 m buffer around the major drainage lines within the study area. The existing unnamed farm road runs over the Rugseers River. Therefore the potential upgrade and widening of the existing farm road will be undertaken within 32 m of a water course. However, it is important to note that the 2014 EIA Regulations allow for development within watercourses or within 32 m of water courses by way of listed activities, which if triggered, need to be assessed as part of a BA or an EIA. Section A of the finalised BA Report includes the listed activities that are applicable to the proposed project and have been included in the Application for EA, including those that will result in activities and construction work within 32 m of water courses (i.e. Activity 12 (x) and (xii) of GN R983; Activity 19 (i) of GN R983; and Activity 18 (a) (ii) and (ii) of GN R985). Therefore, it is understood that the widening and upgrading of the unnamed farm road is permitted to take place in terms of the EIA Regulations (should the project receive EA).

In terms of traffic generation, a Traffic Impact Statement has been provided in Appendix D.8 of this finalised BA Report. This statement considered the full development (i.e. the development of the three Solar PV Facilities and the associated electrical infrastructure). The types of materials that will need to be transported to site during the construction phase include the following:

- Transformers;
- Steel and Aluminium;
- Switchgear and equipment;
- Cables;
- Gravel and sand;
- Concrete;
- Water;
- Reinforcement; and
- Other material.

During the operational phase, fewer materials will need to be transported to site. Trips will also be generated for the transportation of staff during the construction and operational phases. A description of the vehicle trips are provided in Appendix D.8 of this finalised BA Report.

4.5. WATER, SEWAGE, WASTE AND ELECTRICITY REQUIREMENTS

During the project initiation phase of the proposed project it was noted that the Project Applicant intended to make use of existing boreholes to source groundwater (if available and if suitable) for the construction phase. If the groundwater was available and suitable, the water would be transported from the boreholes to the Solar PV facility via water pipelines and stored on site in suitable containers. However, the Geohydrological Assessment undertaken as part of the BA Process (Appendix D.5 of this finalised BA Report) studied the quality of the groundwater and its suitability for use. The Geohydrological Assessment noted that the groundwater on site is extremely low in terms of yields and is not suitable for use. The specialists do not recommend that groundwater be used as a source of water during the construction phase.

Based on the findings of the Geohydrological Assessment (Appendix D.5 of this finalised BA Report), the Applicant no longer plans to make use of groundwater during the construction phase. If the groundwater is not sufficient or suitable for use, water will then be sourced from the municipal supply if required (i.e. delivery via water tankers). During the construction phase (including that of the Kenhardt PV 1 facility), it is proposed to have 5 to 10 water tanks (i.e. suitable containers or reservoir tanks (or similar)) on site. The capacity of the tanks are estimated to be approximately 10 000 litres. During the construction phase, delivery of water will be required once every two days (via water tankers from the municipality). At this stage, no water is planned to be abstracted from or discharged to any surface water systems.

The project will require sewage services during the construction phase. Low volumes of sewage or liquid effluent are estimated. Liquid effluent will be limited to the ablution facilities during the construction phase. Portable sanitation facilities (i.e. chemical toilets) will be used during the construction phase, which will be regularly serviced and emptied by a suitable (private) contractor on a weekly basis. The waste water will be transported to a nearby Waste Water Treatment Works for treatment. Due to the remote location of the project site; a conservancy tank or septic tank system could be used on site, which is expected to be serviced by the municipality. The EAP made attempts to obtain feedback from the municipality (in terms of capacity) during the BA Phase. Due to the remote locality of the farm, sewage cannot be disposed in the municipal waterborne sewage system.

In terms of waste generation, general waste generated during the construction phase will be temporarily and safely stored in a skip on site and periodically removed on a regular basis to a licenced waste disposal facility by a suitable contractor. Waste management is discussed in the EMPr (Appendix G of this finalised BA Report).

In terms of electricity supply, the developer will be provided with auxiliary supply from already existing Eskom infrastructure. The exact location of this source as well route for provision of such supply is still to be determined by Eskom.

The Project Applicant will consult with the municipality in order to confirm the supply of services (in terms of water, waste removal, sewage and electricity) for the proposed project. During the 30-day review of the BA (and EIA) Reports, several emails were sent to the municipality to obtain comments and to seek confirmation of services. Copies of these follow up emails are included in Appendix E.2 of this finalised BA Report. To date, no responses have been received from the municipality in this regard. Telephonic calls were also made, however no engagements were able to be made.

Notwithstanding the above, it must be noted that should the municipality not have adequate capacity for the handling of waste, provision of water and sewage handling provisions available; then the Applicant will make use of private contractors to ensure that the services are provided. The Applicant will also ensure that adequate waste disposal measures are implemented by obtaining waste disposal dockets of waste removed from site (in line with the EMPr).

During the operational phase of the proposed transmission line, water requirements, and sewage and waste generation are not applicable. The transmission line will not have any electricity requirements as the project itself will transmit electricity.

4.6. OVERVIEW OF PROJECT DEVELOPMENT CYCLE

The project can be divided into the following three main phases:

- Construction Phase;
- Operational Phase; and
- Decommissioning Phase.

Each activity undertaken as part of the above phases may have environmental impacts and has therefore been assessed by the specialist studies (Appendix D of this finalised BA Report). It is important to note that for the operational phase, the transmission line will result in impacts on avifauna and the surrounding environment; however requirements for water, sewage management and waste disposal do not apply (as explained above).

4.6.1. CONSTRUCTION PHASE

The construction phase will take place subsequent to the issuing of an EA from the DEA and a successful BID in terms of the REIPPPP (i.e. the issuing of a PPA from the DOE). The construction phase for the proposed Kenhardt PV 1 – Transmission Line project is expected to extend 12 to 14 months (however the construction period is subject to the final requirements of Eskom and the REIPPPP Request for Proposal provisions at that point in time).

As noted above, the construction phase will involve the transportation of personnel, construction material and equipment to the site, and personnel away from the site. In terms of site establishment, laydown areas will be required at the outset of the construction phase, as well as dedicated access routes from the laydown areas to the working areas. Haul roads for construction traffic (for the delivery of concrete, road materials and other construction materials) will be required.

The laydown area for the Kenhardt PV 1 project will be used for the construction of the proposed transmission line and associated electrical infrastructure. It is expected that the laydown area will be temporary in nature (for the duration of the construction phase) and will include the establishment of the construction site camp (including site offices and other temporary facilities for the appointed Contractors).

All efforts will be made to ensure that all construction work will be undertaken in compliance with local, provincial and national legislation, local and international best practice, as well as the EMPr, which is included in Appendix G of the finalised BA Report. During the construction phase, it is estimated that approximately 130 employment opportunities are expected to be created. Additional details regarding the employment opportunities are provided in the Social Impact Assessment (Appendix D.7 of this finalised BA Report). The employment creation is also dependent on the REIPPPP bidding requirements and the final engineering design.

The main activities that will form part of the construction phase are:

- Removal of vegetation for the proposed infrastructure;
- Excavations for infrastructure and associated infrastructure;
- Establishment of a laydown area for equipment;
- Stockpiling of topsoil and cleared vegetation;
- Transportation of material and equipment to site; and
- Construction of the transmission lines and additional infrastructure.

4.6.2. OPERATIONAL PHASE

The following activities will occur during the operational phase:

- The transmission of electricity generated from the proposed 75 MW Kenhardt PV 1 facility to the Eskom Nieuwehoop Substation; and
- Maintenance of the transmission line servitude including the gravel road.

During the life span of the power line (approximately 20 years), on-going maintenance will be required on a scheduled basis. This maintenance work will be undertaken by contractors employed by the Project Applicant or Eskom, and in compliance with the EMPr. The projected operations are expected to provide several services and added economic spin offs.

4.6.3. DECOMMISSIONING PHASE

The main aim of decommissioning is to return the land to its original, pre-construction condition. Should the unlikely need for decommissioning arise (i.e. if the actual PV facility becomes outdated or the land needs to be used for other purposes), the decommissioning procedures will be undertaken in line with the EMPr and the site will be rehabilitated and returned to its pre-construction state.

b) Provide a detailed description of the listed activities associated with the project as applied for

Note from the CSIR: As noted above, the Application for EA for this BA Process will be submitted to the DEA together with this BA Report (as well as the BA Reports for the Kenhardt PV 2 and 3 Transmission Lines, and the EIA Reports for the Kenhardt PV 1, 2 and 3 PV facilities). The Application for EA will be included in the finalised BA Report, which will be submitted to the DEA for decision-making.

Table 3: Applicable Listed Activities

Listed Activity as described in GN R983, R984 and R985	Description of Project Activity that triggers Listed activity
GN R983	
<p>GN R 983: Activity 11 (i)</p> <p>The development of facilities or infrastructure for the transmission and distribution of electricity:</p> <p>(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.</p>	<p>The proposed project will entail the construction and installation of an overhead 132 kV transmission line which will extend from the Kenhardt PV 1 project (on the remaining extent of Onder Rugzeer Farm 168) to the Eskom Nieuwehoop Substation on the Remaining Extent of Portion 3 of Gemsbok Bult Farm 120.</p> <p>The proposed project will also include associated electrical infrastructure at the Eskom Nieuwehoop Substation (including but not limited to feeders, Busbars, transformer bay and extension to the platform at the Eskom Nieuwehoop Substation).</p> <p>The proposed project will take place approximately 80 km south of Upington and 30 km north-east of Kenhardt within the !Kheis Local Municipality, Northern Cape Province. Hence the proposed project will take place outside of an urban area.</p>
<p>GN R 983: Activity 12 (x) and (xii)</p> <p>The development of:</p> <p>(x) buildings exceeding 100 square metres in size; (xii) infrastructure or structures with a physical footprint of 100 square metres or more;</p> <p>where such development occurs -</p> <p>a) within a watercourse; b) in front of a development setback; or c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a</p>	<p>The proposed project will entail the construction and installation of an overhead 132 kV transmission line which will extend from the Kenhardt PV 1 project (on the remaining extent of Onder Rugzeer Farm 168) to the Eskom Nieuwehoop Substation on the Remaining Extent of Portion 3 of Gemsbok Bult Farm 120.</p> <p>The proposed project will entail the construction of a gravel road below the proposed 132 kV transmission line extending approximately 4 km to 9 km in length and less than 6 m in width. Foundations for the transmission line pylons and towers will also be constructed. The proposed project will also include associated electrical infrastructure at the Eskom Nieuwehoop Substation (including but not limited to feeders,</p>

Listed Activity as described in GN R983, R984 and R985	Description of Project Activity that triggers Listed activity
<p>watercourse;</p> <p>excluding-</p> <p>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</p> <p>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</p> <p>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</p> <p>(dd) where such development occurs within an urban area; or</p> <p>(ee) where such development occurs within existing roads or road reserves.</p>	<p>Busbars, transformer bay and extension to the platform at the Eskom Nieuwehoop Substation). This constitutes infrastructure with a physical footprint of more than 100 m².</p> <p>The proposed project will also entail the construction of an on-site substation, which will cover an approximate area of 20 000 m² (2 ha). This constitutes buildings and infrastructure with a physical footprint of more than 100 m².</p> <p>The Ecological Impact Assessment undertaken as part of the BA Process has identified major drainage lines on site (such as the Wolfkopseloop River and major drainage features that serve the Wolfkopseloop (i.e. tributaries)). The Ecological Impact Assessment has recommended a 32 m buffer around the major drainage lines. However, the Ecological Impact Assessment also identified various minor drainage lines that occur within the electrical corridor area (which do not need to be avoided based on the findings of the Ecological Impact Assessment). Therefore, infrastructure associated with the construction of the transmission line (as noted above, i.e. gravel road, pylon foundations, buildings etc.) may occur within the minor drainage lines or within 32 m of the edge of the minor (or major) drainage lines.</p> <p>The proposed project will take place approximately 80 km south of Upington and 30 km north-east of Kenhardt within the !Kheis Local Municipality, Northern Cape Province. Hence the proposed project will take place outside of an urban area.</p>
<p><u>GN R 983: Activity 19 (i)</u></p> <p>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from –</p> <p>(i) a watercourse;</p> <p>but excluding where such infilling, depositing, dredging, excavation, removal or moving-</p> <p>a) will occur behind a development setback;</p> <p>b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or</p> <p>c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.</p>	<p>The proposed project may entail the excavation, removal and moving of possibly more than 5 m³ of soil, sand, pebbles or rock from the nearby drainage lines/watercourses. The proposed project may also entail the infilling of more than 5 m³ of material into the nearby drainage lines/watercourses. This infilling and excavation of the material will occur as a result of the construction of the gravel road, pylon foundations, construction of associated electrical infrastructure at the Eskom Nieuwehoop Substation (including but not limited to feeders, Busbars, transformer bay and extension to the platform at the Eskom Nieuwehoop Substation); as well as the upgrading and widening of the unnamed farm road to gain access to the site. Details of the infilling of the drainage lines will be confirmed during the detailed design phase.</p> <p>The Ecological Impact Assessment undertaken as part of the BA Process has identified major drainage lines on site (such as the Wolfkopseloop River and major drainage features that serve the Wolfkopseloop (i.e. tributaries)). The Ecological Impact Assessment has recommended a 32 m buffer around the major drainage lines. However, the Ecological Impact Assessment also identified various minor drainage lines that occur within the electrical corridor area (which do not need to be avoided based on the findings of the Ecological Impact Assessment). Therefore, activities associated with the construction of the transmission line (as noted above, i.e.</p>

Listed Activity as described in GN R983, R984 and R985	Description of Project Activity that triggers Listed activity
	construction of the gravel road and the widening of the unnamed farm road to gain access to the site etc.) may result in infilling and excavation of material within the minor and major drainage lines.
<p>GN R 983: Activity 27</p> <p>The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for:</p> <p>(i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p>	<p>The proposed project will also entail the construction of an on-site substation, which will cover an approximate area of 20 000 m² (2 ha). As a result, more than 1 ha of indigenous vegetation could possibly be removed for the construction of the proposed on-site substation.</p> <p>The presence of indigenous vegetation on site, as well as legislative requirements surrounding its potential removal is provided in the Ecological Impact Assessment which has been undertaken as part of the BA Process.</p>
<p>GN R 983: Activity 28 (ii)</p> <p>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:</p> <p>(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;</p> <p>excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.</p>	<p>The proposed transmission line will extend from the remaining extent of Onder Rugzeer Farm 168 to the remaining extent of Portion 3 of Gemsbok Bult Farm 120. The transmission lines will span over the Remainder of Boven Rugzeer 169 and Portion 4 of Onder Rugzeer Farm 168. The proposed project will take place north-east of Kenhardt in the Northern Cape. It is understood that the land is currently used for agricultural purposes (mainly grazing). The proposed project (i.e. Kenhardt PV 1 – Transmission Line), which is considered to be a commercial/industrial development, will entail the construction of a gravel road below the proposed 132 kV transmission line extending approximately 4 km to 9 km in length and less than 6 m in width. Foundations for the pylons and towers for the transmission lines will also be constructed. This constitutes infrastructure with a physical footprint of more than 1 hectare (approximately 6 hectares).</p>
<p>GN R 983: Activity 47</p> <p>The expansion of facilities or infrastructure for the transmission and distribution of electricity where the expanded capacity will exceed 275 kilovolts and the development footprint will increase.</p>	<p>The proposed project will also include associated electrical infrastructure at the Eskom Nieuwehoop Substation (including but not limited to feeders, Busbars, transformer bay and extension to the platform at the Eskom Nieuwehoop Substation).</p>
<p>GN R 983: Activity 56</p> <p>The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre:</p> <p>(i) where no reserve exists, where the existing road is wider than 8 metres;</p> <p>excluding where widening or lengthening occur inside urban areas.</p>	<p>In terms of access, the proposed project site can be accessed via an existing gravel road (an unnamed farm road) and the existing Transnet Service Road (private). Both access routes are considered and included in the proposed project. The R27 extends from Keimoes (in the north) to Vredendal in the south. The R27 is 6 m wide and falls within a 45 m road reserve. This National Road is designed for minimum daily traffic exceeding 1000 vehicle units. The Transnet Service Road can be accessed from the R27. The existing gravel road (an unnamed farm road) can be accessed from the R383 Regional Road also via the R27 National Road. The Transnet Service Road and unnamed farm road are both (in some sections) wider than 8 m, however in certain sections; the unnamed farm road is believed to be about 2-3 m wide.</p> <p>Discussions have been initiated and held with Transnet and the Project Applicant regarding the potential use of the Transnet Road and associated specific requirements. However, should the Transnet Service Road not be used for</p>

Listed Activity as described in GN R983, R984 and R985	Description of Project Activity that triggers Listed activity
	<p>access, then the unnamed farm gravel road will be used. This farm road, however, will need to be upgraded and widened by more than 6 m (where required). Exact specifications of the widening and upgrading of the unnamed farm gravel road will be confirmed during the detailed design phase.</p> <p>The proposed project will take place approximately 80 km south of Upington and 30 km north-east of Kenhardt within the !Kheis Local Municipality, Northern Cape Province. Hence the proposed project will take place outside of an urban area.</p>
GN R985	
<p>GN R 985: Activity 18</p> <p>The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.</p> <p>(a) In Free State, Limpopo, Mpumalanga and Northern Cape provinces:</p> <p>(ii) outside urban areas and</p> <p>(ii) Areas on the watercourse side of the development setback line or within 100 metres from the edge of a watercourse where no such setback line has been determined.</p>	<p>In terms of access, the proposed project site can be accessed via an existing gravel road (an unnamed farm road) and the existing Transnet Service Road (private). Both access routes are considered and included in the proposed project. The R27 extends from Keimoes (in the north) to Vredendal in the south. The R27 is 6 m wide and falls within a 45 m road reserve. This National Road is designed for minimum daily traffic exceeding 1000 vehicle units. The Transnet Service Road can be accessed from the R27. The existing gravel road (an unnamed farm road) can be accessed from the R383 Regional Road also via the R27 National Road. The Transnet Service Road and unnamed farm road are both (in some sections) wider than 8 m, however in certain sections; the unnamed farm road is believed to be about 2-3 m wide.</p> <p>Discussions have been initiated and held with Transnet and the Project Applicant regarding the potential use of the Transnet Road and associated specific requirements. However, should the Transnet Service Road not be used for access, then the unnamed farm gravel road will be used. This farm road, however, will need to be upgraded and widened by more than 6 m (where required). Exact specifications of the widening and upgrading of the unnamed farm gravel road will be confirmed during the detailed design phase.</p> <p>The Ecological Impact Assessment undertaken as part of the BA Process has identified major drainage lines on site (such as the Wolfkopseloop River and major drainage features that serve the Wolfkopseloop (i.e. tributaries)). The Ecological Impact Assessment has recommended a 32 m buffer around the major drainage lines. However, the Ecological Impact Assessment also identified various minor drainage lines (which do not need to be avoided based on the findings of the Ecological Impact Assessment). Therefore, the proposed gravel road widening may occur within 100 m of the edge of the minor and major drainage lines.</p> <p>The proposed project will take place approximately 80 km south of Upington and 30 km north-east of Kenhardt within the !Kheis Local Municipality, Northern Cape Province. Hence the proposed project will take place outside of an urban area.</p>

Notes from the CSIR:

The above listed activities have been identified in line with the following:

- It should be noted that a precautionary approach was followed when identifying listed activities (for inclusion in the Application for EA), i.e. if the activity potentially forms part of the project, it is listed. However, the final project description will be shaped by the findings of the BA Process and PPP and certain activities may be added or removed from the project proposal. It is important to note that there have been no changes to the identified listed activities as described above and as included in the Application for EA (which was submitted to the DEA with the BA (and EIA) Reports in March 2016).
- Based on the assessment undertaken for the site, the proposed project area does not fall within any threatened ecosystems, National Protected Areas, National Protected Area Expansion Strategy Focus Areas or areas of conservation planning. The closest protected area is approximately 113 km away from the proposed project site. An Ecological Support Area (i.e. a buffer around the Hartbees River) is located approximately 14 km west of proposed project as part of the Namakwa District Biodiversity Sector Plan. Furthermore, there is no conservation plan for the !Kheis Local Municipality and the ZF Mgcawu District Municipality, hence Critical Biodiversity Areas are not present or defined. Therefore, most of the listed activities relating to specific geographic areas contained in GN R985 of the 2014 NEMA EIA Regulations do not apply to the proposed project at this stage. Only Activity 18 of GN R985 applies due to the upgrading and widening of the access road that will occur within 100 m from the edge of a watercourse.
- It is proposed that less than 30 m³ of dangerous goods (such as petrol and diesel) will be temporarily stored on site during the construction phase. Furthermore, no infrastructure or structures are planned to be specifically constructed for the aforementioned temporary storage. Recommendations for the temporary storage of petrol and diesel on site during the construction phase have been provided in the EMPr (Appendix G of this finalised BA Report).
- The relevant listed activities applicable to the construction of the proposed Kenhardt PV 1, 2 and 3 facilities are included in the separate EIA Reports and the Applications for EA for the EIA Processes. As mentioned previously, the original Applications for EA for the EIA Processes were lodged with the DEA in September 2015, and amended Applications for EA were submitted to the DEA with the finalised EIA Reports in April 2016.

2. FEASIBLE AND REASONABLE ALTERNATIVES

“alternatives”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Describe alternatives that are considered in this application as required by Appendix 1 (3)(h), Regulation 2014. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the, competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

The identification of alternatives should be in line with the Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004. Should the alternatives include different locations and lay-outs, the co-

ordinates of the different alternatives must be provided. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

Note from the CSIR:

This section discusses the alternatives that have been considered as part of the BA Process. Sections 24(4) (b) (i) and 24(4A) of the NEMA require an EIA to include investigation and assessment of impacts associated with alternatives to the proposed project. In addition, Section 24O (1)(b)(iv) also requires that the Competent Authority, when considering an application for EA, takes into account "where appropriate, any feasible and reasonable alternatives to the activity which is the subject of the application and any feasible and reasonable modifications or changes to the activity that may minimise harm to the environment".

Therefore, the assessment of alternatives should, as a minimum, include the following:

- The consideration of the no-go alternative as a baseline scenario;
- A comparison of the reasonable and feasible alternatives; and
- Providing a methodology for the elimination of an alternative.

As part of their review of the BA Report during the 30-day review period (extending from 3 March 2016 to 5 April 2016), the DEA provided the following comment regarding the assessment of alternatives:

- *"Please provide a description of all identified alternatives for the proposed activity that are feasible and reasonable, including the advantages and disadvantages that the proposed project activity or alternatives will have on the environment and on the community that may be affected by the activity as per Appendix 1 (2) (e) and 3 (1) (h) (i) of GN R.982 of 2014. Alternatively, you should submit written proof of an investigation and motivation if no reasonable or feasible alternatives exist in terms of Appendix 1".*

Compliance with Regulation 3 (1) (h) (i) of Appendix 1 of the 2014 NEMA EIA Regulations is discussed below. Regulation 2 (e) of Appendix 1 of the 2014 NEMA EIA Regulations states:

- The objective of the basic assessment process is to, through a consultative process, through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to (i) identify and motivate a preferred site, activity and technology alternative; (ii) identify suitable measures to avoid, manage or mitigate identified impacts; and (iii) identify residual risks that need to be managed and monitored.

As described above, a large corridor has been assessed by the specialists in order to identify sensitive areas that need to be considered in the routing of the proposed transmission line. The sensitive areas identified by the specialists have been taken into consideration in determining the routing of the transmission line, which is indicated in Appendix A and Appendix C of this finalised BA Report. The location of the proposed transmission line is dictated by and dependent on the location of the Kenhardt PV 1 facility and the Eskom Nieuwehoop Substation, and therefore certain alternatives are not applicable or feasible, as discussed and motivated further below.

As discussed above, the main factors that determined the location of the proposed transmission line are indicated below and discussed within this section:

- Location of the Kenhardt PV 1 facility;
- Location of the Nieuwehoop Substation; and
- The most cost-effective route and distance between the Kenhardt PV 1 facility and Nieuwehoop Substation.

The location and property on which the proposed transmission line and associated electrical infrastructure will be constructed is largely dependent on the location of the proposed 75 MW Kenhardt PV 1 facility. As discussed previously, the overall aim of this proposed project is to provide the necessary electrical infrastructure to ensure that the proposed 75 MW Kenhardt PV 1 facility is equipped and enabled to transmit the generated electricity (from the Solar PV Plant) to the Eskom Nieuwehoop Substation. The location and property on which the proposed transmission line and associated electrical infrastructure will be constructed is also dependent on the location of the Eskom Nieuwehoop Substation. The location of the Nieuwehoop Substation influences and determines the location of the construction of the proposed associated electrical infrastructure at the substation (including but not limited to an additional feeder bay, Busbars, transformer bay and extension to the platform at the substation).

In terms of the alternatives considered for the type of activity to be undertaken, this is also entirely dependent on the activity associated with the proposed Kenhardt PV 1 facility (where the activity associated with the PV facility is generation of electricity). Essentially, the Kenhardt PV 1 facility governs the type of activity associated with the proposed project. The activity to be undertaken is therefore the transmission of electricity that will be generated by the proposed Kenhardt PV 1 facility. Therefore, as a result, alternatives for the type of activity for this proposed BA project are **not applicable**. The only feasible method of transmitting the electricity that is generated by the proposed PV plant to the Eskom Nieuwehoop Substation is via overhead transmission lines. Underground cabling is not deemed technically feasible as the voltage is considered to be too high.

Notwithstanding the above, it is important to note that the implementation of a solar energy facility at the proposed project site (for the Kenhardt PV 1 facility) was determined to be more favourable and feasible than other alternative energy facilities (such as Biomass, Hydro Energy and Wind Energy) for generating 20 MW or more of electricity from a renewable resource. Based on the preliminary investigations undertaken by the Project Applicant (as discussed in the separate EIA Reports), no other renewable energy technologies were deemed to be appropriate for the site. The unsuitability of other renewable energy developments, as well as the suitability of solar energy, for the site is discussed within the separate EIA Report for Kenhardt PV 1 facility.

a) Site alternatives

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
<p>As noted above, the location of the proposed transmission line and associated electrical infrastructure is dependent on the location of the proposed Kenhardt PV 1 facility. The overall aim of this proposed project is to provide the necessary electrical infrastructure to the proposed 75 MW Kenhardt PV 1 facility to ensure that it is equipped and enabled to transmit the generated electricity to the Eskom Nieuwehoop Substation. The location of the proposed transmission line and associated electrical infrastructure is also dependent on the location of the Eskom Nieuwehoop Substation. The location of the Nieuwehoop Substation guides and determines the location of the construction of the proposed associated electrical infrastructure at the substation (including but not limited to an additional feeder bay, Busbars, transformer bay and extension to the platform at the substation).</p> <p>Based on the above, the overall locality of this proposed project is largely dependent on the location of the proposed Kenhardt PV 1 facility and the Eskom Nieuwehoop Substation. In addition, the location of the proposed electrical infrastructure at the substation itself is fixed due to the positioning of the Eskom Nieuwehoop Substation. As a result, site alternatives for this proposed BA project are not applicable.</p> <p>Please note that the co-ordinates provided in this section reflect the approximate centre-point location of the proposed electrical corridor.</p>	29° 10' 36.71" S	21° 18' 43.23" E
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

In the case of linear activities:

Alternative:

Alternative S1 (preferred)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

Latitude (S):

Longitude (E):

29° 12' 11.29" S	21° 18' 58.78" E
29° 10' 36.71" S	21° 18' 43.23" E
29° 9' 4.14" S	21° 20' 10.13" E

Alternative S2 (if any)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

Alternative S3 (if any)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A of this form.

Note from the CSIR: As noted above, an electrical corridor has been assessed as part of this BA Process. The transmission lines and electrical infrastructure required for the Kenhardt PV 1, 2 and 3 facilities (which have been subjected to separate EIA Processes) will be constructed within this corridor. The corridor exceeds 500 m in length, and as such, the co-ordinates taken every 250 m along the boundary of the corridor are included in Appendix A of this finalised BA Report. The co-ordinates for the transmission line (based on the preliminary routing provided in Appendices A and C of this report) are also included in Appendix A of this finalised BA Report.

The co-ordinates of the corners points of the corridor are also included in Appendix A of this report.

b) Lay-out alternatives

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
The Rochdale Envelope Approach ¹ was applied to determine a suitable approach to determine the corridor in which the proposed transmission line will occur. The Rochdale Envelope approach is named after two legal cases relating to a proposed business park in Rochdale in the United Kingdom. These cases considered applications for outline planning consent in the context of preparing an EIA. The goal of the Rochdale Envelope approach is to allow for an EIA to be undertaken, based on the 'worst case scenario', whereby the Competent Authority granting the EA will then decide whether, based on this 'worst case scenario', the environmental impacts are acceptable.		

¹ Infrastructure Planning Commission (IPC), Using the 'Rochdale Envelope': February 2011

This approach is very useful since normally an EIA or BA is undertaken prior to the technical assessment of the site which would consider the exact placement of, for example, the solar panels and associated infrastructure. The main principle behind this approach is that, should the development fall within the parameters set within this "envelope" (in this case, an electrical corridor), as determined by the BA Process, the placement of the different components could be determined at a later stage provided that the components fall within the parameters of the envelope. This approach therefore allows for flexibility to the developer during the detailed design phase in terms of engineering, design and construction parameters.

As discussed above, as part of the BA, a large corridor area was considered and assessed by the specialists in order to ensure that any development constraints or environmental sensitivities can be avoided in the final siting and location of the proposed transmission line. Based on the findings of the specialist studies, an environmental sensitivity map has been produced (and included in Appendix A of this finalised BA Report, as well as the EMPr included in Appendix G of this finalised BA Report). This map shows the sensitivities on site (terrestrial, aquatic, and sensitive heritage features) within the corridor that was assessed. Based on this map, the preferred location and routing for the Kenhardt PV 1 transmission line avoids the sensitive features that were identified by the specialists within the corridor. Based on the boundaries of the corridor and the constraints of the environmental sensitivities, a routing has been preliminarily determined for this project, which is included in Appendices A and C of this finalised BA Report, as well as the EMPr included in Appendix G of this finalised BA Report. It is important to note that should the routing change subsequent to the issuing of an EA (should such authorisation be granted), any alternative layout/routing or revisions to the layout/routing occurring within the boundaries of the corridor would not be regarded as a change to the scope of work or the findings of the impact assessments undertaken during the BA Phase. This is based on the understanding that the specialists have assessed the larger area and have identified sensitivities, which have been avoided in the siting of the proposed infrastructure. The corridor is considered to be a "box" in which the project components can be constructed at whichever location (within its boundaries) without requiring an additional assessment or change in impact significance. Any changes to the layout within the boundaries of the corridor following the issuing of the EA (should it be granted), will therefore be considered to be non-substantive. However, if any changes to the layout/routing occur outside of the boundaries of the corridor following the issuing of the EA (should it be granted) will need to be undertaken as part of a separate EA Amendment process and will be considered as substantive.

Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

c) Technology alternatives

Alternative 1 (preferred alternative)
The technology that is proposed for the construction and operation of the proposed transmission line and electrical infrastructure will be guided by national standards and best practice. The technology options and operational aspects are also governed by Eskom's requirements and building specifications. This therefore limits the amount of variability in terms of the technology and operational processes. The type of technology used will relate to the infrastructure being installed and constructed, such as the type of conductors, pylon structures and design, use of Bird Flight Diverters, and building structures for the on-site substation. Other technology options for this project relate to the construction equipment and vehicles used during the construction phase, such as portable fire-fighting equipment (if necessary), stormwater management and spill contingency.
Alternative 2
Alternative 3

d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)

Alternative 1 (preferred alternative)
No other alternatives are being considered for the proposed project. Refer to the explanations provided above regarding the alternative process.
Alternative 2
Alternative 3

e) No-go alternative

<p>The no-go alternative assumes that the proposed project will not go ahead i.e. it is the option of not constructing the proposed Kenhardt PV 1 – Transmission Line project. This alternative would result in no environmental impacts (as identified in Section D of this finalised BA Report) on the site or surrounding local area. It provides the baseline against which other alternatives are compared and considered throughout the report.</p> <p>The following implications will occur if the “no-go” alternative is implemented (i.e. if the proposed Kenhardt PV 1 – Transmission Line project is not constructed):</p> <ul style="list-style-type: none"> There will be negative implications for the proposed Kenhardt PV 1 facility, as there will be no dedicated, fundamental electrical infrastructure to allow the PV facility to connect to the Eskom Nieuwehoop Substation and the national grid. This could possibly result in non-realisation of the benefits, such as economic spin offs and electricity generation, associated with the proposed Kenhardt PV 1 facility. This could also result in additional costs and expenditure, as well as additional timeframes required, due to the potential re-design of the Kenhardt PV 1 facility to align with an alternative substation within the region. Using an alternative substation within the region (dependent on capacity requirements) could result in longer transmission lines and associated gravel roads, which could, in turn, cause additional negative impacts to the surrounding environment, including avifauna. If re-design is not financially and technically feasible, then the proposed Kenhardt PV 1 facility will not be able to be constructed as it will not have fundamental infrastructure to link it to the national grid. If the proposed Kenhardt PV 1 facility cannot be constructed as a result of the no-go of the proposed Kenhardt PV 1 – Transmission Line, this could, in turn, result in the following implications:

- The landowners of the remaining extent of the Onder Rugzeer Farm 168, Portion 3 of Gemsbok Bult Farm 120, remainder of Boven Rugzeer 169 and Portion 4 of Onder Rugzeer Farm 168 will not be able to derive benefits from the implementation of an additional land-use;
 - No additional power will be generated or supplied through means of renewable energy resources by this project at this location. The proposed 75 MW facility is predicted to generate approximately 200 GW/h per year which could power 20 000 households;
 - There will be no contributions and assistance to the government in achieving its proposed renewable energy target of 17 800 MW by 2030;
 - No additional power to the local grid will be provided via the Eskom grid, with approximately 90% coal-based power generation with associated high levels of CO₂ emissions and water consumption;
 - Electricity generation will remain constant (i.e. no additional renewable energy generation will occur on the proposed site) and the local economy will not be diversified;
 - Local communities will continue their dependence on agriculture production and government subsidies. The local municipality's vulnerability to economic downturns will increase because of limited access to capital;
 - There will be no opportunity for additional employment in an area where job creation is identified as a key priority. Between 90 and 150 skilled and 400 and 460 unskilled employment opportunities are expected to be created during the construction phase of the proposed Kenhardt PV 1 facility. Approximately 20 skilled and 40 unskilled employment opportunities will be created over the 20 year lifespan of the proposed Kenhardt PV 1 facility;
 - There will be lost opportunity for skills transfer and education/training of local communities;
 - The positive socio-economic impacts likely to result from the project such as increased local spending and the creation of local employment opportunities will not be realised; and
 - The local economic benefits associated with the REIPPPP will not be realised, and socio-economic contribution payments into the local community trust will not be realised.
- In addition, the following additional implications will occur if the "no-go" alternative is implemented:
- There will be further implications for the proposed Kenhardt PV 2 and PV 3 facilities, as these plants will share the same corridor (and potentially the same on-site substation) with that of Kenhardt PV 1 (therefore, a cumulative impact);
 - There will be no opportunity for additional employment in an area where job creation is identified as a key priority. Approximately 130 employment opportunities are expected to be created during the construction phase of the proposed Kenhardt PV 1 – Transmission Line project;
 - There will be lost opportunity for skills transfer and education/training of local communities; and
 - The positive socio-economic impacts likely to result from the project such as increased local spending and the creation of local employment opportunities will not be realised.

Converse to the above, the following benefits could occur if the "no-go" alternative is implemented:

- There will be no development of electrical infrastructure and transmission lines that are associated with solar energy facilities at the proposed location;
- The agricultural land use will remain only;
- No threatened vegetation will be removed or disturbed during the development of the transmission line and electrical infrastructure;
- No potential impact to avifauna present in the area;
- No change to the current landscape will occur; and
- No additional water use and waste generation during the construction phase will occur.

It is important to take into account that the country is facing serious power and water shortages due to its heavy dependency on fossil fuels such as coal. There is therefore a need for additional electricity generation options to be developed throughout the country. The purpose of the proposed Kenhardt PV 1 – Transmission Line project is to transmit electricity generated by a renewable energy resource into the national electricity grid.

Many other socio-economic and environmental benefits will result from the development of this project such as development of renewable energy resources in the country and contribution to the increase of energy security, employment creation and local economic development (as noted above).

Hence, the “no-go” alternative will result in negative environmental impacts, by not going ahead with the project and it will also not result in any positive community development or socio-economic benefits and could, should an alternative connectivity option be considered to a different substation due to the rejection of the current proposal, lead to an increase in the negative impacts associated with the development of electrical infrastructure. Hence the “no-go” alternative is not a preferred alternative.

Note from the CSIR:

Appendix 1 of the 2014 EIA Regulations has certain requirements in terms of alternatives. Table 4 below indicates these requirements and also includes a response from the EAP showing how the requirements of the 2014 EIA Regulations have been addressed in this report.

Table 4: Requirements of Appendix 1 of the EIA Regulations

Requirements for a BA Report (in terms of alternatives) in terms of Appendix 1 of the 2014 NEMA EIA Regulations	Response from EAP
Regulation 3 (1) (h): A full description of the process followed to reach the proposed preferred alternative within the site, including:	Refer to Section A (2) i.e. this section of the BA Report for a description of the alternatives considered, and a justification for the inapplicability of certain alternatives.
<ul style="list-style-type: none"> ▪ (i) details of all the alternatives considered; 	Refer to Section C of this BA Report for a description of the PPP undertaken.
<ul style="list-style-type: none"> ▪ (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; 	Refer to Section C and Appendix E of this BA Report for a description of the issues raised by I&APs during the PPP.
<ul style="list-style-type: none"> ▪ (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; 	Refer to Section A (2) i.e. this section of the BA Report for a description of the alternatives considered. Site alternatives are not applicable as the location of the proposed transmission line and associated infrastructure is dependent on the location of the proposed Kenhardt PV 1 facility and the Eskom Nieuwehoop Substation.
<ul style="list-style-type: none"> ▪ (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; 	Refer to Section A (2) i.e. this section of the BA Report for a description of the alternatives considered, and a justification for the inapplicability of certain alternatives. Note that a complete impact assessment is included in Section D of this BA Report. Section D of this BA Report details the impacts and risks identified, and Appendix F includes the complete impact assessment (which is also included in the respective specialist studies in Appendix D of this BA Report), which includes the nature, significance, consequence, extent, duration, probability, reversibility, and irreplaceability of the impacts. The methodology used in the impact assessment is also noted in Section D of this report. The specialists assessed the worst case by studying the entire electrical infrastructure corridor, whilst the transmission line will only be constructed within a portion thereof. Essentially, the sensitivities identified within the corridor have been identified by the specialists and the routing of the transmission line has been determined based on these sensitivities by way of avoidance.
<ul style="list-style-type: none"> ▪ (v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; 	Alternatives are not applicable as the location of the proposed transmission line and associated infrastructure is dependent on the location of the proposed Kenhardt PV 1 facility and the Eskom Nieuwehoop Substation.
<ul style="list-style-type: none"> ▪ (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; 	Based on the aspects considered in this section, the following concluding statement has been provided in terms of the preferred alternatives that have been considered in the BA Phase:
<ul style="list-style-type: none"> ▪ (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; 	
<ul style="list-style-type: none"> ▪ (viii) the possible mitigation measures that could be applied and level of residual risk; 	
<ul style="list-style-type: none"> ▪ (ix) the outcome of the site selection matrix; 	
<ul style="list-style-type: none"> ▪ (x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and 	
<ul style="list-style-type: none"> ▪ (xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity. 	

Requirements for a BA Report (in terms of alternatives) in terms of Appendix 1 of the 2014 NEMA EIA Regulations	Response from EAP
	<ul style="list-style-type: none"> Development of the Kenhardt PV 1 – Transmission Line project, using various technological alternatives relating to the design and construction of the pylon structures on the preferred site (i.e. the remaining extent of Onder Rugzeer Farm 168, the remaining extent of Portion 3 of Gemsbok Bult Farm 120, the Remainder of Boven Rugzeer 169 and Portion 4 of Onder Rugzeer Farm 168) is dependent on the location of the proposed Kenhardt PV 1 facility and the Eskom Nieuwehoop Substation. The final layout of the transmission line has been informed by specialist studies undertaken during the BA Phase to avoid environmental sensitivities as far as possible.

Paragraphs 3 – 13 below should be completed for each alternative.

3. PHYSICAL SIZE OF THE ACTIVITY

Note from the CSIR: The physical size and dimensions of the project components will be finalised upon completion of detailed engineering, which is subject to the issuing of an EA, should such an authorisation be granted (i.e. the detailed design will be undertaken after the EA has been issued). The details provided in this section are estimates and based on the worst case, where applicable.

- a) Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:

Size of the activity:

Alternative A1 ² (preferred activity alternative): Transmission Line On-site Substation Gravel Road Widening and Upgrading of the Site Access Road (Unnamed Farm Access Road)	Linear Activity – Refer to the Section Below 20 000 m ² Linear Activity – Refer to the Section Below Linear Activity – Refer to the Section Below
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or, for linear activities:

Alternative:

Length of the activity:

Alternative A1 (preferred activity alternative): Transmission Line On-site Substation Gravel Road Widening and Upgrading of the Site Access Road (Unnamed Farm Access Road)	Approximately 4000 m Non-linear - Refer to the Section Above 4000 m to 9000 m 4000 m to 9000 m
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² "Alternative A.." refer to activity, process, technology or other alternatives.

b) Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:	Size of the site/servitude:
Alternative A1 (preferred activity alternative):	
Transmission Line	208 000 m ²
On-site Substation	20 000 m ²
Gravel Road	24 000 m ² to 54 000 m ²
Widening of the Site Access Road (Unnamed Farm Access Road)	24 000 m ² to 54 000 m ²

4. SITE ACCESS

Does ready access to the site exist?

YES ✓
Please see explanation below

If NO, what is the distance over which a new access road will be built

Describe the type of access road planned:

As noted in Section A (1) (a) and (b) of this finalised BA Report, the proposed project will include the construction of a gravel road below the proposed 132 kV transmission line. The proposed gravel road will follow the route of the transmission line and will extend approximately 4 km to 9 km in length and less than 6 m in width. Exact specifications will be confirmed during the detailed design phase. For the purposes of this BA Process, a 6 m width has been considered as the worst case.

In terms of access, the proposed project site can be accessed via the existing unnamed farm road and the existing Transnet Service Road (private). Both access routes are considered and included in the proposed project. The R27 extends from Keimoes (in the north) to Vredendal in the south. The R27 is 6 m wide and falls within a 45 m road reserve. This National Road is designed for minimum daily traffic exceeding 1000 vehicle units. The Transnet Service Road can be accessed from the R27. The existing gravel road (unnamed farm road) can be accessed from the R383 Regional Road also via the R27 National Road. The Transnet Service Road and unnamed farm road are both (in some sections) wider than 8 m, however in certain sections; the unnamed farm road is believed to be about 2-3 m wide. A further access road will be constructed from either the Transnet Service Road or the unnamed farm road to the proposed Kenhardt PV 1, 2 and 3 facilities (which has been assessed separately as part of the EIA Processes).

Discussions have been initiated and held with Transnet and the Project Applicant regarding the potential use of the Transnet Road and associated specific requirements. Transnet have informed the Project Applicant of their requirements that need to be met should the Transnet Service Road be used to gain access to the site. These requirements will be considered in the design where required, and the details of the agreement will be finalised outside of this BA Process.

However, should the Transnet Service Road not be used for access, then the unnamed farm gravel road will be used. This farm road, however, will need to be upgraded and widened by more than 6 m (where required) in order to make use of the road and to ensure easy access to and mobility of large trucks. Exact specifications of the widening and upgrading of the unnamed farm gravel road will be confirmed during the detailed design phase.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

Note from the CSIR: The existing access to the site is shown on the locality map in Appendix A.1 of this finalised BA Report, as well as Appendix C.

5. LOCALITY MAP

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map). The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any;
- indication of all the alternatives identified;
- closest town(s);
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection).

Note from the CSIR: Refer to Appendix A.1 of this finalised BA Report for the Locality Map.

6. LAYOUT/ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

- the property boundaries and numbers of all the properties within 50 metres of the site;
- the current land use as well as the land use zoning of the site;
- the current land use as well as the land use zoning each of the properties adjoining the site or sites;
- the exact position of each listed activity applied for (including alternatives);
- servitude(s) indicating the purpose of the servitude;
- a legend; and
- a north arrow.

Note from the CSIR: Refer to Appendix A.2 of this finalised BA Report for the Layout/Route Map, as well as Appendix C.

7. SENSITIVITY MAP

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

- watercourses;
- the 1:100 year flood line (where available or where it is required by DWS);
- ridges;

- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or infested with alien species); and
- critical biodiversity areas.

The sensitivity map must also cover areas within 100 m of the site and must be attached in Appendix A.

Note from the CSIR: Refer to Appendix A.3 of this finalised BA Report for the Sensitivity Map, as well as Appendix C.

8. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

Note from the CSIR: Three photograph points which best represent the proposed project area were selected. Photographs were taken in the eight major compass directions at each photograph point. The co-ordinates of the photograph points are shown below:

Photograph Point 1 - 29° 10' 46.19" S and 21° 18' 4.63" E
 Photograph Point 2 - 29° 9' 50.36" S and 21° 19' 9.51" E
 Photograph Point 3 - 29° 9' 7.62" S and 21° 20' 13.72" E

Additional photographs were also taken. All photographs are included in Appendix B of this finalised BA Report.

9. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of at least 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

Note from CSIR: As mentioned previously, preliminary layouts and routings have been provided in Appendices A and C of this finalised BA Report. These layouts have been determined based on the Development Envelope and sensitivities identified by the specialists within the corridor. Any changes to the layout/routing within the boundaries of the Development Envelope following the issuing of the EA (should it be granted) will be considered as non-substantive. However, if any changes to the layout/routing occur outside of the boundaries of the Development Envelope following the issuing of the EA (should it be granted), this will need to be undertaken as part of a separate EA Amendment process and will be considered as substantive.

10. ACTIVITY MOTIVATION

Motivate and explain the need and desirability of the activity (including demand for the activity):

1. Is the activity permitted in terms of the property's existing land use rights?	YES ✓	NO	Please explain
<p>As noted above, the proposed transmission line will extend from the remaining extent of Onder Rugzeer Farm 168 to the remaining extent of Portion 3 of Gemsbok Bult Farm 120. The transmission line will span over the Remainder of Boven Rugzeer 169 and Portion 4 of Onder Rugzeer Farm 168. The project site is currently being used for agricultural purposes, predominantly grazing. Should the proposed projects (i.e. the Kenhardt PV 1 – Transmission Line, Kenhardt PV 2 – Transmission Line, and Kenhardt PV 3 – Transmission Line), and ultimately the Kenhardt PV 1, 2 and 3 facilities proceed, it is not expected that this will threaten the agricultural activities present on site. As noted in Appendix D.6 of this finalised BA Report (Soils and Agricultural Potential Assessment), due to the climate and soil limitations, the site is not suitable for any agricultural land use other than low intensity grazing.</p>			

Currently, the site is used for grazing, which could continue in the surrounding regions, together with the generation of additional income via the leasing of the land to the Applicant. The potential negative impact of loss of agricultural land and the potential positive impact of additional land use income were both rated with a very low significance (without the implementation of mitigation measures) in the Soils and Agricultural Potential Assessment.

2. Will the activity be in line with the following?

(a) Provincial Spatial Development Framework (PSDF)	YES ✓	NO	Please explain
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The !Kheis Municipality Draft Integrated Development Plan (IDP) (2012 – 2017 and 2015 – 2019) states that an opportunity exists to utilise solar energy more widely and lessen the dependence on wood and fire. This opportunity has been identified because not all people within the municipal area have access to electricity. Even though the proposed Kenhardt PV 1, 2 and 3 solar facilities (which have been subjected to separate EIA Processes, as noted above) will not provide electricity to the municipality directly, the energy produced by the facilities will feed into the national grid as a result of the proposed Kenhardt PV Transmission Line projects (i.e. this specific Kenhardt PV 1 – Transmission Line project will assist and enable the proposed Kenhardt PV 1 facility to feed the generated electricity to the national grid). In addition, on a local level, the proposed project will contribute towards job creation which is needed within the area.

As noted above, the SEA for Wind and Solar PV development aims to identify strategic geographical areas best suited for the roll-out of large scale wind and solar PV energy projects, referred to as REDZs. The proposed transmission line project, which will fundamentally support the proposed Kenhardt PV 1 facility, falls within one of the potential eight REDZ. Therefore, should the REDZ be established and renewable projects operate within these areas, Eskom may be able to unlock funding to proactively construct grid infrastructure to facilitate generation capacity from these areas. This will mean that the municipality will also benefit from these upgrades and potentially alleviate the electrification backlogs present in the area.

One of the priority issues identified within the !Kheis Municipality IDP (2012 – 2017 and 2015 – 2019) is the low levels of skilled people, as well as high levels of poverty and unemployment. The IDP (2012 – 2017 and 2015 – 2019) states that the objective to resolve this issue is to create an environment whereby the local community is empowered through capacity building and skills development (particularly for the youth). The proposed project will create job opportunities and economic spin offs during the construction phase (if an EA is granted by the DEA). It is estimated that approximately 130 employment opportunities will be created during the construction phase. It should however be noted that employment during the construction phase will be temporary. During the operational phase, the transmission line could possibly be operated by Eskom.

Therefore, the proposed transmission line project will fundamentally support and facilitate the optimal functioning of the proposed Kenhardt PV 1 solar energy facility, which would help to address the need for increased electricity supply while also providing advanced skills transfer and training to the local communities and creating contractual and permanent employment in the area.

(b) Urban edge / Edge of Built environment for the area	YES	NO ✓	Please explain
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The proposed project falls approximately 80 km south of Upington and 20-30 km north-east of Kenhardt within the !Kheis Local Municipality, Northern Cape Province. The proposed project falls within a rural landscape.

(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	YES	NO ✓	Please explain
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The proposed activity does not compromise any of the objectives set within the !Kheis Municipality Draft IDP (2012 – 2017 and 2015 – 2019). The proposed project will also be supportive of the IDP's objective of creating more job opportunities. The proposed project will also create economic spin offs during the construction phase (if an EA is granted by the DEA). It is estimated that approximately 130 employment opportunities will be created during the construction phase. The proposed project will also provide fundamental infrastructure to ensure that the proposed Kenhardt PV 1 facility is able to operate and transmit the electricity that it will

generate. The proposed project will therefore ultimately also assist in local job creation during the construction and operation phases of the proposed Kenhardt PV 1 facility project (if an EA is granted by the DEA).			
(d) Approved Structure Plan of the Municipality	YES ✓	NO	Please explain
It is not expected that the approval of the proposed project would compromise the integrity of the existing plans for the area. Furthermore, mitigation measures have been recommended as part of the BA Process to manage potential negative environmental impacts that may occur during the construction, operational and potential decommissioning phases. To this end, an EMPr, which is included as Appendix G of this finalised BA Report, has been compiled for the proposed project to ensure that all potential negative impacts identified are suitably managed and mitigated, and potential positive impacts are enhanced.			
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	YES ✓	NO	Please explain
It is not expected that the approval of the proposed project would compromise the integrity of the existing plans and environmental priorities for the area. Furthermore, mitigation measures have been recommended as part of the BA Process to manage potential negative environmental impacts that may occur during the construction, operational and potential decommissioning phases. To this end, an EMPr, which is included as Appendix G of this finalised BA Report, has been compiled for the proposed project to ensure that all potential negative impacts identified are suitably managed and mitigated, and potential positive impacts are enhanced.			
As noted above, the project site is currently being used for agricultural purposes, predominantly grazing. It should be noted that the existing livestock grazing is expected to continue in the area surrounding the transmission line. Furthermore, Section 2.1.4 of the Siyanda District Municipality (now known as ZF Mgcawu District Municipality) Environmental Management Framework states that "in the year 2000, the utilization of groundwater in the area was approximately in balance with a sustainable yield from this source. No significant potential for further development exists. Over-exploitation of the groundwater has not been experienced in the EMF area". The Applicant planned to make use of groundwater as a water source during the construction phase. However, the Geohydrological Assessment (included in Appendix D.5 of this finalised BA Report) has concluded that groundwater should not be used as a source of water, as the groundwater on site is limited and of a poor quality. Additional information regarding the possible use of groundwater included in Appendix D.5 of this finalised BA Report.			
(f) Any other Plans (e.g. Guide Plan)	YES	NO	Please explain
Refer to the explanations provided above.			
3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	YES ✓	NO	Please explain
The !Kheis Municipality Draft IDP (2012 – 2017 and 2015 – 2019) states that an opportunity exists to utilise solar energy more widely and lessen the dependence on wood and fire. This opportunity has been identified because not all people within the municipal area have access to electricity. Even though the proposed Kenhardt PV 1, 2 and 3 solar facilities (which have been subjected to separate EIA Processes, as noted above) will not provide electricity to the municipality directly, the energy produced by the facilities will feed into the national grid as a result of the proposed Kenhardt PV Transmission Line projects (i.e. this specific Kenhardt PV 1 – Transmission Line project will assist and enable the proposed Kenhardt PV 1 facility to feed the generated electricity to the national grid). As noted above, the SEA for Wind and Solar PV development aims to identify strategic geographical areas best suited for the roll-out of large scale wind and solar PV energy projects, referred to as REDZs. The proposed project, which will fundamentally support the proposed Kenhardt PV 1 facility, falls within one of the potential eight REDZ. Therefore, should the REDZ be established and			

renewable projects operate within these areas, Eskom may be able to unlock funding to proactively construct grid infrastructure to facilitate generation capacity from these areas. This will mean that the municipality will also benefit from these upgrades and potentially alleviate the electrification backlogs present in the area.

One of the priority issues identified within the !Kheis Municipality IDP (2012 – 2017 and 2015 – 2019) is the low levels of skilled people, as well as high levels of poverty and unemployment. The IDP (2012 – 2017 and 2015 – 2019) states that the objective to resolve this issue is to create an environment whereby the local community is empowered through capacity building and skills development (particularly for the youth). The proposed project will create job opportunities and economic spin offs during the construction phase (if an EA is granted by the DEA). It is estimated that approximately 130 employment opportunities will be created during the construction phase. It should however be noted that employment during the construction phase will be temporary. During the operational phase, the transmission line could possibly be operated by Eskom.

Therefore, the proposed transmission line project will support and facilitate the optimal functioning of the proposed Kenhardt PV 1 solar energy facility, which would help to address the need for increased electricity supply while also providing advanced skills transfer and training to the local communities and creating contractual and permanent employment in the area.

<p>4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)</p>	<p>YES ✓</p>	<p>NO</p>	<p>Please explain</p>
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As noted above, South Africa has a high level of Renewable Energy potential and presently has in place a generation target of 10 000 GWh of Renewable Energy. As noted above, at a national level, the DOE has set the target of having 17 800 MW of electricity generated from Renewable Energy sources contributing to the national grid by 2030 to ensure the continued uninterrupted supply of electricity. As noted above, Scatec Solar intends to submit the Kenhardt PV 1, PV 2 and PV 3 (EIA Projects) for Round 5 of the REIPPPP and this project (i.e. Kenhardt PV 1 – Transmission Line) can therefore contribute to the IPP goals and feed into the national grid, which results in this project having national importance. Furthermore, the proposed transmission line project will ensure that the proposed Kenhardt PV 1, PV 2 and PV 3 (EIA Projects) are viable for submission as part of the REIPPPP as it will ensure fundamental connection to the national grid.

At a local level, the !Kheis Municipality Draft IDP (2012 – 2017 and 2015 – 2019) states that an opportunity exists to utilise solar energy more widely (especially in the remote areas of the municipality) and lessen the dependence on wood and fire. This opportunity has been identified because not all people within the municipal area have access to electricity. The IDP (2015 – 2019) also states that due to small communities present in sparsely populated areas, effective distribution of electricity becomes difficult in some areas. Even though the proposed Kenhardt PV 1, 2 and 3 solar facilities (which have been subjected to separate EIA Processes, as noted above) will not provide electricity to the municipality directly, the energy produced by the facilities will feed into the national grid as a result of the proposed Kenhardt PV Transmission Line projects (i.e. this specific Kenhardt PV 1 – Transmission Line project will assist and enable the proposed Kenhardt PV 1 facility to feed the generated electricity to the national grid). In addition, on a local level, the project will contribute towards job creation which is needed within the area.

<p>5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)</p>	<p>YES <i>Refer to the explanation below</i></p>	<p>NO</p>	<p>Please explain</p>
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Some services are currently available to cater for the proposed development; however services to support the proposed transmission line will need to be constructed as well (such as the proposed gravel road for maintenance purposes).

Furthermore, as noted above, existing roads (such as a private Transnet Service Road or an unnamed farm road) will be used to gain access to the site. The Transnet Service Road can be accessed from the R27 and the farm road can be accessed from the R383 Regional Road also via the R27 National Road. An internal gravel road may also be constructed from either the Transnet Service Road or the unnamed farm road to the proposed Kenhardt PV 1, PV 2 and PV 3 facilities (as shown in the preliminary layout in Appendix A of this finalised BA Report). This specific road construction has been assessed separately as part of the separate EIA Processes. If the Transnet Service Road cannot be used, the unnamed farm road will need to be upgraded and widened by more than 6 m.

Existing municipal services for the handling of waste, provision of water and sewage handling are expected to be used for the proposed project. It was noted in the BA Report, which was released for a 30-day comment period in March 2016, that confirmation of the availability of the services would be obtained during the 30-day review of the BA Report. However, during the 30-day review of the BA Report, several emails were sent to the municipality (i.e. ZF Mgqawu District Municipality, !Kheis Local Municipality and the Kai !Garib Local Municipality) to obtain comments and seek confirmation of services. Copies of these follow up emails are included in Appendix E.2 of this finalised BA Report. To date, no responses have been received from the municipality in this regard. Telephonic calls were also made, however no engagements were able to be made.

However, as noted previously, should the municipality not have adequate handling of waste, provision of water and sewage handling provisions available; then the Applicant will make use of private contractors to ensure that the services are provided. The Applicant will also ensure that adequate waste disposal measures are implemented by obtaining waste disposal docket of waste removed from site (in line with the EMPr).

<p>6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)</p>	<p>YES</p>	<p>NO ✓</p>	<p>Please explain</p>
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There is no anticipated negative impact on municipal infrastructure planning (no clash of priority, and/or placement) as additional infrastructure required to maintain the proposed transmission line would be provided and maintained by the Applicant or Eskom (as explained above). The activity is furthermore proposed on agricultural land with little or no existing and planned infrastructure. The opportunity cost of constructing the proposed project might increase the viability of agricultural productivity due to financial advantage (i.e. farmers will receive payments for lease of the property per quarter or year). The opportunity cost of not constructing the proposed transmission line to service the proposed Kenhardt PV 1 facility would be the maintenance of the current status quo, which is marginal agriculture and grazing.

<p>7. Is this project part of a national programme to address an issue of national concern or importance?</p>	<p>YES ✓</p>	<p>NO</p>	<p>Please explain</p>
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The National Integrated Resource Plan for Electricity (IRP2) (2011) suggests that 42% of national energy supply must come from renewable energy sources between 2010 and 2030. Therefore, this project will provide the necessary infrastructure to fundamentally support the proposed Kenhardt PV 1 facility, which is aligned with the government's plan to increase renewable energy sources.

<p>8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)</p>	<p>YES ✓</p>	<p>NO</p>	<p>Please explain</p>
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As discussed above, the solar resource of this area is high, which makes it a very favourable location for the proposed Kenhardt PV 1, 2 and 3 facilities (which have been subjected to separate EIA Processes). The location of the proposed transmission line project is highly dependent on the location of the proposed Kenhardt PV 1 facility and the Eskom Nieuwehoop Substation. If the proposed Kenhardt PV 1 facility cannot connect to the Nieuwehoop Substation, this could also result in additional costs and expenditure, as well as additional

timeframes required, as a result of the potential re-design of the Kenhardt PV 1 facility to align with an alternative substation within the region. Using an alternative substation within the region (dependent on capacity requirements) could result in longer transmission lines and associated gravel roads. This could result in additional negative impacts to the surrounding environment, including avifauna.

Due to the presence of the Eskom Nieuwehoop Substation, the land use is favoured from an electrical landscape perspective. In addition, the landscape of the immediate adjacent area is already impacted by the ore freight railway line and will become even more industrialised by the Eskom Nieuwehoop substation and high voltage transmission lines. As noted in the Visual Impact Assessment (Appendix D.2 of this finalised BA Report), the visual intrusion will be low for visual receptors on surrounding farms since the landscape is already transformed by existing structures (as mentioned above).

As noted in Appendix D.6 of this finalised BA Report (Soils and Agricultural Potential Assessment), due to the climate and soil limitations, the site is not suitable for any agricultural land use other than low intensity grazing. Currently, the site is used for grazing, which could continue in the surrounding regions, together with the generation of additional income via the leasing of the land to the Applicant. The potential negative impact of loss of agricultural land and the potential positive impact of additional land use income were both rated with a very low significance (without the implementation of mitigation measures) in the Soils and Agricultural Potential Assessment.

9. Is the development the best practicable environmental option for this land/site?	YES ✓	NO	Please explain
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Based on the findings of this BA, the proposed project would not have a significant ("high") negative impact on the receiving environment, with the implementation of suitable mitigation measures. As noted in the Soils and Agricultural Potential Assessment, due to the climate and soil limitations, the site is not suitable for any agricultural land use other than low intensity grazing. Currently, the site is used for grazing, which could continue in the surrounding regions, together with the generation of additional income via the leasing of the land to the Applicant. The potential negative impact of loss of agricultural land and the potential positive impact of additional land use income were both rated with a very low significance (without the implementation of mitigation measures) in the Soils and Agricultural Potential Assessment.

However, it is also important to point out that the proposed project will be designed according to relevant national specifications and standards which are regarded as best practice in the renewable energy sector.

Based on the above, the construction of the proposed project is the best practicable option for the land. In addition, the construction the proposed transmission line (and ultimately the proposed Kenhardt PV 1 facility) would have a positive socio-economic impact on the area.

10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	YES ✓	NO	Please explain
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Based on the findings of this BA, the proposed project would not have a significant ("high") negative impact on the receiving environment, with the implementation of suitable mitigation measures. As noted in the Soils and Agricultural Potential Assessment, due to the climate and soil limitations, the site is not suitable for any agricultural land use other than low intensity grazing. Currently, the site is used for grazing, which could continue in the surrounding regions, together with the generation of additional income via the leasing of the land to the Applicant. The potential negative impact of loss of agricultural land and the potential positive impact of additional land use income were both rated with a very low significance (without the implementation of mitigation measures) in the Soils and Agricultural Potential Assessment.

In addition, the construction the proposed transmission line (and ultimately the proposed Kenhardt PV 1 facility) would have a positive socio-economic impact on the area.

11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	YES ✓	NO	Please explain
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Various other solar energy facilities and electrical transmission lines have been proposed in the immediate area. The Eskom Nieuwehoop Substation is presently under construction, while three solar energy facilities

have been granted EA (although it is unknown when they will be built).			
12. Will any person's rights be negatively affected by the proposed activity/ies?	YES	NO ✓	Please explain
<p>No negative impacts of a high significance (with the implementation of mitigation measures) have been identified as part of the BA.</p> <p>The impacts on health and wellbeing are expected to be minimal as the proposed project is taking place within a sparsely populated region. Dust may be generated during the construction phase; however it is expected to be of a short-term duration and of low significance. However, where applicable, mitigation measures relating to potential impacts on the health and wellbeing of people (such as construction staff, farm workers, construction staff at the Eskom Nieuwehoop Substation and the operational staff of the ore railway line) have been included in the EMPr (Appendix G of the finalised BA Report). Odours will be minimal during the construction phase and non-existent during the operational phase.</p> <p>During the construction phase, noise may be generated as a result of the operation of equipment, vehicles and machinery, the transportation of construction materials and staff to and from site, the establishment of site construction areas, as well as general construction activities. However, the noise levels and impacts will be short-term and are not expected to be significant during the construction phase. During the operational phase, the proposed transmission line will not generate any noise. Mitigation measures (where applicable) have been included in the EMPr (Appendix G of the finalised BA Report) to reduce the negative noise impacts during the construction phase.</p> <p>In terms of visual character and sense place, the visual landscape and the agricultural landscape has been altered by the ore freight railway line. The site is expected to become even more industrialised by the Eskom Nieuwehoop Substation and high voltage transmission lines. As noted above, this has been assessed in the Visual Impact Assessment (Appendix D.2 of this finalised BA Report).</p> <p>Notwithstanding the above, the socio-economic benefits likely to result from the proposed project (e.g. creation of jobs and regional economic development) would most likely outweigh the issues mentioned above.</p>			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	YES	NO ✓	Please explain
The proposed project falls approximately 80 km south of Upington and 20-30 km north-east of Kenhardt within the !Kheis Local Municipality, Northern Cape Province. The proposed project falls within a rural landscape.			
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	YES	NO <i>Refer to the explanation below</i>	Please explain
<p>The proposed project itself is not part of any of the SIPS. However, as noted above, the SEA for Wind and Solar PV development aims to identify strategic geographical areas best suited for the roll-out of large scale wind and solar PV energy projects, referred to as REDZs. The proposed project, which will fundamentally support the proposed Kenhardt PV 1 facility, falls within one of the potential eight REDZ. Therefore, should the REDZ be established and renewable projects operate within these areas, Eskom may be able to unlock funding to proactively construct grid infrastructure to facilitate generation capacity from these areas. This will mean that the municipality will also benefit from these upgrades and potentially alleviate the electrification backlogs present in the area. Even though the proposed Kenhardt PV 1, 2 and 3 solar facilities (which have been subjected to separate EIA Processes, as noted above) will not provide electricity to the municipality directly, the energy produced by the facilities will feed into the national grid as a result of the proposed Kenhardt PV Transmission Line projects (i.e. this specific Kenhardt PV 1 – Transmission Line project will assist and enable the proposed Kenhardt PV 1 facility to feed the generated electricity to the national grid).</p>			
15. What will the benefits be to society in general and to the local communities?	Please explain		
The socio-economic benefits likely to result from the proposed project (e.g. creation of jobs and regional economic development) would most likely outweigh the minor issues noted above, such as dust generation, noise, impacts to the visual landscape, and odour emissions.			

16. Any other need and desirability considerations related to the proposed activity?	Please explain
The need and desirability considerations have been described above.	
17. How does the project fit into the National Development Plan for 2030?	Please explain
<p>The National Development Plan (National Planning Commission, 2011, p.10) proposes to create 11 million jobs by 2030 by:</p> <ul style="list-style-type: none"> ▪ “Realising an environment for sustainable employment and inclusive economic growth; ▪ Promoting employment in labour-absorbing industries; ▪ Raising exports and competitiveness; ▪ Strengthening government’s capacity to give leadership to economic development; and ▪ Mobilising all sectors of society around a national vision”. <p>Approval of this BA project will enable and facilitate the construction of a larger suite of PV projects proposed by Scatec Solar, which will play a role in enhancing employment and economic growth objectives by creating employment opportunities and contributing to economic growth.</p>	
18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.	
The general objectives of Integrated Environmental Management set out in Section 23 of the NEMA and how these objectives have been taken into account in this BA Process is provided below.	
Section 23 in NEMA:	How it has been addressed in this BA Process:
(2) The general objective of integrated environmental management is to: (a) promote the integration of the principles of environmental management set out in section 2 into the making of all decisions which may have a significant effect on the environment;	Discussed in Question 19 below.
(b) identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with the principles of environmental management set out in section 2;	Potential impacts on the environment, society, the economy and cultural heritage, occurring as a result of the proposed project, have been identified and assessed in Section D of this finalised BA Report (as well as in Appendix D of this finalised BA Report). Mitigation measures to minimise potential negative impacts and maximise positive impacts have also been suggested in Section D of this finalised BA Report, as well as Appendix G (EMPr).
(c) ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them;	Assessing the potential impacts of the proposed project (as noted in Section D and Appendix D of this finalised BA Report) warrants that all effects associated with the proposed project have received adequate consideration prior to any action relating to these activities being undertaken.
(d) ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment;	Appropriate public participation has been undertaken for the proposed project, in compliance with the 2014 EIA Regulations. The PPP is described in Section C of this finalised BA Report.
(e) ensure the consideration of environmental attributes in management and decision-making which may have a significant effect on the environment; and	The specialist studies undertaken as part of the BA Process and included in Appendix D of this finalised BA Report assisted in the identification and description of environmental attributes and significant environmental impacts, which are indicated and assessed in Section D of this BA Report as well. Mitigation measures have also been suggested in Section D of this finalised BA Report, as well as Appendix G (EMPr).
(f) identify and employ the modes of environmental management best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management set out in section 2.	The EMPr (included in Appendix G of this finalised BA Report) includes mitigation measures to minimise negative environmental impacts, as well as mitigation objectives and management.
19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.	
The principles of NEMA have been considered in this assessment through:	

- Compliance with the requirements of relevant legislation in undertaking the assessment of potential impacts;
- Implementation of the principle of sustainable development where appropriate mitigation measures have been recommended for impacts which cannot be avoided;
- Ensuring that the successful implementation and appropriate management of this project will aid in achieving the principle of minimisation of pollution and environmental degradation;
- Undertaking the BA Process in an inclusive and transparent manner; and
- Making great efforts to involve I&APs, stakeholders and relevant Organs of State in the process such that an informed decision regarding the project can be made by the Competent Authority.

11. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
NEMA (Act 107 of 1998, as amended)	The proposed project will require the implementation of appropriate environmental management practices.	National Department of Environmental Affairs	19 November 1998
NEMA EIA Regulations published in Government Notice R982, R983, R984 and R985	These Regulations provide the procedures that need to be followed for the BA Process.	National Department of Environmental Affairs	8 December 2014
NEMA EIA Regulations published in Government Notice R983 and R985	These Regulations contain the relevant listed activities that were triggered, thus requiring a BA. Please refer to Section A (1) (b) of this BA Report for the complete list of listed activities.	National Department of Environmental Affairs	8 December 2014
National Environmental Management: Waste Act (Act 59 of 2008) (NEMWA)	General and hazardous waste will be generated during the construction phase, which will require proper management.	National Department of Environmental Affairs	6 March 2009
National Environmental Management: Waste Amendment Act (Act 26 of 2014)	General and hazardous waste will be generated during the construction phase, which will require proper management.	National Department of Environmental Affairs	2 June 2014
National Environmental Management: Air Quality Act (Act 39 of 2004)	The proposed stockpiling activities, including earthworks, may result in the unsettling of, and temporary exposure to, dust. Appropriate dust control methods will need to be applied.	National Department of Environmental Affairs	19 February 2005
Water Services Act (Act 108 of 1997)	Water will be required during the construction and decommissioning phases of the proposed project, for consumption purposes, earthworks and grassing etc.	National Department of Water Affairs	1997
Hazardous Substances Act (Act 15 of 1973)	During the proposed project, fuel and diesel will be utilised to power vehicles and equipment. In addition, potential spills of hazardous materials could occur during the construction and decommissioning phases.	Department of Health	1973
Environmental Conservation Act (ECA) (Act 73 of 1989 Amendment Notice No.1183 of 1997)	ECA was promulgated prior to the NEMA, and was the main piece of legislation in dealing with environmental issues in South Africa. The ECA has largely been repealed and replaced with NEMA.	National Department of Environmental Affairs	1997
National Forests Act (Act 84 of 1998)	As noted in Appendix D.1 of this finalised BA Report (Ecological Impact Assessment), the National Forest Act (Act 84 of 1998) governs the removal, disturbance, cutting or damage and destruction of identified "protected trees". Listed species that may be encountered in the area include <i>Boscia</i> spp and possibly <i>Acacia</i>	Department of Agriculture, Forestry and Fisheries	1998

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	<p><i>erioloba</i>. Neither of these species were identified as falling within the proposed corridor. However, if any protected species are found on site during the search and rescue or construction, the Provincial Department of Agriculture, Forestry and Fisheries will be contacted to discuss the permitting requirements.</p> <p>It is unlikely that an application for the "clearing of a natural forest", as defined within the Act, will be required on the route in question.</p>		
National Water Act (NWA) (Act 36 of 1998)	<p>Water will be utilised during the proposed project. The unlikely need for a Water Use Licence, as a result of the proposed transmission line, will be confirmed by the Department of Water and Sanitation. During the BA Phase, follow up emails were sent to the Department of Water and Sanitation in March and April 2016 to verify if the Department has any comments on the BA Reports. Copies of these follow up emails are included in Appendix E.2 of this finalised BA Report. The Department of Water and Sanitation provided combined comments on the BA (and EIA) Reports on 5 April 2016, which are included in Appendix E.6 of this finalised BA Report. However, these comments are the same as those comments issued by the Department during the Scoping Phase. Responses to these comments are included in Appendix E.3 of this finalised BA Report.</p> <p>However, it is important to note that the Ecological Impact Assessment (Appendix D.1 of this finalised BA Report) states that the water courses (i.e. minor drainage lines) do not meet the criteria to be termed "wetlands", while the final routing of the power line may fall in excess of 500 m from the water courses, thus not necessitating a Water Use Licence application.</p>	Department of Water Affairs	1998
Integrated Environmental Management (IEM) guideline series published by the DEA (various documents dated from 2002 to present)	The IEM Guideline series provides guidance on conducting and managing all phases and components of the required BA and PPP, such that all associated tasks are performed in the most suitable manner.	National Department of Environmental Affairs	2002 - present
National Heritage Resources Act (Act 25 of 1999)	The proposed project may require a permit in terms of the National Heritage Resources Act prior to any fossils/artefacts being removed by professional palaeontologists/ archaeologists. Additional information regarding this is provided in the Heritage Impact Assessment (Appendix D.3) and Palaeontological Impact Assessment (Appendix D.4).	National Department of Arts and Culture	1999
Conservation of Agricultural Resources Act (Act 43 of 1983)	The Conservation of Agricultural Resources Act (CARA) (Act 43 of 1983) has categorised	National Department of Agriculture	1983

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	<p>a large number of invasive plants together with associated obligations of the land owner. Invasive plants listed in CARA may occur on site (as noted in the Ecological Impact Assessment in Appendix D.1 of this finalised BA Report). Invasive plant species that should be removed or maintained only under certain commercial situations are identified in terms of the CARA. This Act will be applicable to the project if and where such plants arise within or adjacent to the project area. Notably most listed alien invasive species are propagated and driven by the disturbance of land during and following construction.</p>		
<p>Northern Cape Nature Conservation Act (Act 9 of 2009)</p>	<p>All species listed by the Northern Cape Nature Conservation Act will require removal permits should they be impacted upon by the construction activities. The Northern Cape Conservation Act under its pertinent regulation, governs the disturbance of species listed in Tables 1 and 2 of the Ecological Impact Assessment (included in Appendix D.1 of this finalised BA Report), or possibly other species not yet identified on route.</p> <p>A permit from the Provincial Department of Environment and Nature Conservation will be required in order to disturb or translocate such species. Species that would require such permitting include <i>Aloe dichotoma</i> and <i>Aloe claviflora</i> which has been identified within the proposed corridor. However, the Aloe conspecies have been <u>excluded from the development footprint (i.e. routing of the transmission line will avoid these species)</u>.</p> <p>The absence or presence of these species will be confirmed as part of the plant rescue and protection plan and should any species be present and determined that they will be impacted on, permits will be obtained from Department of Environment and Nature Conservation in this regard.</p>	<p>Northern Cape Department of Environment and Nature Conservation</p>	<p>2009</p>
<p>National Environmental Management: Biodiversity Act (Act 10 of 2004)</p>	<p>This Act serves to control the disturbance and land utilisation within certain habitats, as well as the planting and control of certain exotic species. The proposed development, taking place in the identified Bushmanland Arid Grassland environment, may not necessitate any particular application for a change in land use from an ecological perspective, however the effective disturbance and removal of species identified in Tables 1 and 2 of the Ecological Impact Assessment (included in Appendix D.1 of this finalised BA Report), as well as possible other species (i.e. TOPS species), will require specific permission from the applicable authorities.</p>	<p>National DEA</p>	<p>September 2004</p>

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	In addition, the planting and management of exotic plant species on route, if and where required, will be governed by the Alien and Invasive Species (AIS) regulations, which were gazetted in 2014. These regulations compel landowners to manage exotic weeds on land under their jurisdiction and control.		
Astronomy Geographic Advantage (Act 21 of 2007)	<p>The Astronomy Geographic Advantage (Act 21 of 2007) aims is to provide for the preservation and protection of areas within the Republic that are uniquely suited for optical and radio astronomy; to provide for intergovernmental co-operation and public consultation on matters concerning nationally significant astronomy advantage areas; and to provide for matters connected therewith.</p> <p>This site falls within 20 km of a SKA station and based on distance to the nearest SKA station, the location of the station, and the information currently available on the detailed design of the PV installation, the proposed facility poses a medium to high risk of detrimental impact on the SKA.</p> <p>As requested by the SKA, Electromagnetic Interference and Radio Frequency Interference studies have been commissioned by the Project Applicant to determine the impact of the proposed project on the SKA. This report is included in Appendix D.9 of this finalised BA Report.</p>	Department of Science and Technology	2007
Subdivision of Agricultural Land Act (Act 70 of 1970)	An application for the change of land use (re-zoning) for the development on agricultural land will be lodged by the Applicant for approval in terms of the Subdivision of Agricultural Land Act (Act 70 of 1970) (SALA) as required. The Soils and Agricultural Potential Assessment specialist study (Appendix D.6 of this finalised BA Report) notes that a servitude for the proposed transmission line will need to be registered on the affected farm portions. Servitude requirements will also be discussed between the Applicant and Eskom.	Republic of South Africa	1970

12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?

YES	<input checked="" type="checkbox"/>
	50 m ³

If YES, what estimated quantity will be produced per month?

How will the construction solid waste be disposed of (describe)?

The quantity of waste generated will depend on the construction phase, which is estimated is extend 12 to 14 months (as mentioned in Section A (1) (a) of this finalised BA Report). However, it is estimated that 50 m³ of

waste will be generated every month during the construction phase. During the construction phase, the following waste materials are expected:

- Packaging material, such as the cardboard, plastic and wooden packaging and off-cuts;
- Hazardous waste from empty tins, oils, soil containing oil and diesel (in the event of spills), and chemicals;
- Building rubble, discarded bricks, wood and concrete;
- Domestic waste generated by personnel; and
- Vegetation waste generated from the clearing of vegetation.

Solid waste will be managed via the EMPr (Appendix G of the finalised BA Report), which incorporates waste management principles. As mentioned previously, general waste will be temporarily stockpiled in a designated area on site and thereafter removed and disposed at a registered waste disposal facility on a regular basis by an approved waste disposal Contractor (i.e. a suitable Contractor). Any hazardous waste (such as contaminated soil as a result of spillages) will be temporarily stockpiled (for less than 90 days) in a designated area on site (i.e. placed in leak-proof storage skips), and thereafter removed off site by a suitable service provider for safe disposal at a registered hazardous waste disposal facility.

Waste disposal slips and waybills will be obtained for the collection and disposal of the general and hazardous waste. These disposal slips (i.e. safe disposal certificates) will be kept on file for auditing purposes as proof of disposal.

Where will the construction solid waste be disposed of (describe)?

All waste will be collected and temporarily stored in skips on site. The waste will then be emptied into trucks and disposed of at a registered/licenced waste disposal facility by an approved Contractor. The waste disposal facility selected will be suitable and able to receive the specified waste stream (i.e. hazardous waste will only be disposed of at a registered/licenced waste disposal facility). The details of the disposal facility will be finalised during the contracting process, prior to the commencement of construction.

Where possible, recycling and re-use of material will be encouraged.

Will the activity produce solid waste during its operational phase?

NO ✓

If YES, what estimated quantity will be produced per month?

How will the solid waste be disposed of (describe)?

Not applicable, the proposed project will not generate any waste during the operational phase. Refer to the explanation below.

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

Not applicable, the proposed project will not generate any waste during the operational phase. Refer to the explanation below.

Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)?

Not applicable, the proposed project will not generate any waste during the operational phase. Refer to the explanation below.

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Note from the CSIR: As noted in Section A (1) of this finalised BA Report, during the operational phase of the proposed transmission line, waste generation is not applicable. Only the following activities will occur during the operational phase:

- The transmission of electricity generated from the proposed 75 MW Kenhardt PV 1 facility to the Eskom Nieuwehoop Substation; and
- Maintenance of the transmission line servitude including the gravel road.

Therefore, during the life span of the power line (approximately 20 years), on-going maintenance will be required on a scheduled basis. This maintenance work will be undertaken by contractors employed by the Project Applicant or Eskom, and in compliance with the EMPr.

Can any part of the solid waste be classified as hazardous in terms of the NEM:WA?

NO ✓ <i>Refer to the explanation below.</i>
--

If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

Note from the CSIR: It is important to note that the proposed project does not trigger any activities listed in Categories A and B of the List of Waste Management Activities published in GN 921 and as such a Waste Management Licence is not required. Therefore, it is of the opinion of the EAP that a Scoping and EIA is not warranted.

A Waste Management Licence, in terms of the NEMWA, is not required when activities listed in Category C are triggered; however instead, compliance with the relevant National Norms and Standards must be achieved. Activity 2 of Category C of GN 921 states the following: "the storage of hazardous waste at a facility that has the capacity to store in excess of 80 m³ of hazardous waste at any one time, excluding the storage of hazardous waste in lagoons or temporary storage of such waste". It is estimated that during the construction phase, limited amounts of hazardous waste will be generated. The type of hazardous waste will be limited to waste hydraulic oils; waste engine, gear and lubricating oils; waste insulating and heat transmission oils; wastes of liquid fuels; or hazardous portions of other oil wastes. This could occur as a result of fuel spillages on site (due to construction equipment and vehicles). It is not likely that more than more than 80 m³ of waste fuel spillages will emanate from the construction process that will need to be stockpiled on site for longer than 90 days. Therefore, the National Norms and Standards for the Storage of Waste (published on 29 November 2013 under GN 926) will not need to be complied with. However, these recommendations have been included in the EMPr.

Hazardous waste generated during the construction phase will be temporarily stockpiled in designated sealed containers on impervious surfaces. The hazardous waste will be collected by an appointed waste removal Contractor and disposed of at a licenced/registered hazardous waste disposal facility. Waste disposal slips and waybills will be obtained for the collection and disposal of the hazardous waste. These disposal slips will be kept on file for auditing purposes as proof of disposal.

Is the activity that is being applied for a solid waste handling or treatment facility?

NO ✓

If YES, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?

NO ✓

If YES, what estimated quantity will be produced per month?

Will the activity produce any effluent that will be treated and/or disposed of on site?

NO

If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Will the activity produce effluent that will be treated and/or disposed of at another facility?

NO ✓
Refer to the explanation below (only normal sewage)

If YES, provide the particulars of the facility:

Facility name:

Contact

person:

Postal address:

Postal code:

Telephone:

E-mail:

Cell:

Fax:

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

Not applicable. Refer to the explanation provided below.

Note from the CSIR:

As noted in Section 1 (A) of this finalised BA Report, the proposed project will require sewage services during the construction phase. Low volumes of sewage or liquid effluent are estimated. Liquid effluent will be limited to the ablution facilities during the construction phase. Portable sanitation facilities (i.e. chemical toilets) will be used during the construction phase, which will be regularly serviced and emptied by a suitable (private) Contractor on a weekly basis. The waste water will be transported by the Contractor to a nearby Waste Water Treatment Works for treatment. Due to the remote location of the project site; a conservancy tank or septic tank system could be used on site, which is expected to be serviced by the municipality. Attempts were made to obtain feedback from the municipality (in terms of capacity) during the BA Phase, however no feedback was received. Due to the remote locality of the farm, sewage cannot be disposed in the municipal waterborne sewage system.

As mentioned previously, should the municipality not have adequate sewage handling provisions available; then the Applicant will make use of private contractors to ensure that the services are provided. The Applicant will also ensure that adequate waste disposal measures are implemented by obtaining safety disposal dockets of sewage removed from site (in line with the EMPr).

During the operational phase of the proposed transmission line, sewage generation is not applicable.

c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere other than exhaust emissions and dust associated with construction phase activities?

NO ✓

If YES, is it controlled by any legislation of any sphere of government?

If YES, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If NO, describe the emissions in terms of type and concentration:

During the construction phase, dust will be generated from the earthworks and excavation required for the construction of the proposed infrastructure and building foundations, the removal of vegetation, the movement of vehicles and equipment accessing the site, and the infilling of excavations and levelling. Appropriate mitigation measures will be implemented during the construction phase to reduce the dust levels. Approved soil stabilizing agents may need to be used to minimise dust. Dust generation during the construction phase will be of a short-term duration and is predicted to be of low significance with the implementation of mitigation measures. Appropriate mitigation and management measures are included in the EMPr (Appendix G of the finalised EMPr).

The construction vehicles and equipment will also generate exhaust emissions. However, these emissions are also expected to be short-term in duration and of low significance with the implementation of mitigation measures. Appropriate mitigation and management measures are included in the EMPr (Appendix G of the finalised EMPr) with regards to traffic control.

d) Waste permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA?

YES NO

If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority.

Note from the CSIR: As noted above, a Waste Management Licence is not required for the proposed project. Refer to Section A (12) (a) of this finalised BA Report, which explains that a Waste Management Licence is not required for the proposed project in terms of the NEMWA.

e) Generation of noise

Will the activity generate noise?

YES NO

If YES, is it controlled by any legislation of any sphere of government?

YES NO

Describe the noise in terms of type and level:

During the construction phase, noise will be generated by the construction activities, earthworks, personnel, equipment and vehicles on the site. The levels of noise are not expected to be excessive and will be in line with standard industry levels associated with the proposed activity. In addition, noise generation during the construction phase is considered to be localised and short-term, with a low to very low significance (with the implementation of mitigation measures). During the construction phase, the ambient noise is not expected to exceed 45 dB(A) during the day and 35 dB(A) at night for rural districts (as required by SANS 10103:2008). In addition, the proposed project will not generate any noise during the operational phase.

13. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

Municipal [Redacted]

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:

Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?

YES NO

If YES, please provide proof that the application has been submitted to the Department of Water Affairs.

Note from the CSIR: Water will be used during the construction phase mainly for earthworks, domestic purposes, dust control and re-vegetation watering processes. Water will be sourced from the municipal system.

It was noted during the Project Initiation Phase that groundwater could be used from existing boreholes if it was available and of a suitable quality. It was planned to construct water pipelines in order to transfer groundwater from existing boreholes to the proposed solar facility (where the water will be distributed to the transmission line area). However, the Geohydrological Assessment (undertaken as part of the BA Process and included in Appendix D.5 of this finalised BA Report) recommends that the groundwater is not suitable for use during the construction phase. Therefore, water pipelines will not need to be constructed in order to transfer groundwater from existing boreholes. As a result, water will therefore be sourced from the municipality. Tanks will be provided on site for the storage of municipal water during the construction phase. The tanks will have a capacity of 10 000 litres each. Therefore, no abstraction of groundwater will be undertaken during the construction phase, and as such a Water Use Licence will not be required in this regard.

The Ecological Impact Assessment specialist study (included in Appendix D.1 of this finalised BA Report), also explains that at this point, there is no necessity for a Water Use Licence, as a result of the proposed transmission line, however this will be confirmed by the Department of Water and Sanitation. It is noted that the water courses (i.e. minor drainage lines) do not meet the criteria to be termed "wetlands", while the final routing of the power line may fall in excess of 500 m from the water courses, thus not necessitating a Water Use Licence (WUL) application.

14. ENERGY EFFICIENCY

Describe the design measures, if any, which have been taken to ensure that the activity is energy efficient:

The design takes the position of the optimum solar radiation into account in order to efficiently capture solar energy, generate the electricity from the renewable source and transmit the generated electricity.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

Not applicable

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

- For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

Section B Copy No. (e.g. A):

- Paragraphs 1 - 6 below must be completed for each alternative.

- Has a specialist been consulted to assist with the completion of this section? YES
✓

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

Note from the CSIR: The proposed electrical corridor is not large and does not have varying environmental features within the site.

As discussed in Section 1 (A) above, only one site and location alternative (i.e. the preferred alternative) is applicable.

Note that the specialist declarations of interest are included in Appendix I of this finalised BA Report, with the complete specialist studies included in Appendix D.

Property description/ physical address:

Province	Northern Cape
District Municipality	ZF Mgcawu District Municipality
Local Municipality	!Kheis Local Municipality
Ward Number(s)	Not Applicable
Farm name and number	<ul style="list-style-type: none"> ▪ Remainder of farm Onder Rugzeer Number 168 ▪ Remaining extent of Portion 3 of the Farm Gemsbok Bult 120 ▪ Remainder of Boven Rugzeer 169 ▪ Portion 4 of Onder Rugzeer Farm 168
Portion number	<ul style="list-style-type: none"> ▪ Remainder of farm Onder Rugzeer Number 168 – Portion 0 ▪ Remaining extent of Portion 3 of the Farm Gemsbok Bult 120 - Portion 3 ▪ Remainder of Boven Rugzeer 169 – Portion 0 ▪ Portion 4 of Onder Rugzeer Farm 168 – Portion 4
SG Code	<ul style="list-style-type: none"> ▪ C03600000000016800000 ▪ C03600000000012000003 ▪ C03600000000016900000 ▪ C03600000000016800004

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

Current land-use zoning as per local municipality IDP/records:

Agricultural land-use - mainly livestock grazing

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required?

YES ✓

Note from the CSIR: The Soils and Agricultural Potential Assessment specialist study (Appendix D.6 of this finalised BA Report) notes that a servitude for the proposed transmission line will need to be registered on the affected farm portions. Servitude requirements will also be discussed between the Applicant and Eskom.

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat ✓	1:50 – 1:20 ✓	
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Alternative S2 (if any):

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Alternative S3 (if any):

--	--	--

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

2.1 Ridgeline		2.4 Closed valley		2.7 Undulating plain / low hills	✓
2.2 Plateau		2.5 Open valley		2.8 Dune	
2.3 Side slope of hill/mountain		2.6 Plain	✓	2.9 Seafront	
2.10 At sea					

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following?

	Alternative S1:	Alternative S2 (if any):	Alternative S3 (if any):
Shallow water table (less than 1.5m deep)	NO ✓		
Dolomite, sinkhole or doline areas	NO ✓		
Seasonally wet soils (often close to water bodies)	NO ✓		
Unstable rocky slopes or steep slopes with loose soil	NO ✓		
Dispersive soils (soils that dissolve in water)	NO ✓		
Soils with high clay content (clay fraction more than 40%)	NO ✓		

	Alternative S1:	Alternative S2 (if any):	Alternative S3 (if any):
Any other unstable soil or geological feature	NO ✓		
An area sensitive to erosion	YES ✓		

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted.

Note from the CSIR: A detailed Soils and Agricultural Potential Assessment is included in Appendix D.6 of this finalised BA Report, which provides a detailed description of the soil conditions on site. The Geohydrological Assessment included in Appendix D.5 of this finalised BA Report provides a detailed assessment of the groundwater and provides a description of the geology. The desktop Palaeontological Impact Assessment (Appendix D.4 of this finalised BA Report) also includes a description of the geology of the area.

4. GROUNDCOVER

Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition ^E	Natural veld with scattered aliens ^E ✓	Natural veld with heavy alien infestation ^E	Veld dominated by alien species ^E	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an ^E "is" is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

Note from the CSIR: A detailed Ecological Impact Assessment is included in Appendix D.1 of this finalised BA Report, which provides information on the groundcover in terms of terrestrial vegetation.

5. SURFACE WATER

Indicate the surface water present on and or adjacent to the site and alternative sites?

Perennial River	YES	NO ✓	UNSURE
Non-Perennial River	YES ✓	NO	UNSURE
Permanent Wetland	YES	NO ✓	UNSURE
Seasonal Wetland	YES	NO ✓	UNSURE
Artificial Wetland	YES	NO ✓	UNSURE
Estuarine / Lagoonal wetland	YES	NO ✓	UNSURE

Note from the CSIR: A detailed Ecological Impact Assessment is included in Appendix D.1 of this finalised BA Report, which provides information on the surface water in terms of aquatic ecology.

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

As noted above, the proposed powerline corridor traverses lands presently set aside for the grazing of livestock. The proposed Kenhardt PV 1 transmission line corridor can be described as a generally level portion of land, with a low gradient draining towards the west, into a shallow drainage feature known locally as “Wolfkopseloop” (as shown in Figure 3 below). This drainage line serves an area of approximately 280 km², most of which lies outside of the study area. Wolfkopseloop drains into the Hartebees River, which in turn serves the Sout River and Orange River systems. Minor drainage lines (shown in white in Figure 3 below) that serve the Wolfkopseloop River flow through certain sections of the transmission line corridor. The Wolfkopseloop system and its immediate tributaries may be regarded as major drainage features.

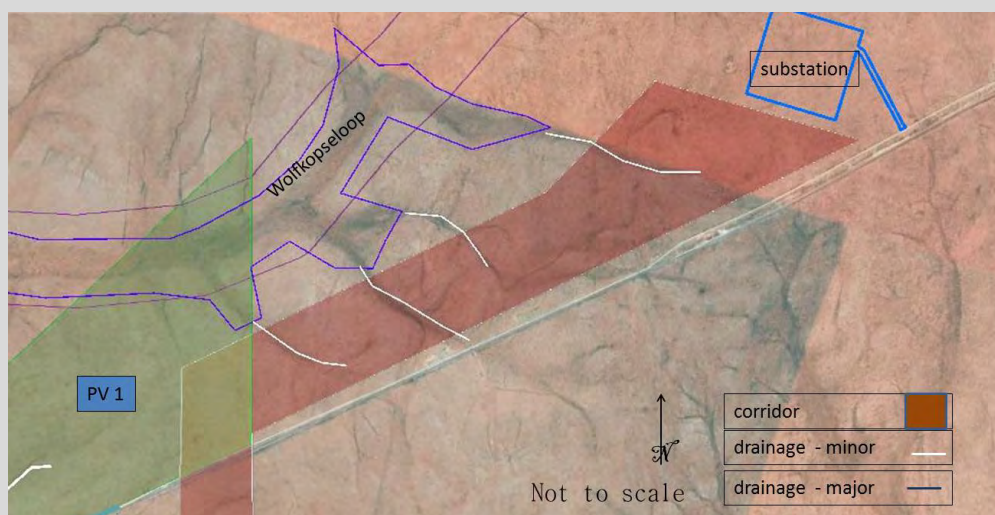


Figure 3: Image showing the proposed corridor associated with the Kenhardt PV 1 transmission line lying between the proposed Kenhardt PV 1 facility and Eskom Nieuwehoop Substation. The Wolfkopseloop feature and its associated drainage lines, lying to the north of the corridor, are considered a major hydrogeomorphic feature and is outlined in purple. Minor dendritic drainage features are identified in white (SDP, 2016).

As indicated above, surface drainage along the proposed transmission line corridor traverses a number of minor drainage lines which serve the (major) Wolfkopseloop drainage feature. These drainage features do not show specific hygrophilous vegetation characteristics as may be defined, nor do they show the presence of geohydromorphic soils, primarily on account of the erratic levels of inundation over extended periods of time, which is driven by the intensity and erratic rainfall experienced in this region. The drainage lines show short term inundation during high rainfall periods, “every 4 to 5 years” (S Strauss pers. comm.) (i.e. are non-perennial). Flow is sluggish under these conditions, and following the cessation of rains, the water rapidly drains from route on account of the percolative, sandy conditions, or is lost to evaporation. For this reason, the major drainage lines have been delineated according to geomorphological features and an apparent change in vegetation form from a sparse and arrested growth form to a more verdant state.

Hydrogeomorphological features are indicated primarily by evidence of flow or deposition of materials (Brinson et al 1993; USDA 2008) while verdant vegetation establishment is a combination of both improved plant water relations and increased nutrient availability. Therefore major drainage features were allied with a combination of both vegetation structure and significant geohydromorphic

indicators, while minor drainage features were distinguished through the presence of a more verdant vegetative association and in some cases indicators of minor surface flow ('rills').

The interface between major and minor drainage lines is often vague, however where rills exceeded a depth of 30cm (gullies), such features were defined as "major" drainage systems.

The Ecological Impact Assessment (Appendix D.1 of this finalised BA Report) has applied a 32 m "buffer" or "setback" around the major drainage lines (i.e. Wolfkopseloop), which is an indicative "norm" recommended by the various authorities. This buffer is considered acceptable in light of the fact that hydrogeomorphic features are the primary dictate in the identification and delineation of the major drainage lines, rather than other functional features such as geohydromorphic soil conditions or botanical species diversity and compositional variation. The application of 32 m from such features is expected to accommodate both the variation in habitat structure and the erosive action associated with gullies and larger drainage features.

On the other hand, the Ecological Impact Assessment (Appendix D.1 of this finalised BA Report) concluded that the "minor" drainage features are not considered to require exclusion from any land use change or proposed construction. The assessment notes that it would however be best for the design of the proposed transmission line to note the presence of these minor features and avoid establishing structures such as buildings and other permanent and significant structures (powerline towers) within them.

6. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

Natural area ✓	Dam or reservoir	Polo fields
Low density residential	Hospital/medical centre	Filling station ^H
Medium density residential	School	Landfill or waste treatment site
High density residential	Tertiary education facility	Plantation
Informal residential ^A	Church	Agriculture ✓
Retail commercial & warehousing	Old age home	River, stream or wetland ✓
Light industrial	Sewage treatment plant ^A	Nature conservation area
Medium industrial ^{AN}	Train station or shunting yard ^N	Mountain, koppie or ridge ✓
Heavy industrial ^{AN}	Railway line ^N ✓	Museum
Power station	Major road (4 lanes or more) ^N	Historical building
Office/consulting room	Airport ^N	Protected Area
Military or police base/station/compound	Harbour	Graveyard
Spoil heap or slimes dam ^A	Sport facilities	Archaeological site (<u>Refer to Section 7 below</u>)
Quarry, sand or borrow pit	Golf course	Other land uses (describe)

Note from the CSIR: As noted above, the proposed transmission line will extend from the remaining extent of Onder Rugzeer Farm 168 to the remaining extent of Portion 3 of Gemsbok Bult Farm 120. The transmission line will span over the Remainder of Boven Rugzeer 169 and Portion 4 of Onder Rugzeer Farm 168. The proposed project will take place approximately 80 km south of Upington and 20-30 km north-east of Kenhardt within the !Kheis Local Municipality, Northern Cape Province.

The Ecological Specialist notes that the proposed electrical infrastructure corridor lies within open tussock grasslands primarily utilised for the expansive grazing of livestock. As such, the area can in general be considered “natural” given the historical context of such grazing, as well as the general alignment of the region with Bushmanland Arid Grassland veld type.

Furthermore, as described above, a non-perennial stream, the Wolfkopseloop stream, lies approximately 300 m to the west of the proposed electrical infrastructure corridor. This stream is a typical xeric environment drainage system, with little riparian determinants present. The system is subject to flow on an irregular inter annual basis. The proposed electrical infrastructure corridor will traverse minor dendritic drainage features associated with the Wolfkopseloop system.

The Ecological Impact Assessment (Appendix D.1 of the finalised BA Report) also notes that a dolerite koppie lies to the south east of the site. This low lying feature comprises primarily of weathered dolerite and lies within a level calcrete and Aeolian driven environment, similar to the subject site.

Furthermore, a Visual Impact Assessment is included in Appendix D.2 of this finalised BA Report, which provides information on the land uses of the surrounding area. The Soils and Agricultural Potential Assessment (Appendix D.6 of this finalised BA Report) provides an assessment of the soil and agricultural potential on site, as well as the impact that the proposed project will have on the existing land use (which is largely grazing). The Ecological Impact Assessment included in Appendix D.1 of this finalised BA Report provides information on the surface water, and terrestrial and aquatic ecology, as well as the impact that the proposed project will have on the drainage lines and dolerite koppie. The dolerite koppie is also described in the Heritage Impact Assessment (Archaeology and Cultural Landscape), which is included in Appendix D.3 of this finalised BA Report. Overall, the specialist studies included in Appendix D of this finalised BA Report provide a description of the prominent features that currently occur within a 500 m radius of the site and give description of how this influences the proposed project or how it may be impacted on by the proposed project.

If any of the boxes marked with an “N” are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

The Transnet Freight Rail Sishen-Saldanha Railway Line and associated infrastructure (including the maintenance road) occurs within 500 m of the proposed electrical corridor (i.e. to the east of the corridor). As such the railway line altered surface water flow into the study area following its construction. Other than such variance, the railway line has little ecological impact on the corridor site.

The Project Applicant has initiated discussions with Transnet Freight Rail to confirm their requirements to allow the transmission line to cross the railway line, as well as to allow the use of the Transnet Service Road as an access to the site. These requirements will be considered in the design where required, and the details of the agreement will be finalised outside of this BA Process.

Impacts of the proposed project on the surrounding infrastructure (such as the Transnet Freight Rail and the surrounding road network) have been discussed in this BA Report. Management actions regarding the use of the Transnet Service Road in terms of traffic impacts are included in the EMPr (Appendix G of this finalised BA Report).

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Not Applicable

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Not Applicable

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan)	YES	NO ✓
Core area of a protected area?	YES	NO ✓
Buffer area of a protected area?	YES	NO ✓
Planned expansion area of an existing protected area?	YES	NO ✓
Existing offset area associated with a previous Environmental Authorisation?	YES	NO ✓
Buffer area of the SKA? <i>Note from the CSIR: Refer to the explanation provided below</i>	YES	NO

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A.

Note from the CSIR: As noted in the Ecological Impact Assessment (Appendix D.1 of this finalised BA Report), the proposed corridor does not lie within protected areas, nor within 5 kilometres of a protected area, nor within 10 kilometres of a World Heritage site and does not form part of a Critical Biodiversity Area. The various regulations within NEMA and the Protected Areas Act are not applicable to this site. It is also noted that the corridor does not fall within any expansion area in terms of a conservation strategy for the Northern Cape.

In terms of the SKA, the Astronomy Geographic Advantage (Act 21 of 2007) aims to provide for:

- the preservation and protection of areas within the Republic that are uniquely suited for optical and radio astronomy;
- intergovernmental co-operation and public consultation on matters concerning nationally significant astronomy advantage areas; and
- matters connected therewith.

The overall purpose of the Act is to preserve the geographic advantage areas that attract investment in astronomy. The entire Northern Cape Province, excluding the Sol Plaatjie Municipality, has been declared an Astronomy Advantage Area. The South African MeerKAT radio telescope is currently being constructed about 90 km north-west of Carnarvon in the Northern Cape Province. The MeerKAT radio telescope is a precursor to the SKA telescope and will be integrated into the SKA Phase 1 (SKA South Africa, 2014).

According to the SKA Project Office, the nearest SKA station has been identified as SKA Station ID 2362, at approximately 20 km from the proposed project. The SKA Project Office has been pre-identified as a key stakeholder and therefore included on the project database of I&APs (as shown in Appendix E.5 of this finalised BA Report). As such, the SKA Project Office was provided with a copy of the Background Information Document, Letter 1, and Comment and Registration Form during the Project Initiation Phase. Comments received from the SKA Project Office during the Project Initiation Phase are included in Appendix E.6 of this finalised BA Report.

According to the SKA, based on distance to the nearest SKA station, the location of the station, and the information currently available on the design of the PV installation, the proposed facility poses a medium to high

risk of detrimental impact on the SKA. As noted previously, in line with this and based on the request from the SKA, Electromagnetic Interference and Radio Frequency Interference studies have been undertaken and commissioned by the Project Applicant to determine appropriate mitigation and management measures to reduce the risk of a detrimental impact on the SKA project. This technical report, compiled by MESA Solutions (PTY) Ltd, is included in Appendix D.9 of this finalised BA Report. The report includes a topographical analysis of the terrain profiles between various PV project locations (assessed separately as part of EIA Processes), as well as the associated infrastructure, in the Astronomy Geographic Advantage (AGA) area and the closest and core-site SKA telescopes. A total of three Scatec Solar sites (Kenhardt PV 1 to PV 3), as well as ten MULLO sites (Boven PV1 to PV4; Gemsbok PV1 to PV6) in close proximity (as described in Section D of this report), have been considered in this cumulative assessment. It should however be noted that depending on how many solar facilities are constructed on site, the cumulative impact will differ. For example, if all 13 proposed facilities are constructed, then the exceedance of emissions from the three Scatec Solar Kenhardt facilities (i.e. the facilities under consideration in the EIA Process) above the required protection level, taking into account their locations, will be 38 dB towards the closest SKA Telescope. However, if only the three Kenhardt facilities are constructed, the cumulative effect reduces, and so the exceedance above the required protection level reduces to 31.6 dB towards the closest SKA Telescope. The mitigation measures provided as part of the MESA Solutions (PTY) Ltd study will assist in ensuring adherence to the South African Radio Astronomy Services (SARAS) protection level threshold.

This report has been reviewed by the SKA Project Office during the BA (and EIA) Phase and their comments are included in Appendix E.6 of this finalised BA Report. As part of their review, the SKA Project Office recommended (in a letter dated 23 March 2016 and included in Appendix E.6 of this finalised BA Report) that an appropriate Electromagnetic Control (EMC) Plan should be developed to identify specific mitigation measures that will be implemented for the Kenhardt PV 1, PV 2 and PV 3 facilities (for which separate EIA Processes have been followed). The SKA Project Office further recommended that in particular, the measures implemented for Kenhardt PV 2 (separate EIA Process followed and EIA Report produced) should be tested and proven within a laboratory environment prior to the commencement of construction.

Scatec Solar have allocated project budget and have committed to adhere to the provisions stipulated within the correspondence from the SKA dated 23 March 2016. The EMC Plan will be provided to the SKA for comment and authorisation during the pre-construction design phase. Refer to Appendix E.2 of this finalised BA Report for a letter from the Project Applicant to the DEA stating its commitment to the implementation of the mitigation measures and recommendations of the SKA Project Office.

In order to ensure further commitment from the Project Developer, it is recommended that the abovementioned recommendations from the SKA Project Office be included as conditions to the EA for the applicable projects (should such an authorisation be granted). It is understood that these mitigation measures are also linked to the proposed BA Transmission Line projects as the proposed transmission lines will form part of the design and will connect to the PV projects.

7. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:

NO ✓
*Refer to the
explanation
provided
below*

As noted above, a Heritage Impact Assessment (Archaeology and Cultural Landscape) has been undertaken as part of this BA Process and is included in Appendix D.3 of this finalised BA Report. A desktop Palaeontological Impact Assessment has also been undertaken and is included in Appendix D.4 of this finalised BA Report.

In terms of archaeological heritage, the area is relatively flat, although gently undulating terrain occurs in places. A pan occurs at the northern end of the proposed corridor, while a small rocky koppie occurs in the southern part of the corridor (as shown in Figure 4 below).

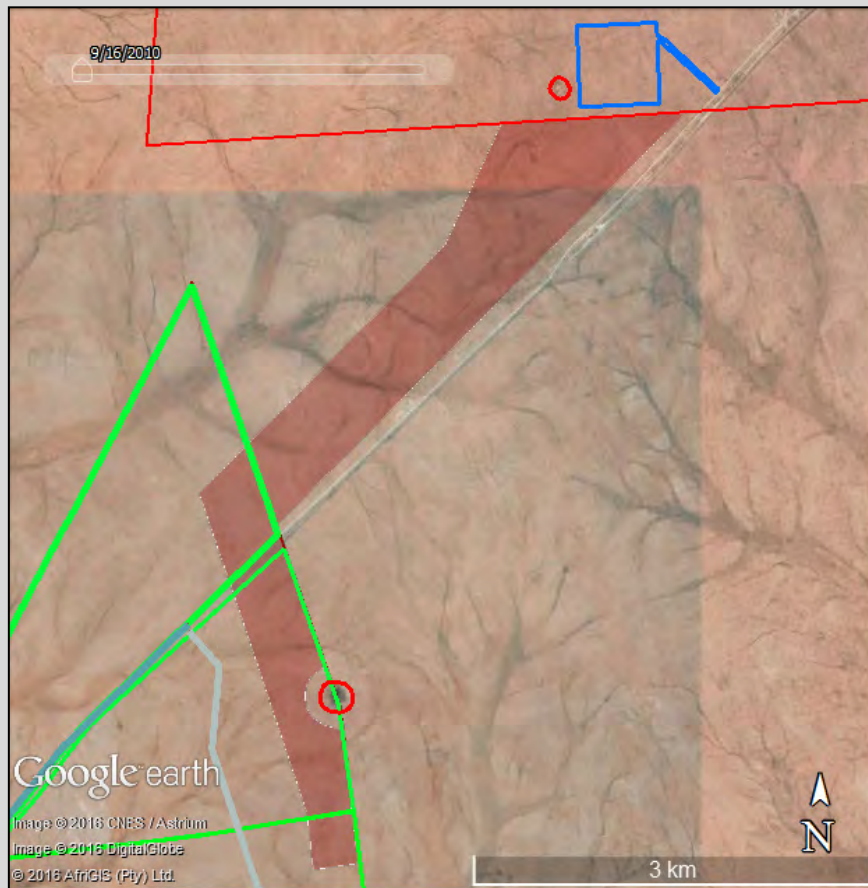


Figure 4: Aerial view of the study area showing the two areas to be avoided (red circles: dolerite koppie (in the south) and pan (in the north)) in relation to the proposed transmission line corridor (shaded red) (Orton, 2016).

During the survey undertaken as part of the assessment, archaeological material in the form of background scatter was located across much of the general area but impacts to this material would be of very low significance. No archaeological sites or graves were found along the alignment of the proposed transmission line corridor but sites may be expected in association with the pan and koppie. Although sites of high significance are unlikely to occur, these two areas should be avoided with buffers of 75 m radius from the centre of the pan and 120 m radius from the summit of the koppie as a precautionary measure. The landscape was identified as a heritage resource however, due to the presence of electrical and other infrastructure in the area, the significance of new impacts is considered to be very low. The significance of the potential impacts to archaeological resources and graves is rated as being very low, while the impacts to the landscape are also rated with a very low significance (without the implementation of mitigation measures). Aside from avoiding the pan and koppie, no mitigation measures are suggested. Refer to the complete Heritage Impact Assessment (included in Appendix D.3 of this finalised BA Report) for a detailed description of the surrounding heritage.

In terms of palaeontology, the proposed electrical corridor is underlain at depth by Precambrian basement rocks (c. 1-2 billion years old) assigned to the Namaqua-Natal Province. These ancient igneous and high-grade metamorphic rocks - mainly granites and gneisses of the Keimoes Suite and Jacomynspan Group - crop out at surface in small areas and are entirely unfossiliferous. A large proportion of the basement rocks are mantled by a range of superficial sediments of Late Cenozoic age that may contain sparse fossil remains. These predominantly thin, unconsolidated deposits include small patches of calcretes, gravelly to sandy river alluvium, pan sediments, surface gravels, colluvium (scree) as well as Pleistocene to Recent wind-blown sands of the Gordonia Formation (Kalahari Group). Most of these younger rock units are of widespread occurrence and low palaeontological sensitivity. Scientifically important vertebrate fossil remains (e.g. Pleistocene mammalian bones and teeth) have been recorded within older stratified pan and river sediments elsewhere in the Bushmanland region where they are often associated with stone artefacts, while a limited range of trace fossils (e.g. plant root casts, termitaria and other invertebrate burrows) may be found within calcrete horizons.

No previously recorded areas or sites of exceptional fossil heritage sensitivity or significance have been identified within the Kenhardt PV project area as a whole, including the transmission line corridor. Due to (1) the inferred scarcity of scientifically important fossil remains within the study areas, as well as (2) the small scale of excavations for electrical pylon footings concerned, the overall impact significance of the construction phase of the proposed transmission line is assessed as very low (before and after mitigation). The potentially fossiliferous sedimentary rock units represented within the study area (e.g. Gordonia aeolian sands, calcrete) are of widespread occurrence and this is also likely to apply to most of the fossils they contain.

Given the low palaeontological sensitivity of the eastern Bushmanland region, as determined from desktop and field-based studies, as well as the inferred very low impact significance of the proposed transmission line for fossil heritage conservation, no specialist palaeontological monitoring or mitigation is recommended, pending the discovery of substantial new fossil remains during construction. During the construction phase all substantial bedrock excavations should be monitored for fossil material by the responsible Environmental Control Officer (ECO). Should significant fossil remains - such as vertebrate bones and teeth, plant-rich fossil lenses, petrified wood or dense fossil burrow assemblages - be exposed during construction, the responsible ECO should safeguard these, preferably *in situ*. The South African Heritage Resources Agency (SAHRA) should be alerted as soon as possible, so that appropriate action can be taken by a professional palaeontologist (commissioned by the Project Applicant). Mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as associated geological data (e.g. stratigraphy, sedimentology, taphonomy) by a professional palaeontologist. The palaeontologist concerned with mitigation work will need a valid fossil collection permit from SAHRA and any material collected would have to be curated in an approved depository (e.g. museum or university collection). Refer to the complete desktop Palaeontological Impact Assessment (included in Appendix D.4 of this finalised BA Report) for a detailed description of the palaeontology in the region.

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist:



Will any building or structure older than 60 years be affected in any way?

NO ✓

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

NO ✓

If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

Note from the CSIR: In terms of archaeological heritage, the National Heritage Resources Act (Act 25 of 1999) does not require the developer to obtain permits prior to construction. However, any archaeological mitigation work (i.e. test excavations, sampling etc.) that may be required (in the event of archaeological resources of significance being found within the development footprint during construction) would need to be conducted under a permit issued to, and in the name of, the appointed archaeologist. The permit application process allows the heritage authorities to ensure that a suitably qualified and experienced archaeologist undertakes the work and that the proposed excavation/sampling methodology is acceptable.

As explained above, in terms of palaeontological heritage, where palaeontological mitigation of a development project is required, the palaeontologist concerned with mitigation work would need a valid fossil collection permit from SAHRA and any material collected would have to be curated in an approved depository (e.g. museum or university collection). All palaeontological specialist work should conform to international best practice for palaeontological fieldwork and the study (e.g. data recording fossil collection and curation, final report) should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies recently developed by SAHRA.

8. SOCIO-ECONOMIC CHARACTER

Note from the CSIR: A detailed Social Impact Assessment is included in Appendix D.7 of this finalised BA Report, which provides information on the socio-economic environment.

a) Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

Note from the CSIR: It must be noted that documented data on the study area, particularly in terms of area specific (i.e. Kenhardt and surrounds) socio-economic data, is very limited. Accordingly, the available data is interpreted in terms of professional opinion and generally accepted trends within the study area and South Africa.

Demographic Profile:

The ZF Mgqawu District Municipality (DM) comprises six Local Municipalities namely: Mier; Kai! Garib; Khara Hais; Tsantsabane, !Kheis and Kgatelopele and is classified as a Category C municipality (Figure 5). The ZF Mgqawu DM covers an area of approximately 100 000 km² (almost 30 % of the Province) (ZF Mgqawu DM IDP, 2014) and according to the 2011 Census has approximately 236 783 inhabitants.

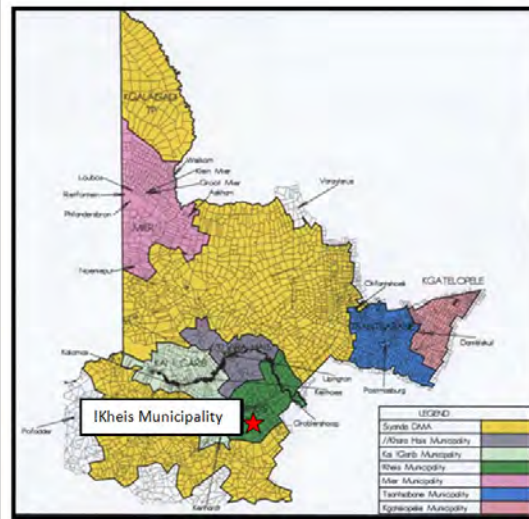


Figure 5: Siyanda DM (now known as ZF Mgcawu DM) boundary and boundaries of local municipalities (Siyanda DM IDP, 2013)

The actual project footprint is located within the !Kheis Local Municipality. However, the closest urban center, Kenhardt, is located in the Kai !Garib Local Municipality.

A total of 16 703 households resides in the Kai !Garib Local Municipality, with 35 % of households being female headed. The total female population dominates the total male population by 8.5 % (Kai !Garib Draft IDP, 2014). Population of the working age demographic (i.e. 15 to 65 years) makes-up 70.5 % of the population, whereas those below 15 years of age comprise 24.4 % of the population, and the above 65 years age group makes-up 5.1 % of the population of the Kai !Garib Local Municipality. Accordingly, the dependency ratio (i.e. the economically active population vs. the non-economically active population: 24.4 % + 5.1 %) is 29.5 % (du Toit, 2015).

The !Kheis Local Municipality consists of a total of 4146 households, with 34.6 % of households being female headed. Population of the working age demographic (i.e. 15 to 65 years) makes-up 70.5 % of the population, whereas those below 15 years of age comprises 35 % of the population, and the above 65 years age group makes-up 5.1 % of the population (Statistics SA, 2015).

This data is suggestive of an area with a relatively high level of vulnerable people groups (i.e. woman and children) and, potentially, a corresponding high level of vulnerable households.

The !Kheis Local Municipality, in which the proposed project is located, has a population of 16 637, according to the 2011 Census (Statistics SA, 2015). As shown in Table 5, the !Kheis Local Municipality constitutes 8 % of the total population of the ZF Mgcawu DM.

Table 5: Population of the Local Municipalities within the ZF Mgcawu DM (Statistics SA, 2011)

Municipality	Census 2001	Census 2011	% of the total population	Difference	Area (Km ²)	Persons / Km ²
Mier	7207	7003	3%	493	22468	0.3
Kai Garib	58 617	65 869	24%	799	26357	2.1
//Kara Hais	77 919	93 494	42%	25249	21780	4.6
!Kheis	16 538	16 637	8%	2797	11107	1.7
Tsatsabane	27 082	35 093	12%	4018	18330	1.5
Kgatelopele	14 743	18 687	9%	6755	2478	8.7
Total	202 106	236 783	100%	35903	102520	2.3

Afrikaans is the dominant language (76.4 %) and Setswana the second largest language (15.8 %) spoken in the ZF Mgcawu DM. Within the !Kheis Local Municipality 94 % of the population speaks Afrikaans and 1.9 % Setswana. The population of the ZF Mgcawu DM is predominantly Coloured (61.2 %), followed by Black Africans (29.8 %) and Whites (8.3 %), with the !Kheis Local Municipality containing a similar racial population group composition (as shown in Figure 6).

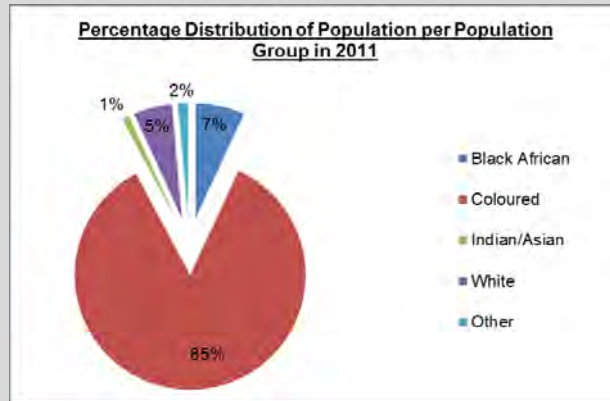


Figure 6: Percentage Distribution of Population per Population Group for the !Kheis Local Municipality in 2011 (Statistics South Africa, 2015).

The age distribution of the ZF Mgcawu DM (shown in Figure 7 below) is represented by a majority of young people, i.e. persons younger than 40 years old (Statistics SA, 2011).

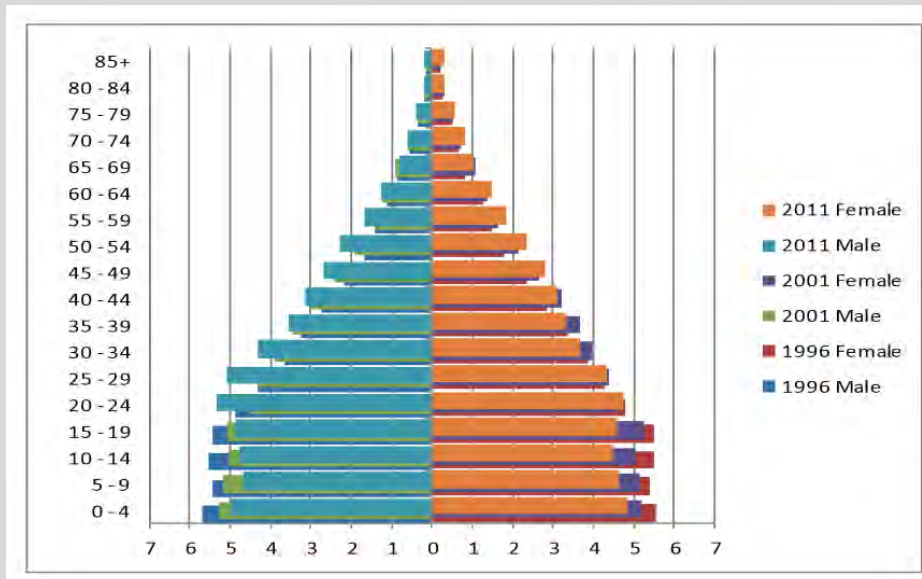


Figure 7: Age Distribution of the ZF Mgcawu DM (Statistics South Africa, 2011).

Level of unemployment:

The 2011 census indicates that 22 % and 34 % of the economically active population (between the ages of 15-34) in the ZF Mgcawu DM and the !Kheis Local Municipality, respectively, are unemployed. The !Kheis Local Municipality has the highest unemployment percentage of all the local municipalities falling within the ZF Mgcawu DM. Also, nearly a third of the population is economically inactive which suggests that individual and household incomes generated in the study area are being

used to support a substantial amount of dependents. This in turn exacerbates the level of household vulnerability in the area.

The unemployment rate for the Kheis Local Municipality in 2001 was 20 % and in 2011 was 28 % (Statistics SA, 2015). The official unemployment rate of 10 % (based on the 2011 Census) has decreased by 6.1 % since the 2001 Census measurement of 16.1 % for the Kai !Garib Local Municipality. The economic sector is dominated by agriculture which provides 51.8 % of jobs, followed by the Community and Government Services sector with 15.9 %. The number of jobs generated by the agricultural sector needs to be interpreted within the context of the Kai !Garib Municipality. The vast majority of the land area occupied by the Kai !Garib Municipality consists of agricultural land, accordingly, it is unsurprising that agriculture would register as the major employer at municipal (i.e. regional) level.

However, the distribution of jobs within urban centers, like Kenhardt, does not necessarily follow this agriculturally dominated pattern. If the prevailing practice of predominantly male-oriented employment within the agricultural sector (specifically in terms of sheep farming) is assumed, the 51.8 % of jobs generated by the agricultural sector could in fact be heavily skewed towards men. This in turn is suggestive of a female dominated population which is heavily dependent on other economic sectors (i.e. non-agricultural sectors) for their income, and could very well imply that socio-economic impacts on urban centers, like Kenhardt, could be of more significance than farm-based impacts.

Economic profile of local municipality:

The Northern Cape Province has the third highest per capita income of all nine provinces; however, income distribution is extremely skewed, with a high percentage of the population living in extreme poverty. Approximately 60 % of ZF Mgcau DM's population has an income of between R 0 to R 800 per month. Approximately 7.7% of the population of the !Kheis Local Municipality has no income, whereas the majority of the population (i.e. 28.30 %) earns between the R 19 601 – R 38 200 income bracket, as shown in Figure 8 below.

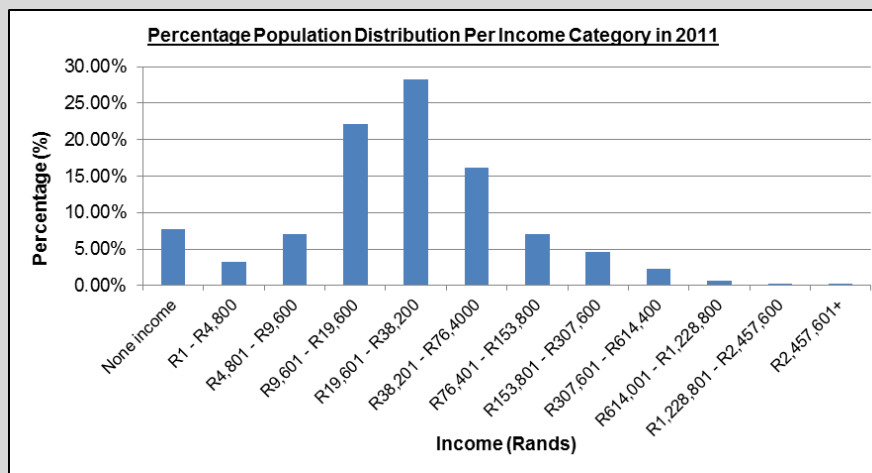


Figure 8: Income Distribution of the !Kheis Local Municipality in 2011 (Statistics South Africa, 2015).

The economy of the ZF Mgcau DM is dominated by mining and agriculture and accounts for up to 30 % of the Northern Cape's economy. Agriculture is the major industry in the district, contributing to job creation and economic growth. The region is characterised by livestock farming which occurs

mainly on large farms that are managed for extensive production. The majority of these farms are privately owned. According to the !Kheis Local Municipality's IDP, the area is ideal for stock-farming, with the main focus being on sheep farming. The stock-farming industry also provides work to local people.

The ZF Mgcawu DM has a unique landscape that has the potential to contribute to and provide for a range of local and international tourist activities and destinations. The main attractions and destinations in the area are the Augrabies Falls National Park and the Kgalagadi Transfrontier Park. The presence of the Orange River is also a tourism asset providing several tourism opportunities. The natural appearance of the area also supports agricultural tourism. The ZF Mgcawu DM IDP indicates that tourism is one of the most important economic sectors in the Northern Cape as well as within the ZF Mgcawu DM boundaries. Tourism is a growing component of the economy of the Northern Cape and the IDP indicates that, after the agricultural sector, the local tourism industry should become the most important economic activity in the area within the next ten years. This is based on the current growth rate in both development and employment.

Level of education:

In terms of education, only 9.5 % of the total population of ZF Mgcawu DM has no formal schooling, while 13.5 % of the !Kheis Local Municipality's population is unschooled. Based on the 2011 Census, 3.1 % of the population of the !Kheis Local Municipality has no form of education, 55 % has some primary schooling, 7.5 % completed primary school, 5.7 % completed secondary school and 0.5 % has higher education, as shown in Figure 9 below.

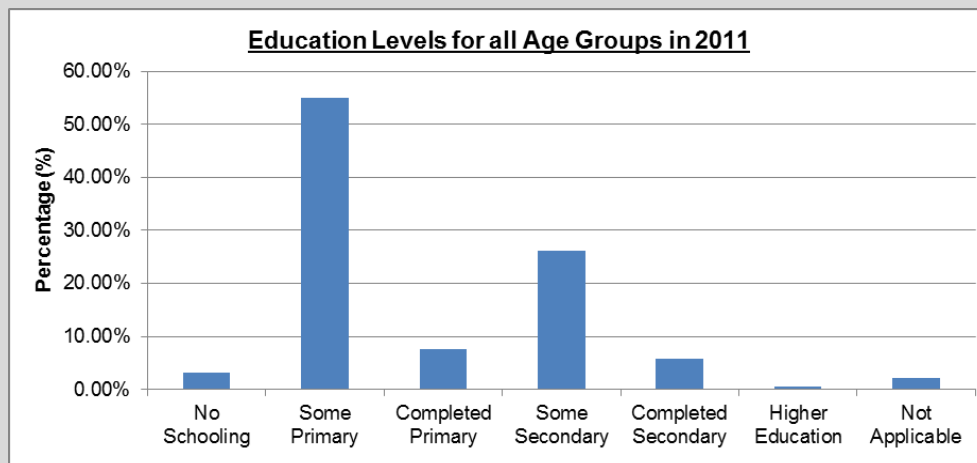


Figure 9: Education Levels of the !Kheis Local Municipality in 2011 (Statistics South Africa, 2015).

b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?

What is the expected yearly income that will be generated by or as a result of the activity?

Will the activity contribute to service infrastructure?

Is the activity a public amenity?

How many new employment opportunities will be created in the development and construction phase of the activity/ies?

± R 150 million to R 250 million
Not Applicable
YES
YES
Approximately 130

What is the expected value of the employment opportunities during the development and construction phase?	± R 10 million
What percentage of this will accrue to previously disadvantaged individuals?	± 60 %
How many permanent new employment opportunities will be created during the operational phase of the activity?	Eskom Operated
What is the expected current value of the employment opportunities during the first 10 years?	Eskom Operated
What percentage of this will accrue to previously disadvantaged individuals?	Eskom Operated

9. BIODIVERSITY

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult <http://bgis.sanbi.org> or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report.

Note from the CSIR: As noted above and in the Ecological Impact Assessment (Appendix D.1 of this finalised BA Report), the proposed corridor does not lie within protected areas, nor within 5 kilometres of a protected area, nor within 10 kilometres of a World Heritage site and does not form part of a Critical Biodiversity Area. The various regulations within NEMA and the Protected Areas Act are not applicable to this site. It is also noted that the corridor does not fall within any expansion area in terms of a conservation strategy for the Northern Cape.

Refer to the Ecological Impact Assessment in Appendix D.1 of this finalised BA Report for a complete description of the biodiversity occurring on the site and associated potential impacts of the proposed project activities.

- a) Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)

Systematic Biodiversity Planning Category				If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan
Critical Biodiversity Area (CBA)	Ecological Support Area (ESA)	Other Natural Area (ONA)	No Natural Area Remaining (NNR)	
		✓		

Note from the CSIR: Refer to the note above and the Ecological Impact Assessment in Appendix D.1 of this finalised BA Report for a complete description of the biodiversity occurring on the site and associated potential impacts of the proposed project activities.

b) Indicate and describe the habitat condition on site

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	80%	Much of the area aligns with the identified veld type of Bushmanland Arid Grassland. Although subject to extensive and significant grazing, species composition is in line with such veld type.
Near Natural (includes areas with low to moderate level of alien invasive plants)	17%	Some portions of the surrounding area have been subject to alteration through grazing, the establishment of camps, boreholes and other agricultural activities.
Degraded (includes areas heavily invaded by alien plants)	0%	
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	3%	A minor portion of the land in and around the subject site has been transformed to accommodate infrastructure such as roads and railway lines, as well as substations and roadways.

Note from the CSIR: Refer to the note above and the Ecological Impact Assessment in Appendix D.1 of this finalised BA Report for a complete description of the biodiversity occurring on the site and associated potential impacts of the proposed project activities.

c) Complete the table to indicate:

- (i) the type of vegetation, including its ecosystem status, present on the site; and
- (ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		Aquatic Ecosystems								
Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	Critical	Wetland (including rivers, depressions, channelled and unchannelled wetlands, flats, seeps pans, and artificial wetlands)			Estuary		Coastline			
	Endangered									
	Vulnerable									
	Least Threatened ✓	YES ✓	NO	UNSURE	YES	NO ✓	YES	NO ✓		

Note from the CSIR: Refer to the note above and the Ecological Impact Assessment in Appendix D.1 of this finalised BA Report for a complete description of the biodiversity occurring on the site and associated potential impacts of the proposed project activities. Also refer to Section B (5) of this finalised BA Report for a description of the aquatic systems on site.

- d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

Refer to the note above and the Ecological Impact Assessment in Appendix D.1 of this finalised BA Report for a complete description of the biodiversity occurring on the site and associated potential impacts of the proposed project activities. Also refer to Section B (5) of this BA Report for a description of the aquatic systems on site.

The site is considered to fall within a xeric environment (dry or semi desert) and as such, is subject to significant seasonal to daily fluctuations in meteorological and physical factors which influence the prevailing ecology. In addition to the above, anthropogenic interventions associated with both the presence of livestock on the land in question, as well as indirect influences arising from the establishment of infrastructure (roads and rail) have served to alter other biophysical factors, including surface hydrology and the nature and composition of habitat.

The transmission line corridor falls within the Bushmanland Arid Grassland Veld type, which is typically dominated by *Aristida* spp grasses. The proposed powerline route will traverse one existing camp, which at the time contained livestock. The dominant vegetation form is a *Rhigozum* – *Aristida* association with some quartz exposures.

Two consocieties of the quiver tree, *Aloe dichotoma* are noted, these lying to the west and to the east of the proposed transmission line corridor (Figure 10). In addition, *A claviflora* are also evident in association with *A dichotoma* (Figure 11). These consocieties have been identified in the planning of the corridor. The routing of the transmission line must avoid the *Aloe* consocieties identified. This may be achieved, preferably by locating the final route proximal to the existing railway line/roadway, or less favourably by spanning over the consocieties. Mitigation and management measures proposed are that the actual powerline lie either to the south or north of the identified consocieties and where applicable, towers be suitably positioned at points distal from these communities. The relocation of these specimens is possible; however this method should be avoided. Towers should be spaced adequately to avoid the necessity for relocation. A 60 m buffer should be implemented around the *Aloe* consocieties.

The Northern Cape Conservation Act under its pertinent regulation governs the disturbance of species listed in Tables 1 and 2 shown in the Ecological Impact Assessment in Appendix D.1 of this finalised BA Report, or possibly other species not yet identified on route. A permit from the Provincial Department of Environment and Nature Conservation will be required in order to disturb or translocate such species. Species that would require such permitting include *Aloe dichotoma*, which has been identified within the proposed corridor.

Common to the dendritic and minor surface drainage features that dissect the line route are more verdant associations of *Rhigozum trichotomum*, *Aristida ascensionis* and *A congesta*. *Stipagrostis ciliata* is also common to these features. A list of species identified across the proposed transmission line route is presented in the Ecological Impact Assessment in Appendix D.1 of this finalised BA Report.



Figure 10: Image indicating *A dichotoma* in foreground and prevailing habitat to the west of the proposed powerline route/corridor.



Figure 11: Image indicating *Aloe concocies* that lies to the east of the proposed powerline route/corridor. *A claviflora* in foreground.

The drainage features are typical of xeric environments, indicated by only geomorphological determinants, derived during high rainfall and flood conditions. For long periods of time, often extending over several years, no flow is evident within these systems. Figure 12 below, indicates the general nature of drainage features associated with the Wolfkopseloop system.



Figure 12: Image indicating the nature of drainage lines (primarily more verdant vegetation) and low depressions.

SECTION C: PUBLIC PARTICIPATION

Note from the CSIR: This section provides an overview of the tasks undertaken during the BA Phase, with a particular emphasis on providing a clear record of the PPP followed. As discussed in Section A (1) of this BA Report, three Solar PV projects are being proposed by the Applicant which requires a Scoping and EIA Process. These projects are referred to as Kenhardt PV 1, Kenhardt PV 2, and Kenhardt PV 3. Separate EIA Processes have been undertaken for the construction of the proposed PV facilities. The proposed Solar PV facilities also require transmission lines and associated electrical infrastructure to facilitate the connection to the Eskom Nieuwehoop Substation (which require separate BA Processes). These separate BA Projects are referred to as Kenhardt PV 1 – Transmission Line (i.e. this BA Report), Kenhardt PV 2 – Transmission Line, and Kenhardt PV 3 – Transmission Line.

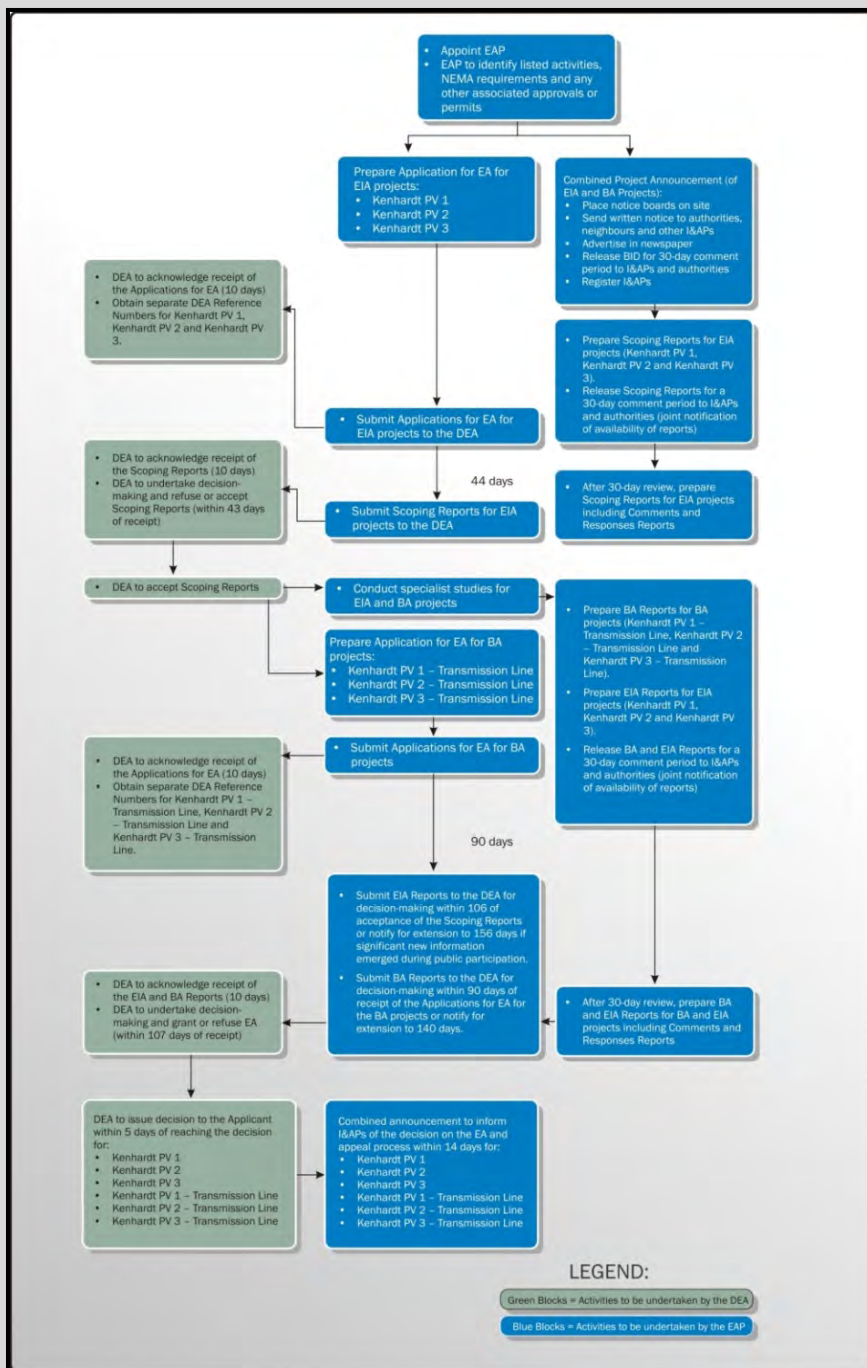


Figure 13: Joint PPP proposed for the Kenhardt PV EIA and BA Projects

As noted above, an integrated PPP has been undertaken for the Scoping and EIA Projects (i.e. Kenhardt PV 1, PV 2 and PV 3) and the BA Projects (i.e. Kenhardt PV 1 – Transmission Line (this BA Report), Kenhardt PV 2 – Transmission Line and Kenhardt PV 3 – Transmission Line). This integrated approach was discussed and approved by the DEA at a pre-application meeting, which was held on 17 September 2015. Appendix J.2 of this finalised BA Report includes a copy of the agenda and notes of the meeting, as well as the presentation given by the CSIR at the pre-application meeting.

Integrated PPP for the proposed projects will entail that all public participation documents (such as newspaper advertisements, site notices, notification letters etc.) will serve to notify the public and Organs of State of the joint availability of all reports for the abovementioned projects and will provide I&APs with an opportunity to comment on the reports. This process is outlined in Figure 13. This approach was undertaken due to the close proximity of the sites (i.e. the proposed projects will take place within the same geographical area) and that proposed project will entail the same activity (i.e. generation of electricity with the use of solar PV panels and transmission of electricity via transmission lines).

The BA and EIA Processes commenced in July 2015, during which the proposed projects were announced in the public domain via the release of the Background Information Document (BID) for a 30-day comment period. Following the release of the BID, and the closure of the associated 30-day comment period, the Applications for EA for the Scoping and EIA Projects (i.e. Kenhardt PV 1, PV 2 and PV 3) were submitted to the DEA and the Scoping Reports were released to I&APs and the authorities for comment (as part of the EIA Phase) in September 2015. The next phase entailed the completion of the finalised Scoping Reports in November 2015 and the submission to the DEA (as part of the EIA Phase). The finalised Scoping Reports were accepted by the DEA on 8 December 2015, which marked the end of the Scoping Phase, after which the EIA Process moved into the impact assessment and reporting phase. The BA impact assessment and reporting phase also commenced at this point to allow for a combined process in terms of the PPP.

This was then followed by the concurrent release of the EIA Reports (for the Kenhardt PV 1, PV 2 and PV 3 EIA Projects) and the BA Reports (for the Kenhardt PV 1 – Transmission Line (this BA Report), Kenhardt PV 2 – Transmission Line and Kenhardt PV 3 – Transmission Line BA Projects) to I&APs for a 30-day comment period (extending from 3 March 2016 to 5 April 2016). Subsequent to the 30-day comment period, and in order to meet the timeframes for the Scoping and EIA Process as stipulated in the 2014 NEMA EIA Regulations, the finalised EIA Reports for the Kenhardt PV 1, PV 2 and PV 3 projects were compiled (with the inclusion of comments raised by I&APs, Stakeholders and Organs of State during the 30-day review period), and submitted to the DEA in April 2016 for decision-making in terms of Regulation 24 of the 2014 NEMA EIA Regulations. The DEA acknowledged receipt of the finalised EIA Reports for the Kenhardt PV 1, PV 2 and PV 3 projects on 19 April 2016.

All comments submitted during the 30-day review of the BA Report (which was circulated during the consultation process) have been incorporated into this finalised BA Report as applicable and where necessary. This finalised BA Report has been submitted to the DEA, in accordance with Regulation 19 (1) of the 2014 NEMA EIA Regulations, for decision-making in terms of Regulation 20 of the 2014 NEMA EIA Regulations. It was originally planned to submit the finalised EIA and BA Reports to the DEA for decision-making at the same time, however based on the timeframes for the submission of the EIA Reports (as per the EIA Regulations), these had to be submitted to the DEA first.

1. ADVERTISEMENT AND NOTICE

Publication name	The Gemsbok	
Date published	29 July 2015 and 2 March 2016	
Site notice position	Latitude	Longitude
	Refer to Table 6 below	Refer to Table 6 below
Date placed	3 August 2015 and 10 September 2015	

Include proof of the placement of the relevant advertisements and notices in Appendix E1.

Note from the CSIR: Appendix E.1 of this finalised BA Report includes proof of the placement of the newspaper advertisement and site notice board.

Newspaper Advertisement:

In order to notify and inform the public of the proposed project and invite I&APs to register on the project database, the BA Processes (combined with the EIA Processes) were advertised in one local newspaper (i.e. The Gemsbok), as indicated above. Furthermore, to inform the public and stakeholders of the release of the BA (and EIA) Reports for the 30-day review period in March 2016, an advertisement was also placed in The Gemsbok on 2 March 2016 (as indicated above). A copy of the advertisements placed is contained in Appendix E.1 of this finalised BA Report. The newspaper advertisements also provided the details of the project website (i.e. <http://www.csir.co.za/eia/ScatecSolarPV/>), where information available on the project could be downloaded from.

It is important to note that The Gemsbok is a weekly newspaper and is distributed on Wednesdays and dated for the Fridays. The Gemsbok is therefore distributed from Wednesday onwards and was released on 29 July 2015 (for the Project Initiation Phase) and 2 March 2016 (for the release of the BA (and EIA) Reports Phase) for the proposed projects. The Gemsbok is distributed in Upington, Aggenys, Alexanderbaai, Augrabies, Boesmanland, Brandvlei, Calvinia, Garies, Groblershoop, Grootdrink, Kakamas, Kamieskroon, Kanoneiland, Kathu, Keimoes, Kenhardt, Kuruman, Lambersdrift, Leerkrans, Marydale, Nababeep, Okiep, Olifantshoek, Pofadder, Port Nolloth, Postmasburg, Prieska, Sishen and Springbok.

Site Notice Board:

Regulation 41 (2) (a) of the 2014 EIA Regulations requires that a notice board providing information on the project and BA (and EIA) Process is fixed at a place that is conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of the site where the application will be undertaken or any alternative site. To this end, an 841 mm x 594 mm notice board was placed at the locations shown in Table 6 on 3 August 2015 and 10 September 2015. Overall, four notice boards were placed for the proposed projects. A copy of the notice boards and proof of placement thereof is included in Appendix E.1 of this BA Report.

Table 6: Site Notice Boards Placed for the Commencement of the BA, Scoping and EIA Processes (Kenhardt PV 1, Kenhardt PV 2, Kenhardt PV 3, Kenhardt PV 1 – Transmission Line (i.e. this project), Kenhardt PV 2 – Transmission Line and Kenhardt PV 3 – Transmission Line)

Location	Co-ordinates	Language
Entrance to the Transnet Service Road, which serves as one of the access routes to the project sites.	29° 19' 47.79" S and 21° 9' 15.53" E	Afrikaans
Entrance to the alternative access road (unnamed farm road), which serves as one of the access routes to the project sites.	29°16' 21.13" S and 21°19' 15.17" E	English
Kenhardt Petrol Station	29° 20' 52.23" S and 21° 9' 7.97" E	Afrikaans
Kai !Garib Municipality Offices in Kenhardt	29° 20' 56.01" S and 21° 9' 7.69" E	English

2. DETERMINATION OF APPROPRIATE MEASURES

Provide details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN 982.

Key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 982.

Note from the CSIR: Refer to the section below which provides a detailed outline of the measures taken to include all potential I&APs during the BA Process (as required by Regulation 41(2)(e), 41(6) and 41(2)(b) of GN R982, in terms of the 2014 EIA Regulations). Appendix E.2 contains copies of registered mailing receipts (as proof of correspondence) and Appendix E.5 contains a detailed copy of the I&AP database which indicates interaction with I&APs, key stakeholders and all I&APs registered on the project database during the BA Process.

Key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 982.

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)
Note from the CSIR: Refer to Appendix E.5 for the complete I&AP database.	Note from the CSIR: Refer to Appendix E.5 for the complete I&AP database.	Note from the CSIR: Refer to Appendix E.5 for the complete I&AP database.

Note from the CSIR: Appendix E.5 includes a copy of the I&AP Database in the format indicated in the table above.

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E.2. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

Note from the CSIR:

Proof of registered mailing for Letter 1 to I&APs, Stakeholders and Organs of State, as well as emails sent during the Project Initiation Phase (i.e. for the release of the BID) are included in Appendix E.2 of this finalised BA Report. Appendix E.2 of this finalised BA Report also includes proof of registered mailing for Letter 3 to I&APs, Stakeholders and Organs of State, as well as emails sent for the release of the BA (and EIA) Reports. Proof of correspondence sent to I&APs, Stakeholders and Organs of State during the Scoping Phase of the EIA Projects (including Letter 2 and Emails 2, 3 and 4) are included separately in **Appendix E of the Kenhardt PV 1, PV 2 and PV 3 EIA Reports**.

In terms of Regulation 41(2)(e) of GN R982, at this stage of the assessment process no persons have been identified as desiring but unable to participate in the process. Therefore, no alternative methods have been agreed to by the competent authority.

In line with Regulation 41(2)(b) of GN R982 and prior to the commencement of the BA Process (and advertising the EA Process in the local print media), an initial database of I&APs (including key stakeholders and Organs of State) was developed for the combined BA and EIA Processes. This was supplemented with input from the EIA

Project Managers, CSIR, and the Project Applicant, Scatec Solar. A total of 54 I&APs were included on the project database in this manner. Appendix E.5 of this BA Report contains the current I&AP database, which has been updated to include requests to register interest in the project, and comments received. At the time of compiling the BA Report for release to I&APs, Organs of State and stakeholders in March 2016, the database included 80 I&APs. However, at the time of compiling this finalised BA Report for submission to the DEA for decision-making, the database was updated to include a total of 83 I&APs, Organs of State and Stakeholders.

While I&APs have been encouraged to register their interest in the project from the start of the process, following the public announcements, the identification and registration of I&APs was ongoing for the duration of the study. Stakeholders from a variety of sectors, geographical locations and/or interest groups were expected to show an interest in the proposed project, for example:

- Provincial and Local Government Departments;
- Local interest groups, for example, Councillors and Rate Payers associations;
- Surrounding landowners;
- Farmer Organisations;
- Environmental Groups and NGOs; and
- Grassroots communities and structures.

In terms of the electronic database, I&AP details were captured and automatically updated as and when information is distributed to or received from I&APs. This ongoing record of communication is an important component of the PPP. It must be noted that while not required by the regulations, those I&APs proactively identified at the outset of the BA Process remained on the project database throughout the process and were kept informed of all opportunities to comment and were only removed from the database by request (it should be noted that to date, no requests to de-register were received by the EAP, however requests to amend contact details were received).

As noted above, the proposed transmission line will extend from the remaining extent of Onder Rugzeer Farm 168 to the remaining extent of Portion 3 of Gemsbok Bult Farm 120. The transmission line will span over the Remainder of Boven Rugzeer 169 and Portion 4 of Onder Rugzeer Farm 168. Van Niekerk Gesintrust is the owner of the land on which the proposed project will take place (i.e. the remaining extent of Onder Rugzeer Farm 168 and the Remainder of Boven Rugzeer 169). The proposed transmission line will connect to the Eskom Nieuwehoop Substation on the remaining extent of Portion 3 of Gemsbok Bult Farm 120, and this falls within a servitude created by Eskom. Eskom have been informed of the proposed project. In addition, the owner of the remaining extent of Portion 3 of Gemsbok Bult Farm 120 is Kamkuip Boerdery (Pty) Ltd, whilst the owner of the remaining extent of Portion 4 of Onder Rugzeer Farm 168 is Transnet Freight Rail. Van Niekerk Gesintrust, Eskom, Kamkuip Boerdery (Pty) Ltd and Transnet Freight Rail have been informed of the proposed project and they are included on the database of I&APs (as included in Appendix E.5). Therefore, written notice has been provided to the occupiers of the site (as shown in Appendix E of this finalised BA Report) (in accordance with Regulation 41 (2) (b) (i) of the 2014 EIA Regulations).

As noted above, the initial database included 54 I&APs, including affected Organs of State and authorities. Letters regarding the combined BA and EIA Processes were mailed to all pre-identified key stakeholders on the database via Letter 1. This letter, dated 30 July 2015, provided I&APs with a 30-day period to register their interest on the project database. The registration period concluded on 31 August 2015. Appendix E.2 of this report contains copies of correspondence and information distributed to I&APs (including Stakeholders and Organs of State) during the Project Initiation Phase (i.e. for the release of the BID). It is important to reiterate that the correspondence sent to I&APs (i.e. Letter 2 and emails) for the release of the Scoping Reports is included as appendices to the separate EIA Reports for the Kenhardt PV 1, PV 2 and PV 3 projects. This BA Report only includes correspondence sent to I&APs for the Project Initiation Phase and the combined release of the BA and EIA Reports (which is included in Appendix E.2 of this finalised BA Report). Letter 1 to I&APs included the BID and a Comment and Registration Form. The purpose of the BID was to inform the public of the proposed projects, provide information on the project description, the BA (and EIA) Processes and to provide an overview of the opportunities and mechanisms for public participation. The letter was sent to all I&APs and Organs of State

(where postal and physical addresses were available) on the pre-identified database via registered mail. Appendix E.2 of this finalised BA Report contains copies of registered mailing receipts (as proof of correspondence). Letter 1 to I&APs, the BID and Comment and Registration Form were also emailed to all I&APs and Organs of State (where email addresses were available) on the pre-identified database on 29 July 2015. A copy of this email and delivery thereof is included in Appendix E.2 of this finalised BA Report. In line with the 2014 EIA Regulations, copies of this correspondence were also placed on the project website (i.e. <http://www.csir.co.za/eia/ScatecSolarPV/>). The same approach was followed for the release of the BA (and EIA) Reports.

In terms of Regulation 41(6) of GN R982 the section below outlines the PPP for this assessment in order to provide potential I&APs, Stakeholders and Organs of State access to information on the project and the opportunity to comment at the various stages of the assessment process.

Project Initiation Phase - Identification and Notification to I&APs and Organs of State

The following summarises the PPP undertaken up to the release of the BA Report for I&AP Review:

- **Database Development and Maintenance:** In line with Regulation 41(2)(b) of GN R982, prior to the commencement of the BA Process and placing the newspaper advertisements (during the Project Initiation Phase as noted in Section C (1) above), an initial database of potential I&APs was developed for the BA Process (as noted above). A total of 54 potential I&APs (including Organs of State and Stakeholders) were proactively identified and included on the project database. As noted above, while not required by the regulations, all 54 I&APs (and authorities and Organs of State) proactively identified prior to advertising the BA Process remained on the database for the duration of the assessment process. As comments were received or requests to register interest were received from I&APs during the project, the database was amended to include these I&APs as registered I&APs. At the time of submission of this finalised BA Report, **83 I&APs** were registered on the project database. A copy of the updated I&AP database is included in Appendix E.5 of this finalised BA Report.
- **Letter 1 to I&APs:** As noted above, all 54 I&APs were notified via Letter 1 (dated 30 July 2015) of the Project Initiation Phase, which included a BID and a Comment and Registration Form. Letter 1 to I&APs, the BID and Comment and Registration Form were mailed (via registered mail) and emailed to all I&APs and organs of state on the database (where postal, physical and email addresses were available) on 29 July 2015. A copy of this correspondence and proof of delivery is included in Appendix E.2 of this finalised BA Report.
- **Advertisements to Register Interest:** An advertisement was placed in a local newspaper (The Gemsbok) on 29 July 2015, advertising the BA (and EIA) commencement and opportunity to comment. A copy of this advertisement is included in Appendix E.1 of this finalised BA Report.
- **Site Notice Board:** As noted in Section C (1) above, four notice boards were placed for the proposed projects on 3 August 2015 and 10 September 2015. A copy of the notice boards and proof of placement thereof are included in Appendix E.1 of this finalised BA Report.
- **30 Day Comment Period:** As noted above, during the Project Initiation Phase, the potential I&APs, including authorities and Organs of State, were notified via Letter 1 of the 30 day comment and registration period within which to submit comments on the proposed project and/or to register on the I&AP database, which extended from 30 July 2015 to 31 August 2015.
- **Comments Received:** Copies all comments received during the Project Initiation Phase are included in Appendix E.6 of this finalised BA Report and in the Comments and Response Report in Appendix E.3 of this BA Report.
- **Access to Information** - All project information has been made available on an easily accessible website: <http://www.csir.co.za/eia/ScatecSolarPV/>

BA Report Phase - Review of the BA Report

As noted above, the BA Reports for each transmission line and electrical infrastructure project was released to I&APs for review at the same time as the EIA Reports. The section below summarises the PPP for the review of the BA (and EIA) Reports.

- **Database Maintenance:** As noted above, at the time of release of the BA Report for comment in March 2016, 80 I&APs were registered on the project database. However, the database has been updated and it is included in Appendix E.5 of this finalised BA Report.
- **Letter 3 to I&APs:** Written notification of the availability of the BA (and EIA) Reports was sent to all I&APs and Organs of State registered on the project database via Letter 3 (dated 4 March 2016, which was sent via registered mail and email (where postal, physical and email addresses were available). The letter sent via postage included notification of the 30-day comment period for the BA (and EIA) Reports, as well as an Executive Summary of the BA (and EIA) Reports, and a Comment and Registration Form. Proof of registered mailing and a copy of the emails sent have been included in Appendix E.2 of this finalised BA Report (which has now been submitted to the DEA for decision-making). It is important to note that Letter 2 was sent to I&APs in September 2015 to notify I&APs of the release of the Scoping Reports for the Kenhardt PV 1, PV 2 and PV 3 projects. This correspondence is included in the EIA Reports for the Kenhardt PV 1, PV 2 and PV 3 projects.
- **30-day Comment Period:** As noted above, registered I&APs, including authorities and Organs of State, were notified via Letter 3, of the 30-day comment period for the BA (and EIA) Reports.
- **Advertisement for the Release of the BA (and EIA) Reports:** As explained above, an advertisement was placed in a local newspaper (The Gemsbok), to notify potential I&APs of the availability of the BA (and EIA) Reports for review. The advertisement was placed on 2 March 2016. The Gemsbok is a weekly newspaper which is distributed every Wednesday and made available from Wednesday to Friday; however it is dated for a Friday (in this case, 4 March 2016). A copy of this advertisement is included in Appendix E.1 of this finalised BA Report (which has now been submitted to the DEA for decision-making).
- **Availability of Information:** The BA (and EIA) Reports were made available and distributed to ensure access to information on the project and to communicate the outcome of specialist studies. Copies of the reports were placed at the Kenhardt and Groblershoop local libraries for I&APs and Stakeholders to access for viewing. Key authorities were provided with either a hard copy and/or CD of the BA Reports via courier. Refer to Appendix E.2 of this finalised BA Report for a copy of the proof of receipt (i.e. courier waybills) of the CD and/or hard copies of the BA Reports that were provided to key authorities, as well as the libraries. The BA (and EIA) Reports were uploaded to the project website (i.e. <http://www.csir.co.za/eia/ScatecSolarPV/>) and telephonic consultations took place, as necessary.
- **Meetings Held:** It was noted in the BA Reports that were circulated for comment in March 2016 that a public meeting could possibly be held during the review of the BA (and EIA) Reports, if warranted and if there is substantial public interest during the separate Scoping and EIA Phase (for the Kenhardt PV 1, PV 2 and PV 3 projects). However, due to the limited public input and/or interest in the proposed project, this was not deemed necessary. Telephonic consultations with key I&APs took place as required and where necessary (i.e. to seek comments).
- **Comments Received:** A key component of the BA Process is documenting and responding to the comments received from I&APs and the authorities. Copies of all comments received during the review of the BA (and EIA) Reports have been included in Appendix E.6 of this finalised BA Report and in the Comments and Response Report (Appendix E.3 of this finalised BA Report), which has now been submitted to the DEA in terms of Regulation 19 (1) (a) of the 2014 NEMA EIA Regulations for decision-making. The Comments and Responses Report indicates the nature of the comment, as well as when and who raised the comment. The comments received have been considered by the BA team and appropriate responses have been provided by the relevant member of the team, Applicant and/or specialist. The response provided indicates how the comment received has been considered in the finalised BA Reports for submission to the DEA and in the project design or EMPRs.

It is important to note that during the 30-day review of the BA (and EIA) Reports, follow up email correspondence and telephonic follow ups (as required) were made to the SAHRA, SKA Project Office, Provincial Department of Environment and Nature Conservation, Department of Agriculture, Forestry and Fisheries (DAFF), Department of Water and Sanitation, Local and District Municipality, Transnet Freight Rail, SAEON, SANRAL, BirdLife South Africa, Southern African Large Telescope (SALT) Sutherland, Provincial Department of Agriculture, Land Reform and Rural Development, the South African Civil Aviation Authority (SACAA), the Department of Transport, the Endangered Wildlife Trust (EWT), BirdLife SA, and the Department of Mineral Resources in order to confirm if they had any comments on the BA (and EIA) Reports. Copies of these follow up emails are included in Appendix E.2 of this finalised BA Report. Despite these follow up correspondence, only the SAHRA, DAFF, the Department of Water and Sanitation and the SKA Project Office submitted comments on the BA (and EIA) Reports. Comments were also issued by the DEA via email on 25 April 2016 which is included in Appendix E.6 of this finalised BA Report. In line with Regulation 3 (4) of the 2014 EIA Regulations, it is therefore regarded that other I&APs, Stakeholders and Organs of State have no comments on the EIA and BA Reports.

- **SAHRA:** To facilitate comment from the relevant heritage authorities, the proposed project was loaded onto the SAHRIS on 30 and 31 July 2015 (during the Project Initiation Phase). An application was created for each EIA and BA project and all necessary project information (including the BID, Letter 1, and Comment and Registration Form) was uploaded to the SAHRIS. The following Case Reference Numbers were allocated to the proposed projects: Kenhardt PV 1: 8204; Kenhardt PV 2: 8205; Kenhardt PV 3: 8206; Kenhardt PV 1 – Transmission Line: 8207; Kenhardt PV 2 – Transmission Line: 8208; and Kenhardt PV 3 – Transmission Line: 8209. Comments were provided by SAHRA (dated 22 September 2015) and loaded onto SAHRIS in response to the review of the BID (as part of the Project Initiation Phase). These comments have been captured in Appendix E.3 (Comments and Responses Report) and Appendix E.6 of this finalised BA Report. The finalised BA (and EIA) Reports (including the Heritage Impact Assessment and desktop Palaeontological Impact Assessment) were also uploaded onto SAHRIS for comment by the heritage authorities during the 30-day review of the BA (and EIA) Reports (i.e. in March 2016). Follow up communication (between the CSIR and SAHRA) was undertaken during the 30-day comment period as shown in Appendix E.2 of the finalised BA Report. SAHRA provided final comment via SAHRIS on 5 April 2016. These comments have been included in Appendix E.6, and Appendix E.3 of this finalised BA Report, where they have been addressed with adequate responses. The status of the case files on SAHRIS is “closed and approved”. The final comment issued by the heritage authority, as well as the recommendations therein, will be considered by the DEA during the decision-making phase and will be included in the conditions of the EA where required (should such an authorisation be granted). This essentially gives ‘permission’ from the heritage authorities to proceed. If any archaeological mitigation is required then this would need to be conducted by an appropriate specialist under a permit issued to that specialist by SAHRA. This permit has no bearing on the developer or development but is purely a way in which the heritage authority can be sure that the mitigation work will be carried out satisfactorily.
- **DAFF:** Several follow up emails were sent by the CSIR to the Provincial DAFF to seek comments on the BA (and EIA) Reports during the 30-day comment period. These follow up emails are included in Appendix E.2 of this finalised BA Report. Comments were provided by the DAFF on 12 April 2016 for the Kenhardt PV 1, 2 and 3 EIA Projects, as well as the Kenhardt PV 1 – Transmission Line BA Project and the Kenhardt PV 3 – Transmission Line BA Project, which are included in Appendix E.6 of the respective finalised BA Report (as applicable).
- **Department of Water and Sanitation:** The Department of Water and Sanitation was consulted with during the combined BA and EIA Phase to confirm the need for a WUL, as well as to seek comment on the proposed project. It is important to note that the Regional Department of Water and Sanitation did provide preliminary comment on the Scoping Report during the 30-day review period. These comments are included and addressed in Appendix E.3 of this finalised BA Report for purposes of completeness. During the combined BA and EIA Phase, follow up emails were sent to the Department of Water and Sanitation in March and April 2016 to verify if they had any comments on the BA (and EIA) Reports. Copies of these follow up emails are included in Appendix E.2 of this finalised BA Report. The Department of Water and Sanitation provided combined comments on the EIA and BA Reports on 5 April 2016, which are included in Appendix E.6 of this finalised BA Report.

- **SKA:** As explained above, the SKA Project Office provided comments on the BA (and EIA) Reports, including the technical report compiled by MESA Solutions (PTY) Ltd. These comments are included in Appendix E.6 of this finalised BA Report, with responses provided in Appendix E.3 as well. The CSIR reviewed these comments and contacted the SKA Project Office regarding queries on the interpretation of the comments. These follow up emails from the CSIR are included in Appendix E.2 of this finalised BA Report. The SKA Project Office responded via email on 7 April 2016 with additional information regarding the mitigation measures proposed in the technical report, as well as the recommendations from the SKA Project Office. Copies of these comments are included in Appendix E.3 and Appendix E.6 of this finalised BA Report.

Compilation of finalised BA Report for Submission to the DEA (Current Stage)

- Following the 30-day commenting period of the BA Reports and incorporation of the comments received into the reports, the BA Report (i.e. hard copies and electronic copies) have been submitted to the DEA in line with Regulation 19 (1) (a) of the 2014 EIA Regulations. In line with best practice, I&APs on the project database will be notified via email (where email addresses are available) of the submission of the BA Reports to the DEA for decision-making.
- The BA Reports that are submitted for decision-making include proof of the PPP that was undertaken to inform Organs of State, Stakeholders and I&APs of the availability of the BA Reports for the 30 day review (as explained above). To ensure ongoing access to information, copies of the BA Reports that have been submitted for decision-making and the Comments and Response Report (detailing comments received during the BA Phase and responses thereto) are to be placed on the project website (i.e. <http://www.csir.co.za/eia/ScatecSolarPV/>).
- The DEA will have 107 days (from receipt of the finalised BA Reports) to either grant or refuse EA (in line with Regulation 20 (1) of the 2014 EIA Regulations).

Environmental Decision-Making

- **Environmental Decision-Making and Appeal Period** - Subsequent to the decision-making phase, if an EA is granted by the DEA for the proposed projects, all registered I&APs, Organs of State and stakeholders on the project database will receive notification of the issuing of the EA and the appeal period. The 2014 EIA Regulations (i.e. Regulation 4 (1)) states that after the Competent Authority has reached a decision, it must inform the Applicant of the decision, in writing, within 5 days of such decision. Regulation 4 (2) of the 2014 EIA Regulations stipulates that I&APs need to be informed of the EA and associated appeal period within 14 days of the date of the decision. All registered I&APs will be informed of the outcome of the EA and the appeal procedure and its respective timelines. The distribution of the EA (should such authorisation be granted by the DEA), as well as the notification of the appeal period, will include the placement of one advertisement in The Gemsbok local newspaper to notify I&APs of the EA and associated appeal process. A letter (i.e. Letter 4) will also be sent via registered mail and email to all registered I&APs, Stakeholders and Organs of State (where postal, physical and email addresses are available) on the database. The letter will include information on the appeal period, as well as details regarding where to obtain a copy of the EA. A copy of the EA will be uploaded to the project website (i.e. <http://www.csir.co.za/eia/ScatecSolarPV/>). In addition, all I&APs on the project database will be notified of the outcome of the appeal period in writing.

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Note from the CSIR: Issues raised by I&APs prior to the release of the BA Report are noted below. It is important to note that comments were raised by the DEA specifically in relation to the Scoping Reports (for the Kenhardt PV 1, Kenhardt PV 2 and Kenhardt PV 3 EIA Projects) that were released for a 30-day review in September 2015. These comments are included as an appendix to the separate EIA Reports for the Kenhardt PV 1, Kenhardt PV 2 and Kenhardt PV 3 EIA Projects. They have been included in Appendix E.3 of this BA Report for the purpose of completeness. The comments raised by the DEA based on the review of the BA

Reports (that were released for comment in March 2016) are included in Appendix E.6 of this finalised BA Report.

Summary of main issues raised by I&APs	Summary of response from EAP
<p>EIA and BA Process and PPP:</p>	<ul style="list-style-type: none"> ▪ These comments relate to the requests to register interest, submission of completed comment and registration forms, and requests for copies of reports. All these comments and the responses thereto have been provided in Appendix E.3 of this finalised BA Report.
<p>Project Details:</p> <ul style="list-style-type: none"> ▪ Impact on existing infrastructure, such as the Transnet Freight Rail Sishen-Saldanha Railway Line and train drivers (in terms of glare), National Roads and the SKA Project. 	<ul style="list-style-type: none"> ▪ The aspect of glare from the solar panels has been addressed separately in <u>Chapter 2 of the EIA Reports for the Kenhardt PV 1, Kenhardt PV 2 and Kenhardt PV 3 projects</u>. The impact of glare is not directly related to the proposed Transmission Line project. ▪ As noted in above, existing roads (such as a private Transnet Service Road or an unnamed farm road) will be used to gain access to the site. The Transnet Service Road can be accessed from the R27 and the farm road can be accessed from the R383 Regional Road also via the R27 National Road. Discussions have been initiated and held between Transnet Freight Rail and the Project Applicant to discuss the requirements for use of the Transnet Service Road. Dust may be generated during the construction phase, however it is expected to be of a short-term duration and insignificant. However, mitigation measures relating to potential dust impacts have been included in the EMPr (Appendix G of this finalised BA Report), as applicable. ▪ As noted in Section A (1) of this report, the proposed transmission line will extend between the proposed Kenhardt PV 1 facility and the Eskom Nieuwehoop Substation. The transmission line and electrical infrastructure will be constructed within an electrical infrastructure corridor. The Project Applicant has initiated discussions with Transnet Freight Rail to note their requirements for the crossing of the railway line by the proposed transmission line. These requirements will be incorporated into the detailed engineering, as required. ▪ Recommendations and mitigation measures to reduce the risk of accidents as a result of the nearby ore railway line have been generally included in the EMPr (Appendix G of this finalised BA Report). Transnet Freight Rail have been provided with an opportunity to comment on the BA Reports and EMPr during the 30-day review period. ▪ Comment noted. Scatec Solar has complied with

Summary of main issues raised by I&APs	Summary of response from EAP
	<p>the requirements from the SKA Project Office. A technical Electromagnetic Interference (EMI) and Radio Frequency Interference (RFI) study has been commissioned by Scatec Solar, as requested by the SKA Project Office. As noted in Section A (1) of this finalised BA Report, Scatec Solar appointed MESA Solutions (PTY) Ltd to conduct the RFI and EMI studies to determine the level of mitigation shielding required in order to comply with the SKA Regulations. The technical report is included in Appendix D.9 of this finalised BA Report. This technical report aims to inform the potential impact that the proposed project will have on the SKA project and to determine suitable mitigation measures to manage the risk (if any) posed to the SKA project by the development of this project.</p> <ul style="list-style-type: none"> ▪ Based on the conceptual design, it is not anticipated that any of the proposed infrastructure will be located within 60 m of the national road, or crossing the national road.
<p>Project Details:</p> <ul style="list-style-type: none"> ▪ Impact on Archaeology and Palaeontology. 	<ul style="list-style-type: none"> ▪ As noted in Section A (1) of this finalised BA Report, a Heritage Impact Assessment (Archaeology and Cultural Landscape) has been undertaken as part of the BA Process (i.e. prior to the commencement of construction of the Kenhardt PV 1 – Transmission Line project (subject to the issuing of an EA)). This specialist assessment was conducted by Dr. Jayson Orton of ASHA Consulting (PTY) Ltd, who is a registered member of the Association of Southern African Professional Archaeologists. The Heritage Impact Assessment is included in Appendix D.3 of this finalised BA Report, which was made available to registered I&APs and the public for a 30-day comment period (extending from 3 March 2016 to 5 April 2016). <p>The Heritage Impact Assessment (Archaeology and Cultural Landscape) has identified and assessed the significance of archaeological sites that are located within the proposed project area. The specialist assessment also indicates the relevant permit requirements, including if a permit is required from the Ngwao-Boswa Jwa Kapa Bokone (i.e. the Northern Cape Provincial Heritage Resources Authority) for the potential disturbance of any heritage features on site. The specialist study provides recommendations and suggests appropriate mitigation measures (if required), for the recording, sampling and dating of any archaeological sites that could potentially</p>

Summary of main issues raised by I&APs	Summary of response from EAP
	<p>be destroyed as a result of the proposed project.</p> <ul style="list-style-type: none"> ▪ As further noted in Section B of this report, based on the low palaeontological sensitivity of the area, a Palaeontological Heritage Desktop Assessment has been undertaken as part of the BA Phase (i.e. prior to the commencement of construction of the Kenhardt PV 1 - Transmission Line project (subject to the issuing of an EA)). This specialist assessment was conducted by Dr. John Almond of Natura Viva cc. The Desktop Palaeontological Impact Assessment assesses the significance of potential impacts of the proposed project on palaeontological resources. The Palaeontological Heritage Desktop Assessment includes recommendations for inclusion in the EMPr (Appendix G of this finalised BA Report). The desktop assessment is included in Appendix D.4 of this finalised BA Report, which was made available to registered I&APs and the public for a 30-day comment period. The Heritage Impact Assessment and Palaeontological Impact Assessment were also uploaded to the South African Heritage Resources Information System (SAHRIS) for comment.
Impacts on Terrestrial and Aquatic Ecology	<ul style="list-style-type: none"> ▪ The comments raised regarding impacts on terrestrial and aquatic ecology, including avifauna and protected trees as a result of the proposed project have been addressed in the Impact Assessment Section (i.e. Section D) of this BA Report, as well as the Ecological Impact Assessment (in Appendix D.1 of this BA Report). In addition, recommendations to mitigate potential impacts on terrestrial and aquatic ecology have been included in the EMPr in Appendix G of this finalised BA Report.

Note from the CSIR: Issues raised by I&APs, Stakeholders and Organs of State during the review of the BA (and EIA) Reports are noted below.

Summary of main issues raised by I&APs	Summary of response from EAP
EIA and BA Process and PPP:	<ul style="list-style-type: none"> ▪ These comments relate to the submission of completed comment and registration forms, the submission of comments, the requests to upload documents on SAHRIS, and feedback on the status of the submission of comments. The DEA also provided comments in this regard that relate to the listed activities being specific and the same as those included in the Application for EA, compliance with the 2014 NEMA EIA Regulations in terms of the EAP expertise and declaration, PPP, and the recording and consideration of

Summary of main issues raised by I&APs	Summary of response from EAP
<p>Project Details:</p> <ul style="list-style-type: none"> ▪ Impact on existing infrastructure, such as the SKA Project. 	<p>comments received. All these comments and the responses thereto have been provided in Appendix E.3 of this finalised BA Report.</p> <ul style="list-style-type: none"> ▪ As noted in Section A (1) of this finalised BA Report, Scatec Solar appointed MESA Solutions (PTY) Ltd to conduct the RFI and EMI studies. The technical report is included in Appendix D.9 of this BA Report, which aims to inform the potential impact that the proposed project will have on the SKA project and to determine suitable mitigation measures to manage the risk (if any) posed to the SKA project by the development of this project. The mitigation measures will be considered and incorporated into the design by the Project Developer in order to ensure that the risks are lowered. As noted above and as requested by the SKA, the Project Developer will develop an appropriate EMC Plan to identify specific mitigation measures that will be implemented for the Kenhardt PV 1, 2 and 3 facilities (for which separate EIA Processes have been undertaken). In addition, the Project Developer will appoint a suitable specialist to test and prove the measures implemented for the Kenhardt PV 2 facility (for which a separate EIA Process has been conducted and finalised EIA Report compiled and submitted to the DEA for decision-making) in a laboratory environment prior to the commencement of construction. The EMC Plan will be provided to the SKA for comment and authorisation during the pre-construction design phase. Refer to Appendix E.2 of this finalised BA Report for a letter from the Project Applicant to the DEA stating its commitment to the implementation of the mitigation measures and recommendations of the SKA Project Office.
<p>Project Details:</p> <ul style="list-style-type: none"> ▪ Impact on Archaeology and Palaeontology. 	<ul style="list-style-type: none"> ▪ The comments raised regarding impacts on archaeology and palaeontology as a result of the proposed project have been respectively assessed in the Heritage Impact Assessment (Archaeology and Cultural Landscape) (Appendix D.3 of this finalised BA Report) and the Palaeontological Impact Assessment (Appendix D.4 of this finalised BA Report). This is also addressed in the Impact Assessment Section (i.e. Section D) of this finalised BA Report. In addition, recommendations to mitigate potential impacts on archaeology and palaeontology have been included in the EMPr in Appendix G of the BA Report.

Summary of main issues raised by I&APs	Summary of response from EAP
	<ul style="list-style-type: none"> ▪ It is important to note that at the time of preparing the BA Report for release to I&APs for comment in March 2016, additional spatial information and details of the farms became available. It was originally understood that the transmission line will extend from the remaining extent of Onder Rugzeer Farm 168 to the remaining extent of Portion 3 of Gemsbok Bult Farm 120, and span over the Remainder of Boven Rugzeer 169 and <i>Portion 2 of Boven Rugzeer 169</i>. However based on the additional property details, the transmission line will span over the Remainder of Boven Rugzeer 169 and <i>Portion 4 of Onder Rugzeer Farm 168 (not Portion 2 of Boven Rugzeer)</i>. Portion 4 of Onder Rugzeer Farm 168 belongs to Transnet Freight Rail. This was amended in the BA Report that was released to I&APs for review in March 2016, but it was not updated in the Heritage Impact Assessment (Appendix D.3 of the BA Report) at the time. However, it has been updated in this finalised BA Report (Appendix D.3). It is important to note that this change is a minor change and does not impact on the routing of the transmission line as indicated in the BA Report that was released in March 2016, and there is no change to the reporting and impact significance, only the farm portion number has been corrected. <p>The farm portion was also incorrectly noted in the comment from SAHRA, which states: "Orton, J. 2016. Heritage Impact Assessment for a proposed 132kV power line (Kenhardt PV 1- Transmission Line on farms 168/REM, 169/2, 169/REM and 120/3, Kenhardt Magisterial District, Northern Cape". Based on this, the comment from SAHRA needs to be insignificantly amended to "Orton, J. 2016. Heritage Impact Assessment for a proposed 132kV power line (Kenhardt PV 1- Transmission Line on farms 168/REM, 168/4, 169/REM and 120/3, Kenhardt Magisterial District, Northern Cape". The SAHRA were contacted to discuss the above in May 2016, and a follow up email was sent from the CSIR (as shown in Appendix E.2). The SAHRA issued an amended comment which has been included in Appendix E.6 and Appendix E.3 of this report accordingly.</p>
Impacts on Terrestrial and Aquatic Ecology	<ul style="list-style-type: none"> ▪ The comments raised regarding impacts on terrestrial and aquatic ecology, including protected trees as a result of the proposed project have been addressed in the Impact Assessment

Summary of main issues raised by I&APs	Summary of response from EAP
	Section (i.e. Section D) of this BA Report, as well as the Ecological Impact Assessment (in Appendix D.1 of this BA Report). In addition, recommendations to mitigate potential impacts on terrestrial and aquatic ecology have been included in the EMPr in Appendix G of the BA Report.

4. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to the Final BAR as Appendix E3.

Note from the CSIR: The Comments and Response Report is attached as Appendix E.3 of this BA Report.

As noted above, follow up correspondence were sent to I&APs, Stakeholders and Organs of State in order to seek comments on the BA (and EIA) Reports that were released for comment in March 2016.

5. AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
Note from the CSIR: Refer to the explanation below.					

Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix E4.

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

Note from the CSIR: The proof of registered mailing and email delivery, included in Appendix E.2 of this BA Report does not distinguish between potential I&APs, Authorities and Organs of State identified as key stakeholders. However, the current database of potential I&APs, including Authorities and Organs of State, is included in Appendix E.5. Authorities and Organs of State received written notification of the proposed activities via registered mail together with all potential I&APs identified for this assessment. This can be cross referenced to the proof of registered mail contained in Appendix E.2 of this BA Report.

The I&AP database included in Appendix E.5 of this BA Report has been divided into Organs of State, Stakeholders (NGOs and Conservation Organisations), Landowners, Adjacent Property Owners and Additional Registered I&APs (based on requests to register). As this is a renewable energy project, Eskom and the SKA Project Office are included on the database of Organs of State.

Notification of the Project Initiation Phase:

All Authorities and Organs of State were notified via Letter 1 (dated 30 July 2015) of the 30 day period within which to submit comments on the proposed project, which extended from 30 July 2015 to 31 August 2015.

Notification of the BA Report Release Phase:

All Authorities and Organs of State on the project database were notified of the 30-day comment period on the BA Reports, via Letter 3 (dated 4 March 2016). Key authorities were provided with either a hard copy and/or CD of the BA Reports via courier. Proof of courier waybills is included in Appendix E.2 of this finalised BA Report.

Organs of State will also be notified via email (where email addresses are available) of the submission of this finalised BA Report to the DEA, as well as via post and email (where postal, physical and email addresses are available) of the outcome of the decision-making process.

6. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for any activities (linear or other) where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the competent authority.

Proof of any such agreement must be provided, where applicable. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

Note from the CSIR: No deviations from the PPP have been requested.

A list of registered I&APs must be included as appendix E5.

Note from the CSIR: Appendix E.5 includes a copy of the I&AP database for this project. At the time of submission of this finalised BA Report, 83 I&APs were registered on the project database.

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

Note from the CSIR: As noted above, telephonic consultations with key I&APs took place where necessary and when required. All correspondence and comments received from I&APs prior to the release of the BA Report for comment in March 2016 are included in Appendix E.6 of this report. Comments received from I&APs during the 30-day review of the BA Report are also included in Appendix E.6 of this finalised BA Report.

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014 and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

Notes from the CSIR:

- In this section, the impact status (i.e. neutral, negative or positive) is provided in brackets adjacent to the significance ratings.
- The significance ratings provided in this section (i.e. Section D (1)) are provided without the implementation of the recommended mitigation measures.
- Site, layout, technology and other alternatives for this proposed BA project are not applicable. Site alternatives are not applicable as the proposed project location is completely dependent on the location of the proposed 75 MW Kenhardt PV 1 facility and the Eskom Nieuwehoop Substation. However, the no-go alternative has been described.

APPROACH TO THE BA

1. METHODOLOGY OF IMPACT ASSESSMENT

The identification of potential impacts includes impacts that may occur during the construction, operational and decommissioning phases of the development. The assessment of impacts includes direct, indirect as well as cumulative impacts. In order to identify potential impacts (both positive and negative) it is important that the nature of the proposed projects is well understood so that the impacts associated with the projects can be assessed. The process of identification and assessment of impacts includes:

- Determining the current environmental conditions in sufficient detail so that there is a baseline against which impacts can be identified and measured;
- Determining future changes to the environment that will occur if the activity does not proceed;
- Develop an understanding of the activity in sufficient detail to understand its consequences; and
- The identification of significant impacts which are likely to occur if the activity is undertaken.

The impact assessment methodology has been aligned with the requirements for BA Reports as stipulated in Appendix 1 (3) (j) of the 2014 EIA Regulations, which states the following:

"A BA Report must contain the information that is necessary for the Competent Authority to consider and come to a decision on the application, and must include an assessment of each identified potentially significant impact and risk, including –

- (i) cumulative impacts;
- (ii) the nature, significance and consequences of the impact and risk;
- (iii) the extent and duration of the impact and risk;
- (iv) the probability of the impact and risk occurring;
- (v) the degree to which the impact and risk can be reversed;
- (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and
- (vii) the degree to which the impact and risk can be mitigated”.

As per the DEAT Guideline 5: Assessment of Alternatives and Impacts, the following methodology is applied to the prediction and assessment of impacts and risks. Potential impacts and risks have been rated in terms of the direct, indirect and cumulative:

- **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.
- **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all 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.
- **Cumulative impacts** are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. The cumulative impacts have been assessed by identifying other solar energy project proposals and other applicable projects, such as construction and upgrade of electricity generation, and transmission or distribution facilities in the local area (i.e. within 20 km of the proposed Kenhardt PV 1 – Transmission Line project) that have been approved (i.e. positive EA has been issued) or is currently underway. The proposed and existing electrical and solar developments that have been considered as part of the BA Phase are provided in Table 7 below. The cumulative impacts will be assessed in terms of each proposed Kenhardt PV project as well. Cumulative effects associated with these similar types of projects include inter alia: traffic generation; avifaunal collisions and mortalities; habitat destruction and fragmentation; loss of agricultural land; removal of vegetation; increase in stormwater run-off and erosion; increase in water requirements; job creation; increased interference to the SKA project; social upliftment; and upgrade of infrastructure and contribution of renewable energy into the National Grid.

Table 7: Projects considered as part of the cumulative impact assessment that occur within 20 km of the site

Project Name	Applicant	DEA Reference Number	Brief project description	Phase
Nieuwehoop 400/50 kV Substation loop in and loop out lines, Northern Cape Province.	Eskom Holdings SOC Limited	DEA Reference Number: 12/12/20/1166	Construction of the 400/50kV Nieuwehoop substation between the Garona and Aries substations, and 3km Loop In and Loop Out Lines.	The project received a positive EA on 21 February 2011. Site preparation for the construction of the Nieuwehoop Substation has commenced.
EIA, WULA and EMPr for the proposed Solar CSP Integration Project: Project 1 – Solar substation, 2 X 400 kV power lines from Aries to the solar substation and 400 kV power line from Nieuwehoop to the Solar substation.	Eskom Holdings SOC Limited	DEA Reference Number: 12/12/20/2606 NEAS Reference Number: DEA/EIA/0000785/2011	The proposed Solar Park Integration Project entails the construction of a substation at the Upington Solar Park, 400 kV transmission lines to the east and south of Upington to feed the electricity into Eskom's National Grid as well as the construction of a number of 132 kV power lines inter-linking the IPP solar plants with the Eskom Grid and distributing the power generated to Upington.	The project received a positive EA on 14 February 2014.
Proposed construction of Gemsbok PV1 75 MW Solar PV facility on the remaining extent of Portion 3 of the Farm Gemsbok Bult 120, Kenhardt, Northern Cape.	Mulilo Renewable Project Developments (Pty) Ltd	DEA Reference Number: 14/12/16/3/3/2/710	Mulilo Renewable Project Developments (Pty) Ltd intends to develop a 75 MW Solar PV power generation project on the farm Gemsbok Bult (Remaining Extent of Portion 3 of Farm 120).	These projects were undertaken in parallel (i.e. joint PPP) and are collectively referred to as the Nieuwehoop Solar Development. The Final EIA Reports were submitted to the DEA for decision-making. The projects have received positive EA.
Proposed construction of Gemsbok PV2 75 MW Solar PV facility on the remaining extent of Portion 3 of the Farm Gemsbok Bult 120, Kenhardt, Northern Cape.	Mulilo Renewable Project Developments (Pty) Ltd	DEA Reference Number: 14/12/16/3/3/2/711	Mulilo Renewable Project Developments (Pty) Ltd intends to develop a 75 MW Solar PV power generation project on the farm Gemsbok Bult (Remaining Extent of Portion 3 of Farm 120).	
Proposed construction of Boven PV1 75 MW Solar PV facility on the remaining extent of the Farm Boven Rugzeer 169, Kenhardt, Northern Cape.	Mulilo Renewable Project Developments (Pty) Ltd	DEA Reference Number: 14/12/16/3/3/2/712	Mulilo Renewable Project Developments (Pty) Ltd intends to develop a 75 MW Solar PV power generation project on the farm Boven Rugzeer (Remaining Extent of Farm	

Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

Project Name	Applicant	DEA Reference Number	Brief project description	Phase
			169).	
Proposed development of a 75 MW Solar PV Facility (Kenhardt PV 1) on the remaining extent of Onder Rugzeer Farm 168, north-east of Kenhardt, Northern Cape.	Scatec Solar	DEA Reference Number: 14/12/16/3/3/2/837	Scatec Solar intends to develop a 75 MW Solar PV power generation project on the remaining extent of Onder Rugzeer Farm 168.	These projects were undertaken in parallel (i.e. joint PPP). The Scoping Reports and addendums were released for a 30-day comment period. The finalised Scoping Reports were submitted to the DEA for decision-making in November 2015 and were accepted by the DEA in December 2015. The EIA Reports were released for a 30-day comment period (together with the BA Reports) extending from 3 March 2016 to 5 April 2016. The finalised EIA Reports were compiled subsequent to the 30-day comment period and submitted to the DEA for decision-making in April 2016. DEA has acknowledged receipt of the EIA Reports for the Kenhardt PV 1, 2 and 3 EIA Projects, which is thus currently in the decision-making phase.
Proposed development of a 75 MW Solar PV Facility (Kenhardt PV 2) on the remaining extent of Onder Rugzeer Farm 168, north-east of Kenhardt, Northern Cape.	Scatec Solar	DEA Reference Number: 14/12/16/3/3/2/838	Scatec Solar intends to develop a 75 MW Solar PV power generation project on the remaining extent of Onder Rugzeer Farm 168.	
Proposed development of a 75 MW Solar PV Facility (Kenhardt PV 3) on the remaining extent of Onder Rugzeer Farm 168, north-east of Kenhardt, Northern Cape.	Scatec Solar	DEA Reference Number: 14/12/16/3/3/2/836	Scatec Solar intends to develop a 75 MW Solar PV power generation project on the remaining extent of Onder Rugzeer Farm 168.	
Proposed development of a Transmission Line (i.e. Kenhardt PV 2 – Transmission Line to connect to the proposed 75 MW Solar PV Facility (Kenhardt PV 2) on the remaining extent of Onder Rugzeer Farm 168, and the remaining extent of Portion 3 of Gemsbok Bult Farm 120, north-east of Kenhardt, Northern Cape.	Scatec Solar	DEA Reference Number: 14/12/16/3/3/1/1546	Scatec Solar intends to develop a 132 KV transmission line extending from the proposed 75 MW Solar PV facility (Kenhardt PV 2) to the Eskom Nieuwehoop substation on the remaining extent of Portion 3 of Gemsbok Bult Farm 120.	These projects have been undertaken in parallel with Kenhardt PV 1, Kenhardt PV 2 and Kenhardt PV 3 (i.e. joint PPP). The BA Reports were also released for a 30-day comment period (together with the EIA Reports) extending from 3 March 2016 to 5 April 2016. These finalised BA Reports have been compiled subsequent to the 30-day comment period and submitted to the DEA for decision-making.
Proposed development of a Transmission Line (i.e. Kenhardt PV 3 – Transmission Line to connect to the proposed 75 MW Solar PV Facility (Kenhardt PV 3) on the remaining extent of Onder Rugzeer Farm 168, and the remaining extent of Portion 3 of Gemsbok Bult Farm 120, north-east of Kenhardt, Northern Cape.	Scatec Solar	DEA Reference Number: 14/12/16/3/3/1/1545	Scatec Solar intends to develop a 132 KV transmission line extending from the proposed 75 MW Solar PV facility (Kenhardt PV 3) to the Eskom Nieuwehoop substation on the remaining extent of Portion 3 of Gemsbok Bult Farm 120.	
Proposed construction of the Mulilo Solar Development consisting of seven 75 MW PV OR Concentrated PV Solar Energy	Mulilo Renewable Project Developments	DEA Reference Number: 14/12/16/3/3/2/841	Mulilo Renewable Project Developments (Pty) Ltd proposes to construct and operate seven PV or	These projects are being undertaken in parallel (i.e. joint PPP). The BID was released to I&APs and authorities for a 30-day comment period in

Project Name	Applicant	DEA Reference Number	Brief project description	Phase
Facilities and associated infrastructure near Kenhardt, Northern Cape	(Pty) Ltd	DEA Reference Number: 14/12/16/3/3/2/842 DEA Reference Number: 14/12/16/3/3/2/843 DEA Reference Number: 14/12/16/3/3/2/844 DEA Reference Number: 14/12/16/3/3/2/845 DEA Reference Number: 14/12/16/3/3/2/846 DEA Reference Number: 14/12/16/3/3/2/847	Concentrated PV Solar Facilities with a generating capacity of 75 MW each, on Portions 3 and 8 of Gemsbok Bult Farm 120 and the Remaining extent of Boven Rugzeer Farm 169, located 30 km north-east of Kenhardt. Two of the projects will be located on Portion 3-, two projects on Portion 8 of Gemsbok Bult Farm 120 and three projects on the Remaining Extent of Boven Rugzeer Farm 169. Each 75 MW Solar PV facility proposed will cover an approximate area of 200 ha with a collective footprint of approximately 1 400 ha and a combined power generation capacity of 525 MW. The proposed projects will entail the construction of the solar field, buildings, electrical infrastructure, internal access roads, and associated infrastructure and structures.	September 2015. The finalised Scoping Reports were submitted to DEA for decision-making in December 2015 and were accepted in February 2016. The EIA Reports were compiled and released for I&AP review in April 2016. Subsequent to the 30-day comment period, the finalised EIA Reports were finalised and submitted to the DEA for decision-making in May 2016.

In addition to the above, the impact assessment methodology includes the following aspects:

Spatial extent – The size of the area that will be affected by the impact/risk:

- Site specific;
- Local (<10 km from site);
- Regional (<100 km of site);
- National; or
- International (e.g. Greenhouse Gas emissions or migrant birds).

Consequence – The anticipated consequence of the risk/impact:

- Extreme (extreme alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they permanently cease);
- Severe (severe alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they temporarily or permanently cease);
- Substantial (substantial alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they temporarily or permanently cease);
- Moderate (notable alteration of natural systems, patterns or processes, i.e. where the environment continues to function but in a modified manner); or
- Slight (negligible alteration of natural systems, patterns or processes, i.e. where no natural systems/environmental functions, patterns, or processes are affected).

Duration – The timeframe during which the impact/risk will be experienced:

- Very short term (instantaneous);
- Short term (less than 1 year);
- Medium term (1 to 10 years);
- Long term (the impact will cease after the operational life of the activity (i.e. the impact or risk will occur for the project duration)); or
- Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient (i.e. the impact will occur beyond the project decommissioning)).

Reversibility of the Impacts - the extent to which the impacts/risks are reversible assuming that the project has reached the end of its life cycle (decommissioning phase) will be:

- Yes: High reversibility of impacts (impact is highly reversible at end of project life);
- Partially: Moderate reversibility of impacts; or
- No: Impacts are non-reversible (impact is permanent).

Irreplaceability of Receiving Environment/Resource Loss caused by impacts/risks – the degree to which the impact causes irreplaceable loss of resources assuming that the project has reached the end of its life cycle (decommissioning phase) will be:

- High irreplaceability of resources (project will destroy unique resources that cannot be replaced);
- Moderate irreplaceability of resources;
- Low irreplaceability of resources; or
- Resources are replaceable (the affected resource is easy to replace/rehabilitate).

Using the criteria above, the impacts will further be assessed in terms of the following:

Probability – The probability of the impact/risk occurring:

- Very likely;
- Likely;
- Unlikely;
- Very unlikely; and
- Extremely unlikely.

To determine the significance of the identified impact/risk, the consequence is multiplied by probability (as shown in Figure 14). This approach incorporates internationally recognised methods from the IPCC (2014) assessment of the effects of climate change and is based on an interpretation of existing information in relation to the proposed activity. The significance is then rated qualitatively as follows against a predefined set of criteria (i.e. probability and consequence) as indicated in Figure 14:

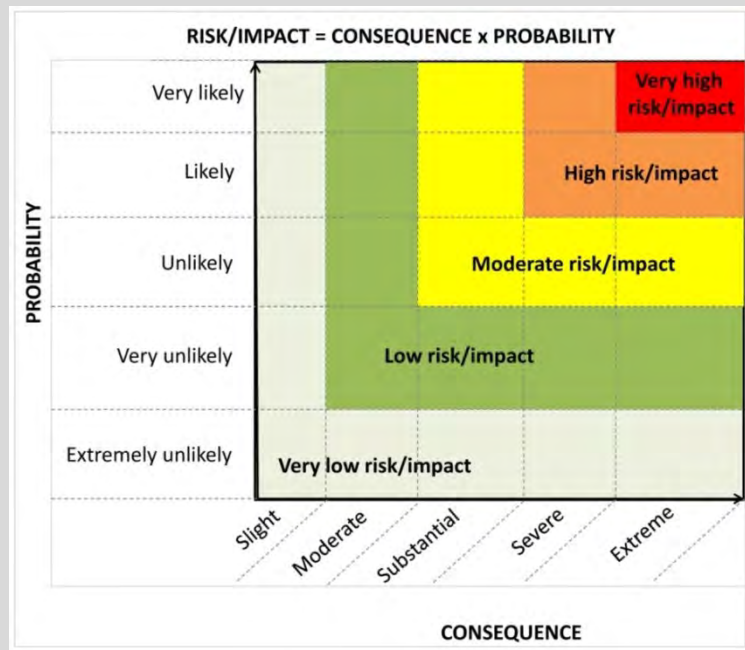


Figure 14: Guide to assessing risk/impact significance as a result of consequence and probability.

Significance – Will the impact cause a notable alteration of the environment?

- Very low (the risk/impact may result in very minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);
- Low (the risk/impact may result in minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);
- Moderate (the risk/impact will result in moderate alteration of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated);
- High (the risk/impact will result in major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making); and
- Very high (the risk/impact will result in very major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making (i.e. the project cannot be authorised unless major changes to the engineering design are carried out to reduce the significance rating)).

With the implementation of mitigation measures, the residual impacts/risks will be ranked as follows in terms of significance (based on Figure 14):

- Very low = 5;
- Low = 4;
- Moderate = 3;
- High = 2; and
- Very high = 1.

Status - Whether the impact/risk on the overall environment will be:

- Positive - environment overall will benefit from the impact/risk;
- Negative - environment overall will be adversely affected by the impact/risk; or
- Neutral - environment overall not be affected.

Confidence – The degree of confidence in predictions based on available information and specialist knowledge:

- Low;
- Medium; or
- High.

Impacts have been collated into the EMPr (Appendix G of the finalised BA Report) and these include the following:

- Quantifiable standards for measuring and monitoring mitigatory measures and enhancements will be set. This includes a programme for monitoring and reviewing the recommendations to ensure their ongoing effectiveness.
- Identifying negative impacts and prescribing mitigation measures to avoid or reduce negative impacts. Where no mitigatory measures are possible this is stated.
- Positive impacts and augmentation measures have been identified to potentially enhance positive impacts where possible.

Other aspects to be taken into consideration in the assessment of impact significance are:

- Impacts are evaluated for the construction and operational phases of the development. The assessment of impacts for the decommissioning phase is brief, as there is limited understanding at this stage of what this might entail. The relevant rehabilitation guidelines and legal requirements applicable at the time will need to be applied;
- Impacts have been evaluated with and without mitigation in order to determine the effectiveness of mitigation measures on reducing the significance of a particular impact;
- The impact evaluation has, where possible, taken into consideration the cumulative effects associated with this and other facilities/projects which are either developed or in the process of being developed in the local area (as described above and in Table 7); and
- The impact assessment attempts to quantify the magnitude of potential impacts (direct and cumulative effects) and outline the rationale used. Where appropriate, national standards are to be used as a measure of the level of impact.

Planning and Design Phase:

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
<i>Alternative 1 (Preferred Alternative) – Refer to Section A (2) of this BA Report and the explanation above regarding applicable alternatives.</i>			
Planning and design of the proposed project activities.	<p><i>Direct impacts:</i></p> <ul style="list-style-type: none"> Impact on existing infrastructure (roads, Transnet Service Road, Transnet Freight Rail Sishen-Saldanha Railway Line, stormwater pipelines, sewers, and electrical infrastructure and cables etc.). 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> Review building and site plans of the Transnet Freight Rail Sishen-Saldanha Railway Line and associated gravel road, in order to ensure the location of existing underground structures (such as electricity cables, stormwater pipelines etc.) are determined to make provision for safe excavation. Ensure that discussions are held with Transnet Freight Rail during the design phase in order to assist with the location of existing underground service infrastructure. Ensure that discussions are held with Transnet Freight Rail during the design phase in order to determine requirements for potential use of the Transnet Service Road (as main access to the proposed project site), as well as to discuss the requirements for crossing of the railway line by the proposed transmission line. Consultation should be undertaken with the relevant municipal departments during the detailed engineering phase to discuss the impact of the proposed project on existing infrastructure. Scatec Solar should ensure that all relevant approvals have been obtained from the municipality (with regards to Building Plans etc.) prior to construction. The design of the facility should incorporate Stormwater Management. The design should also ensure the free flow of runoff and prevent ponding of water once construction is complete.
	<ul style="list-style-type: none"> Impact on the nearest and surrounding SKA telescopes and the overall SKA project. 	<ul style="list-style-type: none"> High (Negative) 	<ul style="list-style-type: none"> Ensure that the following is considered and implemented in the design <u>where applicable to the proposed transmission line and electrical infrastructure:</u> <ul style="list-style-type: none"> The inverter units, transformers, communication and control units for an array of panels should all be housed in a single shielded environment. For shielding of such an environment it must be

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
			<p>ensured that:</p> <ul style="list-style-type: none"> ▪ RFI gasketting is placed on all the seams and doors. ▪ RFI Honeycomb filtering should be placed on all ventilation openings. ▪ It is important to ensure that the cables are laid directly in the soil or properly grounded cable trays (not plastic sleeves). ▪ The use of bare copper directly in the soil for earthing is recommended to shunt Common Mode (CM) interference currents to ground. ▪ In the case of a tracking PV plant design, care will need to be taken to shield the noise associated with the relays, contactors and hydraulic pumps/motors of the tracking units. ▪ Data communications to and from the plants should be via fibre optic. ▪ As requested by the SKA, the Project Developer should develop an appropriate EMC Plan to identify specific mitigation measures that will be implemented for the Kenhardt PV 1, 2 and 3 (for which separate EIA Processes have been undertaken). In addition, the Project Developer should appoint a suitable specialist to test and prove the measures implemented for the Kenhardt PV 2 facility (for which a separate EIA Process has been conducted and finalised EIA Report compiled and submitted to the DEA for decision-making) in a laboratory environment prior to the commencement of construction of the Kenhardt PV 2 facility.
	<ul style="list-style-type: none"> • Impact on the existing users of the Transnet Service Road and the unnamed Farm Road leading to the site. 	<ul style="list-style-type: none"> • Low (Negative) 	<ul style="list-style-type: none"> • Potential access routes to the project site must be selected during the planning phase in order to prevent traffic impacts. • Relevant stakeholders (such as frequent users of the roads) must be contacted in order to inform them of the proposed

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
			project and to avoid potential traffic impacts. This will also ensure that current operations associated with the farms and the Transnet Freight Rail Sishen-Saldanha Railway Line are not hindered in any way.
	Indirect impacts:		
	No indirect impacts have been identified for the planning and design phase.		
	Cumulative impacts:		
	No cumulative impacts have been identified for the planning and design phase.		
Alternative 2 - Refer to Section A (2) of this BA Report and the explanation above regarding applicable alternatives.			
	Direct impacts:		
	Indirect impacts:		
	Cumulative impacts:		
	Direct impacts:		
	Indirect impacts:		
	Cumulative impacts:		
Alternative 3 - Refer to Section A (2) of this BA Report and the explanation above regarding applicable alternatives.			
	Direct impacts:		
	Indirect impacts:		
	Cumulative impacts:		
	Direct impacts:		
	Indirect impacts:		
	Cumulative impacts:		
NO-GO OPTION			
Planning and design of the proposed project activities.	Direct Impacts:		
	If this proposed project does not proceed: <ul style="list-style-type: none"> • None of the impacts mentioned above will occur. • Only the current agricultural (grazing) land use will remain. • The landowners of the remaining extent of the Onder Rugzeer Farm 168, Portion 3 of Gemsbok Bult Farm 120, remainder of 	Not applicable.	Not applicable.

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	<p>Boven Rugzeer 169 and Portion 4 of Onder Rugzeer Farm 168 will not be able to derive benefits from the implementation of an additional land-use.</p> <ul style="list-style-type: none"> • New employment opportunities will not be created, which may lead to negative local socio-economic implications. • No additional power will be generated or supplied through means of renewable energy resources by this project at this location. • There will be no contributions and assistance to the government in achieving its proposed renewable energy target of 17 800 MW by 2030. • Electricity generation will remain constant (i.e. no additional renewable energy generation will occur on the proposed site) and the local economy will not be diversified. • Local communities will continue their dependence on agriculture production and government subsidies. The local municipality's vulnerability to economic downturns will increase because of limited access to capital. • There will be lost opportunity for skills transfer and education/training of local communities. • The positive socio-economic impacts likely to result from the project such as increased local spending and the creation of local employment opportunities will not be realised. • The local economic benefits associated with 		

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	<p>the REIPPPP will not be realised, and socio-economic contribution payments into the local community trust will not be realised.</p> <ul style="list-style-type: none"> There will be further implications for the proposed Kenhardt PV 2 and PV 3 facilities, as these plants will share the same corridor (and potentially the same on-site substation) with that of Kenhardt PV 1. 		
	Indirect Impacts:		
	No indirect impacts have been identified for the planning and design phase for the No-go Option.		
	Cumulative Impacts:		
	No cumulative impacts have been identified for the planning and design phase for the No-go Option.		

Construction Phase:

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
Alternative 1 (Preferred Alternative) – Refer to Section A (2) of this BA Report and the explanation above regarding applicable alternatives.			
<ul style="list-style-type: none"> Removal of vegetation; Excavations; Establishment of a laydown area for equipment; Stockpiling of topsoil and cleared vegetation; Transportation of material and equipment to site; and Construction of the transmission lines and additional infrastructure. 	Direct Impacts:		
	ECOLOGICAL IMPACT ASSESSMENT		
	<ul style="list-style-type: none"> Alteration of habitat structure and composition in and around towers and possibly through the stringing phase of the project. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> The detailed design should consider and incorporate habitat and features into the routing of the proposed transmission line. The detailed design and confirmation of the proposed tower positions along the proposed transmission line route should assist with the avoidance of specific vegetation associates and forms (where applicable). Identify and avoid the two Aloe consocieties (<i>Aloe dichotoma</i> and <i>A claviflora</i>) identified within the electrical infrastructure corridor as part of the Ecological Impact Assessment (Appendix D.1 of this finalised BA Report). Avoidance, where possible of the minor drainage lines and

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	<ul style="list-style-type: none"> Changes in the geomorphological state of drainage lines. 	<ul style="list-style-type: none"> Low (Negative) 	<p>any additional significant plant species that may be identified and incorporate other features along the route into the design.</p> <ul style="list-style-type: none"> A second assessment of the route should be undertaken in or around February to March (subsequent to the issuing of an EA and the completion of the detailed engineering) in order to identify any additional plant specimens of significance that may be evident along the route. Undertake plant rescue operations, where such specimens may be relocated/removed (i.e. search and rescue) or avoided (with the relevant permits and approvals in place) prior to the commencement of construction. Appoint a suitable Specialist/Contractor to undertake Search and Rescue operations as required, prior to the commencement of the construction phase. The entire width (i.e. 52 m) of the transmission line servitude should not be cleared of vegetation. Vegetation removal should be kept to a minimum and cleared below the transmission line and from either side of the centre line based on the requirements of Eskom and standard operating procedures. Implement exotic weed control during the construction phase. An initial pre-construction clearance of all exotic vegetation on route should be undertaken to reduce the possibility of further exotic weed invasion. Continued exotic weed control measures should be implemented during the construction phase that aligns with an exotic vegetation management plan or an alien eradication plan. <p>The detailed design should consider the location of the major drainage lines (with a 32 m buffer) and exclude them from the tower footprints and development footprint.</p> <ul style="list-style-type: none"> Undertake and complete earthworks and construction activities outside of the high rainfall period (if possible). Ensure that there is maintenance of a high level of housekeeping along the route of the proposed transmission

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
			<p>line during the construction phase.</p> <ul style="list-style-type: none"> • Monitor and implement the management of changes in the drainage features within the study area. Such actions can include undertaking an inspection of drainage features immediately outside of the footprint of the proposed transmission line and removal of solid waste and litter on a regular basis, as well as the redress of excessive erosion attributable to construction activities.
	<ul style="list-style-type: none"> • Increases in the prevalence of exotic and invasive plants. 	<ul style="list-style-type: none"> • Low (Negative) 	<ul style="list-style-type: none"> • The detailed design should consider the location of the major drainage lines (with a 32 m buffer) and exclude them from the development footprint. • Undertake regular monitoring through visual inspection and redress of exotic weeds in and around site, particularly during construction. • Avoidance of excessive earthworks and sculpting of land and maintenance of the general topography of the proposed transmission line route. • Erosion control measures to be implemented to stabilize the soil as required. • Ensure the placement of energy dissipaters if required around tower footings within the minor drainage lines in order to reduce velocity of flow through such features and consequential disturbance.
	<i>VISUAL IMPACT ASSESSMENT</i>		
<ul style="list-style-type: none"> • Potential visual intrusion of construction activities on existing views of sensitive visual receptors 	<ul style="list-style-type: none"> • Low (Negative) 	<ul style="list-style-type: none"> • Implement mitigation measures associated with construction activities to ensure that they are managed and performed in such a way as to minimise its impact on the receiving environment, as well as minimising visual impact during the construction phase. These can include: <ul style="list-style-type: none"> ▪ The contractor must maintain good housekeeping on site to avoid litter and minimise waste; ▪ The Project Developer must demarcate construction boundaries and minimise areas of surface disturbance; ▪ Vegetation and ground disturbance should be 	

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
			<p>minimised and existing clearings should be taken advantage of;</p> <ul style="list-style-type: none"> ▪ Construction of new roads should be minimised and existing roads will be used where possible; ▪ Topsoil from the site should be stripped, stockpiled, and stabilised before excavating earth for the construction of the proposed transmission line; ▪ Vegetation material from vegetation removal should be mulched and spread over fresh soil disturbances to aid in the rehabilitation process; ▪ Plans should be in place to control and minimise erosion risks; ▪ Plans should be in place to minimise fire hazards and dust generation; and ▪ Plans should be in place to rehabilitate cleared areas as soon as possible. <ul style="list-style-type: none"> • Night time construction should be avoided where possible. • Night lighting of the construction sites should be minimised within requirements of safety and efficiency.
HERITAGE IMPACT ASSESSMENT (ARCHAEOLOGY AND CULTURAL LANDSCAPE)			
	<ul style="list-style-type: none"> • Damage to and destruction of archaeological resources during the construction phase as a result of the proposed construction of the transmission line and associated infrastructure. 	<ul style="list-style-type: none"> • Very Low (Negative) 	<ul style="list-style-type: none"> • All activities and vehicles should be confined to the approved footprint or construction corridor so as to minimise impacts to heritage resources in surrounding areas.
	<ul style="list-style-type: none"> • Damage to and destruction of graves during the construction phase as a result of the proposed construction of the transmission line and associated infrastructure. 	<ul style="list-style-type: none"> • Very Low (Negative) 	<ul style="list-style-type: none"> • All activities and vehicles should be confined to the approved footprint or construction corridor so as to minimise impacts to heritage resources in surrounding areas.
	<ul style="list-style-type: none"> • Impacts to the natural and cultural landscape during the construction phase as a result of the proposed construction of the transmission line and associated infrastructure. 	<ul style="list-style-type: none"> • Very Low (Negative) 	<ul style="list-style-type: none"> • None identified.

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	PALAEONTOLOGICAL IMPACT ASSESSMENT		
	<ul style="list-style-type: none"> Impact on Palaeontology: Loss of fossil heritage at or beneath the ground surface as a result of surface clearance and excavations into superficial sediments. 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> Undertake monitoring of all substantial excavations into sedimentary rocks for fossil remains and safeguard any finds <i>in situ</i>. Appoint a professional palaeontologist to record and sample any chance fossil finds.
	GEOHYDROLOGICAL ASSESSMENT		
	<ul style="list-style-type: none"> Potential impact on the groundwater as a result of the construction of the storage yards and temporary construction labour accommodation site camps. 	<ul style="list-style-type: none"> Low (Negative) 	<ul style="list-style-type: none"> During the construction phase, all reasonable measures must be taken to prevent soil and groundwater contamination. The main source of contamination will be from construction vehicles leaking oil or fuel, fuel storage and spillages may occur whilst refuelling vehicles and machinery. During the construction phase, vehicles must be regularly serviced and maintained to check and ensure there are no leakages.
	<ul style="list-style-type: none"> Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages. 	<ul style="list-style-type: none"> Low (Negative) 	<ul style="list-style-type: none"> A precautionary approach should be taken and reasonable measures should be undertaken to prevent oil spillages and fuel leakages from occurring. Vehicles must be regularly serviced and maintained to check and ensure there are no leakages. Any engines that stand in one place for a significant length of time must have drip trays. Fuel storage tanks should be above ground on an impermeable surface and within a bunded area. Construction vehicles and equipment should also be refuelled on an impermeable surface. If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal practices of the spilled material. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.
SOILS AND AGRICULTURAL POTENTIAL ASSESSMENT			
<ul style="list-style-type: none"> Degradation of veld vegetation beyond the direct footprint of the proposed transmission line due to construction disturbance and 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> Minimize the footprint of disturbance during construction activities. Confine vehicle access to roads only. 	

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	potential trampling by vehicles (including dust generation).		<ul style="list-style-type: none"> Control dust generation during construction activities by implementing standard construction site dust control measures (dampening with water) where required. Because of water scarcity, this should only be done where and when dust generation is a significant problem.
	<ul style="list-style-type: none"> Loss of topsoil due to poor topsoil management and constructional activities that disturb the soil profile. 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> Strip and stockpile topsoil from all areas where soil will be disturbed. There are no particular requirements for stockpile management and it can therefore be done in the way that is most practical for the operation. After cessation of disturbance, re-spread topsoil over the surface. Dispose of any sub-surface spoil material, generated from excavations, where they will not impact on land that supports vegetation, or where they can be effectively covered with topsoil.
	<ul style="list-style-type: none"> Loss of agricultural land use as a result of the occupation of the land by the project infrastructure. 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> None identified.
	<ul style="list-style-type: none"> Soil erosion due to the alteration of the land surface characteristics and surface cover. 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion.
	<i>SOCIAL IMPACT ASSESSMENT</i>		
<ul style="list-style-type: none"> Influx of job seekers into the Kenhardt area resulting in disruption of existing social structures. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> Develop and implement a Workforce Recruitment Plan during the construction phase. Reserve employment, where practical, for local residents during the construction phase. It is strongly recommended that the Workforce Recruitment Policy should reserve employment, where practically possible, for local residents (particularly for vulnerable groups such as women and previously disadvantaged individuals). This requirement should be contractually binding. Local in this regard is defined as firstly, the residents of Kenhardt (given its close proximity); followed by the residents of the other urban nodes in the immediate area (i.e. Grobelaarshoop, Marydale 	

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
			<p>and Keimoos). Position should only be filled with outsiders should the requisite skills not be available in the study area.</p> <ul style="list-style-type: none"> Clearly define and agree upon the Project Affected People (PAP) (i.e. define who is considered to be local (Kenhardt) residents; known as the PAP). This should ideally be conducted in collaboration with the local community and local government structures. The purpose of demarcating the PAP is to develop a criterion of characteristics considered to identify a given job seeker as a PAP. Once this criterion is known; all subsequent job seekers can be screened against it in order to determine whether they qualify for employment. The criterion for a PAP should be incorporated into the Workforce Recruitment Policy. Develop a database of PAP and their relevant skills and experience well in advance of the construction phase of the project. This will assist in the early identification of a suitable workforce. Should a similar database already be available in the study area; it can be used by the proponent to achieve the same purpose. However, such an existing database must be regarded as legitimate by the local community in order for it to be used as a substitute by the proponent. Develop and implement a Stakeholder Engagement Plan which sets-out the communication strategy to be followed with regards to the proposed project. This should be done well in advance of the construction phase of the project. The intention of the plan should be to ensure that all project related information (including those related to employment) is communicated: (i) accurately; (ii) timeously; (iii) to the appropriate constituency; (iv) in an appropriate format; and is aimed towards fostering realistic expectations.
	<ul style="list-style-type: none"> Increases in social deviance as a result of outsiders moving into the Kenhardt area. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> Develop and implement a Workforce Recruitment Plan during the construction phase. Reserve employment, where practical, for local residents during the construction phase. It is strongly recommended that the Workforce Recruitment Policy should reserve

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
			<p>employment, where practically possible, for local residents (particularly for vulnerable groups such as women and previously disadvantaged individuals). This requirement should be contractually binding. Local in this regard is defined as firstly, the residents of Kenhardt (given its close proximity); followed by the residents of the other urban nodes in the immediate area (i.e. Grobelaarshoop, Marydale and Keimoes). Position should only be filled with outsiders should the requisite skills not be available in the study area.</p> <ul style="list-style-type: none"> • Clearly define and agree upon the PAP (i.e. define who is considered to be local (Kenhardt) residents; known as the PAP). This should ideally be conducted in collaboration with the local community and local government structures. The purpose of demarcating the PAP is to develop a criterion of characteristics considered to identify a given job seeker as a PAP. Once this criterion is known; all subsequent job seekers can be screened against it in order to determine whether they qualify for employment. The criterion for a PAP should be incorporated into the Workforce Recruitment Policy. • Develop a database of PAP and their relevant skills and experience well in advance of the construction phase of the project. This will assist in the early identification of a suitable workforce. Should a similar database already be available in the study area; it can be used by the proponent to achieve the same purpose. However, such an existing database must be regarded as legitimate by the local community in order for it to be used as a substitute by the proponent. • Develop and implement a Stakeholder Engagement Plan which sets-out the communication strategy to be followed with regards to the proposed project. This should be done well in advance of the construction phase of the project. The intention of the plan should be to ensure that all project related information (including those related to employment) is communicated: (i) accurately; (ii) timeously; (iii) to the

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
			<p>appropriate constituency; (iv) in an appropriate format; and is aimed towards fostering realistic expectations.</p> <ul style="list-style-type: none"> • Delivery on the Economic Development Plan for the area (once the proposed project is successfully awarded preferred bidder status) must be contractually binding on the proponent (i.e. Scatec Solar).
	<ul style="list-style-type: none"> • Expectations created regarding possible employment resulting in increased frustration in the local community. 	<ul style="list-style-type: none"> • Low (Negative) 	<ul style="list-style-type: none"> • It should be recognised that expectations of employment are probably unavoidable in totality. However, proper implementation of the Stakeholder Engagement Plan should lead to realistic expectation of employment for most of the local community. It is important to note that communication should not only elaborate on what kind of employment is on offer and to whom it is offered; but also the worst-case timeframe for such employment to commence. Forewarned community members are better equipped to adjust livelihood strategies to the variability of the project timeframe.
	<ul style="list-style-type: none"> • Local spending resulting in socio-economic benefits as a result of the multiplier effect. <p><i><u>Note that since this is a positive impact, enhancement (not mitigation) measures have been provided.</u></i></p>	<ul style="list-style-type: none"> • Low (Positive) 	<ul style="list-style-type: none"> • The Project Applicant must procure goods and services, as far as practically possible, from within the project area (with a focus on Kenhardt). • Obtain regularly required goods and services (e.g. food and accommodation) from as large a selection of local service providers as possible to ensure distribution of project benefits. • Only if required goods and services are not available in the study area should the proponent seek to obtain it elsewhere.
	<ul style="list-style-type: none"> • Local employment resulting in socio-economic benefits. <p><i><u>Note that since this is a positive impact, enhancement (not mitigation) measures have been provided.</u></i></p>	<ul style="list-style-type: none"> • Moderate (Positive) 	<ul style="list-style-type: none"> • Develop a Workforce Recruitment Policy. This policy should reserve employment, where practically possible, for local residents (particularly for vulnerable groups such as women and previously disadvantaged individuals). This requirement should be contractually binding on the proponent.
	<ul style="list-style-type: none"> • Economic Development Plan contributing to local employment, local spending and human capacity development. 	<ul style="list-style-type: none"> • Moderate (Positive) 	<ul style="list-style-type: none"> • The Economic Development Plan, once fully developed, must be implemented. • The proponent should engage with local NGOs, CBOs and

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	<p><u>Note that since this is a positive impact, enhancement (not mitigation) measures have been provided.</u></p>		<p>local government structures to identify and agree upon relevant skills and competencies required in the Kenhardt community.</p> <ul style="list-style-type: none"> Such skills and competencies should then be included in the Economic Development Plan. Where possible, align Economic Development Plan and skills development initiatives with the Kai !Garib Local Municipality's IDP objectives.
	TRAFFIC IMPACT STATEMENT		
	<ul style="list-style-type: none"> Increased traffic generation during the construction phase. 	<ul style="list-style-type: none"> Low (Negative) 	<ul style="list-style-type: none"> Should abnormal loads need to be transported by road to the site, a permit needs to be obtained from the Provincial Government Northern Cape (PGNC) Department of Public Works, Roads and Transport. Compile and provide a Transport Traffic Plan to SANRAL. Ensure that roadworthy and safety standards are implemented at all times for all construction vehicles. Plan trips so that it occurs during the day but avoid construction vehicle movement on the regional road during peak time (06:00-10:00 and 16:00-20:00).
	<ul style="list-style-type: none"> Accidents with pedestrians, animals and other drivers on the surrounding tarred/gravel roads. 	<ul style="list-style-type: none"> High (Negative) 	<ul style="list-style-type: none"> Road mortality monitoring programme (inclusive of recording keeping for wildlife collisions) should be established and fences (such as Animex fences or similar) should be installed, if needed to direct animals to safe road crossings. Ensure that all contractors adhere to all speed limits applicable to all roads used. Implement clear and visible signalisation and signage indicating movement of vehicles within and around site, especially along access roads and intersections with public and private roads (such as when turning off or onto the Transnet Service Road to ensure safe entry and exit).
	<ul style="list-style-type: none"> Impact on air quality due to dust generation, noise and release of air pollutants from vehicles and construction equipment. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> Implement management strategies for dust generation e.g. apply dust suppressant on the Transnet Service Road, exposed areas and stockpiles. Postpone or reduce dust-generating activities during periods

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION	
			<p>with strong wind.</p> <ul style="list-style-type: none"> • Earthworks may need to be rescheduled or the frequency of application of dust control/suppressant increased in conditions of excessively strong winds. • Ensure that all construction vehicles are roadworthy and respect the vehicle safety standards implemented by the Project Developer. • Avoid using old and noisy (i.e. unmaintained) construction equipment and ensure equipment is well maintained. • Ensure that cleared (excavated) areas and unpaved surfaces are sprayed with water (obtained from an approved source) to minimise dust generation. • Approved soil stabilisers may be utilised to limit dust generation and to minimise water consumption. 	
	<ul style="list-style-type: none"> • Change in the quality and surface condition of the roads leading to and surrounding the site. 	<ul style="list-style-type: none"> • Low (Positive) 	<ul style="list-style-type: none"> • Construction activities will have a higher impact than the normal road activity and therefore the road should be inspected on a weekly basis for structural damage. • Implement management strategies for dust generation e.g. apply dust suppressant on the Transnet Service Road, exposed areas and stockpiles. • A Road Maintenance Plan should be developed for the section of the Transnet Service Road that could possibly be used. The plan should address the following: <ul style="list-style-type: none"> ▪ Grading requirements; ▪ Dust suppressant requirements; ▪ Drainage requirements; ▪ Signage; and ▪ Speed limits. 	
	<i>ADDITIONAL IMPACTS (IN ADDITION TO THOSE IDENTIFIED IN THE SPECIALIST STUDIES AND TRAFFIC IMPACT STATEMENT)</i>			
	<ul style="list-style-type: none"> • Impact on existing infrastructure (roads, stormwater pipelines, sewers, and electricity cables etc.). 	<ul style="list-style-type: none"> • Moderate (Negative) 	<ul style="list-style-type: none"> • Ensure that the Contractor is made aware of the location of existing underground structures (such as electricity cables, stormwater pipelines etc.) to ensure safe excavation. 	
	<ul style="list-style-type: none"> • Removal of alien invasive vegetation from the proposed project area. 	<ul style="list-style-type: none"> • Moderate (Positive) 	<ul style="list-style-type: none"> • Ensure that alien invasive vegetation found on site, within the proposed project footprint, is removed promptly, in a scheduled manner throughout the construction phase. The 	

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
			<p>removal of these species should be carried out in line with relevant specifications and regulations (such as the Regulations published in terms of Section 97(1) of the NEMBA, if applicable).</p> <ul style="list-style-type: none"> The removed alien invasive vegetation should be immediately disposed at a suitable waste disposal facility and should not be kept on site for prolonged periods of time, as this will enhance the spread of these species.
	<ul style="list-style-type: none"> Increased faunal and avifaunal road mortality as a result of increased vehicles travelling to and within the site. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> The construction personnel and staff should be made aware of the presence of fauna within the proposed project area. The construction personnel and staff must also be made aware of the general speed limits on site and must be alert at all times for potential crossings. This can be achieved via the Environmental Awareness Training programme. Furthermore, in order to ensure that animals are not attracted to the site (and potentially resulting in increased road mortality), the waste collection bins and skips should be covered with suitable material, where appropriate, and the site camp must be kept clean on a daily basis.
	<ul style="list-style-type: none"> Impact on the regional water balance as a result of increased water usage. 	<ul style="list-style-type: none"> Low (Negative) 	<ul style="list-style-type: none"> Water is required during the construction phase for various purposes, such as earthworks, as well as to fulfil the requirements of construction personnel on-site. Where possible, water conservation should be practiced. Water conservation techniques include making construction personnel aware of the importance of limiting water wastage, as well as reducing water use during the cleaning of the site (such as sweeping the site before it is being washed). This can be achieved through the Environmental Awareness Training programme. Scatec Solar should also ensure that the water infrastructure on site is monitored for leakages on a regular basis to prevent wastage. Avoid the use of potable water for dust suppression during the construction phase and consider the use of alternative approved sources, where possible.

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	<ul style="list-style-type: none"> Potential spillage of effluent (from portable sanitation facilities for construction personnel) resulting in potential impacts on soil and surface/groundwater. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> Normal sewage management practises should be implemented. These include ensuring that portable sanitation facilities are regularly emptied and the resulting sewage is contained and transported safely (by an appointed (suitable) service provider) for correct disposal at an appropriate, licenced facility. Proof of disposal (in the form of waste disposal slips or waybills) should be retained on file for auditing purposes. No waste water must be discharged to the natural environment. As part of the Environmental Awareness Training, all construction personnel should be made aware of the sewage management practises. The construction camp and necessary ablution facilities meant for construction workers must be located beyond 32 m of the drainage lines.
	<ul style="list-style-type: none"> Pollution caused by spillage or discharge of construction waste water into the surrounding environment. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> Ensure that adequate containment structures are provided for the storage of liquid dangerous goods and hazardous materials on site (such as chemicals, oil, fuel, hydraulic fluids, lubricating oils etc. required for the construction equipment and vehicles). Appropriate bund areas must be provided for the storage of these materials at the site camp. Bund areas should have a capacity of 110 % of the volume of the largest tank in the bund (tanks include storage of fuel/diesel). Bund areas should contain an impervious surface in order to prevent spillages from entering the ground. A Spill Response Plan must be compiled (by Scatec Solar and the Contractor) for the construction phase in order to manage potential spill events. The Contractor should compile a Method statement for refuelling activities under normal and emergency situations. A designated (impervious) area must be established at the site camp for refuelling purposes. Drip trays or similar impervious materials must also be used during refuelling, especially during emergency procedures. Personnel should

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
			<p>be trained to ensure proper transfer and refuelling. Any spilled fuel, oil or grease must be immediately retrieved where possible, and the contaminated material must be removed and disposed at a registered hazardous waste disposal facility. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.</p>
	<ul style="list-style-type: none"> • Pollution of the surrounding environment as a result of contamination of stormwater. Contamination could result from the spillage of chemicals, oils, fuels, sewage, solid waste, litter etc. 	<ul style="list-style-type: none"> • Moderate (Negative) 	<ul style="list-style-type: none"> • The appointed Contractor should compile a Method Statement for Stormwater Management during the construction phase. • Provide secure storage for oil, chemicals and other waste materials to prevent contamination of stormwater runoff. • Regular inspections of stormwater infrastructure should be undertaken to ensure that it is kept clear of all debris and weeds. • Monitoring programmes should be implemented to ensure that no materials enter the surface water drainage system.
	<ul style="list-style-type: none"> • Sedimentation of the surrounding drainage lines as a result of stormwater runoff and stockpiling of excavated material during the construction phase. The excavated material could potentially be washed into the drainage lines via stormwater. This could also impact on avifauna. 	<ul style="list-style-type: none"> • Moderate (Negative) 	<ul style="list-style-type: none"> • The appointed Contractor should compile a Method Statement for Stormwater Management during the construction phase. • All material that is excavated during the construction phase must be stored appropriately on site in order to minimise impacts on the surrounding aquatic environment. • Exposed soil surfaces should be graded to minimise runoff and increase infiltration. • Where possible, sandbags (or similar) should be placed at the bases of the stockpiled material in order to prevent erosion of the material. • Undertake periodic inspections and maintenance of soil erosion measures and stormwater control structures. • Stockpiles must be located at least 32 m away from the drainage lines, on flat areas where run-off will be minimised. • Stockpiles should not exceed 2 m in height. • During periods of strong winds and heavy rain (in line with relevant rainfall patterns), the stockpiles should be covered

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	<ul style="list-style-type: none"> Pollution of the surrounding environment as a result of the handling, temporary stockpiling and disposal of general waste during the construction phase. 	<ul style="list-style-type: none"> Moderate (Negative) 	<p>with appropriate material (e.g. cloth, tarpaulin etc.).</p> <ul style="list-style-type: none"> General waste (i.e. construction waste, building rubble, discarded concrete, bricks, tiles, wood, glass, window panes, air conditioners, plastic, metal, excavated material, packaging material, paper and domestic waste etc.) generated during the construction phase should be stockpiled temporarily (i.e. once-off) on site in a designated area within suitable waste collection bins and skips (or similar). Waste collection bins and skips should be covered with suitable material, where appropriate. Should the on-site stockpiling of general waste exceed 100 m³ and a period of 90 days, then the National Norms and Standards for the Storage of Waste (published on 29 November 2013 under GN 926) must be adhered to. Ensure that the designated stockpiling area for general waste (i.e. skips and waste collection bins) is inspected on a daily basis to verify its condition and integrity, particularly after rainfall events. Ensure that general waste generated during the construction phase is removed from the site on a regular basis, such as daily or weekly (whichever is practical), and safely disposed of at an appropriate, licenced waste disposal facility by an approved waste management Contractor. Waste disposal slips or waybills should be kept on file as proof of disposal. As a general principle, waste manifests must be obtained to prove legal disposal of waste. Ensure that the construction site is kept clean at all times and that construction personnel are made aware of correct waste disposal methods. Littering must be prevented through effective site camp management. Sufficient general waste disposal bins must also be provided for use by construction personnel throughout the site. These bins must be emptied on a regular basis. Ensure that all general waste emanating from the construction phase is removed from site prior to the

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	<ul style="list-style-type: none"> Pollution of the surrounding environment as a result of the handling, temporary stockpiling and disposal of hazardous waste, as well as the removal of the soil contaminated with oil and diesel. 	<ul style="list-style-type: none"> Moderate (Negative) 	<p>commencement of the operational phase.</p> <ul style="list-style-type: none"> Hazardous waste (i.e. empty tins, oils, fuel spillages, spilled materials and chemicals etc.) generated during the construction phase should be stockpiled temporarily (i.e. once-off) on site in a designated area in suitable waste collection bins and leak-proof storage skips (or similar). Waste collection bins and skips should be covered with suitable material, where appropriate. Hazardous waste must be stored separately from all other general waste. The designated stockpiling area must be labelled correctly. Should the on-site stockpiling of hazardous waste exceed 80 m³, then the National Norms and Standards for the Storage of Waste (published on 29 November 2013 under GN 926) must be adhered to. Ensure that the designated stockpiling area for hazardous waste (i.e. leak proof skips and waste collection bins) is inspected on a daily basis to verify its condition and integrity, particularly after rainfall events. Ensure that all hazardous waste is removed from the site on a regular basis and safely disposed at an appropriate, licenced hazardous waste disposal facility by an approved waste management Contractor. Waste disposal slips or waybills should be kept on file as proof of disposal. As a general principle, waste manifests must be obtained to prove legal disposal of waste. Ensure that the construction site is kept clean at all times and that construction personnel are made aware of correct waste disposal methods. Littering must be prevented through effective site camp management. Ensure that all hazardous waste emanating from the construction phase is removed from site prior to the commencement of the operational phase.
	<ul style="list-style-type: none"> Generation of noise as a result of construction activities and the use of diesel powered vehicles, equipment and 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> Keep all equipment and machinery in good working order and ensure that regular maintenance is undertaken. Ensure that equipment is operated within specifications and

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	machinery.		capacity (e.g. do not overload machines). Ensure that the equipment is turned off when not in use.
	<i>Indirect Impacts:</i>		
	ECOLOGICAL IMPACT ASSESSMENT		
	<ul style="list-style-type: none"> Alteration of habitat structure and composition in and around towers and possibly through the stringing phase of the project. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> The detailed design should consider and incorporate habitat and features into the routing of the proposed transmission line. The detailed design and confirmation of the proposed tower positions along the proposed transmission line route should assist with the avoidance of specific vegetation associates and forms (where applicable). Identify and avoid the two Aloe consociates (<i>Aloe dichotoma</i> and <i>A claviflora</i>) identified within the electrical infrastructure corridor as part of the Ecological Impact Assessment (Appendix D.1 of this finalised BA Report). Avoidance, where possible of the minor drainage lines and any additional significant plant species that may be identified and incorporate other features along the route into the design. A second assessment of the route should be undertaken in or around February to March (subsequent to the issuing of an EA and the completion of the detailed engineering) in order to identify any additional plant specimens of significance that may be evident along the route. Undertake plant rescue operations, where such specimens may be relocated/removed (i.e. search and rescue) or avoided (with the relevant permits and approvals in place) prior to the commencement of construction. Appoint a suitable Specialist/Contractor to undertake Search and Rescue operations as required, prior to the commencement of the construction phase. Implement exotic weed control during the construction phase. An initial pre-construction clearance of all exotic vegetation on route should be undertaken to reduce the possibility of further exotic weed invasion. Continued exotic

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
			<p>weed control measures should be implemented during the construction phase that aligns with an exotic vegetation management plan or an alien eradication plan.</p>
	<ul style="list-style-type: none"> Changes in the geomorphological state of drainage lines. 	<ul style="list-style-type: none"> Low (Negative) 	<ul style="list-style-type: none"> The detailed design should consider the location of the major drainage lines (with a 32 m buffer) and exclude them from the tower footprints and development footprint. Undertake and complete earthworks and construction activities outside of the high rainfall period (if possible). Ensure that there is maintenance of a high level of housekeeping along the route of the proposed transmission line during the construction phase. Monitor and implement the management of changes in the drainage features within the study area. Such actions can include undertaking an inspection of drainage features immediately outside of the footprint of the proposed transmission line and removal of solid waste and litter on a regular basis, as well as the redress of excessive erosion attributable to construction activities.
	<ul style="list-style-type: none"> Increases in the prevalence of exotic and invasive plants. 	<ul style="list-style-type: none"> Low (Negative) 	<ul style="list-style-type: none"> The detailed design should consider the location of the major drainage lines (with a 32 m buffer) and exclude them from the development footprint. Undertake regular monitoring through visual inspection and redress of exotic weeds in and around site, particularly during construction. Avoidance of excessive earthworks and sculpting of land and maintenance of the general topography of the proposed transmission line route. Erosion control measures to be implemented to stabilize the soil as required. Ensure the placement of energy dissipaters if required around tower footings within the minor drainage lines in order to reduce velocity of flow through such features and consequential disturbance.

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	GEOHYDROLOGICAL ASSESSMENT		
	<ul style="list-style-type: none"> Potential impact on the groundwater as a result of the construction of the storage yards and temporary construction labour accommodation site camps. 	<ul style="list-style-type: none"> Low (Negative) 	<ul style="list-style-type: none"> During the construction phase, all reasonable measures must be taken to prevent soil and groundwater contamination. The main source of contamination will be from construction vehicles leaking oil or fuel, fuel storage and spillages may occur whilst refuelling vehicles and machinery. During the construction phase, vehicles must be regularly serviced and maintained to check and ensure there are no leakages.
	<ul style="list-style-type: none"> Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages. 	<ul style="list-style-type: none"> Low (Negative) 	<ul style="list-style-type: none"> A precautionary approach should be taken and reasonable measures should be undertaken to prevent oil spillages and fuel leakages from occurring. Vehicles must be regularly serviced and maintained to check and ensure there are no leakages. Any engines that stand in one place for a significant length of time must have drip trays. Fuel storage tanks should be above ground on an impermeable surface and within a bunded area. Construction vehicles and equipment should also be refuelled on an impermeable surface. If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal practices of the spilled material. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.
	Cumulative Impacts:		
	ECOLOGICAL IMPACT ASSESSMENT		
	<ul style="list-style-type: none"> Alteration of habitat structure and composition in and around towers and possibly through the stringing phase of the project. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> None identified.
	<ul style="list-style-type: none"> Changes in the geomorphological state of drainage lines. 	<ul style="list-style-type: none"> Low (Negative) 	<ul style="list-style-type: none"> Implement broad scale management of drainage systems in the region.
<ul style="list-style-type: none"> Increases in the prevalence of exotic and invasive plants (leading to alteration of 	<ul style="list-style-type: none"> Low (Negative) 	<ul style="list-style-type: none"> Undertake regular monitoring through visual inspection and redress of exotic weeds in and around site, particularly 	

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	ecological processes within the wider region).		during construction.
	HERITAGE IMPACT ASSESSMENT (ARCHAEOLOGY AND CULTURAL LANDSCAPE)		
	<ul style="list-style-type: none"> Damage to and destruction of archaeological resources as a result of the proposed construction of the transmission line and associated infrastructure. 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> None identified.
	<ul style="list-style-type: none"> Damage to and destruction of graves as a result of the proposed construction of the transmission line and associated infrastructure. 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> None identified.
	<ul style="list-style-type: none"> Impacts to the natural and cultural landscape as a result of the proposed construction of the transmission line and associated infrastructure. 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> None identified.
	PALAEONTOLOGICAL IMPACT ASSESSMENT		
	<ul style="list-style-type: none"> Impact on Palaeontology: Loss of fossil heritage at or beneath the ground surface as a result of surface clearance and excavations into superficial sediments. 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> Undertake monitoring of all substantial excavations into sedimentary rocks for fossil remains and safeguard any finds <i>in situ</i>. Appoint a professional palaeontologist to record and sample any chance fossil finds.
	TRAFFIC IMPACT STATEMENT		
<ul style="list-style-type: none"> Increased traffic generation as a result of many projects (as outlined in the impact methodology section above) occurring at the same time. 	<ul style="list-style-type: none"> Low (Negative) 	<ul style="list-style-type: none"> None identified. 	
Alternative 2 - Refer to Section A (2) of this BA Report and the explanation above regarding applicable alternatives.			
	<i>Direct impacts:</i>		
	<i>Indirect impacts:</i>		
	<i>Cumulative impacts:</i>		
	<i>Direct impacts:</i>		
	<i>Indirect impacts:</i>		
	<i>Cumulative impacts:</i>		

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
Alternative 3 - Refer to Section A (2) of this BA Report and the explanation above regarding applicable alternatives.			
	<i>Direct impacts:</i>		
	<i>Indirect impacts:</i>		
	<i>Cumulative impacts:</i>		
	<i>Direct impacts:</i>		
	<i>Indirect impacts:</i>		
	<i>Cumulative impacts:</i>		
NO-GO OPTION			
<ul style="list-style-type: none"> ▪ Maintenance of status quo. 	Direct Impacts: If this proposed project does not proceed: <ul style="list-style-type: none"> • None of the impacts mentioned above will occur. • Only the current agricultural (grazing) land use will remain. • The landowners of the remaining extent of the Onder Rugzeer Farm 168, Portion 3 of Gembok Bult Farm 120, remainder of Boven Rugzeer 169 and Portion 4 of Onder Rugzeer Farm 168 will not be able to derive benefits from the implementation of an additional land-use. • New employment opportunities will not be created, which may lead to negative local socio-economic implications. • No additional power will be generated or supplied through means of renewable energy resources by this project at this location. • There will be no contributions and assistance to the government in achieving its proposed renewable energy target of 17 800 MW by 2030. • Electricity generation will remain constant (i.e. no additional renewable energy generation will occur on the proposed site) 	Not applicable.	Not applicable.

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	<p>and the local economy will not be diversified.</p> <ul style="list-style-type: none"> Local communities will continue their dependence on agriculture production and government subsidies. The local municipality's vulnerability to economic downturns will increase because of limited access to capital. There will be lost opportunity for skills transfer and education/training of local communities. The positive socio-economic impacts likely to result from the project such as increased local spending and the creation of local employment opportunities will not be realised. The local economic benefits associated with the REIPPPP will not be realised, and socio-economic contribution payments into the local community trust will not be realised. There will be further implications for the proposed Kenhardt PV 2 and PV 3 facilities, as these plants will share the same corridor (and potentially the same on-site substation) with that of Kenhardt PV 1. 		
	<i>Indirect Impacts:</i>		
	No indirect impacts have been identified for the construction phase for the No-go Option.		
	<i>Cumulative Impacts:</i>		
No cumulative impacts have been identified for the construction phase for the No-go Option.			

Operational Phase:

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
Alternative 1 (Preferred Alternative) – Refer to Section A (2) of this BA Report and the explanation above regarding applicable alternatives.			
<ul style="list-style-type: none"> ▪ Removal of vegetation; ▪ Operation and maintenance of the proposed transmission line and additional infrastructure. 	<i>Direct Impacts:</i>		
	ECOLOGICAL IMPACT ASSESSMENT		
	<ul style="list-style-type: none"> • Overhead transmission lines, as well as subtle changes in habitat are likely to result in the alteration of avian behaviour in and around the route. 	<ul style="list-style-type: none"> • Moderate (Negative) 	<ul style="list-style-type: none"> • The detailed design should consider and incorporate habitat and features into the routing of the proposed transmission line. • Implement exotic weed control during the operational phase. A clearance of all exotic vegetation on route should be undertaken at the commencement of the operational phase to reduce the possibility of further exotic weed invasion. Continued exotic weed control measures should be implemented that aligns with an exotic vegetation management plan or an alien eradication plan.
	<ul style="list-style-type: none"> • The powerlines may increase the risk of collision and electrocution in some avifauna. 	<ul style="list-style-type: none"> • Low (Negative) 	<ul style="list-style-type: none"> • Ensure that Bird Flight Diverters are placed on the proposed transmission line (along the line route). • The Delta tower configuration should not be utilised in this line route. A design that avoids any risk of electrocution to birds would be correct and better suited for this line route.
	<ul style="list-style-type: none"> • Increases in the prevalence of exotic and invasive plants. 	<ul style="list-style-type: none"> • Very Low (Negative) 	<ul style="list-style-type: none"> • Implement intermittent but regular weed control initiatives, as well as regular visual monitoring and redress of exotic weeds in and around site, particularly during the summer period.
	VISUAL IMPACT ASSESSMENT		
	<ul style="list-style-type: none"> • Potential landscape impact of the proposed 132 kV powerline on a rural agricultural landscape. 	<ul style="list-style-type: none"> • Very Low (Negative) 	<ul style="list-style-type: none"> • None identified.
	<ul style="list-style-type: none"> • Potential visual intrusion of the proposed 132 kV power line on the views of sensitive visual receptors. 	<ul style="list-style-type: none"> • Very Low (Negative) 	<ul style="list-style-type: none"> • It is recommended that the type of power line towers used for the proposed power line should be similar to existing power line towers in the landscape where possible.
	HERITAGE IMPACT ASSESSMENT (ARCHAEOLOGY AND CULTURAL LANDSCAPE)		
	<ul style="list-style-type: none"> • Impacts to the natural and cultural landscape during the operational phase as a 	<ul style="list-style-type: none"> • Very Low (Negative) 	<ul style="list-style-type: none"> • None identified.

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	<p>result of the operation of the transmission line and associated infrastructure.</p>		
	SOILS AND AGRICULTURAL POTENTIAL ASSESSMENT		
	<ul style="list-style-type: none"> Loss of agricultural land use as a result of the occupation of the land by the project infrastructure. 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> None identified.
	<ul style="list-style-type: none"> Soil erosion due to the alteration of the land surface characteristics and surface cover. 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion.
	SOCIAL IMPACT ASSESSMENT		
<ul style="list-style-type: none"> Influx of job seekers into the Kenhardt area resulting in disruption of existing social structures. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> Develop and implement a Workforce Recruitment Plan during the operational phase. Reserve employment, where practical, for local residents during the operational phase. It is strongly recommended that the Workforce Recruitment Policy should reserve employment, where practically possible, for local residents (particularly for vulnerable groups such as women and previously disadvantaged individuals). This requirement should be contractually binding. Local in this regard is defined as firstly, the residents of Kenhardt (given its close proximity); followed by the residents of the other urban nodes in the immediate area (i.e. Grobelaarshoop, Marydale and Keimoes). Position should only be filled with outsiders should the requisite skills not be available in the study area. Clearly define and agree upon the PAP (i.e. define who is considered to be local (Kenhardt) residents; known as the PAP). This should ideally be conducted in collaboration with the local community and local government structures. The purpose of demarcating the PAP is to develop a criterion of characteristics considered to identify a given job seeker as a PAP. Once this criterion is known; all subsequent job seekers can be screened against it in order to determine whether they qualify for employment. The criterion for a PAP should be incorporated into the Workforce Recruitment 	

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
			<p>Policy.</p> <ul style="list-style-type: none"> • Develop a database of PAP and their relevant skills and experience well in advance of the operational phase of the project. This will assist in the early identification of a suitable workforce. Should a similar database already be available in the study area; it can be used by the proponent to achieve the same purpose. However, such an existing database must be regarded as legitimate by the local community in order for it to be used as a substitute by the proponent. • Develop and implement a Stakeholder Engagement Plan which sets-out the communication strategy to be followed with regards to the proposed project. This should be done well in advance of the operational phase of the project. The intention of the plan should be to ensure that all project related information (including those related to employment) is communicated: (i) accurately; (ii) timeously; (iii) to the appropriate constituency; (iv) in an appropriate format; and is aimed towards fostering realistic expectations.
	<ul style="list-style-type: none"> • Increases in social deviance as a result of outsiders moving into the Kenhardt area. 	<ul style="list-style-type: none"> • Moderate (Negative) 	<ul style="list-style-type: none"> • Develop and implement a Workforce Recruitment Plan during the operational phase. • Reserve employment, where practical, for local residents during the operational phase. It is strongly recommended that the Workforce Recruitment Policy should reserve employment, where practically possible, for local residents (particularly for vulnerable groups such as women and previously disadvantaged individuals). This requirement should be contractually binding. Local in this regard is defined as firstly, the residents of Kenhardt (given its close proximity); followed by the residents of the other urban nodes in the immediate area (i.e. Grobelaarshoop, Marydale and Keimoes). Position should only be filled with outsiders should the requisite skills not be available in the study area. • Clearly define and agree upon the PAP (i.e. define who is considered to be local (Kenhardt) residents; known as the PAP). This should ideally be conducted in collaboration with

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
			<p>the local community and local government structures. The purpose of demarcating the PAP is to develop a criterion of characteristics considered to identify a given job seeker as a PAP. Once this criterion is known; all subsequent job seekers can be screened against it in order to determine whether they qualify for employment. The criterion for a PAP should be incorporated into the Workforce Recruitment Policy.</p> <ul style="list-style-type: none"> • Develop a database of PAP and their relevant skills and experience well in advance of the operational phase of the project. This will assist in the early identification of a suitable workforce. Should a similar database already be available in the study area; it can be used by the proponent to achieve the same purpose. However, such an existing database must be regarded as legitimate by the local community in order for it to be used as a substitute by the proponent. • Develop and implement a Stakeholder Engagement Plan which sets-out the communication strategy to be followed with regards to the proposed project. This should be done well in advance of the operational phase of the project. The intention of the plan should be to ensure that all project related information (including those related to employment) is communicated: (i) accurately; (ii) timeously; (iii) to the appropriate constituency; (iv) in an appropriate format; and is aimed towards fostering realistic expectations. • Delivery on the Economic Development Plan for the area (once the proposed project is successfully awarded preferred bidder status) must be contractually binding on the proponent (i.e. Scatec Solar).
	<ul style="list-style-type: none"> • Expectations created regarding possible employment resulting in increased frustration in the local community. 	<ul style="list-style-type: none"> • Low (Negative) 	<ul style="list-style-type: none"> • It should be recognised that expectations of employment are probably unavoidable in totality. However, proper implementation of the Stakeholder Engagement Plan should lead to realistic expectation of employment for most of the local community. It is important to note that communication should not only elaborate on what kind of employment is on

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	<ul style="list-style-type: none"> Local spending resulting in socio-economic benefits as a result of the multiplier effect. <p><i><u>Note that since this is a positive impact, enhancement (not mitigation) measures have been provided.</u></i></p>	<ul style="list-style-type: none"> Low (Positive) 	<p>offer and to whom it is offered; but also the worst-case timeframe for such employment to commence. Forewarned community members are better equipped to adjust livelihood strategies to the variability of the project timeframe.</p> <ul style="list-style-type: none"> The Project Applicant must procure goods and services, as far as practically possible, from within the project area (with a focus on Kenhardt). Obtain regularly required goods and services (e.g. food and accommodation) from as large a selection of local service providers as possible to ensure distribution of project benefits. Only if required goods and services are not available in the study area should the proponent seek to obtain it elsewhere.
	<ul style="list-style-type: none"> Local employment resulting in socio-economic benefits. <p><i><u>Note that since this is a positive impact, enhancement (not mitigation) measures have been provided.</u></i></p>	<ul style="list-style-type: none"> Moderate (Positive) 	<ul style="list-style-type: none"> Develop a Workforce Recruitment Policy. This policy should reserve employment, where practically possible, for local residents (particularly for vulnerable groups such as women and previously disadvantaged individuals). This requirement should be contractually binding on the proponent.
	<ul style="list-style-type: none"> Economic Development Plan contributing to local employment, local spending and human capacity development. <p><i><u>Note that since this is a positive impact, enhancement (not mitigation) measures have been provided.</u></i></p>	<ul style="list-style-type: none"> Moderate (Positive) 	<ul style="list-style-type: none"> The Economic Development Plan, once fully developed, must be implemented. The proponent should engage with local NGOs, CBOs and local government structures to identify and agree upon relevant skills and competencies required in the Kenhardt community. Such skills and competencies should then be included in the Economic Development Plan. Where possible, align Economic Development Plan and skills development initiatives with the Kai !Garib Local Municipality's IDP objectives.
TRAFFIC IMPACT STATEMENT			
	<ul style="list-style-type: none"> Increased traffic generation during the operational phase. 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> Adhere to the requirements made within the approved Transport Traffic Plan. Limit access to the site to operational personnel.

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION	
	<ul style="list-style-type: none"> Accidents with pedestrians, animals and other drivers on the surrounding tarred/gravel roads. 	<ul style="list-style-type: none"> High (Negative) 	<ul style="list-style-type: none"> Ensure that where possible, staff members carpool to site. Road mortality monitoring programme (inclusive of recording keeping for wildlife collisions) should be established and fences should be installed, if needed to direct animals to safe road crossings. Ensure that all operational personnel adhere to all speed limits applicable to all roads used. Implement clear and visible signalisation and signage indicating movement of vehicles within and around site, especially along access roads and intersections with public and private roads (such as when turning off or onto the Transnet Service Road to ensure safe entry and exit). 	
	<ul style="list-style-type: none"> Impact on air quality due to dust generation, noise and release of air pollutants from vehicles and operational equipment. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> Implement management strategies for dust generation e.g. apply dust suppressant on the Transnet Service Road, exposed areas and stockpiles. Avoid using old and noisy (i.e. unmaintained) operational equipment and ensure equipment is well maintained. Limit noisy maintenance/operational activities to daytime only. 	
	<ul style="list-style-type: none"> Change in the quality and surface condition of the roads leading to and surrounding the site. 	<ul style="list-style-type: none"> Low (Positive) 	<ul style="list-style-type: none"> Implement the requirements of the approved Road Maintenance Plan. 	
	ADDITIONAL IMPACTS (IN ADDITION TO THOSE IDENTIFIED IN THE SPECIALIST STUDIES AND TRAFFIC IMPACT STATEMENT)			
	<ul style="list-style-type: none"> Removal of alien invasive vegetation from the proposed project area. 	<ul style="list-style-type: none"> Moderate (Positive) 	<ul style="list-style-type: none"> Ensure that alien invasive vegetation found on site, within the proposed project footprint, is removed promptly, in a scheduled manner throughout the operational phase. The removal of these species should be carried out in line with relevant specifications and regulations (such as the Regulations published in terms of Section 97(1) of the NEMBA, if applicable). The removed alien invasive vegetation should be immediately disposed at a suitable waste disposal facility and should not be kept on site for prolonged periods of time, as this will enhance the spread of these species. 	

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	<ul style="list-style-type: none"> Increased faunal and avifaunal road mortality as a result of increased vehicles travelling to and within the site. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> The operational personnel and staff should be made aware of the presence of fauna within the proposed project area. They must also be made aware of the general speed limits on site and must be alert at all times for potential crossings. This can be achieved via the Environmental Awareness Training programme. Furthermore, in order to ensure that animals are not attracted to the site (and potentially resulting in increased road mortality), the waste collection bins and skips should be covered with suitable material, where appropriate, and the line route must be kept clean.
	<ul style="list-style-type: none"> Generation of noise as a result of activities and the use of diesel powered vehicles, equipment and machinery when required during the maintenance phase. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> Keep all equipment and machinery in good working order and ensure that regular maintenance is undertaken. Ensure that equipment is operated within specifications and capacity (e.g. do not overload machines). Ensure that the equipment is turned off when not in use.
	<i>Indirect Impacts:</i>		
	ECOLOGICAL IMPACT ASSESSMENT		
	<ul style="list-style-type: none"> Increases in the prevalence of exotic and invasive plants. 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> Implement intermittent but regular broad scale weed control initiatives.
	<i>Cumulative Impacts:</i>		
	ECOLOGICAL IMPACT ASSESSMENT		
	<ul style="list-style-type: none"> Overhead transmission lines, as well as subtle changes in habitat are likely to result in the alteration of avian behaviour in and around the route. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> Detailed design to consider and incorporate habitat and features into the routing of the proposed transmission line.
<ul style="list-style-type: none"> The powerlines may increase the risk of collision and electrocution in some avifauna. An increase in towers and powerlines will result in greater mortalities in the region. 	<ul style="list-style-type: none"> Low (Negative) 	<ul style="list-style-type: none"> Ensure that Bird Flight Diverters are placed on the proposed transmission line (along the line route). The Delta tower configuration should not be utilised in this region. A design that avoids any risk of electrocution to birds would be correct and better suited for this line route. 	
<ul style="list-style-type: none"> Increases in the prevalence of exotic and invasive plants. 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> Implement intermittent but regular broad scale weed control initiatives. 	

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	VISUAL IMPACT ASSESSMENT		
	<ul style="list-style-type: none"> Cumulative impact of solar energy generation projects and large scale electrical infrastructure on the existing rural-agricultural landscape. 	<ul style="list-style-type: none"> Very Low (Neutral) 	<ul style="list-style-type: none"> None identified.
	<ul style="list-style-type: none"> Cumulative visual impact of solar energy generation projects and large scale electrical infrastructure on existing views of sensitive visual receptors in the surrounding landscape. 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> None identified.
	SOILS AND AGRICULTURAL POTENTIAL ASSESSMENT		
	<ul style="list-style-type: none"> Regional loss of agricultural land and resources as a result of the occupation of the land by the infrastructure of multiple projects. 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> None identified.
	SOCIAL IMPACT ASSESSMENT		
	<ul style="list-style-type: none"> Exacerbated in-migration resulting in a disruption of social structures as more solar energy facilities and associated electrical infrastructure (such as transmission lines) are developed in the study area. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> Not applicable. Refer to Appendix D.7 of this finalised BA Report for an explanation regarding cumulative social impacts.
Alternative 2 - Refer to Section A (2) of this BA Report and the explanation above regarding applicable alternatives.			
	<i>Direct impacts:</i>		
	<i>Indirect impacts:</i>		
	<i>Cumulative impacts:</i>		
	<i>Direct impacts:</i>		
	<i>Indirect impacts:</i>		
	<i>Cumulative impacts:</i>		
Alternative 3 - Refer to Section A (2) of this BA Report and the explanation above regarding applicable alternatives.			
	<i>Direct impacts:</i>		
	<i>Indirect impacts:</i>		
	<i>Cumulative impacts:</i>		
	<i>Direct impacts:</i>		
	<i>Indirect impacts:</i>		

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	<i>Cumulative impacts:</i>		
NO-GO OPTION			
<ul style="list-style-type: none"> ▪ Maintenance of the status quo. 	<p>Direct Impacts:</p> <p>If this proposed project does not proceed:</p> <ul style="list-style-type: none"> • None of the impacts mentioned above will occur. • Only the current agricultural (grazing) land use will remain. • The landowners of the remaining extent of the Onder Rugzeer Farm 168, Portion 3 of Gembok Bult Farm 120, remainder of Boven Rugzeer 169 and Portion 4 of Onder Rugzeer Farm 168 will not be able to derive benefits from the implementation of an additional land-use. • New employment opportunities will not be created, which may lead to negative local socio-economic implications. • No additional power will be generated or supplied through means of renewable energy resources by this project at this location. • There will be no contributions and assistance to the government in achieving its proposed renewable energy target of 17 800 MW by 2030. • Electricity generation will remain constant (i.e. no additional renewable energy generation will occur on the proposed site) and the local economy will not be diversified. • Local communities will continue their dependence on agriculture production and government subsidies. The local municipality's vulnerability to economic 	Not applicable.	Not applicable.

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	<p>downturns will increase because of limited access to capital.</p> <ul style="list-style-type: none"> • There will be lost opportunity for skills transfer and education/training of local communities. • The positive socio-economic impacts likely to result from the project such as increased local spending and the creation of local employment opportunities will not be realised. • The local economic benefits associated with the REIPPPP will not be realised, and socio-economic contribution payments into the local community trust will not be realised. • There will be further implications for the proposed Kenhardt PV 2 and PV 3 facilities, as these plants will share the same corridor (and potentially the same on-site substation) with that of Kenhardt PV 1. 		
	<i>Indirect Impacts:</i>		
	No indirect impacts have been identified for the operational phase for the No-go Option.		
	<i>Cumulative Impacts:</i>		
No cumulative impacts have been identified for the operational phase for the No-go Option.			

Decommissioning Phase:

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
<i>Alternative 1 (Preferred Alternative) – Refer to Section A (2) of this BA Report and the explanation above regarding applicable alternatives.</i>			
<ul style="list-style-type: none"> ▪ Removal of vegetation; ▪ Excavations; ▪ Establishment of a laydown area for equipment; ▪ Stockpiling of topsoil and cleared vegetation; ▪ Transportation of material and equipment to site; and ▪ Removal of structures associated with the transmission line. 	<i>Direct Impacts:</i>		
	ECOLOGICAL IMPACT ASSESSMENT		
	<ul style="list-style-type: none"> • Removal of overhead transmission lines, as well as subtle changes in habitat, is likely to result in the alteration of avian behaviour following the loss of roosts and perches. 	<ul style="list-style-type: none"> • Very Low (Negative) 	<ul style="list-style-type: none"> • None identified.
	<ul style="list-style-type: none"> • Minor and subtle changes in the geomorphological state of drainage lines as hydraulic changes arise within the catchment. 	<ul style="list-style-type: none"> • Very Low (Undefined) 	<ul style="list-style-type: none"> • Stabilisation of disturbed grounds following the removal of infrastructure and avoidance of undue disturbance in and around watercourses.
	<ul style="list-style-type: none"> • Increases in the prevalence of exotic and invasive plants. 	<ul style="list-style-type: none"> • Very Low (Negative) 	<ul style="list-style-type: none"> • Implement intermittent but regular weed control initiatives for a period that spans at least two growing seasons. • Ensure the stabilization of site is undertaken, once decommissioning and removal of infrastructure has arisen.
VISUAL IMPACT ASSESSMENT			
<ul style="list-style-type: none"> • Potential visual intrusion of decommissioning activities on views of sensitive visual receptors. 	<ul style="list-style-type: none"> • Low (Negative) 	<ul style="list-style-type: none"> • Rehabilitation of cleared and disturbed areas. • Working at night should be avoided, where possible. • Night lighting of reclamation sites should be minimised within requirements of safety and efficiency. • Disturbed and transformed areas should be contoured to approximate naturally occurring slopes to avoid lines and forms that will contrast with the existing landscapes. • Stockpiled topsoil should be reapplied to disturbed areas and these areas should be re-vegetated using a mix of indigenous species in such a way that the areas will form as little contrast in form, line, colour and texture with the surrounding undisturbed landscape. • Edges of re-vegetated areas should be feathered to reduce form and line contrasts with surrounding undisturbed landscape. 	

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	HERITAGE IMPACT ASSESSMENT (ARCHAEOLOGY AND CULTURAL LANDSCAPE)		
	<ul style="list-style-type: none"> Impacts to the natural and cultural landscape during the decommissioning phase as a result of the presence of construction vehicles. 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> None identified.
	GEOHYDROLOGICAL ASSESSMENT		
	<ul style="list-style-type: none"> Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages. 	<ul style="list-style-type: none"> Low (Negative) 	<ul style="list-style-type: none"> A precautionary approach should be taken and reasonable measures should be undertaken to prevent oil spillages and fuel leakages from occurring. Vehicles must be regularly serviced and maintained to check and ensure there are no leakages. Any engines that stand in one place for a significant length of time must have drip trays. Fuel storage tanks should be above ground on an impermeable surface and within a bunded area. Vehicles and equipment should also be refuelled on an impermeable surface. If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal practices of the spilled material. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.
	SOILS AND AGRICULTURAL POTENTIAL ASSESSMENT		
<ul style="list-style-type: none"> Degradation of veld vegetation beyond the direct footprint of the proposed transmission line due to decommissioning disturbance and potential trampling by vehicles (including dust generation). 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> Minimize the footprint of disturbance during decommissioning activities. Confine vehicle access to roads only. Control dust generation during decommissioning activities by implementing standard construction site dust control measures (dampening with water) where required. Because of water scarcity, this should only be done where and when dust generation is a significant problem. 	
<ul style="list-style-type: none"> Loss of topsoil due to poor topsoil management and decommissioning activities that disturb the soil profile. 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> Strip and stockpile topsoil from all areas where soil will be disturbed. There are no particular requirements for stockpile management and it can therefore be done in the way that is most practical for the operation. 	

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION	
			<ul style="list-style-type: none"> • After cessation of disturbance, re-spread topsoil over the surface. • Dispose of any sub-surface spoil material, generated from excavations, where they will not impact on land that supports vegetation, or where they can be effectively covered with topsoil. 	
	<ul style="list-style-type: none"> • Loss of agricultural land use as a result of the occupation of the land by the project infrastructure. 	<ul style="list-style-type: none"> • Very Low (Negative) 	<ul style="list-style-type: none"> • None identified. 	
	<ul style="list-style-type: none"> • Soil erosion due to the alteration of the land surface characteristics and surface cover. 	<ul style="list-style-type: none"> • Very Low (Negative) 	<ul style="list-style-type: none"> • Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. 	
	SOCIAL IMPACT ASSESSMENT			
	<ul style="list-style-type: none"> • Job losses as a result of the decommissioning of the proposed development. 	<ul style="list-style-type: none"> • Moderate (Negative) 	<ul style="list-style-type: none"> • The proponent should comply with relevant South African labour legislation when retrenching employees. • Scatec Solar should also implement appropriate succession training of locally employed staff earmarked for retrenchment during decommissioning. Such training could gradually equip workers to enter gainful employment in other locally viable sectors. • All project infrastructures should be decommissioned appropriately and thoroughly to avoid misuse. 	
	TRAFFIC IMPACT STATEMENT			
	<ul style="list-style-type: none"> • Increased traffic generation during the decommissioning phase. 	<ul style="list-style-type: none"> • Low (Negative) 	<ul style="list-style-type: none"> • Should abnormal loads need to be transported by road to the site or away from the site during the decommissioning phase, a permit needs to be obtained from the PGNC Department of Public Works, Roads and Transport. • Compile and provide a Transport Traffic Plan to SANRAL. • Ensure that roadworthy and safety standards are implemented at all times for all vehicles used during the decommissioning phase. • Plan trips so that it occurs during the day but avoid vehicle movement on the regional road during peak time (06:00-10:00 and 16:00-20:00). 	

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	<ul style="list-style-type: none"> Accidents with pedestrians, animals and other drivers on the surrounding tarred/gravel roads. 	<ul style="list-style-type: none"> High (Negative) 	<ul style="list-style-type: none"> Road mortality monitoring programme (inclusive of recording keeping for wildlife collisions) should be established and fences (such as Animex fences or similar) should be installed, if needed to direct animals to safe road crossings. Ensure that all contractors adhere to all speed limits applicable to all roads used. Implement clear and visible signalisation and signage indicating movement of vehicles within and around site, especially along access roads and intersections with public and private roads (such as when turning off or onto the Transnet Service Road to ensure safe entry and exit).
	<ul style="list-style-type: none"> Impact on air quality due to dust generation, noise and release of air pollutants from vehicles and decommissioning equipment. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> Implement management strategies for dust generation e.g. apply dust suppressant on the Transnet Service Road, exposed areas and stockpiles. Postpone or reduce dust-generating activities during periods with strong wind. Earthworks may need to be rescheduled or the frequency of application of dust control/suppressant increased. Ensure that all vehicles are roadworthy and respect the vehicle safety standards implemented by the Project Developer. Avoid using old and noisy (i.e. unmaintained) decommissioning equipment and ensure equipment is well maintained.
	<ul style="list-style-type: none"> Change in the quality and surface condition of the roads leading to and surrounding the site. 	<ul style="list-style-type: none"> Low (Positive) 	<ul style="list-style-type: none"> Decommissioning activities will have a higher impact than the normal road activity and therefore the road should be inspected on a weekly basis for structural damage. Implement management strategies for dust generation e.g. apply dust suppressant on the Transnet Service Road, exposed areas and stockpiles. A Road Maintenance Plan should be developed for the section of the Transnet Service Road that could possibly be used. The plan should address the following: <ul style="list-style-type: none"> Grading requirements;

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
			<ul style="list-style-type: none"> ▪ Dust suppressant requirements; ▪ Drainage requirements; ▪ Signage; and ▪ Speed limits.
	<i>ADDITIONAL IMPACTS (IN ADDITION TO THOSE IDENTIFIED IN THE SPECIALIST STUDIES AND TRAFFIC IMPACT STATEMENT)</i>		
	<ul style="list-style-type: none"> • Removal of alien invasive vegetation from the proposed project area. 	<ul style="list-style-type: none"> • Moderate (Positive) 	<ul style="list-style-type: none"> • Ensure that alien invasive vegetation found on site, within the proposed project footprint, is removed promptly, in a scheduled manner throughout the decommissioning phase. The removal of these species should be carried out in line with relevant specifications and regulations (such as the Regulations published in terms of Section 97(1) of the NEMBA, if applicable). • The removed alien invasive vegetation should be immediately disposed at a suitable waste disposal facility and should not be kept on site for prolonged periods of time, as this will enhance the spread of these species.
	<ul style="list-style-type: none"> • Increased faunal and avifaunal road mortality as a result of increased vehicles travelling to and within the site. 	<ul style="list-style-type: none"> • Moderate (Negative) 	<ul style="list-style-type: none"> • The decommissioning personnel and staff should be made aware of the presence of fauna within the proposed project area. They must also be made aware of the general speed limits on site and must be alert at all times for potential crossings. This can be achieved via the Environmental Awareness Training programme. • Furthermore, in order to ensure that animals are not attracted to the site (and potentially resulting in increased road mortality), the waste collection bins and skips should be covered with suitable material, where appropriate, and the site camp must be kept clean on a daily basis.
<ul style="list-style-type: none"> • Impact on the regional water balance as a result of increased water usage. 	<ul style="list-style-type: none"> • Low (Negative) 	<ul style="list-style-type: none"> • Water is required during the decommissioning phase for various purposes, such as earthworks, as well as to fulfil the requirements of personnel on-site. Where possible, water conservation should be practiced. Water conservation techniques include making personnel aware of the importance of limiting water wastage, as well as reducing water use during the cleaning of the site (such as sweeping the site before it is being washed). This can be achieved 	

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
			<p>through the Environmental Awareness Training programme.</p> <ul style="list-style-type: none"> Avoid the use of potable water for dust suppression during the decommissioning phase and consider the use of alternative approved sources, where possible.
	<ul style="list-style-type: none"> Potential spillage of effluent (from portable sanitation facilities for decommissioning personnel) resulting in potential impacts on soil and surface/groundwater. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> Normal sewage management practises should be implemented. These include ensuring that portable sanitation facilities are regularly emptied and the resulting sewage is contained and transported safely (by an appointed (suitable) service provider) for correct disposal at an appropriate, licenced facility. Proof of disposal (in the form of waste disposal slips or waybills) should be retained on file for auditing purposes. No waste water must be discharged to the natural environment. As part of the Environmental Awareness Training, all decommissioning personnel should be made aware of the sewage management practises. The site camp and necessary ablution facilities meant for workers must be located beyond 32 m of the drainage lines.
	<ul style="list-style-type: none"> Pollution caused by spillage or discharge of waste water into the surrounding environment. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> Ensure that adequate containment structures are provided for the storage of liquid dangerous goods and hazardous materials on site (such as chemicals, oil, fuel, hydraulic fluids, lubricating oils etc. required for the equipment and vehicles). Appropriate bund areas must be provided for the storage of these materials at the site camp. Bund areas should have a capacity of 110 % of the volume of the largest tank in the bund (tanks include storage of fuel/diesel). Bund areas should contain an impervious surface in order to prevent spillages from entering the ground. A Spill Response Plan must be compiled (by Scatec Solar and the Contractor) for the decommissioning phase in order to manage potential spill events. The Contractor should compile a Method statement for refuelling activities under normal and emergency situations. A designated (impervious) area must be established at the

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
			<p>site camp for refuelling purposes. Drip trays or similar impervious materials must also be used during refuelling, especially during emergency procedures. Personnel should be trained to ensure proper transfer and refuelling. Any spilled fuel, oil or grease must be immediately retrieved where possible, and the contaminated material must be removed and disposed at a registered hazardous waste disposal facility. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.</p>
	<ul style="list-style-type: none"> • Pollution of the surrounding environment as a result of contamination of stormwater. Contamination could result from the spillage of chemicals, oils, fuels, sewage, solid waste, litter etc. 	<ul style="list-style-type: none"> • Moderate (Negative) 	<ul style="list-style-type: none"> • The appointed Contractor should compile a Method Statement for Stormwater Management during the decommissioning phase. • Provide secure storage for oil, chemicals and other waste materials to prevent contamination of stormwater runoff. • Regular inspections of stormwater infrastructure should be undertaken to ensure that it is kept clear of all debris and weeds. • Monitoring programmes should be implemented to ensure that no materials enter the surface water drainage system.
	<ul style="list-style-type: none"> • Sedimentation of the surrounding drainage lines as a result of stormwater runoff and stockpiling of excavated material during the decommissioning phase. The excavated material could potentially be washed into the drainage lines via stormwater. This could also impact on avifauna. 	<ul style="list-style-type: none"> • Moderate (Negative) 	<ul style="list-style-type: none"> • The appointed Contractor should compile a Method Statement for Stormwater Management during the decommissioning phase. • All material that is excavated during the decommissioning phase must be stored appropriately on site in order to minimise impacts on the surrounding aquatic environment. • Exposed soil surfaces should be graded to minimise runoff and increase infiltration. • Where possible, sandbags (or similar) should be placed at the bases of the stockpiled material in order to prevent erosion of the material. • Undertake periodic inspections and maintenance of soil erosion measures and stormwater control structures. • Stockpiles must be located at least 32 m away from the drainage lines, on flat areas where run-off will be minimised.

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	<ul style="list-style-type: none"> Pollution of the surrounding environment as a result of the handling, temporary stockpiling and disposal of general waste during the decommissioning phase. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> Stockpiles should not exceed 2 m in height. During periods of strong winds and heavy rain (in line with relevant rainfall patterns), the stockpiles should be covered with appropriate material (e.g. cloth, tarpaulin etc.). General waste (i.e. waste, building rubble, discarded concrete, bricks, tiles, wood, glass, window panes, air conditioners, plastic, metal, excavated material, packaging material, paper and domestic waste etc.) generated during the decommissioning phase should be stockpiled temporarily (i.e. once-off) on site in a designated area within suitable waste collection bins and skips (or similar). Waste collection bins and skips should be covered with suitable material, where appropriate. Should the on-site stockpiling of general waste exceed 100 m³ and a period of 90 days, then the National Norms and Standards for the Storage of Waste (published on 29 November 2013 under GN 926) must be adhered to. Ensure that the designated stockpiling area for general waste (i.e. skips and waste collection bins) is inspected on a daily basis to verify its condition and integrity, particularly after rainfall events. Ensure that general waste generated during the decommissioning phase is removed from the site on a regular basis, such as daily or weekly (whichever is practical), and safely disposed of at an appropriate, licenced waste disposal facility by an approved waste management Contractor. Waste disposal slips or waybills should be kept on file as proof of disposal. As a general principle, waste manifests must be obtained to prove legal disposal of waste. Ensure that the site is kept clean at all times and that personnel are made aware of correct waste disposal methods. Littering must be prevented through effective site camp management. Sufficient general waste disposal bins must also be provided for use by staff throughout the site. These bins must be

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	<ul style="list-style-type: none"> Pollution of the surrounding environment as a result of the handling, temporary stockpiling and disposal of hazardous waste, as well as the removal of the soil contaminated with oil and diesel. 	<ul style="list-style-type: none"> Moderate (Negative) 	<p>emptied on a regular basis.</p> <ul style="list-style-type: none"> Hazardous waste (i.e. empty tins, oils, fuel spillages, spilled materials and chemicals etc.) generated during the decommissioning phase should be stockpiled temporarily (i.e. once-off) on site in a designated area in suitable waste collection bins and leak-proof storage skips (or similar). Waste collection bins and skips should be covered with suitable material, where appropriate. Hazardous waste must be stored separately from all other general waste. The designated stockpiling area must be labelled correctly. Should the on-site stockpiling of hazardous waste exceed 80 m³, then the National Norms and Standards for the Storage of Waste (published on 29 November 2013 under GN 926) must be adhered to. Ensure that the designated stockpiling area for hazardous waste (i.e. leak proof skips and waste collection bins) is inspected on a daily basis to verify its condition and integrity, particularly after rainfall events. Ensure that all hazardous waste is removed from the site on a regular basis and safely disposed at an appropriate, licenced hazardous waste disposal facility by an approved waste management Contractor. Waste disposal slips or waybills should be kept on file as proof of disposal. As a general principle, waste manifests must be obtained to prove legal disposal of waste. Ensure that the decommissioning site is kept clean at all times and that decommissioning personnel are made aware of correct waste disposal methods. Littering must be prevented through effective site camp management.
	<ul style="list-style-type: none"> Generation of noise as a result of decommissioning activities and the use of diesel powered vehicles, equipment and machinery. 	<ul style="list-style-type: none"> Moderate (Negative) 	<ul style="list-style-type: none"> Keep all equipment and machinery in good working order and ensure that regular maintenance is undertaken. Ensure that equipment is operated within specifications and capacity (e.g. do not overload machines). Ensure that the equipment is turned off when not in use.

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
<i>Indirect Impacts:</i>			
ECOLOGICAL IMPACT ASSESSMENT			
	<ul style="list-style-type: none"> Removal of overhead transmission lines, as well as subtle changes in habitat, is likely to result in the alteration of avian behaviour following the loss of roosts and perches. 	<ul style="list-style-type: none"> Very Low (Negative) 	<ul style="list-style-type: none"> None identified.
	<ul style="list-style-type: none"> Increases in the prevalence of exotic and invasive plants. 	<ul style="list-style-type: none"> Low (Negative) 	<ul style="list-style-type: none"> Implement medium term exotic weed and vegetation control interventions.
GEOHYDROLOGICAL ASSESSMENT			
	<ul style="list-style-type: none"> Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages. 	<ul style="list-style-type: none"> Low (Negative) 	<ul style="list-style-type: none"> A precautionary approach should be taken and reasonable measures should be undertaken to prevent oil spillages and fuel leakages from occurring. Vehicles must be regularly serviced and maintained to check and ensure there are no leakages. Any engines that stand in one place for a significant length of time must have drip trays. Fuel storage tanks should be above ground on an impermeable surface and within a bunded area. Vehicles and equipment should also be refuelled on an impermeable surface. If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal practices of the spilled material. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.
<i>Cumulative Impacts:</i>			
ECOLOGICAL IMPACT ASSESSMENT			
	<ul style="list-style-type: none"> Increases in the prevalence of exotic and invasive plants. 	<ul style="list-style-type: none"> Low (Negative) 	<ul style="list-style-type: none"> Implement medium term exotic weed and vegetation control interventions.
Alternative 2 - Refer to Section A (2) of this BA Report and the explanation above regarding applicable alternatives.			
	<i>Direct impacts:</i>		
	<i>Indirect impacts:</i>		
	<i>Cumulative impacts:</i>		
	<i>Direct impacts:</i>		

ACTIVITY	IMPACT SUMMARY	SIGNIFICANCE	PROPOSED MITIGATION
	<i>Indirect impacts:</i>		
	<i>Cumulative impacts:</i>		
Alternative 3 - Refer to Section A (2) of this BA Report and the explanation above regarding applicable alternatives.			
	<i>Direct impacts:</i>		
	<i>Indirect impacts:</i>		
	<i>Cumulative impacts:</i>		
	<i>Direct impacts:</i>		
	<i>Indirect impacts:</i>		
	<i>Cumulative impacts:</i>		
NO-GO OPTION			
<ul style="list-style-type: none"> Maintenance of the status quo. 	Direct Impacts:		
	If this project does not go ahead there will be no need to decommission the project. Therefore direct impacts during the decommissioning phase for the No-go Option are not applicable.	Not applicable.	Not applicable.
	Indirect Impacts:		
	If this project does not go ahead there will be no need to decommission the project. Therefore indirect impacts during the decommissioning phase for the No-go Option are not applicable.		
	Cumulative Impacts:		
	If this project does not go ahead there will be no need to decommission the project. Therefore cumulative impacts during the decommissioning phase for the No-go Option are not applicable.		

A complete impact assessment in terms of Regulation 19(3) of GN 982 must be included as Appendix F.

Note from the CSIR: A complete Impact Assessment is included in Appendix F of this finalised BA Report.

2. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Alternative A (preferred alternative)

As mentioned above, feasible site alternatives (i.e. location and property alternatives) do not exist for the proposed project as the proposed project location is dependent on the location of the Eskom Nieuwehoop Substation and the proposed Kenhardt PV 1 facility.

This section provides a summary of the BA and conclusions drawn from the impacts identified as a result of the proposed Kenhardt PV 1 – Transmission Line project. It is important to note that only the findings of the main specialist studies are summarised in this section. All additional impacts identified by the EAP (outside of those covered by the specialist studies) have been rated with a moderate to low significance with the implementation of mitigation measures (i.e. no impacts have been identified with a high impact significance with the implementation of mitigation measures).

▪ Ecological Impact Assessment:

An Ecological Impact Assessment (Appendix D.1 of this finalised BA Report) was conducted as part of the BA Process in order to identify and assess impacts associated with the construction, operation and decommissioning of the proposed project on the terrestrial and aquatic ecology within the surrounding regions.

The following main impacts were identified in the Ecological Impact Assessment:

Construction Phase:

- Alteration of habitat structure and composition in and around towers and possibly through the stringing phase of the project;
- Changes in the geomorphological state of drainage lines; and
- Exotic weed invasion.

Operational Phase:

- Changes in avian behaviour within increased perch and predation opportunities arising for raptors, which in turn have indirect impacts on prey species in the general locale;
- Bird collisions and mortalities arising from electrocution of birds perching on site and possibly direct collisions with the transmission line; and
- Exotic weed invasion as a consequence of regular and continued disturbance of route.

Decommissioning Phase:

- A reversion back to the present seral stage, where continued grazing by livestock and herbivory by game will arise;
- A reversion of present faunal population states within the subject route; and
- Exotic weed invasion as a consequence of abandonment of route and cessation of weed control measures.

Cumulative Impacts:

- Extensive alteration of habitat structure and composition over an extensive and wide area where an increase in powerlines arise;
- Increased change in the geomorphological state of drainage lines on account of long term and extensive change in the nature of the catchment; and
- Exotic weed invasion as a consequence of regular and continued disturbance across an extensive area of the transmission line route.

Table 8 below illustrates a summary of the number of impacts identified in the Ecological Impact Assessment.

Table 8: Summary of the Ecological Impact Assessment

	Total Impacts	Significance Before Mitigation				Significance After Mitigation			
		Very Low	Low	Moderate	High	Very Low	Low	Moderate	High
Construction Phase: Direct Impacts	3	0	2	1	0	3	0	0	0
Construction Phase: Indirect Impacts	3	0	2	1	0	3	0	0	0
Construction Phase: Cumulative Impacts	3	0	2	1	0	2	0	1	0
Operational Phase: Direct Impacts	3	1	1	1	0	2	1	0	0
Operational Phase: Indirect Impacts	1	1	0	0	0	1	0	0	0
Operational Phase: Cumulative Impacts	3	1	1	1	0	2	1	0	0
Decommissioning Phase: Direct Impacts	3	3	0	0	0	3	0	0	0
Decommissioning Phase: Indirect Impacts	2	1	1	0	0	2	0	0	0
Decommissioning Phase: Cumulative Impacts	1	0	1	0	0	1	0	0	0
Total Impacts	22								

Overall, the above impacts are predicted to be of a moderate to low significance without the implementation of mitigation measures. It is clear from Table 8 that no impacts were assessed as being of high significance after the implementation of mitigation.

▪ **Visual Impact Assessment:**

A Visual Impact Assessment (Appendix D.2 of this finalised BA Report) was conducted as part of the BA Process in order to identify and assess impacts associated with the construction, operation and decommissioning of the proposed project on the surrounding sensitive viewers and receptors.

The following main impacts were identified in the Visual Impact Assessment:

Construction Phase:

- Potential visual intrusion of construction activities on views of sensitive visual receptors.

Operational Phase:

- Potential landscape impact of the proposed 132 kV powerline on a rural agricultural landscape; and
- Potential visual intrusion of the proposed 132 kV powerline on the views of sensitive visual receptors.

Decommissioning Phase:

- Potential visual intrusion of decommissioning activities on views of sensitive visual receptors.

Cumulative Impacts:

- Cumulative impact of solar energy generation projects and large scale electrical infrastructure on the existing rural-agricultural landscape; and
- Cumulative visual impact of solar energy generation projects and large scale electrical infrastructure on existing views of sensitive visual receptors in the surrounding landscape.

Table 9 below illustrates a summary of the number of impacts identified in the Visual Impact Assessment.

Table 9: Summary of the Visual Impact Assessment

	Total Impacts	Significance Before Mitigation				Significance After Mitigation			
		Very Low	Low	Moderate	High	Very Low	Low	Moderate	High
Construction Phase: Direct Impacts	1	0	1	0	0	0	1	0	0
Operational Phase: Direct Impacts	2	2	0	0	0	2	0	0	0
Decommissioning Phase: Direct Impacts	1	0	1	0	0	0	1	0	0
Cumulative Impacts	2	2	0	0	0	2	0	0	0
Total Impacts	6								

No indirect impacts were identified in the Visual Impact Assessment.

Overall, the above impacts are predicted to be of a low to very low significance without the implementation of mitigation measures. It is clear from Table 9 that no impacts were assessed as being of high significance after the implementation of mitigation.

▪ **Heritage Impact Assessment (Archaeology and Palaeontology):**

A Heritage Impact Assessment (Appendix D.3 of this finalised BA Report) was conducted as part of the BA Process in order to identify and assess impacts associated with the construction and operation of the proposed project on the archaeology and the cultural landscape.

The following main impacts were identified in the Heritage Impact Assessment:

Construction Phase:

- Damage to or destruction of archaeological resources and graves; and
- Impacts to the cultural and natural landscape.

Operational Phase:

- Impacts to the cultural and natural landscape.

Decommissioning Phase:

- Impacts to the cultural and natural landscape.

Cumulative Impacts:

- Damage to or destruction of archaeological resources and graves; and
- Impacts to the cultural and natural landscape.

Table 10 below illustrates a summary of the number of impacts identified in the Heritage Impact Assessment.

Table 10: Summary of the Heritage Impact Assessment

	Total Impacts	Significance Before Mitigation				Significance After Mitigation			
		Very Low	Low	Moderate	High	Very Low	Low	Moderate	High
Construction Phase: Direct Impacts	3	3	0	0	0	3	0	0	0
Operational Phase: Direct Impacts	1	1	0	0	0	1	0	0	0
Decommissioning Phase: Direct Impacts	1	1	0	0	0	1	0	0	0
Cumulative Impacts	3	3	0	0	0	3	0	0	0
Total Impacts	8								

Indirect impacts have not been assessed because the nature of the identified heritage resources is such that significant indirect impacts are highly unlikely to occur.

Overall, the above impacts are predicted to be of a very low significance without and with the implementation of mitigation measures. It is clear from Table 10 that no impacts were assessed as being of high significance with or without the implementation of mitigation.

▪ **Desktop Palaeontological Impact Assessment:**

A desktop Palaeontological Impact Assessment (Appendix D.4 of this finalised BA Report) was conducted as part of the BA Process in order to identify and assess impacts associated with the construction of the proposed project on palaeontology.

The following main impacts were identified in the Palaeontological Impact Assessment:

Construction Phase:

- Potential loss of palaeontological heritage resources through disturbance, damage or destruction of fossils and fossil sites (including associated geological contextual data) through surface clearance and excavation activities during the construction phase.

Cumulative Impacts:

- Potential cumulative loss of palaeontological heritage resources through disturbance, damage or destruction of fossils and fossil sites (including associated geological contextual data) through surface clearance and excavation activities during the construction phase of proposed transmission line in the context of several alternative energy projects planned within the broader Kenhardt region and other key electrical infrastructure developments within a 20

km radius of the proposed project site.

Table 11 below illustrates a summary of the number of impacts identified in the Palaeontological Impact Assessment.

Table 11: Summary of the Palaeontological Impact Assessment

	Total Impacts	Significance Before Mitigation				Significance After Mitigation			
		Very Low	Low	Moderate	High	Very Low	Low	Moderate	High
Construction Phase: Direct Impacts	1	1	0	0	0	1	0	0	0
Cumulative Impacts	1	1	0	0	0	1	0	0	0
Total Impacts	2								

No significant impacts on palaeontological heritage are anticipated during the operational and decommissioning phases of the proposed transmission line development, therefore these have not been rated or identified.

Overall, the above impacts are predicted to be of a very low significance without and with the implementation of mitigation measures. It is clear from Table 11 that no impacts were assessed as being of high significance with or without the implementation of mitigation.

▪ **Geohydrological Assessment:**

A Geohydrological Assessment (Appendix D.5 of this finalised BA Report) was conducted as part of the BA Process in order to identify and assess impacts associated with the construction and operation of the proposed project on the groundwater and geohydrological resources.

The following main impacts were identified in the Geohydrological Assessment:

Construction Phase:

- Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages; and
- Potential impact on the groundwater as a result of the construction of the storage yards and temporary construction labour accommodation site camps.

Decommissioning Phase:

- Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages.

Table 12 below illustrates a summary of the number of impacts identified in the Geohydrological Assessment.

Table 12: Summary of the Geohydrological Assessment

	Total Impacts	Significance Before Mitigation				Significance After Mitigation			
		Very Low	Low	Moderate	High	Very Low	Low	Moderate	High
Construction Phase: Direct Impacts	2	0	2	0	0	2	0	0	0
Construction Phase: Indirect Impacts	2	0	2	0	0	2	0	0	0
Decommissioning Phase: Direct Impacts	1	0	1	0	0	1	0	0	0
Decommissioning Phase: Indirect Impacts	1	0	1	0	0	1	0	0	0
Total Impacts	6								

No impacts on geohydrology are anticipated during the operational phase of the proposed transmission line development, therefore these have not been rated or identified. No cumulative impacts have been identified in the specialist study.

Overall, the above impacts are predicted to be of a very low significance with the implementation of mitigation measures. It is clear from Table 12 that no impacts were assessed as being of high significance with or without the implementation of mitigation.

▪ **Soils and Agricultural Potential Assessment:**

A Soils and Agricultural Potential Assessment (Appendix D.6 of this finalised BA Report) was conducted as part of the BA Process in order to identify and assess impacts associated with the proposed project on the soil and agricultural land use.

The following main impacts were identified in the Soils and Agricultural Potential Assessment:

Construction and Decommissioning Phases:

- Degradation of veld vegetation beyond the direct footprint of the proposed transmission line corridor due to construction and decommissioning phase disturbance and potential trampling by vehicles.
- Loss of topsoil due to poor topsoil management (burial, erosion, etc.) during construction and decommissioning related soil profile disturbance (levelling, excavations etc.) and resultant decrease in that soil's capability for supporting vegetation.
- Loss of agricultural land use due to direct occupation by the infrastructural footprint of the proposed development for the duration of the project (all phases). This will take affected portions of land out of agricultural production.
- Soil erosion by wind or water due to the alteration of the land surface characteristics. Alteration of surface characteristics may be caused by construction related land surface disturbance, vegetation removal, and the establishment of excavations and surfaces for the proposed pylon bases. Erosion will cause loss and deterioration of soil resources and may occur during all phases of the project.

Operational Phase:

- Loss of agricultural land use due to direct occupation by the infrastructural footprint of the proposed development for the duration of the project (all phases). This will take affected portions of land out of agricultural production.
- Soil erosion by wind or water due to the alteration of the land surface characteristics. Alteration of surface characteristics may be caused by construction related land surface disturbance, vegetation removal, and the establishment of excavations and surfaces for the proposed pylon bases. Erosion will cause loss and deterioration of soil resources and may occur during all phases of the project.

Cumulative Impacts:

- Cumulative impacts due to the regional loss of agricultural land resources as a result of other developments on agricultural land in the region.

Table 13 below illustrates a summary of the number of impacts identified in the Soils and Agricultural Potential Assessment.

Table 13: Summary of the Soils and Agricultural Potential Assessment

	Total Impacts	Significance Before Mitigation				Significance After Mitigation			
		Very Low	Low	Moderate	High	Very Low	Low	Moderate	High
Construction Phase: Direct Impacts	4	4	0	0	0	4	0	0	0
Operational Phase: Direct Impacts	2	2	0	0	0	2	0	0	0
Decommissioning Phase: Direct Impacts	4	4	0	0	0	4	0	0	0
Cumulative Impacts	1	1	0	0	0	1	0	0	0
Total Impacts	11								

No indirect impacts have been identified in the specialist study.

Overall, the above impacts are predicted to be of a very low significance without and with the implementation of mitigation measures. It is clear from Table 13 that no impacts were assessed as being of high significance with or without the implementation of mitigation.

▪ **Social Impact Assessment:**

A Social Impact Assessment (Appendix D.7 of this finalised BA Report) was conducted as part of the BA Process in order to identify and assess impacts associated with the proposed project on the social environment.

The following main impacts were identified in the Social Impact Assessment:

Construction and Operational Phases:

- Influx of jobseekers;
- Increases in social deviance;
- Increases in incidence of HIV/AIDS infections;
- Expectations regarding jobs;
- Local spending;

- Local employment; and
- Human development resulting from the proposed Economic Development Plan.

Decommissioning Phase:

- Job losses at the end of the project life-cycle.

Cumulative Impacts:

- Cumulative impacts as a result of exacerbated in-migration.

Table 14 below illustrates a summary of the number of impacts identified in the Social Impact Assessment.

Table 14: Summary of the Social Impact Assessment

	Total Impacts	Significance Before Mitigation				Significance After Mitigation			
		Very Low	Low	Moderate	High	Very Low	Low	Moderate	High
Construction Phase: Direct Impacts	6	0	2	4	0	1	3	2	0
Operational Phase: Direct Impacts	6	0	2	4	0	1	3	2	0
Decommissioning Phase: Direct Impacts	1	0	0	1	0	0	1	0	0
Cumulative Impacts	1	0	0	1	0	0	0	1	0
Total Impacts	14								

No indirect impacts have been identified in the specialist study.

It is clear from Table 14 that no impacts were assessed as being of high significance with or without the implementation of mitigation. Note that positive social impacts were also assessed. The overall significance rating of the negative socio-economic impacts associated with the proposed project is low to moderate; whereas the overall significance rating of the positive socio-economic impacts associated with the proposed development is moderate.

Alternative B

As mentioned above, feasible site alternatives (i.e. location and property alternatives) do not exist for the proposed project as the proposed project location is dependent on the location of the Eskom Nieuwehoop Substation and the proposed Kenhardt PV 1 facility.

Alternative C

As mentioned above, feasible site alternatives (i.e. location and property alternatives) do not exist for the proposed project as the proposed project location is dependent on the location of the Eskom Nieuwehoop Substation and the proposed Kenhardt PV 1 facility.

No-go alternative (compulsory)

The following implications will occur if the “no-go” alternative is implemented (i.e. if the proposed Kenhardt PV 1 – Transmission Line project is not constructed):

- There will be negative implications for the proposed Kenhardt PV 1 facility, as there will be no dedicated, fundamental electrical infrastructure to allow the PV facility to connect to the Eskom Nieuwehoop Substation and the national grid. This could possibly result in non-realisation of the benefits, such as economic spin offs and electricity generation, associated with the proposed Kenhardt PV 1 facility. This could also result in additional costs and expenditure, as well as additional timeframes required, as a result of the potential re-design of the Kenhardt PV 1 facility to align with an alternative substation within the region. Using an alternative substation within the region (dependent on capacity requirements) could result in longer transmission lines and associated gravel roads. This could result in additional negative impacts to the surrounding environment, including avifauna. If re-design is not financially and technically feasible, then the proposed Kenhardt PV 1 facility will not be able to be constructed as it will not have fundamental infrastructure to link it to the national grid. If the proposed Kenhardt PV 1 facility cannot be constructed as a result of the no-go of the proposed Kenhardt PV 1 – Transmission Line, this could, in turn, result in the following implications:
 - The landowners of the remaining extent of the Onder Rugzeer Farm 168, Portion 3 of Gemsbok Bult Farm 120, remainder of Boven Rugzeer 169 and Portion 4 of Onder Rugzeer Farm 168 will not be able to derive benefits from the implementation of an additional land-use;
 - No additional power will be generated or supplied through means of renewable energy resources by this project at this location. The proposed 75 MW facility is predicted to generate approximately 200 GW/h per year which could power 20 000 households;

- There will be no contributions and assistance to the government in achieving its proposed renewable energy target of 17 800 MW by 2030;
 - No additional power to the local grid will be provided via the Eskom grid, with approximately 90% coal-based power generation with associated high levels of CO₂ emissions and water consumption;
 - Electricity generation will remain constant (i.e. no additional renewable energy generation will occur on the proposed site) and the local economy will not be diversified;
 - Local communities will continue their dependence on agriculture production and government subsidies. The local municipality's vulnerability to economic downturns will increase because of limited access to capital;
 - There will be no opportunity for additional employment in an area where job creation is identified as a key priority. Between 90 and 150 skilled and 400 and 460 unskilled employment opportunities are expected to be created during the construction phase of the proposed Kenhardt PV 1 facility. Approximately 20 skilled and 40 unskilled employment opportunities will be created over the 20 year lifespan of the proposed Kenhardt PV 1 facility;
 - There will be lost opportunity for skills transfer and education/training of local communities;
 - The positive socio-economic impacts likely to result from the project such as increased local spending and the creation of local employment opportunities will not be realised; and
 - The local economic benefits associated with the REIPPPP will not be realised, and socio-economic contribution payments into the local community trust will not be realised.
- In addition, the following additional implications will occur if the "no-go" alternative is implemented:
- There will be further implications for the proposed Kenhardt PV 2 and PV 3 facilities, as these plants will share the same corridor (and potentially the same on-site substation) with that of Kenhardt PV 1;
 - There will be no opportunity for additional employment in an area where job creation is identified as a key priority. Approximately 130 employment opportunities are expected to be created during the construction phase of the proposed Kenhardt PV 1 – Transmission Line project;
 - There will be lost opportunity for skills transfer and education/training of local communities; and
 - The positive socio-economic impacts likely to result from the project such as increased local spending and the creation of local employment opportunities will not be realised.

Converse to the above, the following benefits could occur if the "no-go" alternative is implemented:

- There will be no development of electrical infrastructure and transmission lines that are associated with solar energy facilities at the proposed location;
- The agricultural land use will remain only;
- No threatened vegetation will be removed or disturbed during the development of the transmission line and electrical infrastructure;
- No change to the current landscape will occur; and
- No additional water use and waste generation during the construction phase will occur.

It is important to take into account that the country is facing serious power and water shortages due to its heavy dependency on fossil fuels such as coal. There is therefore a need for additional electricity generation options to be developed throughout the country. The purpose of the proposed Kenhardt PV 1 – Transmission Line project is to transmit electricity generated by a renewable energy resource into the national electricity grid. Many other socio-economic and environmental benefits will result from the development of this project such as development of renewable energy resources in the country and contribution to the increase of energy security, employment creation and local economic development (as noted above).

Hence, the "no-go" alternative will result in negative environmental impacts, by not going ahead with the project it will also not result in any positive community development or socio-economic benefits and could, should an alternative connectivity option be considered to a different substation due to the rejection of the current proposal, lead to an increase in the negative impacts associated with the development of electrical infrastructure. Hence the "no-go" alternative is not a preferred alternative.

SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?

YES ✓

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment).

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application.

This BA Report has investigated and assessed the significance of the predicted, potential positive and negative direct, indirect and cumulative impacts associated with the proposed Kenhardt PV 1 – Transmission Line project. No negative impacts have been identified within this BA that, in the opinion of the EAPs who have conducted this BA Process, should be considered "fatal flaws" from an environmental perspective, and thereby necessitate substantial re-design or termination of the project.

Based on the findings of the specialist studies, the proposed project is considered to have an overall low negative environmental impact and an overall medium positive socio-economic impact.

The preferred site for the proposed project is the remaining extent of Onder Rugzeer Farm 168 and the remaining extent of Portion 3 of Gembok Bult Farm 120. The proposed transmission line will span over the Remainder of Boven Rugzeer 169 and Portion 4 of Onder Rugzeer Farm 168. The location of the proposed transmission line is dependent on the location of the Kenhardt PV 1 facility and the Eskom Nieuwehoop Substation.

The proposed project will be undertaken within the electrical infrastructure corridor. This corridor area was considered and assessed by the specialists in order to ensure that any development constraints or environmental sensitivities can be avoided in the final siting and location of the proposed transmission line. Based on the findings of the specialist studies, an environmental sensitivity map has been produced (and included in Appendix A of this finalised BA Report, as well as the EMPr included in Appendix G of this finalised BA Report). This map shows the sensitivities on site (terrestrial, aquatic, and sensitive heritage features) within the larger corridor that was assessed. Specifically, Aloe consocias, a dolerite koppie, a pan and minor drainage lines were identified within the larger corridor by the specialists. Based on this map, the preferred location and routing for the Kenhardt PV 1 transmission line within the corridor avoids the sensitive features that were identified by the specialists. Based on the boundaries of the corridor and the constraints of the environmental sensitivities, a routing has been preliminarily determined for this project, which is included in Appendices A and C of this finalised BA Report, as well as the EMPr included in Appendix G of this finalised BA Report. It is important to note that should the routing change subsequent to the issuing of an EA (should such authorisation be granted), any alternative layout or revisions to the layout occurring within the boundaries of the corridor would not be regarded as a change to the scope of work or the findings of the impact assessments undertaken during the BA Phase. This is based on the understanding that the specialists have assessed the corridor area and have identified sensitivities, which have been avoided in the siting of the proposed infrastructure. The corridor is considered to be a "box" in which the project components can be constructed at whichever location (within its boundaries) without requiring an additional assessment or change in impact significance. **Therefore, the routing indicated in Appendix A and Appendix C of this finalised BA Report have taken into consideration the sensitivities identified within the corridor by the specialists.**

This BA considered the nature, scale and location of the proposed development as well as the wise use of land (i.e. is this the right time and place for the development of this proposed project). When considering the timing of this project, the IRP2010 proposes to secure 17 800 MW of renewable energy capacity by 2030. In August 2011, the DOE launched the REIPPPP and invited potential IPPs to submit proposals for the financing, construction, operation and maintenance of the first 3 725 MW of various renewable energy project (including solar and wind). In terms of the REIPPPP, the submitted proposals are then evaluated. Currently, the two main evaluation criteria for compliant proposals are price and economic development with a point allocation of 70/30 (DOE, 2013), with other selection criteria including technical feasibility and grid connectivity, environmental acceptability, black economic empowerment, community development, and local economic and manufacturing propositions. The bidders whose responses rank the highest (according to the

mentioned criteria) will have the greatest potential to be appointed as "Preferred Bidders" by the DOE. The first procurement phase of the DOE's REIPPPP includes five bidding windows. Scatec Solar intends to bid these projects in the 2016 bidding process (i.e. Round 5) to be potentially selected as an IPP. The proposed Kenhardt PV 1 – Transmission Line project is required as part of the bidding process to confirm that the proposed Kenhardt PV 1 facility is enabled and equipped with the necessary infrastructure to connect to the national grid.

Overall the proposed transmission line project will fundamentally support and enable the functioning of the proposed Kenhardt PV 1 facility and to ensure that it is allowed to contribute to the abovementioned renewable energy targets proposed by the DOE.

On a provincial level, the Northern Cape Province is currently facing considerable constraints in the availability and stability of electricity supply. This is a consequence of South Africa's electricity generation and supply system being overstretched, and the reliance of the Northern Cape, as many other South African provinces, on the import of power to service its energy needs.

The development of solar energy is important for South Africa to reduce its overall environmental footprint from power generation (including externality costs), and thereby to steer the country on a pathway towards sustainability. On a municipal planning level, the proposed project does not go against any of the objectives set within the IKheis Municipality Draft IDP 2012-2017. The proposed project will be in line with/supportive of the IDP's objective of creating more job opportunities and it will enable the proposed Kenhardt PV 1, 2 and 3 facilities to be constructed and to function optimally. The proposed transmission line project will assist in local job creation during the construction phase of the project (and ultimately enable job creation as a result of the proposed Kenhardt PV 1, 2 and 3 facilities), if approved by the DEA. It should however be noted that employment during construction phase will be temporary.

Taking into consideration the findings of the BA Process, it is the opinion of the EAP, that the project benefits outweigh the costs and that the project will make a positive contribution to sustainable infrastructure development in the Kenhardt region. The proposed project will play a key role in enabling and facilitating the construction of the proposed 75 MW Kenhardt PV 1 project, which will add electricity to the national grid. Provided that the specified mitigation measures are applied effectively, it is recommended that the proposed project receive EA in terms of the EIA Regulations promulgated under the NEMA.

Section 24 of the Constitutional Act states that "everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that prevents pollution and ecological degradation; promotes conservation; and secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

Based on this, this BA was undertaken to ensure that these principles are met through the inclusion of appropriate management and mitigation measures and monitoring requirements. These measures will be undertaken to promote conservation by avoiding the sensitive environmental features present on site and through appropriate monitoring and management plans to, inter alia, monitor the impacts on birds and protection of SCC potentially present within this area (refer to the EMPr in Appendix G of this finalised BA Report).

In order to ensure the effective implementation of the mitigation and management actions, an EMPr has been compiled and is included in Appendix G of this finalised BA Report. The mitigation measures necessary to ensure that the project is planned and carried out in an environmentally responsible manner are listed in this EMPr. The EMPr is a dynamic document that should be updated as required and provides clear and implementable measures for the proposed project.

Listed below are the main recommendations that should be considered (in addition to those in the EMPr and finalised BA Report) for inclusion in the EA (should such authorisation be granted by the DEA):

- Prior to the commencement of the construction phase, it is recommended that a suitable specialist is appointed to identify any indigenous plant species (such as Aloes, bush clumps etc.) that could potentially be impacted by the proposed project and thus need to be rescued. If any of the plant species are identified as being protected (such as protected tree species *Acacia (Vachellia) erioloba* and *Boscia albitrunca* which are known to occur in the vicinity of Kenhardt), then it is essential that the relevant permits required to remove/disturb the protected plant species are obtained from the relevant Authorities. Once the permits are obtained, a plant search and rescue programme must be implemented to allow for the successful transplantation of these species. Where possible, all rescued plants must be retained in a suitable nursery or transplanted directly into landscaped areas. In addition, the Provincial

Department of Environment and Nature Conservation, and the Provincial DAFF should be contacted to discuss if any protected species are found during the search and rescue.

- The footprint required for the proposed project activities must be kept at a minimum. The proposed project footprint must be demarcated to reduce unnecessary disturbance beyond the proposed project area.
- The entire width (i.e. 52 m) of the transmission line servitude should not be cleared of vegetation. Vegetation removal should be kept to a minimum and cleared below the transmission line and from either side of the centre line based on the requirements of Eskom and standard operating procedures.
- Proper stockpiling must be implemented during all phases of the proposed project in order to prevent erosion and concomitant impacts on the surrounding drainage lines.
- All construction, operational and decommissioning personnel must be made aware of the sensitivity and importance of the surrounding environment (especially the major and minor drainage lines, Aloe consocias and the dolerite koppie). The construction, operational and decommissioning personnel should be made aware and educated of the presence of fauna and bird species and their reliance on the aforementioned features, in order to avoid disrupting activities and collisions.
- Buffers of 75 m radius from the centre of the pan (in the vicinity of the Nieuwehoop Substation) and 120 m radius from the summit of the koppie must be implemented as a precautionary measure. These features should be demarcated as no-go areas and excluded from the development footprint.
- The routing of the transmission line must avoid the Aloe consocias identified. This may be achieved, preferably by locating the final route proximal to the existing railway line/roadway, or less favourably by spanning over the associates. Mitigation and management measures proposed are that the actual powerline lie either to the south or north of the identified associates and where applicable, towers be suitably positioned at points distal from these communities. The relocation of these specimens is possible; however this method should be avoided. Towers should be spaced adequately to avoid the necessity for relocation. A 60 m buffer should be implemented around the Aloe consocias and it must be considered as a no-go area during construction.
- The requirements of the SKA Project Office (such as compiling an EMC Plan for the Kenhardt PV facilities (which have been assessed separately as part of EIA Processes) and undertaking laboratory testing of the mitigation measures to be implemented for the Kenhardt PV 2 EIA project), as well as the recommendations made in the technical report compiled by MESA Solutions (PTY) Ltd (as included in Appendix D.9 of this report) should be implemented by the Project Applicant as applicable.
- Environmental Awareness Training should be carried out at least once-off during the construction and decommissioning phases to ensure that staff are aware of environmental concerns and proper house-keeping recommendations.
- Archaeological and palaeontological mitigation measures stipulated within this BA Report must be implemented during the construction phase. The contact details for SAHRA should be included in relevant documents/specifications provided to the Contractor, to ensure that these authorities are contacted timeously in the event of archaeological material and/or fossils being discovered during construction.
- If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, the SAHRA APM Unit must be alerted. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit must be alerted immediately. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required.
- Waste management must be undertaken rigorously during all phases of the proposed project and any non-compliance must be recorded by the ECO. The designated waste stockpiling areas must be inspected frequently to ensure that the integrity is intact and the condition is not compromised. Waste disposal slips and waybills must be kept for all waste disposed at a registered waste disposal facility. As a general principle, waste manifests must be obtained to prove legal disposal of waste. A detailed record must be kept to track the amount of hazardous and general waste being temporarily stockpiled on site. Should the on-site stockpiling of general waste and hazardous waste respectively exceed 100 m³ and 80 m³, and a period exceeding 90 days, then the National Norms and Standards for the Storage of Waste (published on 29 November 2013 under GN 926) must be adhered to.

Is an EMPr attached?

YES ✓

The EMPr must be attached as Appendix G.

Note from the CSIR: The EMPr is included in Appendix G of this finalised BA Report.

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

Note from the CSIR: The details and expertise of the EAP are included in Appendix H of this finalised BA Report.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Note from the CSIR: The declarations of interest of the specialists are included in Appendix I of this finalised BA Report.

Any other information relevant to this application and not previously included must be attached in Appendix J.

Note from the CSIR: The references used in this finalised BA Report, the notes of the pre-application meeting with the DEA, the title deeds for the applicable land portions comprising the project area, the Application for EA that was submitted to the DEA in March 2016 for the proposed project, and the DEA acknowledgement of receipt of the Application for EA and BA Reports for comment are included in Appendix J of this finalised BA Report.

Surina Laurie

NAME OF EAP



SIGNATURE OF EAP

27 May 2016

DATE

SECTION F: APPENDIXES

The following appendixes must be attached as appropriate:

Appendix A	Maps
Appendix B	Photographs
Appendix C	Facility Illustration(s)
Appendix D	Specialist Reports (including Terms of Reference)
Appendix E	Public Participation
Appendix F	Impact Assessment
Appendix G	Environmental Management Programme (EMPr)
Appendix H	Details of EAP and Expertise
Appendix I	Specialist's Declaration of Interest
Appendix J	Additional Information

BASIC ASSESSMENT REPORT

SECTION F: APPENDICES

Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE) to support the proposed 75 MW Solar Photovoltaic Facility (KENHARDT PV 1) on the remaining extent of Onder Rugzeer Farm 168, north-east of Kenhardt, Northern Cape Province: **BASIC ASSESSMENT REPORT**

APPENDIX A: SITE LAYOUT PLANS

- Appendix A.1: Locality Map
- Appendix A.2: Layout Maps/Route Plan
- Appendix A.3: Sensitivity Maps
- Appendix A.4: Approximate Project Co-ordinates

APPENDIX B: PHOTOGRAPHS

- Appendix B.1: PHOTOGRAPHS • Point 1
- Appendix B.2: PHOTOGRAPHS • Point 2
- Appendix B.3: PHOTOGRAPHS • Point 3
- Appendix B.4: ADDITIONAL PHOTOGRAPHS SHOWING THE GENERAL LANDSCAPE

APPENDIX C: FACILITY ILLUSTRATIONS

APPENDIX D: SPECIALIST REPORTS

- Appendix D.1: Ecological Impact Assessment
- Appendix D.2: Visual Impact Assessment
- Appendix D.3: Heritage Impact Assessment (Archaeology and Cultural Landscape)
- Appendix D.4: Desktop Palaeontological Impact Assessment
- Appendix D.5: Geohydrological Assessment
- Appendix D.6: Soils and Agricultural Potential Assessment
- Appendix D.7: Social Impact Assessment
- Appendix D.8: Traffic Impacts
- Appendix D.9: Electromagnetic Interference Technical Report (Cumulative Topographical Analysis of Proposed PV Projects in AGA Area)

APPENDIX E: PUBLIC PARTICIPATION

- Appendix E.1: Proof of Placement of Newspaper Advertisements and Site Notice Boards
- Appendix E.2: Correspondence Sent to I&APs and Stakeholders (including Organs of State)
- Appendix E.3: Comments and Response Report
- Appendix E.4: Correspondence Sent to Organs of State (Refer to Appendix E.2)
- Appendix E.5: Database of I&APs and Organs of State
- Appendix E.6: Copies of Comments Received and Minutes of Meetings

APPENDIX F: IMPACT ASSESSMENT

APPENDIX G: ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

APPENDIX H: DETAILS OF EAP AND EXPERTISE

- Appendix H.1: Curriculum Vitae of EAP – Surina Laurie
- Appendix H.2: EAP Declaration of Interest
- Appendix H.3: Curriculum Vitae of Project Manager – Rohaida Abed

APPENDIX I: SPECIALIST'S DECLARATION OF INTEREST

APPENDIX J: ADDITIONAL INFORMATION

- Appendix J.1: References used in the BA Report
- Appendix J.2: Pre-Application Meeting with the DEA (17 September 2015)
- Appendix J.3: Title Deeds
- Appendix J.4: Application for EA submitted by the CSIR to the DEA (22 March 2016)
- Appendix J.5: DEA Acknowledgement of Receipt of the Application for EA and BA Reports (31 March 2016)

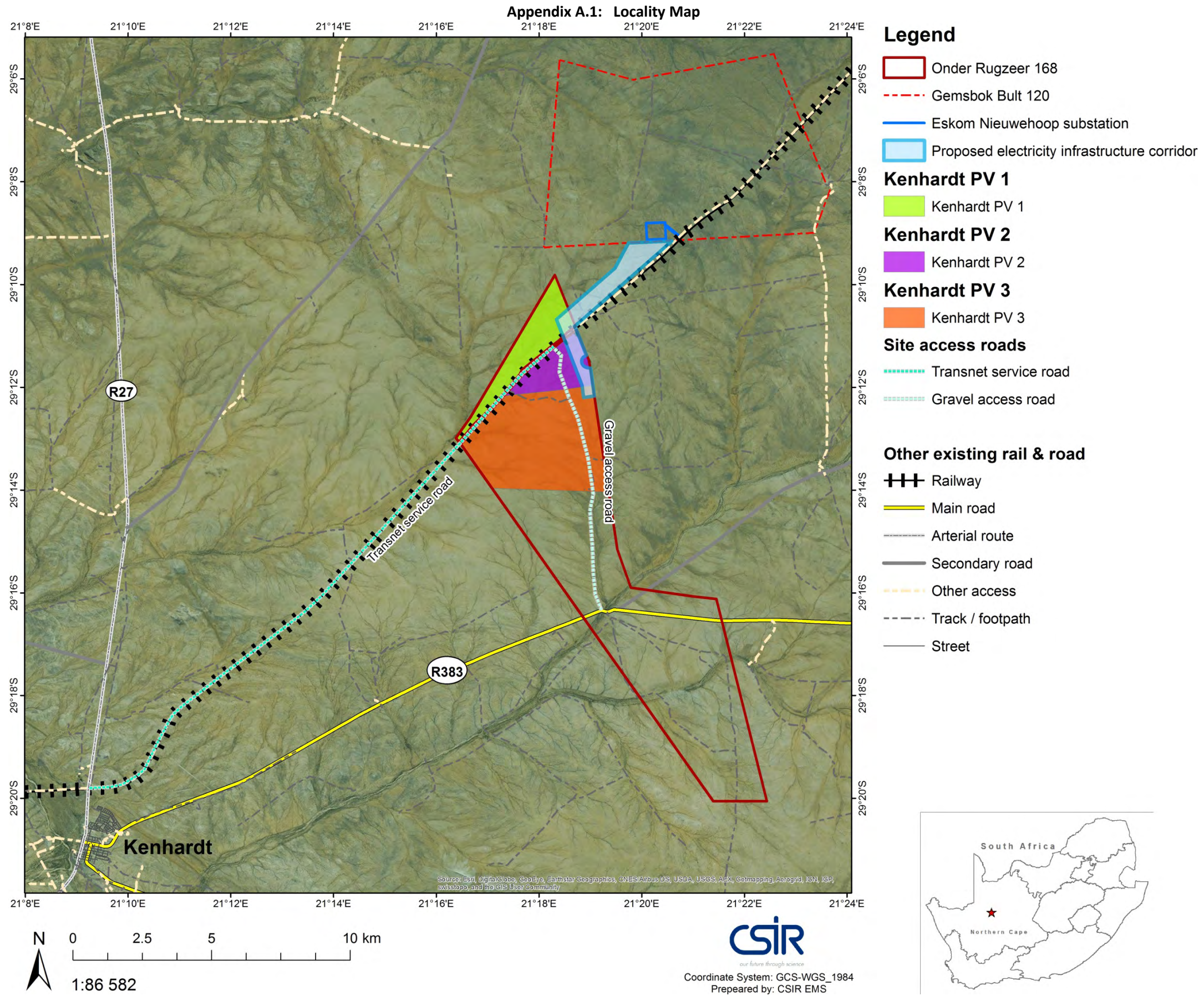
BASIC ASSESSMENT REPORT

APPENDIX A: SITE LAYOUT PLANS

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Appendix A.3:	Sensitivity Maps _____	6
Appendix A.4:	Approximate Project Co-ordinates _____	8

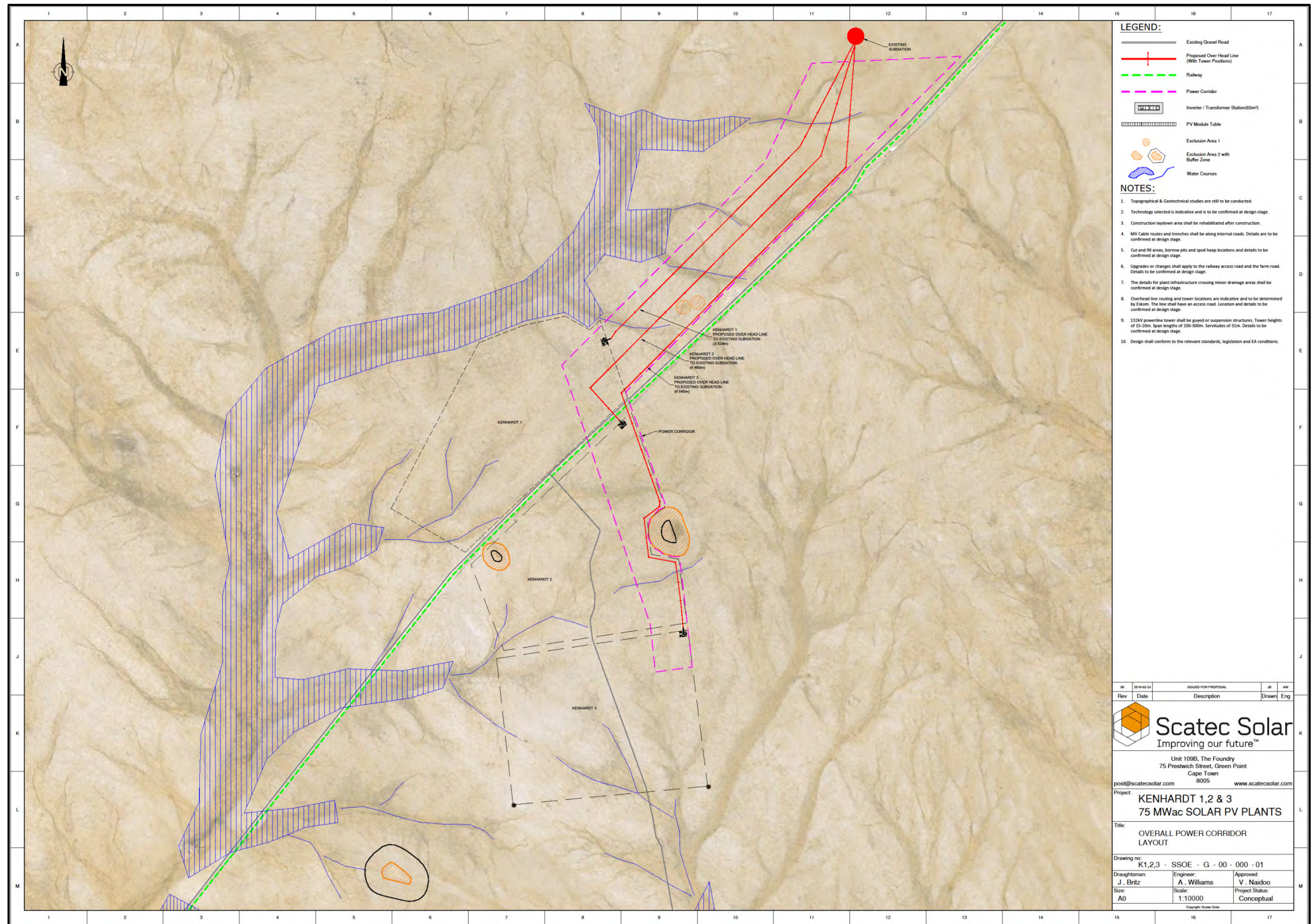
SECTION F: APPENDICES



Note from the CSIR: Locality Map showing the Kenhardt PV 1 – Transmission Line Electrical Infrastructure Corridor in blue (and the Kenhardt PV Solar Facilities which have been subjected to separate EIA Processes).

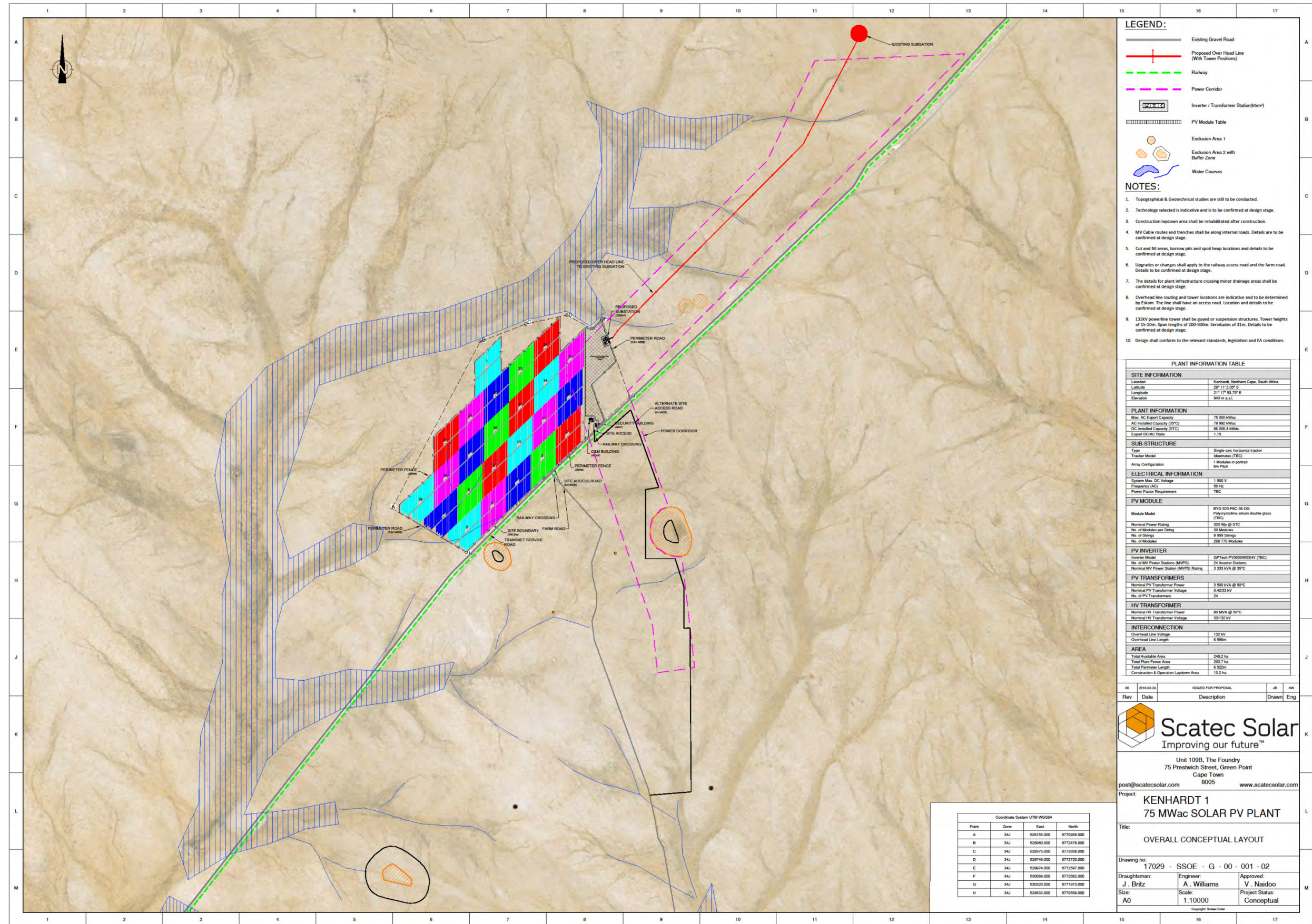
SECTION F: APPENDICES

Appendix A.2: Layout Maps/Route Plan



Note from the CSIR: Layout Map showing the Kenhardt PV 1 – Transmission Line Electrical Infrastructure Corridor (and the Kenhardt PV Solar Facilities which have been subjected to separate EIA Processes). Note that the Kenhardt PV 1, PV 2 and PV 3 Transmission Lines are indicated on the map (as they will be constructed within a single corridor).

SECTION F: APPENDICES



LEGEND:

- Existing Gravel Road
- Proposed Over Head Line (With Tower Positions)
- Railway
- Power Corridor
- Inverter / Transformer Station(55m)
- PV Module Table
- Exclusion Area 1
- Exclusion Area 2 with Buffer Zone
- Water Courses

- NOTES:**
1. Topographical & Geotechnical studies are still to be conducted.
 2. Technology selected is indicative and is to be confirmed at design stage.
 3. Construction laydown area shall be rehabilitated after construction.
 4. MV Cable routes and trenches shall be along internal roads. Details are to be confirmed at design stage.
 5. Cut and fill areas, borrow pits and spoil heap locations and details to be confirmed at design stage.
 6. Upgrades or changes shall apply to the railway access road and the farm road. Details to be confirmed at design stage.
 7. The details for plant infrastructure crossing minor drainage areas shall be confirmed at design stage.
 8. Overhead line routing and tower locations are indicative and to be determined by Eskom. The line shall have an access road. Location and details to be confirmed at design stage.
 9. 132kV powerline tower shall be guyed or suspension structures. Tower heights of 15-20m. Span lengths of 200-300m. Servitudes of 31m. Details to be confirmed at design stage.
 10. Design shall conform to the relevant standards, legislation and SA conditions.

PLANT INFORMATION TABLE	
SITE INFORMATION	
Location	Kenhardt, Northern Cape, South Africa
Latitude	29° 11' 2.00" S
Longitude	21° 17' 53.70" E
Elevation	943 m a.s.l.
PLANT INFORMATION	
Max. AC Export Capacity	75 000 kWac
AC Installed Capacity (DPPC)	79 982 kWac
DC Installed Capacity (DPPC)	86 504 kWdc
Export DC:AC Ratio	1.13
SUB-STRUCTURE	
Type	Single-axis horizontal tracker
Tracker Model	Stemtron (TSC)
Array Configuration	1 Module in portrait 6m Pitch
ELECTRICAL INFORMATION	
System Max. DC Voltage	1 500 V
Frequency (AC)	50 Hz
Power Factor Requirement	0.95
PV MODULE	
Module Model	BYD-320-PHC-36-DS
Module Material	Polycrystalline silicon double glass (DGC)
Nominal Power Rating	320 Wp @ STC
No. of Modules per String	30 Modules
No. of Strings	8 269 Strings
No. of Modules	248 170 Modules
PV INVERTER	
Inverter Model	QPTech P1200WDSHV (TSC)
No. of MV Power Stations (MPPS)	24 Inverter Stations
Nominal MV Power Station (MPPS) Rating	3 333 kVA @ 35°C
PV TRANSFORMERS	
Nominal PV Transformer Power	3 500 kVA @ 30°C
Nominal PV Transformer Voltage	6 600 V
No. of PV Transformers	24
HV TRANSFORMER	
Nominal HV Transformer Power	80 MVA @ 30°C
Nominal HV Transformer Voltage	33 000 V
INTERCONNECTION	
Overhead Line Voltage	132 kV
Overhead Line Length	6 556m
AREA	
Total Available Area	248.2 ha
Total Plant Fence Area	302.7 ha
Total Perimeter Length	6 522m
Construction & Operation Laydown Area	13.2 ha

Rev	Date	Description	Drawn	Eng

Scatec Solar
Improving our future™

Unit 109B, The Foundry
75 Prestwich Street, Green Point
Cape Town
8005
post@scatecsolar.com www.scatecsolar.com

Project: **KENHARDT 1
75 MWac SOLAR PV PLANT**

Title: **OVERALL CONCEPTUAL LAYOUT**

Drawing no: **17029 - SSOE - G - 00 - 001 - 02**

Draughtsman: **J. Britz** Engineer: **A. Williams** Approved: **V. Naidoo**

Size: **A0** Scale: **1:10000** Project Status: **Conceptual**

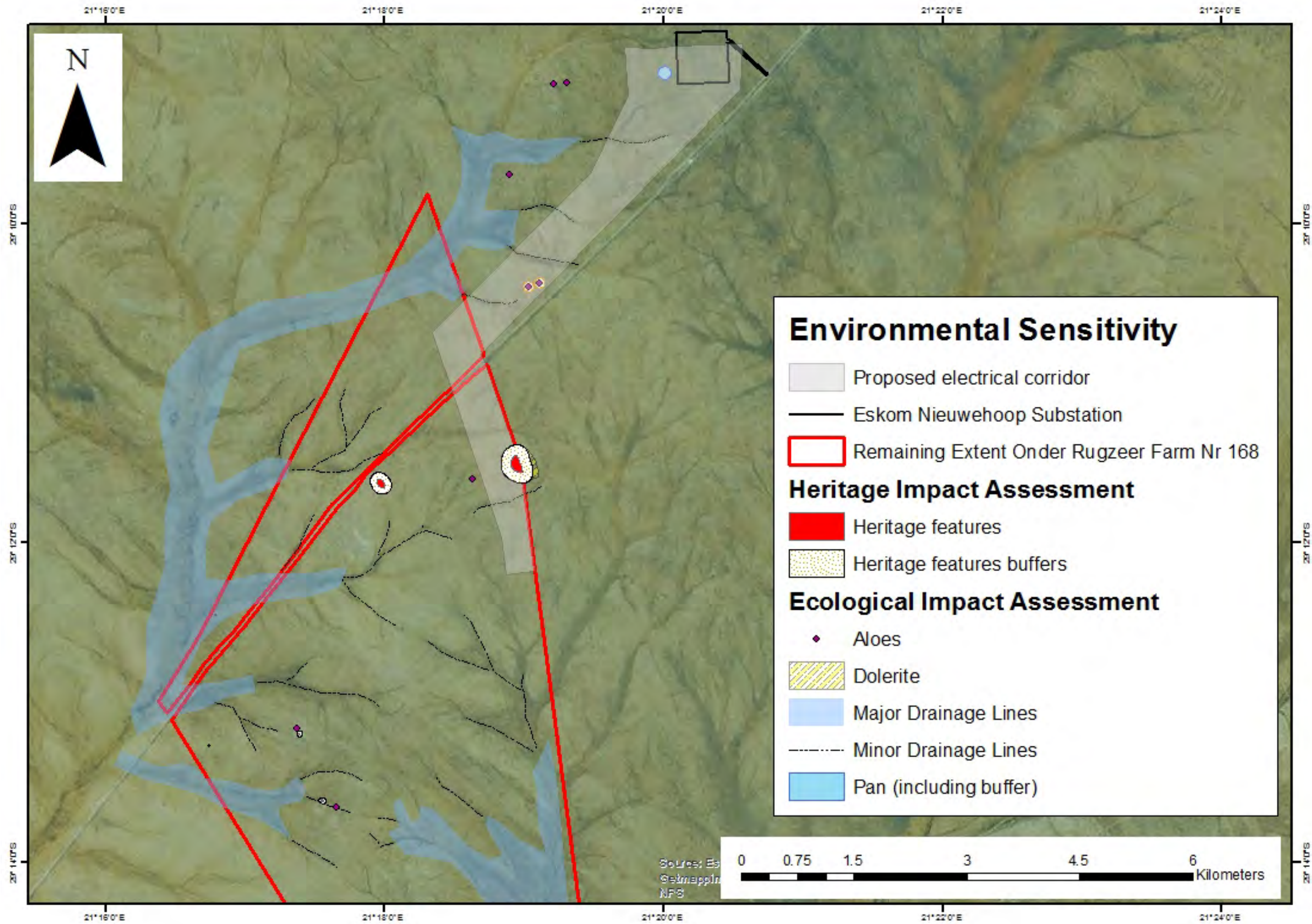
Copyright: Scatec Solar

Coordinate System UTM WGS84			
Point	Zone	East	North
A	34J	628195.000	6770958.000
B	34J	628960.000	6772476.000
C	34J	629715.000	6773994.000
D	34J	630470.000	6775512.000
E	34J	631225.000	6777030.000
F	34J	631980.000	6778548.000
G	34J	632735.000	6780066.000
H	34J	633490.000	6781584.000

Note from the CSIR: Layout Map showing the Kenhardt PV 1 – Transmission Line Electrical Infrastructure Corridor and Proposed Transmission Line Routing (and the Kenhardt PV 1 Solar Facility which has been the subject of a separate EIA Process).

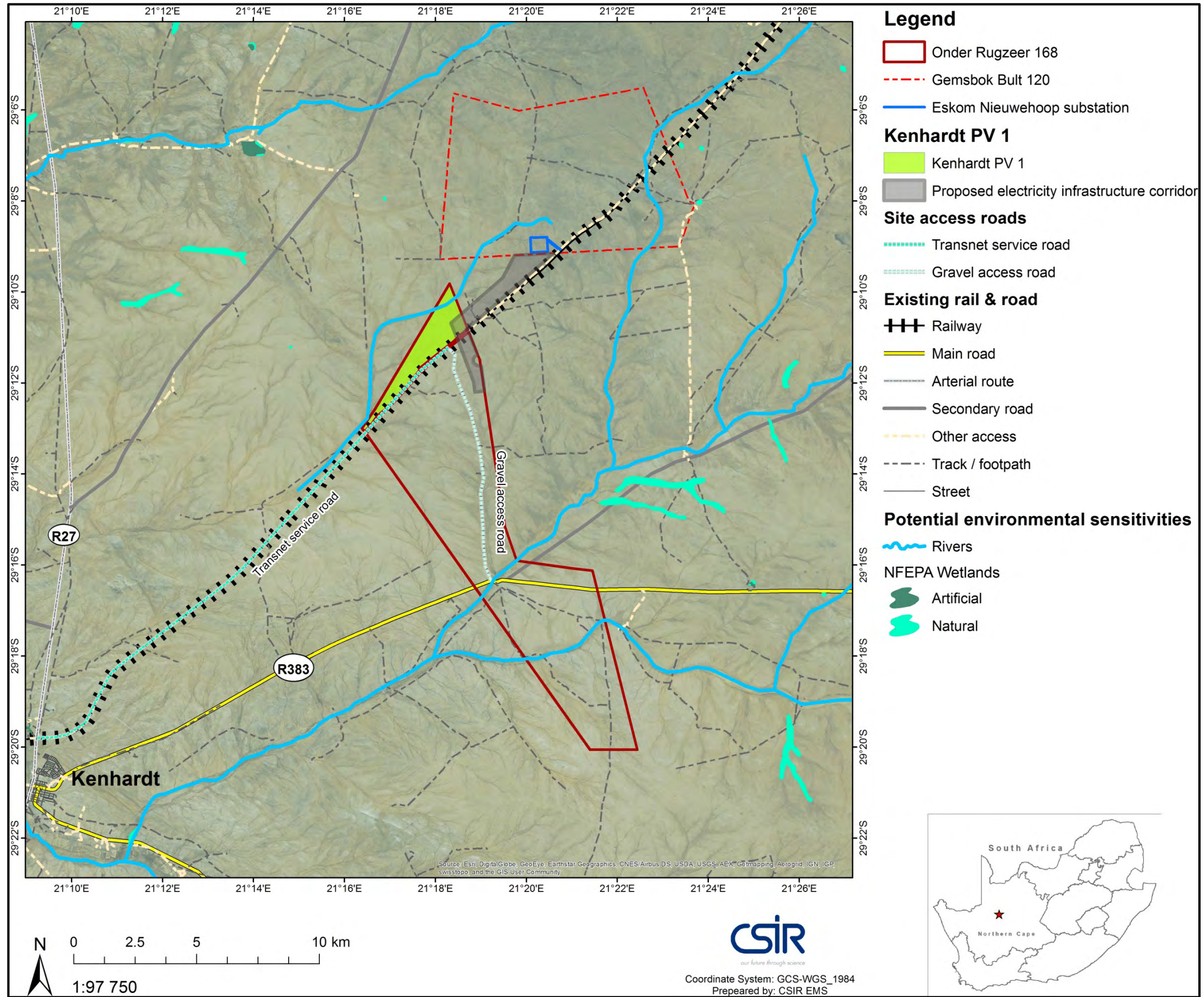
SECTION F: APPENDICES

Appendix A.3: Sensitivity Maps



Combined Sensitivity Map for the Electrical Infrastructure Corridor (this BA Process) and the Kenhardt PV 1, 2 and 3 EIA Projects

SECTION F: APPENDICES



General Sensitivity Map for the Electrical Infrastructure Corridor (this BA Process) and the Kenhardt PV 1 EIA Project

SECTION F: APPENDICES

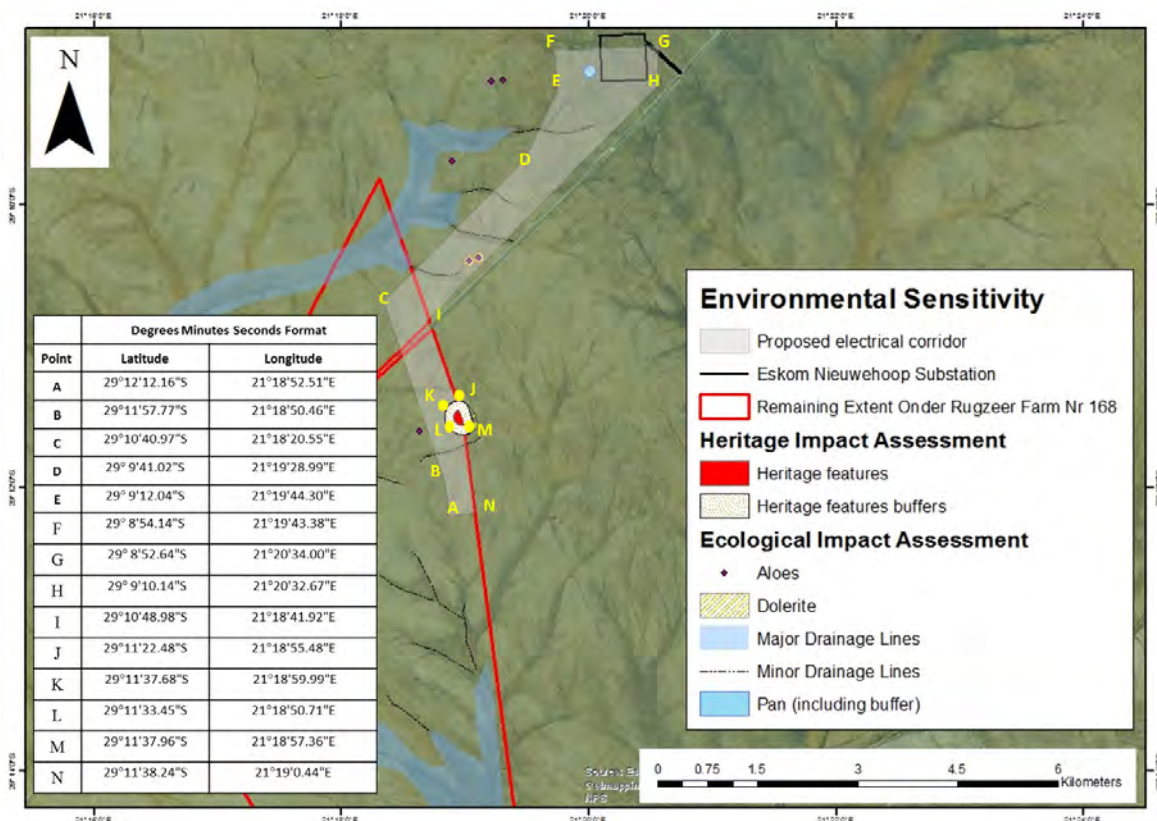
Appendix A.4: Approximate Project Co-ordinates

1. Co-ordinates at every 250 m along the centre line of the Electrical Infrastructure Corridor

Point/Area	Degrees Minutes Seconds Format	
	Latitude	Longitude
A	29° 12' 1.91"S	21° 18' 57.92"E
B	29° 11' 48.46"S	21° 18' 53.19"E
C	29° 11' 28.55"S	21° 18' 46.53"E
D	29° 11' 10.79"S	21° 18' 40.87"E
E	29° 10' 50.54"S	21° 18' 33.93"E
F	29° 10' 41.62"S	21° 18' 31.20"E
G	29° 10' 30.32"S	21° 18' 43.59"E
H	29° 10' 20.81"S	21° 18' 55.61"E
I	29° 10' 8.61"S	21° 19' 8.46"E
J	29° 9' 54.50"S	21° 19' 25.12"E
K	29° 9' 40.09"S	21° 19' 38.26"E
L	29° 9' 27.26"S	21° 19' 51.83"E
M	29° 9' 4.14"S	21° 20' 10.13"E

2. Corner Point Co-ordinates of the Electrical Infrastructure Corridor

Note from the CSIR: The co-ordinate points A to N provided in the table below are labelled on the map provided below.



SECTION F: APPENDICES

	Degrees Minutes Seconds Format	
Point/Area	Latitude	Longitude
A	29°12'12.16"S	21°18'52.51"E
B	29°11'57.77"S	21°18'50.46"E
C	29°10'40.97"S	21°18'20.55"E
D	29° 9'41.02"S	21°19'28.99"E
E	29° 9'12.04"S	21°19'44.30"E
F	29° 8'54.14"S	21°19'43.38"E
G	29° 8'52.64"S	21°20'34.00"E
H	29° 9'10.14"S	21°20'32.67"E
I	29°10'48.98"S	21°18'41.92"E
J	29°11'22.48"S	21°18'55.48"E
K	29°11'37.68"S	21°18'59.99"E
L	29°11'33.45"S	21°18'50.71"E
M	29°11'37.96"S	21°18'57.36"E
N	29°11'38.24"S	21°19'0.44"E

SECTION F: APPENDICES

Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

BASIC ASSESSMENT REPORT

APPENDIX B: PHOTOGRAPHS

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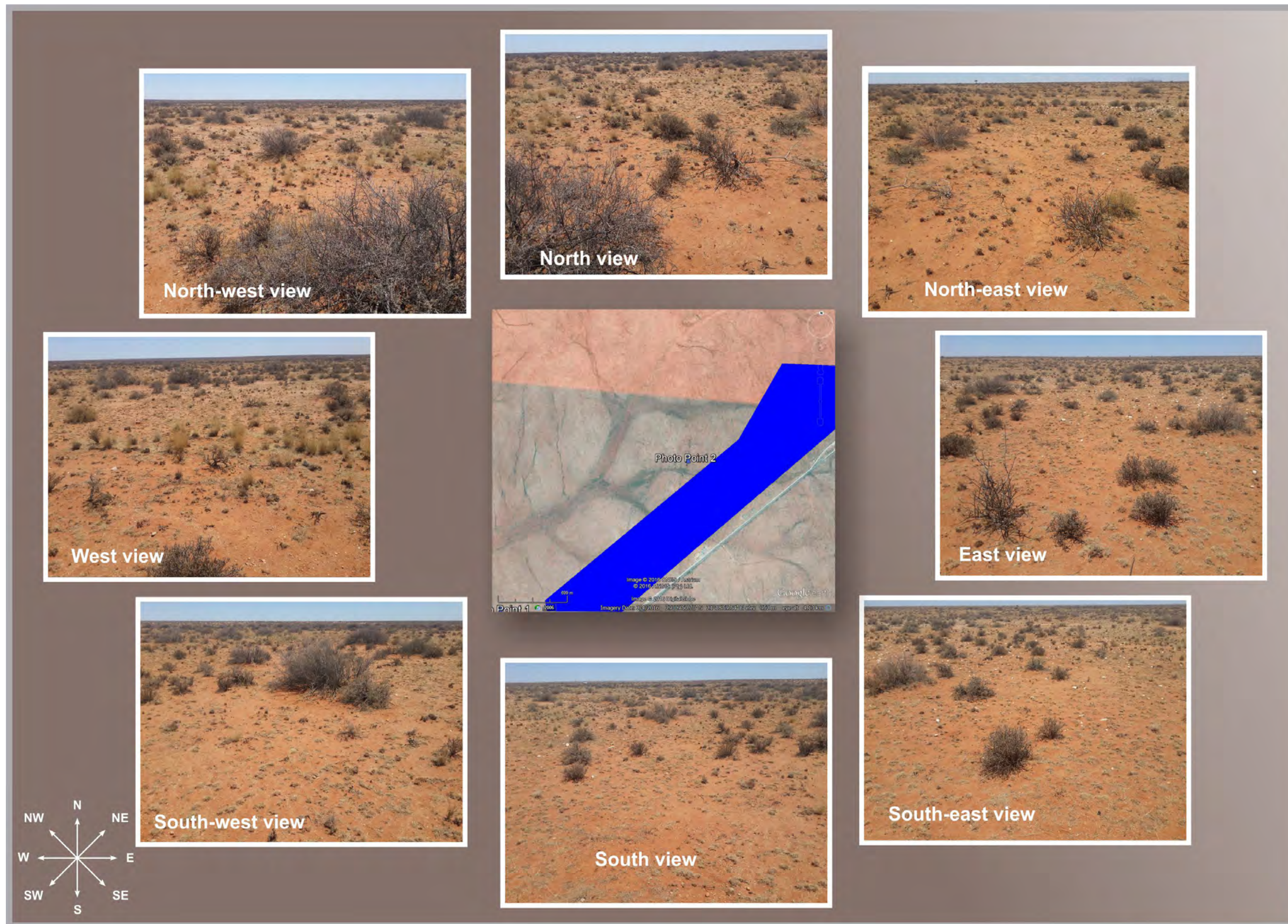
Appendix B.1 PHOTOGRAPHS

- Point 1



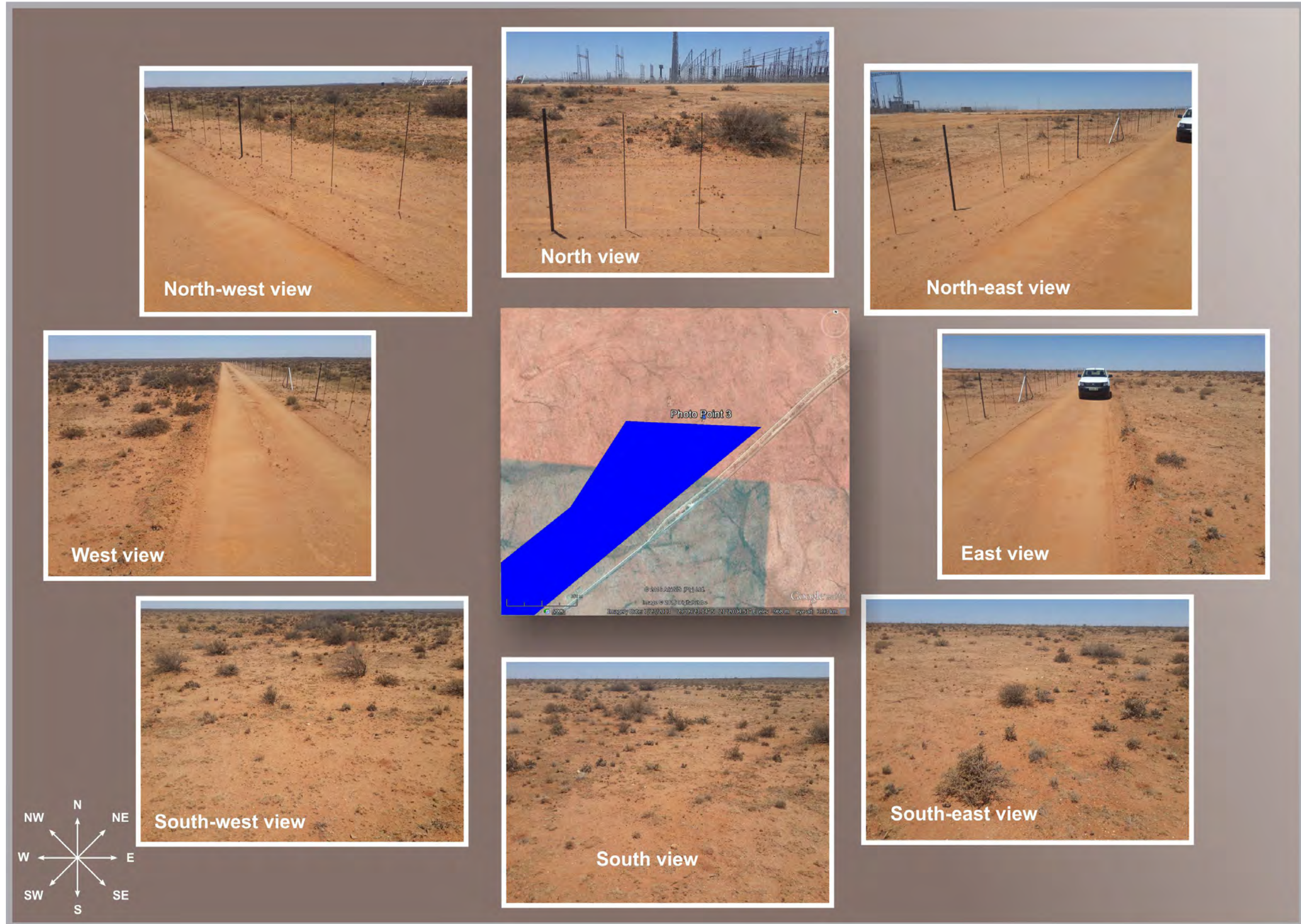
Appendix B.2 PHOTOGRAPHS

- Point 2



Appendix B.3 PHOTOGRAPHS

- Point 3



Appendix B.4 ADDITIONAL PHOTOGRAPHS SHOWING THE GENERAL LANDSCAPE





SECTION F: APPENDICES

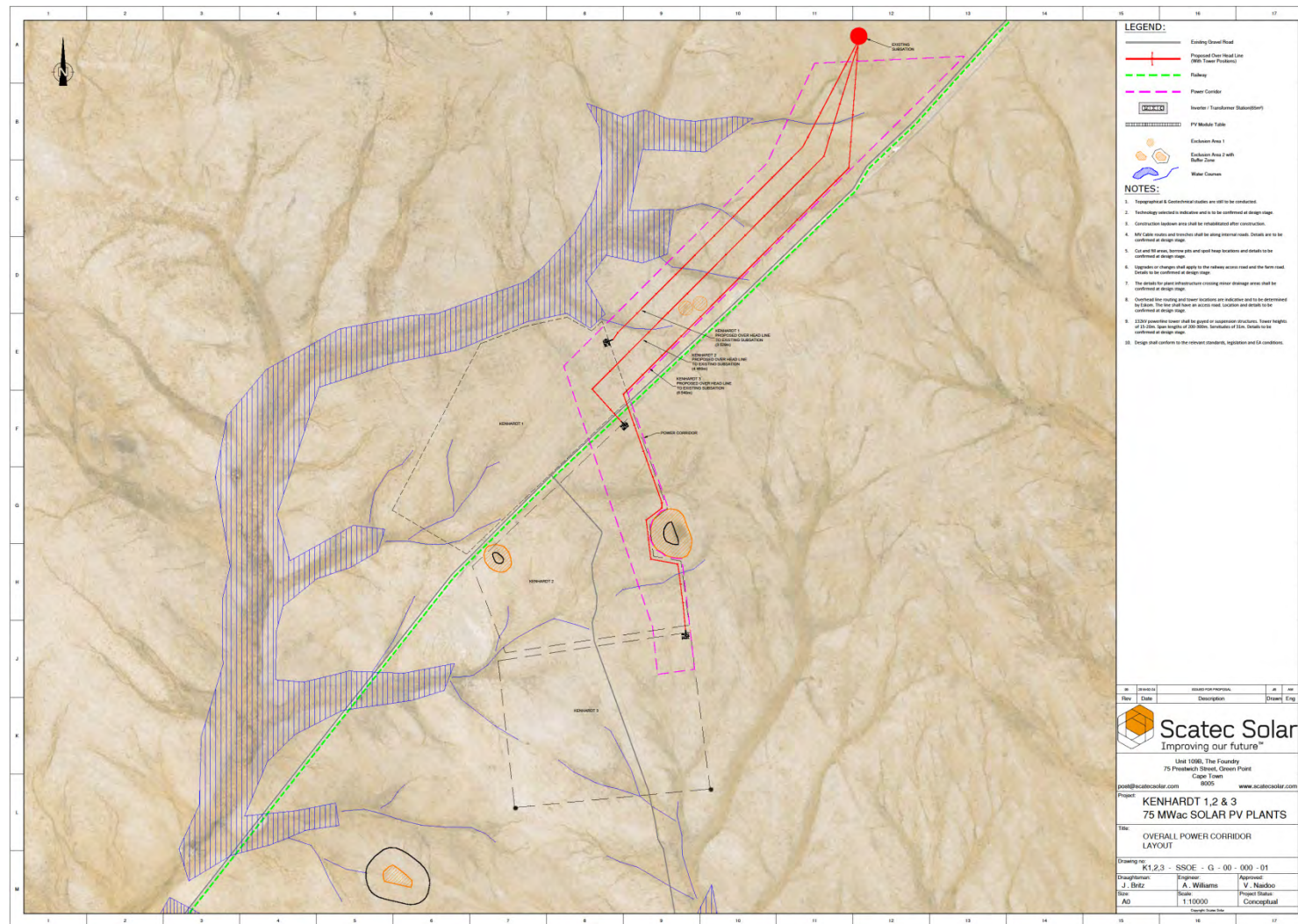
Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

BASIC ASSESSMENT REPORT

APPENDIX C: FACILITY ILLUSTRATIONS

SECTION F: APPENDICES

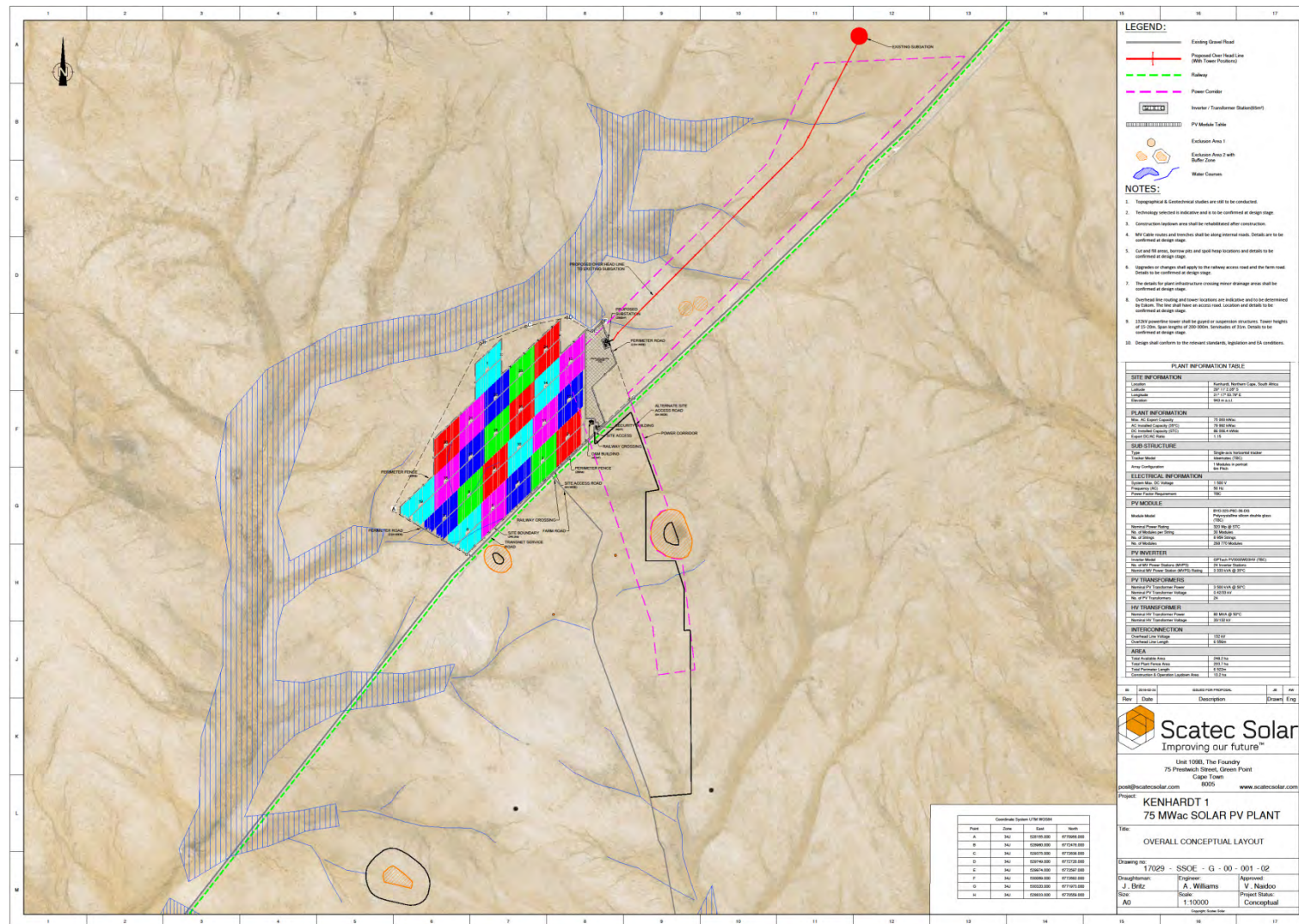
Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT



Note from the CSIR: Layout Map showing the Kenhardt PV 1 – Transmission Line Electrical Infrastructure Corridor (and the Kenhardt PV Solar Facilities which have been subjected to separate EIA Processes). Note that the Kenhardt PV 1, PV 2 and PV 3 Transmission Lines are indicated on the map (as they will be constructed within a single corridor).

SECTION F: APPENDICES

Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT



Note from the CSIR: Layout Map showing the Kenhardt PV 1 – Transmission Line Electrical Infrastructure Corridor and Proposed Transmission Line Routing (and the Kenhardt PV 1 Solar Facility which has been subjected to a separate EIA Process).

SECTION F: APPENDICES

Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

BASIC ASSESSMENT REPORT

APPENDIX D: SPECIALIST REPORTS

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- Appendix D.1 Ecological Impact Assessment
- Appendix D.2 Visual Impact Assessment
- Appendix D.3 Heritage Impact Assessment (Archaeology and Cultural Landscape)
- Appendix D.4 Desktop Palaeontological Impact Assessment
- Appendix D.5 Geohydrological Assessment
- Appendix D.6 Soils and Agricultural Potential Assessment
- Appendix D.7 Social Impact Assessment
- Appendix D.8 Traffic Impacts
- Appendix D.9 Electromagnetic Interference Technical Report (Cumulative Topographical Analysis of Proposed PV Projects in AGA Area)

BASIC ASSESSMENT REPORT

Appendix D.1: Ecological Impact Assessment

ECOLOGICAL IMPACT ASSESSMENT

Basic Assessment for the Proposed Development of a 132 kV Transmission Line (Kenhardt PV 1 – Transmission Line) to service the proposed 75 MW Solar Photovoltaic Facility (Kenhardt PV 1) on the remaining extent of Onder Rugzeer Farm 168, north- east of Kenhardt, Northern Cape Province

Report prepared for:

CSIR – Environmental Management Services
P O Box 17001
Congella, Durban, 4013
South Africa

Report prepared by:

Simon C Bundy – SDP Ecological
P.O. Box 1016
Ballito 4420
South Africa

June 2016

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

SPECIALIST EXPERTISE

Simon Colin Bundy

NAME Simon Colin Bundy

PROFESSION Ecologist

DATE OF BIRTH 7 September 1966

PLACE OF BIRTH Glasgow, Scotland

NATIONALITY South African / British

MEMBERSHIP OF PROFESSIONAL BODIES: South African Council of Natural Scientific Professionals No. 400093/06 – Professional Ecologist

KEY QUALIFICATIONS

Simon Bundy has been involved in environmental and development projects and programmes since 1991 at provincial, national and international level, with employment in the municipal, NGO and private sectors, providing a broad overview and understanding of the function of these sectors. Bundy has a core competency in coastal management and botanical issues and has worked on coastal projects in the Seychelles and Tanzania providing ecological and general environmental advice and support. Bundy has been involved in a number of renewable energy projects including the Kalkbult, Dreunberg and Lindes Solar Parks in the Northern and Eastern Cape, as well as wind energy and solar projects in the Western Cape and Rwanda. In such projects Bundy has provided both technical ecological support, as well as the undertaking of environmental impact assessments.

Allied to the above, Bundy has provided technical assistance to the “Save the Wild Coast” initiative through a technical report outlining the concerns relating to dune mining in and around the Xolobeni prospecting region while also evaluating critically, a number of environmental impact assessments and technical reports for various clients. Such evaluations have included “sea defence structures at Buffalo Bay, Western Cape”, through the Nelson Mandela University. Bundy has also assisted iSimangaliso Wetland Park in its initiatives against unlawful developments in the Bangha Nek area. Bundy has also acted as expert witness on ecological issues on a number of legal cases.

From a technical specialist perspective, Bundy is competent in a large number of ecological methodologies and analytical methods including statistical methods; multivariate analysis and ordination. Bundy is competent in wetland delineation and has formulated ecological coastal set back methodologies for EKZN Wildlife and the Oceanographic Research Institute. Bundy acts as botanical specialist for Eskom Eastern Region, with specific interest in coastal habitat forms.

EDUCATION

BSc Biological Science MSc University of Natal,

Diploma Project Management (1997) Executive Education,

PhD candidate Dept of Engineering UKZN

1998: “Sustainable development initiatives” in Europe. Training Programme in Berlin, Germany

2000: Training course: “Environmental Economics and Development”. University of Colorado (Boulder) USA.

SELECTED RELEVANT PROJECT EXPERIENCE

Task Team Chair and Project Ecologist: Task Team for Coastal Disaster Management, KwaDukuza 2007 - 2011

Management of coastal clean up programme immediately following March storm event of 2007. Activities included introduction of geofabric bag protection options, coastal retreat implementation and development of policy on coastal management following destruction of coastline.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

Ecological Review of Lake Mzingazi for Umhlatuze Water: University of KwaZulu-Natal – (2010)

Review of habitat structure and integrity of Mzingazi Lake System at Richards Bay required to interpret transformation of aquatic system over time and evaluate forecast for future reference.

Ecological Review and Agricultural Assessment – Dreunberg Solar Park, Eastern Cape: Scatec Solar – (2012)

Ecological review of proposed solar park near Burgersdorp, with additional evaluation of veld carrying capacity.

Ecological Review and Rehabilitation Planning : Sodwana Bay: iSimanagaliso Wetland Park Authority – (2013 - 2014)

Analysis and review of state of dune cordon in and around Sodwana Bay with consideration of the impacts of removing exotic trees from route to rejuvenate dune and beach dynamics

Ecological Review of Kalkbult Solar Park (2009)

Ecological review and delineation of ecologically significant areas within the proposed Kalkbult Solar Park, near Pottsville, Northern Cape.

Ecological and Dune retreat investigation of the Kosi Bay Illegal Development Isimangaliso Wetland Park Authority (2011)

Specialist investigation into the impact upon the dune cordon of structures placed in and close to dune cordon near Kosi Bay mouth.

PUBLICATIONS

Bundy S C and Forbes N T 2015. *“Coastal dune mobility and their use in establishing a set back line”* 9th West Indian Ocean Marine Science Conference 2015

Bundy S C and Smith A M 2009 *“ Analysis of the Recovery of Two Separate Coastal Dune Systems Following the 2006 – 2007 Marine Erosion Event and Assessment of the Artificial Dune System in Coastal Management”* KZN Marine and Coastal Management Symposium, Durban South Africa.

Bundy S C , Smith AM, Mather AA 2010“ Dune retreat and stability on the Northern Amanzimtoti Dune Cordon” EKZN Wildlife Conservation Symposium 2010

Smith, A Mather AM Bundy SC, Cooper AS Guastella L, Ramsay PJ and Theron A ; 2010 *“Contrasting styles of swell-driven coastal erosion: examples from KwaZulu-Natal, South Africa”* Geology Journal”, Cambridge University Press

Smith, AM, L Guastella , SC Bundy and AA Mather 2007“*Coastal Storm Damage in the March 2007 Storm* SA Journal of Science 2007 “A Synopsis of Recent Storm Events”

Guastella L, Smith A Mather A and Bundy S 2008 “*As Memories Fade - A Review of the Post 2007 Coastal Erosion Events*” African Wildlife 32 / 2008

Smith A, Mather A, Theron A, Bundy S and Guastella L 2008 “*The 2006-2007 KwaZulu – Natal Coastal Erosion Event in Perspective*” 2009 Contribution to the The South African Environmental Observation Network publication “ Climate Change in Southern Africa”

Smith A and Bundy S 2009 “*Coastal erosion: reparative work on the Ballito coastline, KwaZulu-Natal, South Africa, was it enough?*” 2009 International Multi Purpose Reef and Coastal Conference, Jeffrey's Bay South Africa.

Smith AM, SC Bundy 2012 “Review of Coastal Defence Systems in Southern Africa” Article for Springer Scientific Publications through Ulster University, Pilkey and Cooper

Bundy SC AM Smith, L Guastella 2012 “*A Review of Select Dune Rehabilitation Initiatives and a Proposed Methodology towards Ensuring a Prudent Approach towards the “Greening of Dunes”* VI International Sandy Beaches Symposium Emphakweni Port Alfred

Various popular articles including documentaries on coastal and climate change issues

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

Andrew Craig Blackmore

Full name Andrew Craig Blackmore
Postal address 96 Uplands Road, Blackridge, Pietermaritzburg, 3201 Kwa-Zulu-Natal South Africa
Language English (Excellent spoken & written)
Nationality South African

TERTIARY EDUCATION

Diploma – Multilateral Agreements University of Finland (2011)
Master of Laws (Environmental Law) *cum laude* University of KwaZulu-Natal, Pietermaritzburg (2005)
Master of Science – Ecology University of the Witwatersrand (1992)
Bachelor of Science (Honours) University of the Witwatersrand (1987)
Bachelor of Science University of the Witwatersrand (1986)
Candidate PhD – University of Tilburg Holland

PROFESSIONAL EXPERIENCE

- Research Officer. University of Witwatersrand. 1987 – 1990
- Nature Conservation Scientist. Natal Parks Board. 1990 - 1997
- Regional Ecologist. KZN Conservation Service. 1997 - 1999
- Head Integrated Environmental Management. Ezemvelo KZN Wildlife. 1999 – 2012
- Manager Protected Area Planning & Integrated Environmental Management. Ezemvelo KZN Wildlife 2012 – Present
- External Examiner Environmental Law, University of KZN – Howard Collage 2007 - Present
- Council Member of the Botanical Society of South Africa 2013 - Present
- Executive Member of the Botanical Society of South Africa 2013 - Present

PROFESSIONAL MEMBERSHIP

- Environmental Law Association
- Botanical Society of Society
- Elephant Specialist Advisory Group (Trustee)

References

Mr Trevor Sandwith Director, Global Protected Areas Policy Deputy Chair: World Commission on Protected Areas tsandwith@tnc.org Tel Washington (703) 841-2644

Mr R Porter Previous Head Biodiversity Planning. Ezemvelo KZN Wildlife roger.n.poter@gmail.com
+27 (0) 82908488

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

SPECIALIST DECLARATION

I, Simon C Bundy, as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that I:

- I act as the independent specialist in this application;
- I perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I have no vested interest in the proposed activity proceeding;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:  _____

Name of Specialist: Simon C Bundy

Date: 8 February 2016

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

EXECUTIVE SUMMARY

An Ecological Impact Assessment has been undertaken in order to provide supporting information in respect of an application for Environmental Authorisation associated with the proposed establishment of a 132 kV powerline near the town of Kenhardt. The proposed powerline will be constructed in order to service the requirements of and to enable connection of the proposed Kenhardt PV 1 project (which is the subject of a separate Scoping and EIA Process) to the national grid. The assessment which extended to consideration of the habitat and faunal components of a portion of land on the Farm Onder Rugzeer 168 was undertaken during the period of August to November 2015. The assessment included desktop evaluations, as well as site evaluations of the land within the proposed transmission line route/corridor.

The investigations looked specifically at habitat form and structure and the relationship of such form and structure to the surrounding geology and geomorphology. The assessment sought to identify the ecological status of the land within the route and identify key bio physical drivers. Such information was then considered in respect of any changes to the prevailing habitat that may arise as a consequence of the establishment of the powerline.

The site is considered to fall within a xeric environment (dry or semi desert) and as such, is subject to significant seasonal to daily fluctuations in meteorological and physical factors which influence the prevailing ecology. In addition to the above, anthropogenic interventions associated with both the presence of livestock on the land in question, as well as indirect influences arising from the establishment of infrastructure (roads and rail) have served to alter other bio physical factors, including surface hydrology and the nature and composition of habitat.

The proposed powerline corridor serving the Eskom Nieuwehoop Substation traverses lands presently set aside for the grazing of livestock. The corridor includes two Aloe consocieties (*Aloe dichotoma* and *A claviflora*) of limited extent, which are linked to specific physical drivers. These consocieties (i.e. associations of different genus) have been identified in the planning of the corridor. The routing of the transmission line must avoid the Aloe consocieties identified. This may be achieved, preferably by locating the final route proximal to the existing railway line/roadway, or less favourably by spanning over the associates. Mitigation and management measures proposed are that the actual powerline lie either to the south or north of the identified associates and where applicable, towers be suitably positioned at points distal from these communities. The relocation of these specimens is possible; however this method should be avoided. Towers should be spaced adequately to avoid the necessity for relocation. A 60 m buffer should be implemented around the Aloe consocieties.

Wolfkopseloop, a drainage feature that is inundated on an intermittent basis (periods greater than a year) lies to the north of the site and forms the most significant surface feature. As a significant hydro-geomorphological feature, a buffer of 32m has been applied to this feature, where it intersects with the subject site. Wider buffers are considered to be inappropriate, given the nature of the terrain in question and the nature of the development.

Surface drainage along the proposed transmission line corridor traverses a number of minor drainage lines which serve the Wolfkopseloop drainage feature. As is common to this region, minor drainage lines are influenced by the variability and intensity of rainfall and other factors, in particular the movement of livestock. Such drainage lines have been identified and should be given consideration in the final layout and design of the transmission line. However, these morphological features do not have to be avoided.

Other mitigation measures that may address or redress identified potential impacts were identified during the course of the assessment and proposed in the Environmental Management Programme.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

Having given due consideration to the proposed powerline route and its present ecological state, as well as the nature of the proposed development, it is our opinion that the development cannot be precluded from the route on ecological grounds, provided that suitable measures, as espoused in this report are implemented.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

COMPLIANCE WITH THE APPENDIX 6 OF THE 2014 EIA REGULATIONS

Requirements of Appendix 6 – GN R982	Addressed in the Specialist Report
1. (1) A specialist report prepared in terms of these Regulations must contain-	Preliminary Sections of this Report
a) details of- <ul style="list-style-type: none"> i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae; 	
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Preliminary Sections of this Report, Section 1.1.6 of this Report and Appendix I of the BA Report
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1.1
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 1.1.4
e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	Section 1.1.3
f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	Section 1.3
g) an identification of any areas to be avoided, including buffers;	Section 1.3
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 1.3, Section 1.5 and Section 1.6
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.1
j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	Section 1.6
k) any mitigation measures for inclusion in the EMPr;	Section 1.6
l) any conditions for inclusion in the environmental authorisation;	Section 1.6
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 1.8
n) a reasoned opinion- <ul style="list-style-type: none"> i. as to whether the proposed activity or portions thereof should be authorised; and ii. if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan; 	Section 1.9
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	Section 1.6
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Section 1.5
q) any other information requested by the competent authority.	n/a

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

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LIST OF ABBREVIATIONS

BFD	Bird Flight Diverter
DEA	Department of Environmental Affairs
EIA	Environmental Impact Assessment
ELP	Electrical light pollution
NEMA	National Environmental Management Act
NEMBA	NEM Biodiversity Act
TWINSpan	Two Way Indicator Species Analysis

GLOSSARY

<i>Definitions</i>	
<i>Arid</i>	Areas which receive low levels of rainfall or there is a moisture deficit.
<i>Crepuscular</i>	Fauna that is active at twilight
<i>Dendrogram</i>	A diagram showing relationships determined through a cluster analysis
<i>Calcrete</i>	A carbonate horizon formed in semi-arid regions. Also known as a caliche.
<i>Dolerite</i>	Form of igneous rock.
<i>Drainage line</i>	A geomorphological feature in which water may flow during periods of rainfall.
<i>Edaphic</i>	Pertaining to soils.
<i>Fossorial</i>	Pertaining to burrowing animals or those which live underground
<i>Geophyte</i>	Plants with underground storage organs.
<i>Graminoid</i>	Grasses or grass-like. Also monocotyledonous plants.
<i>Gully</i>	An erosion line exceeding 30cm in depth where water flow is concentrated and erosion resulting from flow is clearly evident.
<i>Hydrogeomorphological</i>	The interaction of geomorphic processes, landforms and /or weathered materials with surface and sub-surface waters.
<i>Hygrophilous</i>	Plants growing in damp or wet conditions
<i>Multivariate analysis</i>	A statistical method of evaluating non linear relationships between groups of data.
<i>Non perennial</i>	Flow is intermittent and irregular
<i>Rill</i>	Shallow erosion lines less than 30cm deep
<i>Xeric</i>	A dry, as opposed to wet (hydric) or mesic (intermediate) environment.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

ECOLOGICAL IMPACT ASSESSMENT

This report presents the Ecological Impact Assessment Specialist Study that was prepared by Mr. Simon Bundy (of Sustainable Development Projects cc (SDP)) as part of the Basic Assessment (BA) for the proposed Kenhardt PV 1 – Transmission Line project within the Northern Cape Province.

1.1 INTRODUCTION AND METHODOLOGY

1.1.1 *Scope and Objectives*

The establishment of a 132 kV overhead powerline serving the proposed Kenhardt PV 1 solar facility and the Eskom Nieuwehoop Substation requires the undertaking of a BA in terms of the EIA Regulations. Such an application entails the provision of information that allows the mandated authority to provide a considered opinion on the proposed project and identify any environmental matters that may require mitigation or moderation either in the planning, construction or operation phases of the project. The specialist study includes an evaluation of the bio-physical and ecological aspects of the receiving environment.

This bio physical evaluation of a portion of the Onder Rugzeer Farm 168 was undertaken during the period August 2015 to November 2015 and entailed both a literature review of the region, as well as site evaluations, during which specific site information and data was collected and evaluated. In addition, the identification of key ecological features along the proposed line route was undertaken and an interpretation of the prevailing habitat form is provided.

All information was evaluated and interpreted in order to provide an understanding of the nature of the prevailing environment at a landscape and habitat level, together with specific evaluation of data relating to habitat form and structure. A key focus of the investigation was to identify anomalies within the prevailing uniform environment common to the area. Such variance may be considered to be indicative of differing habitat forms, which under consideration, may be of higher order ecological value in relation of the prevailing environment.

1.1.2 *Terms of Reference*

The overall objectives of the Ecological Impact Assessment are to:

- Identify and establish an understanding of the route under consideration at a landscape scale of evaluation with particular consideration being given to aquatic or important terrestrial habitats, as they may be identified.
- Provide an evaluation and status of habitat composition and significance within the corridor in order to evaluate the potential impact of the proposed powerline on the ecological function of the subject area.
- Assess the potential impacts arising from the development on both the habitat and fauna within the study area. Such impacts may be directly applicable to the route and contained within the route boundaries, or may be indirect impacts, which may have ramifications outside of the route boundary. Consideration of cumulative impacts arising from similar developments or activities within the region should also be given consideration.

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- Provide guidance on the implementation of mitigation measures that may serve to moderate any negative impacts that may arise on route as a consequence of the development.

The Scope of Work is based on the following broad Terms of Reference, which have been specified for this specialist study:

- Review detailed information relating to the project description and precisely define the environmental risks to the terrestrial and aquatic environment (including avifauna) and consequences for ecology.
- Compile a baseline description of the terrestrial and aquatic ecology (including avifauna) of the study area, and provide an overview of the entire study area in terms of ecological significance and sensitivity (i.e. in terms of the major habitat forms within the study area, giving due consideration to terrestrial ecology (flora), terrestrial ecology (fauna) and freshwater ecosystems/wetlands).
- Provide specific ecological data in respect of the floral, faunal and aquatic components of the site using ground-truthing methods, with an emphasis on those areas considered to be of “high” and possibly, “moderate” sensitivity (based on the desktop study).
- Based on the desktop study, undertake field work and sampling across the site to record relevant data and to compile an overview of the habitat under review.
- Collate all data collected during the field work and undertake a statistical review using methodologies that allows for comparison of biological data.
- Consider wetlands (endoreic pans) and associated water resources within the site in terms of significance within the catchment, habitat value and significance and delineation of extent through preliminary on site evaluation and the use of aerial imagery interpretation (where these arise). Determine if a Water Use Licence is required.
- Undertake a faunal investigation on site based on the points identified during the preliminary aerial photographic interpretation.
- Provide a detailed terrestrial and aquatic ecological sensitivity map of the site, including mapping of disturbance and transformation on site.
- Identify and rate potential direct, indirect and cumulative impacts (in line with the impact assessment methodology provided in Section D of the BA Report) on the terrestrial and aquatic ecology, communities and ecological processes within the site during the construction, operation and decommissioning phases of the project.
- Provide input to the Environmental Management Programme, including mitigation and monitoring requirements to ensure that the impacts on the terrestrial and aquatic ecology are limited.
- Compile an assessment report qualifying the risks and potential impacts on terrestrial and aquatic ecology in the study area and impact evaluations.

1.1.3 Approach and Methodology

A literature review and desktop analysis was undertaken prior to site reconnaissance, utilizing various sources including the South African National Biodiversity Institute (SANBI) data and other relevant sources, including spatial data. Recent and historical, aerial imagery of the route was reviewed in order to identify points for investigation during the field survey.

Utilising the above information, a field investigation was undertaken during the early summer of 2015 (November), whereby:

- The proposed transmission line corridor (with a corridor width of approximately 1000m) was subject to an evaluation using recent historical imagery, with some comparative

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review of older imagery. Notably additional powerlines have been proposed in conjunction with the subject powerline (Figure 1), which are subjected to separate BA Processes (as noted above). These projects are namely powerline PV 2 and PV 3 to the south which would form part of a continuous powerline should the projects all come to realization.

- Field reconnaissance was undertaken during the period of 3 – 6 November 2015, whereby the entire proposed transmission line route/corridor, as well as adjacent points along the route, was given consideration. Consideration was given to:
 1. Geomorphological features identified from aerial imagery.
 2. Habitat form and structure along the proposed transmission line route/corridor, including species composition.
 3. Other factors of a bio-physical nature were given consideration.

Figure 1 below shows the proposed transmission line corridor serving the proposed Kenhardt PV facilities.

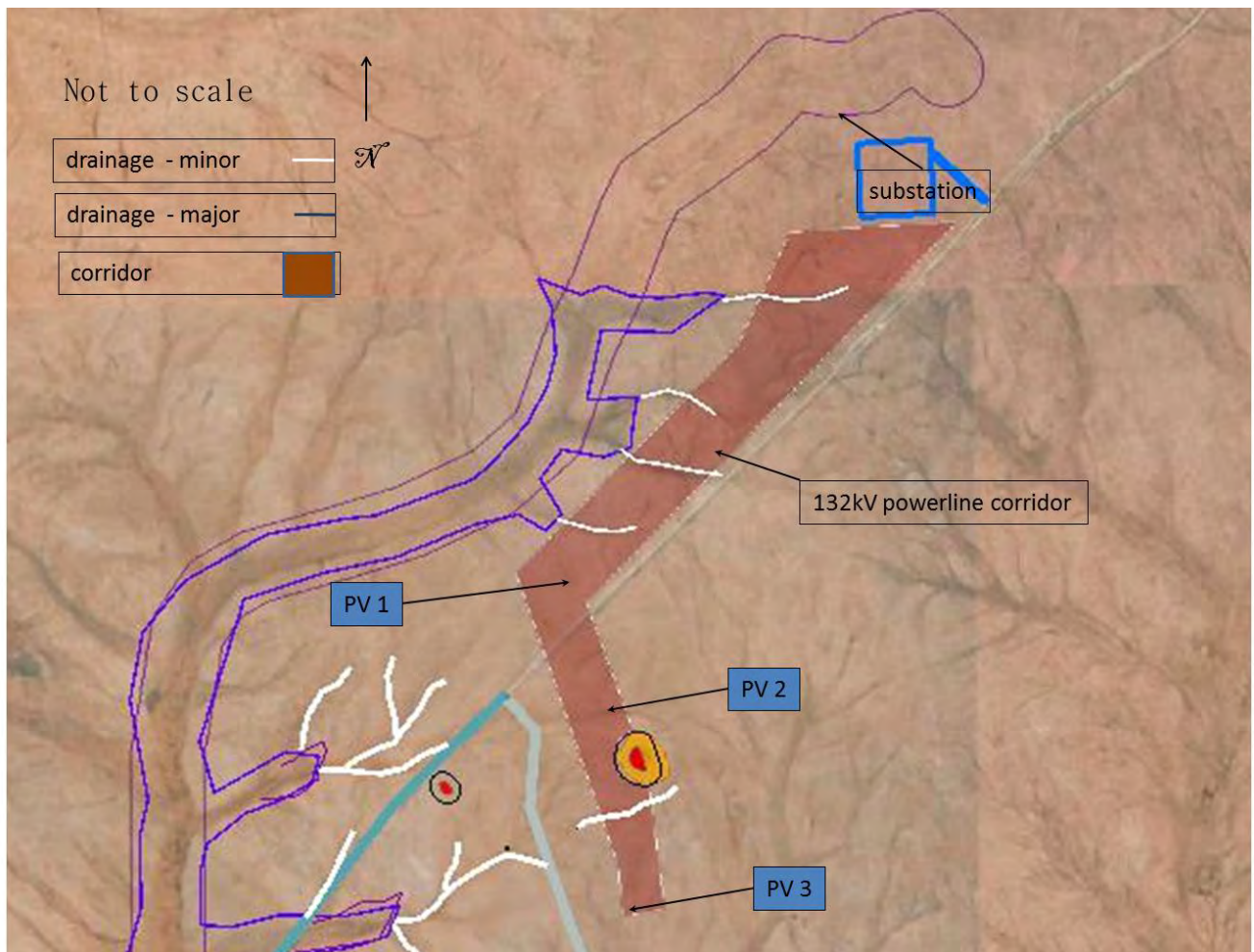


Figure 1: Image of the proposed transmission line corridor and its routing through the Kenhardt PV 1, PV 2 and PV 3 – proposed PV facilities, as well as major drainage lines (purple) and minor drainage lines (white) (Imagery Source: Google Earth, 2015), Not to scale.

Figure 2 below shows a finer resolution of the corridor under consideration as proposed between the Kenhardt PV 1 facility and the Eskom Nieuwehoop Substation.

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In evaluating this corridor all data was collated and evaluated, including the following steps:

1. The position and nature of drainage features proximal to and within the proposed transmission line route/corridor.
2. Botanical species presence within and along the proposed transmission line route/corridor were noted and their alignment with the prevailing Bushmanland Arid Grassland veld type was given consideration.
3. The presence of exotic and identified alien invasive species was given consideration.
4. Faunal presence including that of avian species was noted, including species that were noted within the region, but not within the study area. Evidence of faunal activity was also noted and given consideration.
5. Identification of any habitat anomalies that may be identified in such analysis.

In addition, using methods identified in the Department of Water Affairs' "A Practical Field Procedure for Identification of Wetlands and Riparian Areas" (2005), wetland and riparian areas were identified. Such evaluations utilised both geomorphological, geohydromorphic edaphic conditions and botanical indicators in order to identify such components. In practise, only geomorphological components were utilised, as discussed below. Where riparian and wetland systems are identified and lie within 500 m of the proposed development/activity, an application in terms of Section 21 c and i, of the National Water Act (1998) is required to be submitted to the mandated authority.

1.1.4 Assumptions and Limitations

The route assessment and collation of data was undertaken in the period of 3 - 6 November 2015, during a period of successional and unseasonably high temperatures and low rainfall (SA Weather Services, <http://www.weathersa.co.za>). Such meteorological stressors mean that some botanical species, in particular graminoids and geophytes, are not generally evident. This may affect both the analytical and observation results of the investigation.

Allied to the above, the route investigation coincided with the regular, early summer dry period. As higher rainfall in the region is a late summer phenomenon, many botanical species remain dormant, until the advent of rains, effectively masking their presence.

In terms of the assessment of potential cumulative impacts included in this specialist study, these take into consideration certain developments that occur with a 20 km radius of the proposed project, as shown in Section D of the BA Report.

1.1.5 Source of Information

This assessment was undertaken utilising:

- 1:50 000 topographic mapping sourced from the Surveyor General's office; and
- Aerial imagery sourced from Google Earth.

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In addition, use was made of the following data:

- Wetland and riparian habitat GIS data sourced from the National Freshwater Ecological Priority Area Programme of SANBI;
- SANBI veld types data; and
- Literature as referenced.

1.1.6 Declaration of Independence of Specialist

Refer to the preliminary sections of this specialist report for the Curriculum Vitae of Mr. Simon Bundy and Mr. Andy Blackmore, which highlights their experience and expertise. The declaration of independence by the specialist is provided in Box 1.1 below, with a full declaration provided in the preliminary section of this report and included in Appendix I of the BA Report.

BOX 1.1: DECLARATION OF INDEPENDENCE

I, Simon Bundy, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed Kenhardt PV 1 – Transmission Line Project, application or appeal in respect of which I was appointed, other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.



Simon Bundy

1.2 DESCRIPTION OF PROJECT ASPECTS RELEVANT TO TERRESTRIAL, AVIFAUNA, AND AQUATIC ECOLOGY (INCLUDING HYDROLOGICAL FEATURES)

A single powerline corridor has been given due consideration. This corridor of approximately 1000 in width has been identified for expediency purposes and forms the most logical and efficient powerline route available to serve the proposed Kenhardt PV 1 facility. Upon the identification and finalization of the proposed corridor, it is envisaged that the final route will accommodate the most applicable and from an ecological perspective, most appropriate line route:

The proposed transmission line and electrical infrastructure connectivity options that have been considered are:

- The construction of a single 132 kV transmission line from each Kenhardt PV facility to the Eskom Nieuwehoop Substation; or
- Separate 22 kV/33 kV transmission lines are proposed to connect the Kenhardt PV 2 and Kenhardt PV 3 projects to the proposed Kenhardt PV 1 on-site substation, which will link via a 132 kV line to the Eskom Nieuwehoop Substation; or
- Construct one 132 kV transmission line from the Kenhardt PV 1 project to the Eskom Nieuwehoop Substation and connect the Kenhardt PV 2 and Kenhardt PV 3 facilities together via medium voltage transmission lines to either the on-site substation of Kenhardt PV 2 or PV 3, followed by the construction of one 132 kV transmission line from the on-site substation to the Eskom Nieuwehoop Substation.

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The transmission lines are being assessed separately as part of a BA for each Kenhardt PV project. The Kenhardt PV 1 – Transmission Line project will entail a single 132 KV transmission line from the Kenhardt PV 1 project to the Eskom Nieuwehoop Substation, within the overall corridor.

Regardless of which connectivity option is selected, all the options occur within an electrical infrastructure corridor (shown in Figure 2).

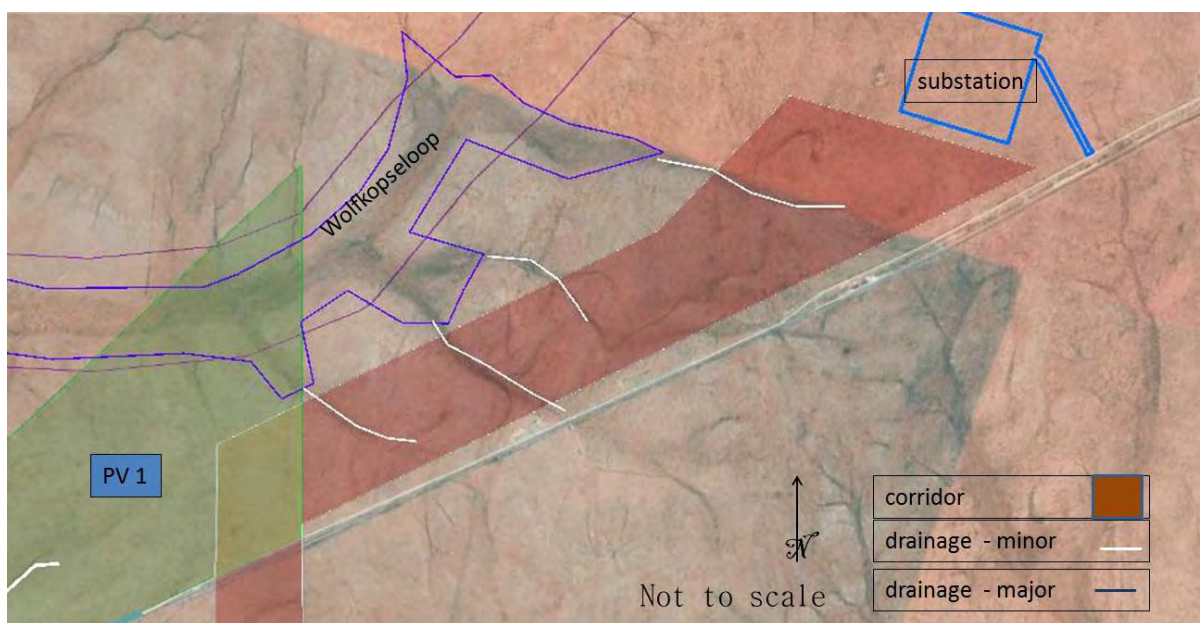


Figure 2: Image showing the proposed corridor associated with the Kenhardt PV 1 transmission line lying between the proposed Kenhardt PV 1 facility and Eskom Nieuwehoop Substation. The Wolfkopseloop feature and its associated drainage lines, lying to the north of the corridor, are considered a major hydrogeomorphic feature and is outlined in purple. Minor dendritic drainage features are identified in white.

Other activities associated with the powerline construction are:

1. Finalisation of the proposed powerline route and identification of tower positions.
2. Clearance of points around the powerline towers.
3. Establishment of towers using earthscrews or similar foundation methods. A steel framework or concrete tower will be constructed thereon.
4. Stringing of the proposed powerline utilising cabling dispensed from a truck which drives the length of the route.

The establishment of the proposed powerline will thus entail *low to moderate* alteration of the prevailing habitat (i.e. during the construction phase). Once established, the powerline is a generally benign structure (i.e. during the operational phase).

A detailed project description is included in Section A of the BA Report, which includes dimensions and specifications of the proposed project components.

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1.3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

According to Mucina and Rutherford's veld type classification of 2006, Kenhardt and surrounding regions fall within the Bushmanland Arid Grassland veld type (NKb3). This veld type is located extensively south of the Orange River, but may include a number of smaller habitat forms within its broader extent.

The proposed Kenhardt PV 1 transmission line corridor can be described as a generally level portion of land, with a low gradient draining towards the west, into a shallow drainage feature known locally as "Wolfkopseloop" (Figure 2 and Figure 3). This drainage line serves an area of approximately 280 km², most of which lies outside of the study area. Wolfkopseloop drains into the Hartebees River, which in turn serves the Sout River and Orange River systems. Figure 1 and Figure 2 show that the minor drainage lines which serve the Wolfkopseloop River flow through certain sections of the transmission line corridor. The Wolfkopseloop system and its immediate tributaries may be regarded as major drainage features.



Figure 3: Image indicating Wolfkopseloop in the background – more verdant vegetation - with a camp fence in the foreground and an indication of the general nature of the receiving habitat.

The area in general can be considered to have a low rainfall of less than 200 mm per annum (SA Weather Services, 2015) although the recorded average rainfall for the period 2000 to 2012 approximates 238 mm within an average of 51 rain days per year (www.worldweatheronline.com). As such the area has been described as a "semi-arid region" (Bailey, 1979). Using the Koppen-Geiger climate classification method (www.koepen-geiger.vu-wien.ac.at), the area is classified as "BWh", which is indicative of an *arid hot environment*, - which is supported by Esler *et. al.*, (2006) who have defined areas with an annual rainfall of less than 200 mm as being "deserts". This *desert* status may be the case in the Kenhardt region under its lower rainfall periods. In addition, the highest annual

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temperatures for the region are recorded between January and February, with maximum temperatures being 37°C (www.worldweatheronline.com). Extreme temperatures thus coincide with the peak rainfall period. Such correlation may give rise to the low groundwater recharge rates projected for the region, this being estimated at approximately 0.03 mm / annum (Musekiwa and Majola, 2011). Groundwater is described in greater detail in Geohydrological Assessment (which forms Appendix D.5 of the BA Report).

With the above in mind, the most definitive physical drivers of the Bushmanland Arid Grassland veld type that lies within which the subject route, are meteorological and will relate to surface and subsurface hydrology. Other physical drivers will include localised geologies and edaphics.

1.3.1 *Habitat and Vegetation*

The proposed Kenhardt PV 1 transmission line corridor will run parallel to the Sishen – Saldanha railway line and its associated support road, as indicated in Figures 1 and 2 above. The establishment of the railway line has altered surface hydrology on route, although it is evident that such transformation would relate primarily to minor dendritic drainage lines. In general the site is level, within little topographic variation and a low, gentle gradient to the west. These minor dendritic drainage features in turn, serve the Wolfkopseloop drainage line. Minor and major drainage lines are shown in Figures 1 and 2 above.

In general, the area appears to have been subject to extensive and significant grazing. The proposed powerline route will traverse one existing camp, which at the time contained livestock. The dominant vegetation form is a *Rhigozum* – *Aristida* association with some quartz exposures. Two consocieties of the quiver tree, *Aloe dichotoma* are noted, these lying to the west and to the east of the proposed transmission line corridor (Figure 4). In addition, *A claviflora* are also evident in association with *A dichotoma* (Figure 5). Common to the dendritic and minor surface drainage features that dissect the line route are more verdant associations of *Rhigozum trichomotum*, *Aristida ascensionis* and *A congesta*. *Stipagrostis ciliata* is also common to these features. A list of species identified across the proposed transmission line route is presented in Table 1 below.

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Table 1. List of observed species within the proposed transmission line corridor.

Species	Conservation Significance	
	NC NCA *	NFA#
<i>Acacia karroo</i>		
<i>Acacia mellifera</i>		
<i>Aizoon elongatum</i>		
<i>Aloe dichotoma</i>	X	
<i>Aloe claviflora</i>	X	
<i>Aptosimum spinescens</i>		
<i>Aristida ascensionis</i>		
<i>Aristida congesta</i>		
<i>Asparagus suaveolens</i>		
<i>Atriplex lindleyi</i>		
<i>Blepharis capensis</i>		
<i>Cadaba aphylla</i>		
<i>Chrysocoma ciliata</i>		
<i>Enneapogon scaber</i>		
<i>Datura ferox</i> \$		
<i>Enneapogon cenchroides</i>		
<i>Eragrostis nindensis</i>		
<i>Eriocephalus encoides</i>		
<i>Euphorbia glanduligera</i>		
<i>Euphorbia stellispina</i>		
<i>Felicia muricata</i>		
<i>Lessertia annularis</i>		
<i>Lyceum cinereum</i>		
<i>Mesembryanthemum guerichianum</i>		
<i>Monechma incanum</i>		
<i>Osteospermum spinescens</i>		
<i>Pentzia spinescens</i>		
<i>Prosopis glandulosa</i> \$		
<i>Rhigozum trichotomum</i>		
<i>Riccia albornata</i>		
<i>Salsola tuberculata</i>		
<i>Schmidtia pappophoroides</i>		
<i>Stipagrostis anomala</i>		
<i>Stipagrostis ciliata</i>		
<i>Tetragonia arbuscular</i>		
<i>Tribulus cristatus</i>		
<i>Tribulus pterophorus</i> \$		

*NC NCA = Northern Cape Nature Conservation Act (1998)

#NFA = National Forest Act (1998)

\$ = exotic

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Figure 4 Image indicating *A dichotoma* in foreground and prevailing habitat to the west of the proposed powerline route/corridor.



Figure 5: Image indicating *Aloe concocies* that lies to the east of the proposed powerline route/corridor. *A claviflora* in foreground.

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From the above and as depicted in Appendix A of this report, it is evident that the proposed transmission line corridor, if developed, should not intersect with the two Aloe consocieties identified or the routing may be established in order to accommodate the presence of these specimens. This may be achieved, preferably by locating the final route proximal to the existing railway line/roadway, or less favourably by spanning over the associates. Final planning of the powerline route should take consideration of the position of the Aloe consocieties, as well as other factors including existing powerlines and infrastructure. The positioning of towers and where possible the routing of the line either to the west or east of the Aloe consocieties is proposed. A 60 m buffer should be implemented around the Aloe consocieties.

1.3.2 “Aquatic” and Riparian Habitat

As indicated above, surface drainage along the proposed transmission line corridor traverses a number of minor drainage lines which serve the (major) Wolfkopseloop drainage feature. These drainage features do not show specific hygrophilous vegetation characteristics as may be defined, nor do they show the presence of geohydromorphic soils, primarily on account of the erratic levels of inundation over extended periods of time, which is driven by the intensity and erratic rainfall experienced in this region. Interaction with the farmer presently utilising the land in question, indicated that the drainage lines show short term inundation during high rainfall periods, “every 4 to 5 years” (S Strauss *pers. comm.*). Flow is sluggish under these conditions, and following the cessation of rains, the water rapidly drains from route on account of the percolative, sandy conditions, or is lost to evaporation. For this reason, the major drainage lines have been delineated according to geomorphological features and an apparent change in vegetation form from a sparse and arrested growth form to a more verdant state (Figure 6).

Hydrogeomorphological features are indicated primarily by evidence of flow or deposition of materials (Brinson et al 1993; USDA 2008) while verdant vegetation establishment is a combination of both improved plant water relations and increased nutrient availability. Therefore major drainage features were allied with a combination of both vegetation structure and significant geohydromorphic indicators, while minor drainage features were distinguished through the presence of a more verdant vegetative association and in some cases indicators of minor surface flow (‘rills’).

The interface between major and minor drainage lines is often vague, however where rills exceeded a depth of 30cm (gullies), such features were defined as ‘major’ drainage systems.

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Figure 6: An image indicating a verdant vegetation state around a drainage feature within the Kenhardt PV 3 area. Compare with adjacent vegetation forms which appear arrested in growth.

Although ephemeral in terms of the presence of water within these features, these drainage lines do bestow intermittent hydrological benefit to the landscape and can be considered groundwater “recharge zones” in respect of the local subsurface hydrology. From a biotic perspective, the drainage lines do serve as seasonally important refugia and congregation points for *inter alia* invertebrates (e.g. Class Odonata) and vertebrates (e.g. Order Anura) (faunal aspects are described further in Section 1.3.4 of this report).

Figure 2 and Appendix A of this report indicates the position and extent of the major drainage features, with minor dendritic features (those features that show only minor indications of flow and some vegetation change), also being identified. The evident differentiation between the major and minor drainage features is highlighted in the mapping imagery. The former are considered to be important ecological factors within the landscape, while the latter are of less significance, but should be given consideration, where they may intersect with the development footprint of the proposed transmission line corridor.

1.3.3 Habitat Sensitivity

Appendix A of this report indicates exclusion zones, relating to the proposed development within the study route. **These zones relate to the major drainage features.** No additional sites of ecological significance that should be excluded from the development footprint have been identified.

A 32 m “buffer” or “setback” around the major drainage lines has been established, which is an indicative “norm” recommended by the various authorities. This buffer is to be established and applied around the major drainage systems. This buffer is considered acceptable in light of the fact that hydrogeomorphic features are the primary dictate in the identification and delineation

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of the major drainage lines, rather than other functional features such as geohydromorphic soil conditions or botanical species diversity and compositional variation. It is evident that a 100m exclusion area around the major drainage lines would incorporate extensive tracts of land which are in no way indicative of the concentrated surface hydrology. The application of 32m from such features is expected to accommodate both the variation in habitat structure and the erosive action associated with gullies and larger drainage features.

The “minor” drainage features are not considered to require exclusion from any land use change or a development akin to that proposed on account of:

1. The transformed surface hydraulics arising from the establishment of the railway line and its associated stormwater management infrastructure.
2. The nature of the proposed powerline, whereby the towers may be strategically positioned in order to minimise their influence and position in relation to the identified watercourses.
3. The origins of many of the minor features, as explained above.
4. Other anthropogenic interventions, such as borrow pits and roadways, which have further altered surface drainage.

Therefore, based on the above, the minor drainage lines occurring within the transmission line corridor do not require avoidance. **It would however be best for the design of the proposed transmission line to note the presence of these minor features and avoid establishing structures such as buildings and other permanent and significant structures (powerline towers) within them.**

1.3.4 Fauna

1.3.4.1 Terrestrial

Fauna that prevail along the proposed transmission line route are considered to be typical of a xeric environment, with limited habitat variation across the study area. Table 2, below indicates species evidence of their presence observed *en route* and in the general locale. The occurrence of such species is likely in respect of these animals either utilizing the subject area as refugia or as part of a wider foraging range or territory. As is typical of the region, a large number of fossorial and burrowing species, including mammals and invertebrates, were identified across the route in general. Such species included suricates (meerkat), (*Suricata suricata*) and ground squirrel, (*Xerus inauris*). These species live in mutual habitation within active burrows (Figures 7 and 8). In addition foraging excavations indicating the presence of Aardvark (*Orycteropus afer*), as well as the porcupine (*Hystrix africaeaustralis*) are evident.

Other larger mammals that were noted on route of the proposed transmission line include Springbok (*Antidorcas marsupalis*), which are prevalent across the area and may be accompanied by Steenbok (*Raphicerus campestris*), which are also common in the region and open habitat (Estes, 1992).

Most larger mammals located within the proposed transmission line route and general study area are not reliant upon the study area in particular and are likely to forage over extensive ranges that extend beyond the study area. Estes (1992) indicates that suricates may use warrens for a number of months or possibly years, before relocating.

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Noted on other PV routes, suricates are quite capable of establishing warrens within solar parks following their construction, while armadillo (*O. tereticaenosa*) and other fossorial species are capable of excavating under fencing, which may only initially serve to exclude them from an area.



Figure 7: Suricate warren located in proximity to the proposed transmission line route.



Figure 8: Ground squirrel (*Xerus inauris*).

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Table 2. List of Terrestrial Species identified within the proposed Transmission Line Route and likely to be Present within the region/corridor. Species of Conservation Importance is Identified.

		Observations	TOPS (2007)	Conservation importance (IUCN Red List) *
Mammals				
<i>Orycteropus afer</i>	Aardvark	Foraging evidence?		LC
<i>Felis nigripes</i>	Black-footed cat			VU
<i>Atelerix frontalis</i>	South African hedgehog	Pers.comm J Orven	Protected	LC
<i>Canis mesomelas</i>	Black back jackal			Not listed
<i>Xerus inauris</i>	Cape ground squirrel	Observed		Not listed
<i>Lepus capensis</i>	Cape hare	Observed		Not listed
<i>Felis caracal ?</i>	Caracal ?	Remains of prey		Not listed
<i>Procavia capensis</i>	Rock dassie	Observed		LC
<i>Suricata suricatta</i>	Meerkat	Observed		LC
<i>Aethomys namaquensis</i>	Namaqua rock mouse			Not listed
<i>Hystrix africaeaustralis</i>	Porcupine	Foraging evidence?		LC
<i>Antidorcas marsupialis</i>	Springbok	Observed		LC
<i>Raphicerus campestris</i>	Steenbok			LC
<i>Cynictis penicillata</i>	Yellow mongoose	Observed		LC
Reptiles				
<i>Ptenopus spp</i>	Barking gecko			LC
<i>Naja nivea</i>	Cape cobra			Not listed
<i>Chondrodactylus angulifer</i>	Giant ground gecko			LC
<i>Cordylus spp</i>	Girdled lizard		Protected	<i>C cataphractus</i> ; - VU
<i>Psammobates tentorius</i>	Karoo tent tortoise			Not listed
<i>Geochelone pardalis</i>	Leopard tortoise	Observed		Not listed
<i>Bitis arietans</i>	Puff adder			Not listed
<i>Agama makarikarica</i>	Spiny agama			Not listed
Amphibians				
<i>Tomopterna cryptotis</i>	Tremolo sand frog			LC
Invertebrates				
<i>Locustana pardalina</i>	Brown locust	Observed		Not listed
<i>Pterinochilus spp</i>	Baboon spider		Protected	Not listed
<i>Seothyra spp</i>	Buckspoor spider			Not listed
Family Vespidae	Various wasps	Observed		
Opisthophthalmus spp	Burrowing scorpions?	Burrow entrance?	Protected	Not listed
Parabuthus spp	Parabuthid scorpion			Not listed
Family Hodotermitidae	Termite			Not listed

TOPS – Threatened or Protected Species GN R151 of the National Environmental Management: Biodiversity Act (Act 10 of 2004)

IUCN – International Union of Conservation Networks

* LC = Least concern; NT = Near threatened; VU = Vulnerable; EN = Endangered

CR = Critically endangered; EW = Extinct in the wild; NE = not evaluated; DD = data deficient

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1.3.4.2 Avifauna

As the study area is located in an arid region, it is expected that the avifaunal densities will be low, typical of the Bushmanland Arid Grassland environment. Consideration of the birds observed within the study area during the beginning of November 2015 (Table 3) and the Southern African Bird Atlas Project (SABAP) sighting data (see <http://sabap2.adu.org.za/>) indicates that the proposed powerline presents a **limited risk to the avifaunal community**.

The SABAP data indicates three species of potential concern. These species are two raptor species - the Pygmy Falcon (*Polihierax semitorquatus*) and the Southern Pale Chanting Goshawk (*Melierax canorus*), and the Kori Bustard (*Ardeotis kori*). The predatory flight habit of the raptor species is such that they are likely to avoid collision with horizontal and vertically aligned infrastructure. It is, however, to be recognized that the powerlines and pylons provide these species with artificial perching points. This, as has been recorded elsewhere, provides both the falcon and goshawk a predatory advantage, increasing their prey species vulnerability. Given the current low numbers of these artificial perches, this impact is considered *low to moderate* at a route specific level and *low* at a landscape level. Caution is however raised that with an increase in the number of artificial perching points possible in the future, the resultant cumulative impacts are likely to become significant at a landscape level. Although generally indeterminate at a coarse level of evaluation such changes that may favour predatory birds could result in an equilibria shift in the populations of various prey species. The assessment of this potential impact is assessed in Section 1.6 of this report.

The Kori Bustard is classified as 'Near Threatened' and is particularly vulnerable to collision with powerlines. At these points the placement of *Bird Flight Diverters* (BFD) or bird flappers along the powerlines is advised as a suitable mitigation. Given the paucity of wetlands and open water within that landscape, the impact of the proposed solar PV facility on wetland avifauna is considered negligible. As indicated above, drainage features in the form of gullies show an extremely limited presence of flow or indeed the presence of water. Water fowl in the region are to be considered transitory in nature or associated with times of inundation of the abovementioned drainage features. Finally, given the abundance of habitat surrounding the proposed corridor, the loss of habitat integrity as a consequence of the establishment of the powerline is likely to have a low measurable impact on avifauna. Notwithstanding this observation, the continued and cumulative loss of habitat at a landscape to regional level is a possible matter of concern.

Table 3. Species noted within and adjacent to the study area.

Aves		Observations
<i>Cercomela schlegelii</i>	Karoo chat	Observation on route
<i>Cisticola aridulu</i>	Desert cisticola	Observation on route
<i>Corvus albus</i>	Pied crow	Observation off route
<i>Egretta garzetta</i>	Little Egret	Observation off route
<i>Lanius collaris</i>	African fiscal	Observation off route
<i>Melierax gabar</i>	Gabar goshawk	Observation off route
<i>Oena capensis</i>	Namaqua dove	Observation on route
<i>Philetairus socius</i>	Weaver, sociable	Proximal nesting route
<i>Streptopelia capicola</i>	Cape turtle dove	Observation off route
<i>Streptopelia senegalensis</i>	Laughing dove	Observation off route

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1.4 APPLICABLE LEGISLATION AND PERMIT REQUIREMENTS

The proposed establishment of the 132 kV powerline along the study route is considered to elicit a requirement for compliance with the following legislation.

1. The National Environmental Management: Biodiversity Act (Act 10 of 2004)
2. The National Water Act (Act 36 of 1998)
3. The National Forest Act (Act 84 of 1998)
4. The Northern Cape Nature Conservation Act (Act 9 of 2009)
5. The Conservation of Agricultural Resources Act (Act 43 of 1983)

The potential applicability of the abovementioned acts to the subject site is provided below:

1. The National Environmental Management: Biodiversity Act (Act 10 of 2004)

This Act serves to control the disturbance and land utilisation within certain habitats, as well as the planting and control of certain exotic species. The proposed development, taking place in the identified Bushmanland Arid Grassland environment, may not necessitate any particular application for a change in land use from an ecological perspective, however the effective disturbance and removal of species identified in Tables 1 and 2, as well as possible other species (i.e. TOPS species), will require specific permission from the applicable authorities.

In addition, the planting and management of exotic plant species on route, if and where required, will be governed by the Alien and Invasive Species (AIS) regulations, which were gazetted in 2014. These regulations compel landowners to manage exotic weeds on land under their jurisdiction and control.

2. The National Water Act (Act 36 of 1998)

The National Water Act controls activities in and around water resources, as well as the general management of water resources, including abstraction of groundwater and disposal of water. Authorisation for changes in land use, up to 500 m from a defined water resource / wetland system will require an application for a Water Use Licence from the Department of Water and Sanitation. A Water Use Licence will possibly be required in respect of the proposed development under Section 21 (c) and (i), of the Act, however such license should not preclude this development. The necessity for a Water Use Licence in respect of the proposed powerline will be determined by the Department of Water and Sanitation, however it is noted that the watercourses do not meet the criteria to be termed "wetlands", while the final routing of the powerline may fall in excess of 500 m from the watercourse (Wolfkopseloop), thus not necessitating a Water Use Licence application.

3. The National Forest Act (Act 84 of 1998)

The National Forest Act (Act 84 of 1998) governs the removal, disturbance, cutting or damage and destruction of identified "protected trees". Listed species that may be encountered in the area include *Boscia* spp and possibly *Acacia erioloba*. Neither of these species were identified as falling within the proposed corridor.

It is unlikely that an application for the "clearing of a natural forest", as defined within the Act, will be required on the route in question.

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4. The Northern Cape Conservation Act

The Northern Cape Conservation Act under its pertinent regulation, governs the disturbance of species listed in Tables 1 and 2 above, or possibly other species not yet identified on route. A permit from the Provincial Department of Environment and Nature Conservation will be required in order to disturb or translocate such species. Species that would require such permitting include *Aloe dichotoma*, which has been identified within the proposed corridor.

5. The Conservation of Agricultural Resources Act

Invasive plant species that should be removed or maintained only under certain commercial situations are identified in terms of the Conservation of Agricultural Resources Act (CARA). This Act will be applicable to the project if and where such plants arise within or adjacent to the project area. Notably most listed alien invasive species are propagated and driven by the disturbance of land during and following construction.

As the proposed corridor does not lie within protected areas, nor within 5 kilometres of a protected area, nor within 10 kilometres of a World Heritage site and does not form part of a critical biodiversity area (CBA), the various regulations within the National Environmental Management Act and the NEM Protected Areas Act are not applicable to this site. It is also noted that the corridor does not fall within any expansion area in terms of a conservation strategy for the Northern Cape.

1.5 IDENTIFICATION OF KEY ISSUES

1.5.1 Key Issues Identified During the BA

As indicated in both this report and the environmental scoping report, the subject site is to be considered a xeric environment, with limitations in the presence of aquatic or wetland environments in both temporal and spatial terms. With this in mind, the consideration of issues arising from the proposed development is considered at an integrated level as they may arise. The following key issues were identified during the BA Process:

Construction Phase:

1. The disturbance of fauna and loss of vegetation/habitat through anthropogenic activities, disturbance of refugia and general change in habitat.
2. Disturbance of vegetation, in particular habitat associations as a consequence of the establishment of the proposed towers of the transmission line.
3. Alteration of surface drainage patterns on account of construction activities leading to change in plant communities and general habitat structure, primarily the establishment of the proposed concrete or steel towers along the transmission line route, which require some level of excavation and the placement of concrete foundations.
4. Alteration of surface water quality on account of construction activities that lead to change in water chemistry.
5. Changes in edaphics (soils) on account of excavation and import of soils, leading to the alteration of plant communities and fossorial species in and around these points.

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Operational Phase

1. Operation of the proposed overhead transmission line, as well as subtle changes in habitat, are likely to result in the alteration of avian behaviour in and around the transmission line route/corridor. Possible avian collisions and bird strikes may arise from flying or birds roosting upon the lines. Birds at risk may include the sociable weaver and larger raptors.

To date, the following comments and issues have been raised by I&APs in relation to ecological impacts. Appendix E.3 of the BA Report includes the complete list of comments and responses.

Comment	Commentator and Date	Response from Specialist
<p>Point 3 - The proposed development do not form part of the Strategic Environmental Assessment (SEA) for Eskom's electricity grid upgrades and roll-outs as it falls outside one of the corridors identified by Eskom (i.e. the Western Corridor; one of the five identified corridors; refer to Figure 3). Comprehensive field surveys (within appropriate seasons) should thus be done for this specific area; it didn't form part of Eskom's assessment and the former project's surveys can thus not be used as baseline studies.</p> <p>Caption Figure 3 - Strategic Environmental Assessment (SEA) for ESKOM's electricity grid upgrades and roll-outs (Feb 2014) in relation to the proposed development (black arrow) near Kenhardt The proposed development falls outside one of the corridors identified by ESKOM (i.e. the Western Corridor; one of the five identified corridors), hence, it didn't form part of Eskom's assessment.</p>	<ul style="list-style-type: none"> • Elsabe Swart (Deputy Director – Research and Development Support) and Samantha De la Fontaine (District Ecologist), Northern Cape Department of Environment and Nature Conservation • 5 November 2015 (Letter via email) 	<ol style="list-style-type: none"> 1. Refer to the response provided in Appendix E.3 of the BA Report regarding the SEA for the Eskom Electricity Grid Infrastructure SEA. 2. Field and desktop investigations have been undertaken during November 2015. The primary data collated on site and the sampling regime employed has been extrapolated to consider other seasonal variations.
<p>The Department of Water and Sanitation (DWS) hereby acknowledges receipt of your scoping and environmental impact assessment for the proposed development of three Solar Photovoltaic Facilities (Referred to as Kenhardt PV 1, Kenhardt PV 2 and Kenhardt PV 3) on the remaining extent of Onder Rugzeer Farm 168, north-east of Kenhardt, Northern Cape Province. The department has reviewed the document and the comments are as follows:</p> <ul style="list-style-type: none"> ▪ Please note that no development should take place within 100 m horizontal distance from a water course or within 1:100 year flood line. Operation and storage of equipment within the riparian zone must be limited as far as possible. ▪ Storm water must be diverted from the construction works and roads and must be managed in such a manner as to disperse runoff and to prevent the concentration of storm water flow. Where necessary, works must be constructed to attenuate the velocity of the storm water discharge and to protect the banks of the watercourse. ▪ Please note that no taking of water or storing of water from the water resource shall be lawful without a water use authorisation. Due to the high number of renewable energy projects that are taking part in the Department of Energy (DOE) bidding process, this Department (DWS) will only process applications for water use authorisations received from developers who have attained preferred bidder status. Developers who wish to submit applications for water use authorisations may however proceed to do so, with the understanding that their applications will be processed as soon as we have confirmation of their status with the DOE. Attached to this letter is Annexure 1 that details information, which must be submitted as part of the application for water use authorisation. 	<ul style="list-style-type: none"> • Ms. Chantèl Schwartz, Orange Proto- CMA, Department of Water and Sanitation • 3 November 2015 (Email) 	<ol style="list-style-type: none"> 1. 100m set back has been noted, however given the fact that hydrogeomorphological indicators and vegetation structure have been used to delineate drainage features; a 100m non-development area around such features is considered excessive. The use of the more conservative 32m buffer is appropriate as this incorporates the identified vegetation indicators and provides a cordon around the erosive edges of such hydrological features. Notably, the powerline corridor is generally distal from most drainage features that are considered "major" systems. The corridor does not bisect any major drainage lines. 2. Advisory on dispersal of storm water is noted and it is proposed that engineering and layout of the powerline will accommodate this requirement. 3. Applicant has been advised and is aware of the Water Use Licence requirements.
<p>Point 6 - It is advisable that RE facilities are not proposed for areas that favour local faunal diversity (e.g. endorheic pans, dry river washes, rocky outcrops, etc.).</p>	<ul style="list-style-type: none"> • Elsabe Swart (Deputy Director – Research and Development Support) and 	<ol style="list-style-type: none"> 1. Habitat that favours faunal diversification and increased faunal populations have been

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<p>The Northern Cape is water scarce province, hence any form of sustained water, has the potential to stimulate vegetative growth and attract faunal species.</p> <p>Above-mentioned areas should be noted as sensitive areas during the EIA phase.</p>	<p>Samantha De la Fontaine (District Ecologist), Northern Cape Department of Environment and Nature Conservation</p> <ul style="list-style-type: none"> 5 November 2015 (Letter via email) 	<p>identified and should be excluded from the "final line route"</p> <p>2. Features mentioned have been incorporated into the assessment.</p>
<p>Point 1 - It should be noted that the areas where the proposed developments are to be constructed have been historically poorly surveyed, hence extrapolations from desktop studies for specialist's studies will give an incomplete representation of the biodiversity within the area (refer to Figure 2).</p> <p>Caption Figure 2- South African National Biodiversity Institute's (SANBI) PRECIS database (2013) indicating the number of plant specimens collected for specific Quarter Degree Grid Squares (QDGS). The proposed development falls within QDGS indicative of a very low species count (i.e. 1 – 50 species sampled per grid). Red squares denote zero specimens.</p>	<ul style="list-style-type: none"> Elsabe Swart (Deputy Director – Research and Development Support) and Samantha De la Fontaine (District Ecologist), Northern Cape Department of Environment and Nature Conservation 5 November 2015 (Letter via email) 	<p>1. Field reconnaissance was undertaken during assessment.</p> <p>2. PRECIS data base noted and confirmed.</p>
<p>Point 2 - Large Aloe dichotoma populations are known to occur in the region. The species is protected under the Northern Cape Nature Conservation Act (Act 9 of 2009) and at present there is a moratorium in place in the Northern Cape on the removal of A. dichotoma from the wild due to historic trade related pressures on populations (Proclamation No 968, 1 April 2005). Hence, trees may not be removed until the moratorium is lifted. All trees within the development or close proximity thereof should be mapped and information provided with the EIA documents.</p>	<ul style="list-style-type: none"> Elsabe Swart (Deputy Director – Research and Development Support) and Samantha De la Fontaine (District Ecologist), Northern Cape Department of Environment and Nature Conservation 5 November 2015 (Letter via email) 	<p>A dichotoma were noted within the corridor and should be considered and excluded from the final powerline route.</p>
<p>Point 5 - The development is proposed for an area that falls within the Bushmanland Arid Grassland, one of the most extensive vegetation types within the Northern Cape (Mucina and Rutherford, 2006). This vegetation types is poorly conserved in formal protected areas and extensive areas have been historically overgrazed. As a result, large areas are currently degraded and drainage lines have been modified as a result of anthropogenic impacts. As a result of the extent of the area, impact would most likely be on landscape connectivity as the site is in close proximity of drainage lines and wetlands (refer to Figure 5).</p> <p>Caption Figure 5 - Several landscape scale connections through drainage lines are evident within the area in question. The two proposed facilities i.e. the Three Solar PV (blue arrow) and Seven Solar PV (black arrow) are to be located in close proximity of drainage lines and wetlands.</p>	<ul style="list-style-type: none"> Elsabe Swart (Deputy Director – Research and Development Support) and Samantha De la Fontaine (District Ecologist), Northern Cape Department of Environment and Nature Conservation 5 November 2015 (Letter via email) 	<p>1. Connectivity identified and preserved.</p> <p>2. Drainage lines that are considered to be major watercourse features are excluded from the corridor.</p>
<p>Point 9 - It is advised that the consultants for this project liaise with the Forestry branch of the Department of Agriculture, Forestry and Fisheries (DAFF) if trees protected under the National Forest Act (Act No. 84 of 1998) are to be impacted by the proposed development.</p>	<ul style="list-style-type: none"> Elsabe Swart (Deputy Director – Research and Development Support) and Samantha De la Fontaine (District Ecologist), Northern Cape Department of Environment and Nature Conservation 5 November 2015 (Letter via email) 	<p>1. All protected trees identified along the corridor route have been identified and should be accommodated in the final powerline establishment route.</p>
<p>Point A. Specialist's studies:</p> <ul style="list-style-type: none"> A thorough baseline survey of the grids 2921AB and 2921AD should be conducted during the EIA phase with at least the following biotic specialists: Ornithologist, Mammologist, Herpetologist (including amphibians) and Botanist. <ul style="list-style-type: none"> Surveys for both the faunal and floral specialist reports should be done during the most optimum period for this area i.e. mid-summer to autumn, after the rains and during the growth season when maximum biota can be expected. 	<ul style="list-style-type: none"> Elsabe Swart (Deputy Director – Research and Development Support) and Samantha De la Fontaine (District Ecologist), Northern Cape Department of Environment and Nature Conservation 5 November 2015 (Letter via email) 	<p>1. An ecologist, ornithologist and aquatic specialist comprised part of the team.</p> <p>2. Timeframes do not allow for February to April period assessment. Drought period and meteorological state is noted at time of assessment.</p> <p>3. Timeframes do not allow for continued long term assessments. Interpretation of landform, floral and faunal</p>

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<ul style="list-style-type: none"> ○ This should be done in order to give a good representation of the ecology in the area. ○ Due to the extreme variability in time and space of rainfall events, even a once-off survey within the rainy season will not provide a representative picture of the ecology of the area. ○ The number of plants of conservation concern (e.g. Aloe dichotoma, Aloe spp., Trichocaulon spp., Hoodia spp., Boscia spp. etc. under the Northern Cape Nature Conservation Act No. 9 of 2009 and National Environmental Management: Biodiversity Act No. 10 of 2004, etc.) that may be directly affected by the development must be estimated during the EIA phase. ○ Large Aloe dichotoma [NCNCA protected spp.] populations are known to occur in the region and any populations in close proximity to the planned facilities must be mapped. 		<p>findings and multivariate analysis has been used to interpret and compile assessment. Given the findings of the assessment and the general severely grazed nature of the site, the information collated is considered sufficient to draw a conclusion on the nature of the ecology within the area.</p> <p>4. Identified specimens included under NEMBA have been identified and mapped spatially.</p>
<p>Point C - Ecology and landscape connectivity:</p> <ul style="list-style-type: none"> ▪ The proponent should include in the EIA an environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process and map combining the final layout plan overlain on the environmental sensitivity map. This map should be adequate in size to determine the extent of the development and to identify all aspects adequately as indicated on the maps. No-Go areas should be clearly identified. ▪ The final layout of the proposed developments (all 3 phases) and its constituents should be designed in such a manner as to enhance ecological value to fauna and flora within the area and to avoid pressures associated with surrounding farmland i.e. natural areas for greening and designing to support ecological corridors and landscape connectivity are strongly encouraged. ▪ The actual footprint for all activities related to the whole project (all Solar Park facilities) must be calculated to determine the total natural vegetation land cover transformation and loss. The collective and residual impact of all developments will be assessed also during permit applications. If the collective impact is assessed early enough the developer can better manage his risks and costs as he/she would know in advance whether a biodiversity offset is triggered also under DENC. ▪ If electrification of the property as security measure is considered, possible electrocution damage to small mammals such as pangolin and tortoises should be taken into consideration. ▪ Existing roads must be used as far as possible. ▪ The EIA should indicate how the Social-Agricultural-Conservation dynamic will change in terms of land use. Will the properties on which the developments occur still be actively farmed or will they become dormant or effectively be converted into conservation land with minimal land use management. Will problem animal control still occur as in standard practice in small livestock farming? How will fencing infrastructure change around the properties which has a bearing on problem animal control, but also on wildlife movement and landscape connectivity. ▪ The application must also be reviewed in the context of cumulative impacts of all RE developments in the region. 	<ul style="list-style-type: none"> • Elsabe Swart (Deputy Director – Research and Development Support) and Samantha De la Fontaine (District Ecologist), Northern Cape Department of Environment and Nature Conservation • 5 November 2015 (Letter via email) 	<ol style="list-style-type: none"> 1. "Sensitivity" map has been included in the assessment (i.e. Appendix A of this report). 2. Recommendations in respect of the proposed layout have been included in report. 3. The proposed project will either make use of the existing unnamed farm road or the Transnet Service Road to gain access to the proposed project site. Should the Transnet Service Road or farm road be considered the preferred access road, it is proposed that an internal gravel road will be constructed from the road to the proposed site. This internal gravel road is not expected to exceed 6 m in width. 4. Comment on broader land use change from a conservation – agricultural – socio economic perspective is provided in ecological report. Notable that there is broad long term uncertainty, however consideration of existing PV facilities indicates that parks, under management can act to change or possibly improve habitat at a regional scale, depending upon one's approach to "habitat management". 5. Cumulative impacts are reviewed where data and forecasting permits.
<p>Point 4 - The proposed area does not fall within or close to an Important Bird Area (IBA), yet it does resort within a region of grids classified as being sensitive to Wind Farm</p>	<ul style="list-style-type: none"> • Elsabe Swart (Deputy Director – Research and Development Support) and 	<ol style="list-style-type: none"> 1. Project is PV related and not wind power. 2. Avifauna assessment

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<p>facilities (refer to Figure 4). The darker the pendent the more sensitive the specific area is to Wind Farm facilities. Closer scrutiny regarding bird studies is thus a prerequisite due to possible impacts of birds on grid infrastructure as by implication local or regional migratory species that move around in response to surface water availability may be at risk from infrastructure collisions. It is also critical to point out that bird data for this area is based on the South African Bird Atlas Project 1 (SABAP1); data published in 1997 and recorded at a much broader scale than the SABAP2 data survey. Evidently, one can conclude that data for this area is outdated. This is specifically highlighted as a point of concern as each of the three PV projects will be separately linked to the Eskom grid through its own set of powerlines.</p> <p>Caption Figure 4: The three Solar PV facility (blue arrow) is proposed for an area classified as being sensitive to Wind Farm facilities. The darker the pendent the more sensitive the specific area is to Wind Farm facilities. Though the proposed development is not a Wind Farm facility it poses significant risks to birds through collision with grid infrastructure as each of the three facilities will have its own transmission lines connecting to the Eskom Nieuwehoop grid station north east of the proposed development. A seven Solar PV facility (black arrow) is proposed north east of the proposed three Solar PV facility, each also having its own transmission line.</p>	<p>Samantha De la Fontaine (District Ecologist), Northern Cape Department of Environment and Nature Conservation</p> <ul style="list-style-type: none"> • 5 November 2015 (Letter via email) 	<p>identified impacts on birds and has made recommendations. Electric fencing (for the Solar PV plant, as assessed in the separate EIA Process), rather than overhead powerlines, is considered to be greatest risk to particular species of avifauna. Comment and recommendations on the type of tower is provided.</p>
<p>Section B - Bird Monitoring:</p> <ul style="list-style-type: none"> ▪ Bird monitoring programmes should form part of the Environmental Management Programme. <ul style="list-style-type: none"> ○ Monitoring of birds over a full seasonal period (12 months) is supported. ○ This will help to support a comparative lack of data on bird species in the study area from the SABAP database. ○ The information will also provide data on bird flight paths, risk of collision in specific areas, habitat niches etc. ○ An extensive monitoring area across the study area (i.e. non-resident species) is advised to comprehensively account for the movement of species. ▪ Appropriate bird deterrent devices must be placed around the facility to lessen the impact caused by collision of avifauna with the development infrastructure (Hernandez et al., 2014, Kagan et al., 2014). <ul style="list-style-type: none"> ○ All Power lines should be clearly marked with bird flappers / markers. ○ Bird marker devices must be put on the earth wires (live wires) of the power line as appose to the conductors [Bird Flight Divertor (BFD) as oppose to other bird marker devices are suggested (Anderson, 2001)]. ▪ Relevant Birdlife SA protocols should be consulted to conduct the EIA assessment for birds (Guide to Access Avian Data for Environmental Impact Assessment Reports, Retief et al. 2013; BirdLife South Africa / Endangered Wildlife Trust best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa, Jenkins et al. 2012). Although the Jenkins and others guideline refers specifically to Wind farms, many of the principles apply for a thorough assessment. The electricity grid infrastructure especially remains a significant risk for bird collisions. ▪ Potential impacts on water fowl such as flamingos, ducks and geese as well as large Terrestrial Birds such as bustards and korhaan as well as raptors must 	<ul style="list-style-type: none"> • Elsabe Swart (Deputy Director – Research and Development Support) and Samantha De la Fontaine (District Ecologist), Northern Cape Department of Environment and Nature Conservation • 5 November 2015 (Letter via email) 	<ol style="list-style-type: none"> 1. Avian monitoring assessment (post Environmental Authorisation) aligning with Bird life SA guidelines is proposed. 2. BFDs are included into recommendations for establishment of powerline. Use of specific non Delta type towers is recommended. 3. Birdlife SA assessment methods are noted, however time resources do not allow for exact application of these protocols. It is also noted that the methods of assessment do align with general ecological principles for faunal assessment, however a broad range evaluation of species within the region as well as a site specific evaluation was undertaken to garner primary data. Such data was matched with secondary data from the literature. 4. Water fowl populations considered to be minimal by avifaunal specialist 5. IAPs noted.

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<p>be investigated. Potential impacts must speak to the Renewable Energy technologies and infrastructure as well electricity grid infrastructure.</p> <ul style="list-style-type: none"> ▪ BirdLifeSA must be informed as I&AP to provide comment on the development. ▪ SKA must be consulted as I&AP to provide comment on the development. ▪ SAEON Arid Node must be informed as I&AP to provide comment on the development. 		
<p>Section D: Environmental Management Programme:</p> <ul style="list-style-type: none"> ▪ Training and awareness on the illegal poaching and removal of succulents (e.g. Hoodia gordonii, Euphorbia spp.) and the protected quiver tree, Aloe dichotoma. ▪ The EIA must address how risk of alien plant infestation by predominantly Prosopis will be addressed, since the region is known to be under threat from infestation. ▪ A proper invasive alien management plan should be written into the EMPr. The area should be kept clear of invasive alien species; active management is a prerequisite. ▪ Bird deterrent devices to lessen the impact caused by collision of avifauna with development infrastructure. ▪ Possible electrocution of small mammals should be taken into account if electric fences are considered as a security measure. ▪ Free movement of small mammals if the development property is to be fenced. <p>Rehabilitation plans must be provided as to how post construction rehabilitation will be approached as well as operational phase control measures for protecting equipment, for example cutting/scraping/ herbicide applications underneath solar panels.</p>	<ul style="list-style-type: none"> • Elsabe Swart (Deputy Director – Research and Development Support) and Samantha De la Fontaine (District Ecologist), Northern Cape Department of Environment and Nature Conservation • 5 November 2015 (Letter via email) 	<ol style="list-style-type: none"> 1. Assessment provides recommendations on removal of exotic weeds. 2. Avifaunal deterrents are incorporated into EMPr recommendations. 3. Impact of electric fence addressed in EMPr. 4. Recommendations on faunal pathways into and out of fence proposed. 5. Rehabilitation proposals provided in EMPr.

Additional comments raised during the 30-day review of the BA Reports (3 March 2016 to 5 April 2016) are included in Appendix E of the finalised BA Report.

1.5.2 Identification of Potential Impacts

1.5.2.1 Construction Phase

The following potential impacts during the Construction Phase can be summarised:

- Alteration of habitat structure and composition in and around towers and possibly through the stringing phase of the project;
- Changes in the geomorphological state of drainage lines;
- The disturbance of fauna and loss of vegetation/habitat through anthropogenic activities, disturbance of refugia and general change in habitat;
- Disturbance of vegetation, in particular habitat associations as a consequence of the establishment of the proposed towers of the transmission line;
- Alteration of surface drainage patterns on account of construction activities leading to change in plant communities and general habitat structure, primarily the establishment of the proposed concrete or steel towers along the transmission line route, which require some level of excavation and the placement of concrete foundations;
- Alteration of surface water quality on account of construction activities that lead to change in water chemistry;
- Changes in edaphics (soils) on account of excavation and import of soils, leading to the alteration of plant communities and fossorial species in and around these points; and

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- Exotic weed invasion.

1.5.2.2 Operation Phase

The following potential impacts during the Operational Phase can be summarised:

- Changes in avian behaviour within increased perch and predation opportunities arising for raptors, which in turn have indirect impacts on prey species in the general locale.
- Bird collisions and mortalities arising from electrocution of birds perching on site and possibly direct collisions with the transmission line.
- Exotic weed invasion as a consequence of regular and continued disturbance of route.

1.5.2.3 Decommissioning Phase

Such alterations and changes will be dependent upon the expectant post-decommissioning land use. However, abandonment of the line route within the corridor would probably see:

- A reversion back to the present seral stage, where continued grazing by livestock and herbivory by game will arise.
- A reversion of present faunal population states within the subject route.
- Exotic weed invasion as a consequence of abandonment of route and cessation of weed control measures.

1.5.2.4 Cumulative Impacts

Cumulative impacts arising from the implementation of this project and other land use changes in the region are likely to exhibit the following:

- Extensive alteration of habitat structure and composition over an extensive and wide area where an increase in powerlines arise;
- Increased change in the geomorphological state of drainage lines on account of long term and extensive change in the nature of the catchment; and
- Exotic weed invasion as a consequence of regular and continued disturbance across an extensive area of the transmission line route.

The cumulative impacts assessed in this specialist study consider certain developments that occur with a 20 km radius of the proposed project, as shown in Section D of the BA Report.

1.6 ASSESSMENT OF IMPACTS AND IDENTIFICATION OF MANAGEMENT ACTIONS

The proposed development of a powerline route linking the proposed PV facility (i.e. Kenhardt PV 1) near Kenhardt with the Eskom Nieuwehoop Substation indicates that the proposed route will traverse primarily uniform, level land with limited impact on habitat of high ecological significance. Drainage features should be avoided and this can be done through the suitable placement of the proposed towers along the transmission line route as has been identified in Section 1.5.1 above. The potential negative impacts that may arise as a consequence of the establishment of the proposed powerline are given further consideration below, with possible mitigation measures being proposed.

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Construction Phase:

1.6.1 Alteration of habitat structure and composition in and around towers and possibly through the stringing phase of the project

During the construction phase, clearance of vegetation and the concomitant ousting or disturbance of fauna may arise. While vegetation cover is sparse and generally intermittent along the proposed corridor line route, some clearance will be necessary. Direct, indirect and cumulative impacts expected to arise as a result of the transmission line are identified below:

Direct Impacts

- Loss of “*less resilient*” plant species and replacement with more *robust* species leading to a change in habitat form and structure around the proposed towers.
- Introduction of exotic vegetation or the invasion of disturbed areas by exotic vegetation through either a physical vector (e.g. machinery, vehicles etc.) or more “natural” dispersion vectors (e.g. wind, avian dispersion).
- The temporary ousting of fauna through disturbance and human presence. Species are likely to return in the short term following the conclusion of construction.

Indirect Impacts

- Some exotic weed invasion may be considered an indirect impact as disturbance levels increase at the proposed tower points, with invasion of other points arising from around the proposed towers.

Cumulative Impacts

- Presently existing powerlines are evident around the Nieuwehoop substation and new lines are being constructed. It is evident that an increase in powerline construction will increase the level of habitat change, where this may arise. However such change should be short term, if mitigation and management measures are implemented at the end of the construction process.

The status of this impact is rated as negative and direct, indirect and cumulative in nature. The direct impact is rated with a site specific spatial extent (i.e. along the proposed route of the transmission line). The impact is rated with a long-term duration (i.e. the impact and risk will occur for the project duration). The consequence and probability are respectively rated as substantial and very likely. The reversibility and irreplaceability of the impact are both rated as low.

The indirect impact is rated with a site specific spatial extent (i.e. along the proposed route of the transmission line). The impact is rated with a long-term duration (i.e. the impact and risk will occur for the project duration). The consequence and probability are respectively rated as substantial and very likely. The reversibility and irreplaceability of the impact are both rated as low.

The cumulative impact is rated with a regional spatial extent. The impact is rated with a long-term duration (if mitigation measures are implemented at the end of the construction phase). The consequence and probability are respectively rated as substantial and very likely. The reversibility and irreplaceability of the impact are both rated as low.

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Significance of Impact without Mitigation:

Moderate

Mitigation

Proposed mitigation measures that may alleviate the significance of the above direct and indirect impacts include:

1. A second assessment of the route should be undertaken in or around February to March (subsequent to the issuing of an Environmental Authorisation and the completion of the detailed engineering) in order to identify any additional plant specimens of significance that may be evident on route. Undertake plant rescue operations, where such specimens may be relocated/removed (i.e. search and rescue) or avoided (with the relevant permits and approvals in place) prior to the commencement of construction.
2. Detailed design and incorporation of habitat and features into the routing of the proposed transmission line. The detailed design and confirmation of the proposed tower positions along the proposed powerline route should assist with the avoidance of specific vegetation associates and forms.
3. Identification and avoidance of the two Aloe associates identified within the corridor.
4. Avoidance, where possible of the minor drainage lines and any additional significant plant species that may be identified and incorporate other features of the route into the design.
5. An initial pre-construction clearance of all exotic vegetation on route should be undertaken to reduce the possibility of further exotic weed invasion. Continued exotic weed control measures should be implemented during the construction phase encapsulated in an alien eradication plan.

Significance of the Impact with Mitigation (Direct and Indirect Impact):

Very Low

1.6.2 Changes in the geomorphological state of drainage lines

Significant drainage features lying to the north of the corridor (Wolfkopseloop) should be avoided in the positioning of the proposed towers along the corridor route. Towers should be positioned outside of the drainage features and the 32m buffer ascribed around major drainage features. It is however evident that some surface flow change will arise on account of excavation, plant and human movement and the placement of structures. Direct, indirect and cumulative surface hydrological impacts expected to arise on route are identified below:

Direct Impacts

- Minor variation in the flow regimen within smaller drainage features, but possibly compounded within larger features will arise as a consequence of the construction phase and the establishment of structures.
- Increased sediment discharge into surface drainage features as a consequence of soils disturbance and moderate to heavy rainfall. This may alter habitat for certain species that are related to the drainage lines.

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Indirect Impacts

- Shifts in habitat form and structure as plant – water relations change on account of minor variations in the surface water flow regime and disturbance of vegetation along the line route within the corridor.

Cumulative Impacts

- Sustained changes in the upper drainage pattern and watershed as a consequence of the establishment of structures and their management will see minor changes in the major drainage lines. This will be compounded further downstream in the Wolfkopseloop system, particularly if other, similar developments within the same catchment arise.

The status of this impact is rated as negative and direct, indirect and cumulative in nature. The direct impact is rated with a site specific spatial extent (i.e. along the proposed route of the transmission line). The impact is rated with a medium-term duration (i.e. the impact and risk will occur for 1 – 10 years). The consequence and probability are respectively rated as moderate and likely. The reversibility of the impact is rated as high and irreplaceability of the impact is rated as low.

The indirect impact is rated with a site specific spatial extent (i.e. along the proposed route of the transmission line). The impact is rated with a medium-term duration (i.e. the impact and risk will occur for 1 – 10 years). The consequence and probability are respectively rated as moderate and likely. The reversibility of the impact is rated as high and irreplaceability of the impact is rated as low.

The cumulative impact is rated with a regional spatial extent. The impact is rated with a medium-term duration (i.e. the impact and risk will occur for 1 – 10 years). The consequence and probability are respectively rated as moderate and likely. The reversibility of the impact is rated as high and irreplaceability of the impact is rated as low.

Significance of Impact without Mitigation: Low

Mitigation

Proposed mitigation measures that may alleviate the significance of the above impacts include:

1. Exclusion of major drainage lines from tower footprints.
2. The undertaking of construction outside of the higher rainfall periods (if possible).
3. High levels of site management and housekeeping on route of the proposed transmission line during construction.
4. Monitoring and management of changes in the drainage features being served by the subject area. Such actions can include removal of solid waste and redress of excessive erosion attributable to construction activities.

Significance of the Impact with Mitigation: Very Low

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1.6.3 Exotic Weed Invasion

Increases in the prevalence of exotic and invasive plants (e.g. *Datura ferox*) is highly probable. Such species are driven by the disturbance of land, often through sustained levels of excavation and the removal of competitive plant species.

Direct Impacts

- Increased levels of exotic plants within or around site. Concomitant invasion of neighbouring areas may arise.

Indirect Impacts

- Shifts in habitat form and structure as species associations change.

Cumulative Impacts

- Large scale presence of exotic and invasive species alters ecological process within the wider region.

The status of this impact is rated as negative and direct, indirect and cumulative in nature. The direct impact is rated with a local spatial extent. The impact is rated with a short-term duration (i.e. the impact and risk will occur for less than one year). The consequence and probability are respectively rated as slight and likely. The reversibility of the impact is rated as high and irreplaceability of the impact is rated as low.

The indirect impact is rated with a local spatial extent. The impact is rated with a short-term duration (i.e. the impact and risk will occur for less than one year). The consequence and probability are respectively rated as slight and likely. The reversibility of the impact is rated as high and irreplaceability of the impact is rated as low.

The cumulative impact is rated with a regional spatial extent. The impact is rated with a short-term duration (i.e. the impact and risk will occur for less than one year). The consequence and probability are respectively rated as slight and likely. The reversibility of the impact is rated as high and irreplaceability of the impact is rated as low.

Significance of Impact without Mitigation:

Very Low

Mitigation

Proposed mitigation measures that may alleviate the significance of the above impacts include:

1. Regular monitoring through visual inspection and redress of exotic weeds in and around site, particularly during construction.
2. Avoidance of excessive earthworks and sculpting of land and maintenance of the general topography of the proposed transmission line route.
3. Erosion control measures to be implemented to stabilize.
4. Exclusion of major drainage lines from the proposed development footprint.
5. Placement of energy dissipaters if identified around tower footings within minor drainage lines to reduce velocity of flow through such features and consequential disturbance.

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Significance of the Impact with Mitigation : **Very Low**

Operational Phase

1.6.4 *Overhead transmission lines, as well as subtle changes in habitat are likely to result in the alteration of avian behaviour in and around the route.*

Direct Impacts

The proposed overhead line and towers will alter the foraging behaviour of avifaunal species, in particular raptors. An increase in perching opportunities will allow for improved predation amongst birds of prey.

Indirect Impacts

None identified

Cumulative Impacts

- As a large area of land will be affected by multiple powerline developments, it is evident that any behavioural changes, as described above, will be compounded by the extent of the facilities in the area.

The status of this impact is rated as negative and direct and cumulative in nature. The direct impact is rated with a local spatial extent. The impact is rated with a long-term duration (i.e. the impact and risk will occur for the duration of the proposed). The consequence and probability are respectively rated as substantial and likely. The reversibility of the impact is rated as moderate and irreplaceability of the impact is rated as low.

The cumulative impact is rated with a local spatial extent. The impact is rated with a long-term duration (i.e. the impact and risk will occur for the duration of the proposed). The consequence and probability are respectively rated as substantial and likely. The reversibility of the impact is rated as moderate and irreplaceability of the impact is rated as low.

Significance of Impact without Mitigation: **Moderate**

Mitigation

1. Detailed design and incorporation of habitat and features into the routing of the proposed transmission line.
2. Implement exotic weed control.

Significance of Impact with Mitigation: **Very Low**

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1.6.5 The powerlines may increase the risk of collision and electrocution in some avifauna. Such mortalities will relate primarily to larger birds that may roost upon or near conductors or alternatively collide with lines.

Direct

- The powerlines may have negative consequences for in particular raptors and larger passerines. Individual specimens may collide with powerlines during flight or be affected by powerlines and conductors on towers. Possible avian collisions and bird strikes may arise from flying or birds roosting upon the lines. Birds at risk may include the sociable weaver and larger raptors.

Indirect

None identified

Cumulative

- An increase in towers and powerlines will result in greater mortalities in the region.

The status of this impact is rated as negative and direct and cumulative in nature. The direct impact is rated with a local spatial extent. The impact is rated with a short-term duration (i.e. the impact and risk will occur for less than one year). The consequence and probability are respectively rated as moderate and likely. The reversibility of the impact is rated as moderate and irreplaceability of the impact is rated as low.

The cumulative impact is rated with a local spatial extent. The impact is rated with a short-term duration (i.e. the impact and risk will occur for less than one year). The consequence and probability are respectively rated as moderate and likely. The reversibility of the impact is rated as high and irreplaceability of the impact is rated as low.

Significance of Impact without Mitigation: Low

Mitigation

1. Placement of bird flight diverters on the proposed powerline along line route.
2. The Delta tower configuration should not be utilised in this line route. A design that avoids any risk of electrocution to birds would be correct for this line route.

Significance of Impact with mitigation: Low

1.6.6 Exotic Weed Invasion

Increases in the prevalence of exotic and invasive plants (e.g. *Datura ferox*) is highly probable often after the construction phase has concluded and possibly up to 5 years after such date.

Direct Impacts

- Increased levels of exotic plants within or around site. Concomitant invasion of neighbouring areas may arise.

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Indirect Impacts

- Shifts in habitat form and structure as species associations change.

Cumulative Impacts

- Large scale presence of exotic and invasive species alters ecological process within the wider region.

The status of this impact is rated as negative and direct, indirect and cumulative in nature. The direct impact is rated with a local spatial extent. The impact is rated with a long-term duration (i.e. the impact and risk will occur for the project duration). The consequence and probability are respectively rated as slight and likely. The reversibility of the impact is rated as moderate and irreplaceability of the impact is rated as low.

The indirect impact is rated with a regional spatial extent. The impact is rated with a long-term duration (i.e. the impact and risk will occur for the project duration). The consequence and probability are respectively rated as slight and likely. The reversibility of the impact is rated as moderate and irreplaceability of the impact is rated as low.

The cumulative impact is rated with a regional spatial extent. The impact is rated with a long-term duration (i.e. the impact and risk will occur for the project duration). The consequence and probability are respectively rated as slight and likely. The reversibility of the impact is rated as moderate and irreplaceability of the impact is rated as low.

Significance of Impact without Mitigation: Very Low

Mitigation

Proposed mitigation measures that may alleviate the significance of the above impacts include:

1. Implement intermittent but regular weed control initiatives, as well as regular visual monitoring and redress of exotic weeds in and around site, particularly the summer period.

Significance of the Impact with mitigation: Very Low

Decommissioning Phase

1.6.7 *Removal of overhead transmission lines, as well as subtle changes in habitat, are likely to result in the alteration of avian behaviour following the loss of roosts and perches.*

Direct Impacts

In a manner similar to the construction of additional points of purchase for in particular, raptors, it is evident that the loss of such areas will have a concomitant shift in avifaunal populations (particularly prey species) back to a population status akin to that presently encountered.

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Indirect Impacts

- Subtle changes in avian populations in and around the site may become evident, depending upon other factors in the region, including the placement of other points of purchase in neighbouring areas.

Cumulative Impacts

- As the establishment and loss of points of purchase are generally unpredictable, it is likely that cumulative impacts will remain indeterminate.

The status of this impact is rated as negative and direct and indirect in nature. The direct and indirect impacts are rated with a local spatial extent. The impacts are rated with a long-term duration (i.e. the impact and risk will occur in perpetuity or until the status quo changes once again). The consequence and probability are respectively rated as slight and likely. The reversibility of the impact is rated as moderate and irreplaceability of the impact is rated as low.

Significance of Impact without Mitigation: Very Low

Mitigation

1. None identified.

Significance of Impact with Mitigation: Very Low

1.6.8 Exotic Weed Invasion

Increases in the prevalence of exotic and invasive plants (e.g. *Datura ferox*) are highly probable following the decommissioning of the powerlines. Such disturbance can be of a short period, with invasive weed impacts arising for periods in excess of 5 years.

Direct Impacts

- Increased levels of exotic plants within or around site. Concomitant invasion of neighbouring areas may arise.

Indirect Impacts

- Shifts in habitat form and structure as species associations change.

Cumulative Impacts

- Large scale presence of exotic and invasive species will alters ecological process within the wider region.

The status of this impact is rated as negative and direct, indirect and cumulative in nature. The direct impact is rated with a local spatial extent. The impact is rated with a long-term duration (i.e. the impact and risk will occur for the project duration). The consequence and probability are respectively rated as slight and likely. The reversibility of the impact is rated as moderate and irreplaceability of the impact is rated as low.

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The indirect and cumulative impacts are rated with a local spatial extent. The impacts are rated with medium-term duration. The consequence and probability for the indirect and cumulative impacts are respectively rated as moderate and very likely. The reversibility of the impact is rated as moderate and irreplaceability of the impact is rated as low.

Significance of Impact without Mitigation (Direct Impact): Very Low
Significance of Impact without Mitigation (Indirect and Cumulative Impacts): Low

Mitigation

Proposed mitigation measures that may alleviate the significance of the above impacts include:

1. Implement intermittent but regular weed control initiatives for a period that spans at least two growing seasons.
2. Ensure the stabilization of site, once decommissioning and removal of infrastructure has arisen.

Significance of the Impact with Mitigation (Direct, Indirect and Cumulative): Very Low

1.6.9 Minor and subtle changes in the geomorphological state of drainage lines as hydraulic changes arise within the catchment

Direct Impacts

- Increased levels of erosion and minor turbidation of drainage features.
- Changes in the geomorphology of drainage lines

Indirect Impacts

- Changes in geomorphological state of watercourses, downstream of site.

Cumulative Impacts

- Overall levels of changes in watercourse morphology with possible change in associated ecologies.

The status of this impact is undefined and direct in nature. The direct impact is rated with a local to regional spatial extent. The impact is rated with a short term duration (i.e. the impact and risk will occur for project decommissioning and a short period thereafter). The consequence and probability are respectively rated as slight and likely. The reversibility of the impact is rated as high and irreplaceability of the impact is rated as low.

Significance of Impact without Mitigation: Very Low

Mitigation

Proposed mitigation measures that may alleviate the significance of the above impacts include:

1. Stabilise disturbed grounds following removal of infrastructure.
2. Avoid disturbance to watercourses and points in and around watercourses.

Significance of the Impact with mitigation : Very Low

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

1.7 IMPACT ASSESSMENT SUMMARY

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Table 4. Direct impacts assessment summary table for the Construction Phase

Construction Phase													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Alteration of habitat structure and composition in and around towers and possibly through the stringing phase of the project	Habitat and species loss	Negative	Site Specific (i.e. along the transmission line route)	Long-Term	Substantial	Very likely	Low	Low	<p>Detailed design and incorporation of habitat and features into the routing of the proposed transmission line.</p> <p>Undertake plant rescue operations</p> <p>Implement exotic weed control</p> <p>A second assessment of the route should be undertaken in or around February to March in order to identify any additional plant specimens of significance that may be evident on route. Such specimens may be relocated/removed (i.e. search and rescue) or avoided (with the relevant permits and approvals in place) prior to the commencement of construction.</p> <p>The detailed design and confirmation of the proposed tower positions along the proposed powerline route should assist with the avoidance of specific vegetation associates and forms.</p> <p>Identification and avoidance of the Aloe associates identified.</p> <p>An initial pre-construction clearance of all exotic vegetation on route should be undertaken to reduce the possibility of further exotic weed invasion. Continued exotic weed control measures should be implemented during the construction phase that aligns with an exotic vegetation management plan.</p>	Moderate	Very Low	5	High
Changes in the geomorphological state of drainage lines	Habitat change through changes in topographic drivers	Negative	Site Specific (i.e. along the transmission line route)	Medium-Term	Moderate	Likely	High	Low	<p>Undertaking and completion of earthworks outside of the high rainfall period (if possible).</p> <p>Maintenance of a high level of housekeeping on route of the proposed transmission line during the construction phase.</p> <p>Inspection of drainage features immediately outside of the footprint of the proposed transmission line and undertake removal of solid waste and litter on a regular basis.</p> <p>Exclusion of major drainage lines from tower footprints.</p>	Low	Very low	5	Medium

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Construction Phase													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Increases in the prevalence of exotic and invasive plants	Water quality change and general pollution of resource	Negative	Local	Short term	Slight	Likely	High	Low	Exclusion of major drainage lines from the proposed development footprint. Avoidance of significant sculpting of land and maintenance of the general topography of the proposed transmission line route. Erosion control measures to be implemented to stabilize. Placement of energy dissipaters if identified around tower footings within minor drainage lines to reduce velocity of flow through such features and consequential disturbance Undertake regular visual monitoring and redress of exotic weeds in and around site, particularly during construction.	Low	Very low	5	High

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Table 5. Indirect impacts assessment summary table for the Construction Phase

Construction Phase													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Alteration of habitat structure and composition in and around towers and possibly through the stringing phase of the project	Habitat and species loss	Negative	Site Specific (i.e. along the transmission line route)	Long-Term	Substantial	Very likely	Low	Low	<p>Implement exotic weed control</p> <p>A second assessment of the route should be undertaken in or around February to March (subsequent to the issuing of an Environmental Authorisation and the completion of the detailed engineering) in order to identify any additional plant specimens of significance that may be evident on route. Undertake plant rescue operations, where such specimens may be relocated/removed (i.e. search and rescue) or avoided (with the relevant permits and approvals in place) prior to the commencement of construction.</p> <p>Detailed design and incorporation of habitat and features into the routing of the proposed transmission line. The detailed design and confirmation of the proposed tower positions along the proposed powerline route should assist with the avoidance of specific vegetation associates and forms (where applicable).</p> <p>An initial pre-construction clearance of all exotic vegetation on route should be undertaken to reduce the possibility of further exotic weed invasion. Continued exotic weed control measures should be implemented during the construction phase that aligns with an exotic vegetation management plan.</p>	Moderate	Very Low	5	High
Changes in the geomorphological state of drainage lines	Habitat change through changes in topographic drivers	Negative	Site Specific (i.e. along the transmission line route)	Medium-Term	Moderate	Likely	High	Low	<p>Undertaking and completion of earthworks outside of the high rainfall period (if possible).</p> <p>Maintenance of a high level of housekeeping on route of the proposed transmission line during the construction phase.</p> <p>Inspection of drainage features immediately outside of the footprint of the proposed transmission line and undertake removal of solid waste and litter on a regular basis.</p> <p>Exclusion of major drainage lines from tower footprints.</p>	Low	Very low	5	Medium

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Construction Phase													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Increases in the prevalence of exotic and invasive plants (leading to shifts in habitat form and structure as species associations change)	Water quality change and general pollution of resource (including habitat and behavioural changes)	Negative	Local	Short term	Slight	Likely	High	Low	Exclusion of major drainage lines from the proposed development footprint. Avoidance of significant sculpting of land and maintenance of the general topography of the proposed transmission line route. Erosion control measures to be implemented to stabilize. Placement of energy dissipaters if identified around tower footings within minor drainage lines to reduce velocity of flow through such features and consequential disturbance Undertake regular visual monitoring and redress of exotic weeds in and around site, particularly during construction.	Low	Very low	5	High

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Table 6. Cumulative impacts assessment summary table for the Construction Phase

Construction Phase													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Alteration of habitat structure and composition in and around towers and possibly through the stringing phase of the project	Habitat and species loss	Negative	Regional	Long-Term	Substantial	Very likely	Low	Low	None identified	Moderate	Not Applicable	3	High
Changes in the geomorphological state of drainage lines	Habitat change through changes in topographic drivers	Negative	Regional	Medium-Term	Moderate	Likely	High	Low	Broadscale management of drainage systems in the region	Low	Very low	5	Medium
Increases in the prevalence of exotic and invasive plants (leading to alteration of ecological processes within the wider region)	Water quality change and general pollution of resource	Negative	Regional	Short term	Slight	Likely	High	Low	Undertake regular visual monitoring and redress of exotic weeds in and around site.	Low	Very low	5	High

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Table 7. Direct impact assessment summary table for the Operation Phase

Operation Phase													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Overhead transmission lines, as well as subtle changes in habitat are likely to result in the alteration of avian behaviour in and around the route	Habitat and species loss	Negative	Local	Long-Term	Substantial	Likely	Moderate	Low	Detailed design and incorporation of habitat and features into the routing of the proposed transmission line. Implement exotic weed control.	Moderate	Very Low	5	High
The powerlines may increase the risk of collision and electrocution in some avifauna.	Habitat change through changes in topographic drivers	Negative	Local	Short term	Moderate	Likely	High	Low	Placement of bird flight diverters on the proposed powerline along line route. The Delta tower configuration should not be utilised in this line route. A design that avoids any risk of electrocution to birds would be correct for this line route.	Low	Low	4	High
Increases in the prevalence of exotic and invasive plants	Habitat change	Negative	Local	Long term	Slight	Likely	Moderate	Low	Implement intermittent but regular weed control initiatives	Very Low	Very Low	5	High

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Table 8. Indirect impact assessment summary table for the Operation Phase

Operation Phase													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Increases in the prevalence of exotic and invasive plants	Habitat change	Negative	Regional	Long term	Slight	Likely	Moderate	Low	Implement intermittent but regular broadscale weed control initiatives	Very Low	Very Low	5	High

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Table 9. Cumulative impact assessment summary table for the Operation Phase

Operation Phase													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Overhead transmission lines, as well as subtle changes in habitat are likely to result in the alteration of avian behaviour in and around the route	Habitat and species loss	Negative	Local	Long-Term	Substantial	Likely	Moderate	Low	Detailed design and incorporation of habitat and features into the routing of the proposed transmission line.	Moderate	Very Low	5	High
The powerlines may increase the risk of collision and electrocution in some avifauna. An increase in towers and powerlines will result in greater mortalities in the region.	Habitat change through changes in topographic drivers	Negative	Local	Short term	Moderate	Likely	High	Low	Placement of bird flight diverters on the proposed powerline along line route. The Delta tower configuration should not be utilised in this region	Low	Low	4	High
Increases in the prevalence of exotic and invasive plants	Habitat change	Negative	Regional	Long term	Slight	Likely	Moderate	Low	Implement intermittent but regular broadscale weed control initiatives	Very Low	Very Low	5	High

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Table 10. Direct impact assessment summary table for the Decommissioning Phase

Decommissioning Phase													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Removal of overhead transmission lines, as well as subtle changes in habitat are likely to result in the alteration of avian behaviour following the loss of roosts and perches	Habitat and species loss	Negative	Local	Long-Term	Slight	Likely	Moderate	Low	None identified	Very Low	Very Low	5	High
Minor and subtle changes in the geomorphological state of drainage lines as hydraulic changes arise within the catchment	Changes in hydrology and water quality	Undefined	Local to regional	Short term	Slight	Likely	High	Low	Stabilisation of disturbed grounds and avoidance of undue disturbance in and around watercourses	Very low	Very Low	5	High
Increases in the prevalence of exotic and invasive plants	Habitat change	Negative	Local	Long term	Slight	Likely	Moderate	Low	Implement intermittent but regular weed control initiatives for a period of two growing seasons. Ensure the stabilization of site, once decommissioning and removal of infrastructure has arisen.	Very Low	Very Low	5	High

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Table 11. Indirect impact assessment summary table for the Decommissioning Phase

Decommissioning Phase													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Removal of overhead transmission lines, as well as subtle changes in habitat are likely to result in the alteration of avian behaviour following the loss of roosts and perches	Habitat and species loss	Negative	Local	Long-Term	Slight	Likely	Moderate	Low	None identified	Very Low	Very Low	5	High
Increases in the prevalence of exotic and invasive plants	Habitat change	Negative	Local	Medium term	Moderate	Very likely	Moderate	Low	Medium term exotic weed and vegetation control interventions	Low	Very low	5	High

Table 12. Cumulative impact assessment summary table for the Decommissioning Phase

Decommissioning Phase													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Increases in the prevalence of exotic and invasive plants	Habitat change	Negative	Local	Medium term	Moderate	Very likely	Moderate	Low	Medium term exotic weed and vegetation control interventions	Low	Very low	4	High

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1.8 INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAMME

Utilising the above information the following broad issues are considered within the Environmental Management Programme that would be associated with the proposed development.

Pre-Construction Phase:

- Pre-construction evaluation and possible plant rescue operations;
- Identification of the proposed tower positions and design to be utilised along line route;
- Identification of laydown areas, roadways etc. along route and evaluation of affected points within route, particularly in respect of floral and faunal presence.
- Permitting requirements in terms of the National Water Act and Northern Cape Conservation Act if identified as a requirement.

Construction Phase:

- Induction and interaction within management on ecological aspects;
- Route inspection and sweep of any fauna within the construction area;
- Monitoring of construction activities and operations, including species presence within the proposed transmission line route, mortalities and sitings;
- Maintenance of vegetation and avoidance of unnecessary clearance of route;
- Exotic weed management; and
- Erosion control measures to be implemented where applicable.

Post Construction Phase:

- Monitoring of avifaunal presence – nesting of species (e.g. *Philetairus socius*) as well as mortalities that may have arisen;
- Vegetation management along route – consideration of redress methods of growth and habitat form around towers if required;
- Exotic weed management; and
- Erosion control measures if required along the proposed transmission line route.

1.9 CONCLUSION AND RECOMMENDATIONS

The ecological evaluation of the proposed corridor included consideration of the bio physical state of drainage systems, topographical features and a holistic review of all components within the ecological landscape. The evaluation of the results of desktop and field reconnaissance identified and served to develop a plan for the exclusion of particular areas from the proposed development. Included in the assessment was consideration of terrestrial and hydrological systems, as well as fauna (including avifauna). Major impacts identified as a consequence of the development proceeding relate to, inter alia;

- Alteration of habitat structure and composition in and around towers and possibly through the stringing phase of the project;
- Changes in the geomorphological state of drainage lines, where affected;
- Increases in the prevalence of exotic and invasive plants, where disturbance arises;

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- Alteration of avian behaviour in and around the proposed corridor route due to the operation and existence of the overhead transmission lines, as well as subtle changes in habitat; and
- The powerlines may increase the risk of collision and electrocution in some avifauna.

None of the above impacts have been identified as being of high significance (with the implementation of mitigation measures). Most impacts arising can be considered to be of low to very significance in a holistic evaluation.

Given the above information, it is evident that with the judicious placement of the proposed transmission line towers and the use of the proposed corridor route as envisaged, that little negative ecological ramifications will arise, with the *proviso* that the proposed mitigation measures are implemented.

Evidently, the proposed corridor:

- Excludes or spans any drainage features within the powerline corridor.
- Avoidance of the Aloe consocieties identified. This may be achieved, preferentially by locating the final route proximal to the existing railway line / roadway, or less favourably by spanning over the associates. The relocation of these specimens is possible; however this method should be avoided.
- Management of exotic weed invasion that may arise. This is discussed in the EMPr and should be incorporated into a final programme for vegetation management.
- Management of avifauna impacts along the powerline route by the establishment of bird flight diverters and the use of appropriate tower design; and
- General land management practices to avoid excessive erosion, dust emissions and possible sources of pollution to ground and surface water resources.

Sound planning and management would include:

- Avoidance of excessive clearance of vegetation within the proposed transmission line corridor, particularly around towers;
- Management of exotic weed invasion that may arise. This is discussed in the EMPr and should be incorporated into a final programme for vegetation management;
- Management of avifauna impacts along the powerline route by the establishment of bird flight diverters and the use of appropriate tower design; and
- General land management practices to avoid excessive erosion, dust emissions and possible sources of pollution to ground and surface water resources.

There is in our opinion no necessity for a Water Use Licence in respect of the proposed powerline at this point however this will be determined by the Department of Water and Sanitation. It is noted that the watercourses do not meet the criteria to be termed “wetlands”, while the final routing of the powerline may fall in excess of 500 m from the watercourses, thus not necessitating a Water Use Licence application.

The above, along with the various mitigation measures espoused in this report should be incorporated as conditions, into any authorisation granted by the relevant authority.

It is our opinion that with the implementation of the above, the powerline corridor, subject to final design and adherence to the above recommendations, should be authorised.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

1.10 REFERENCES

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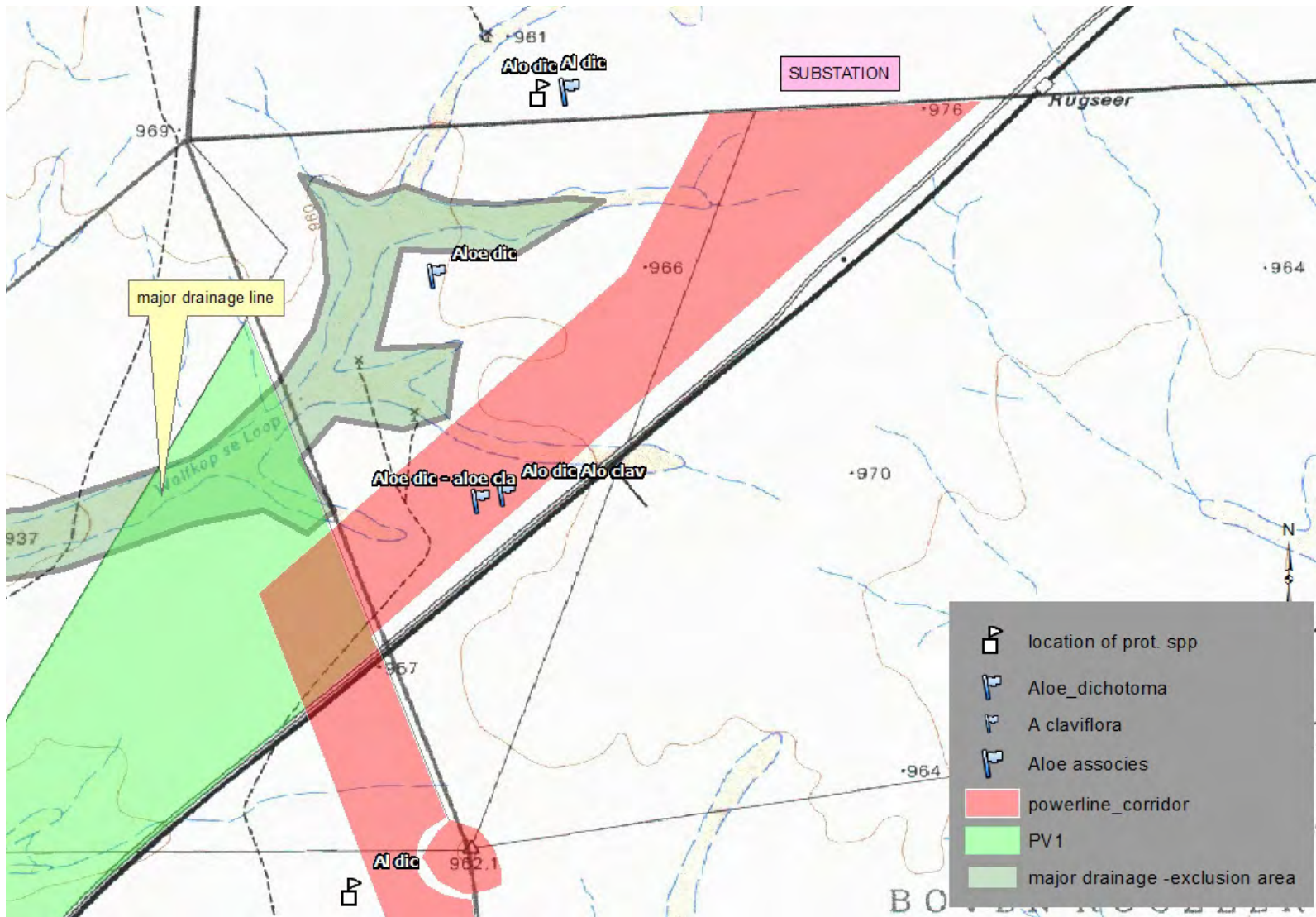
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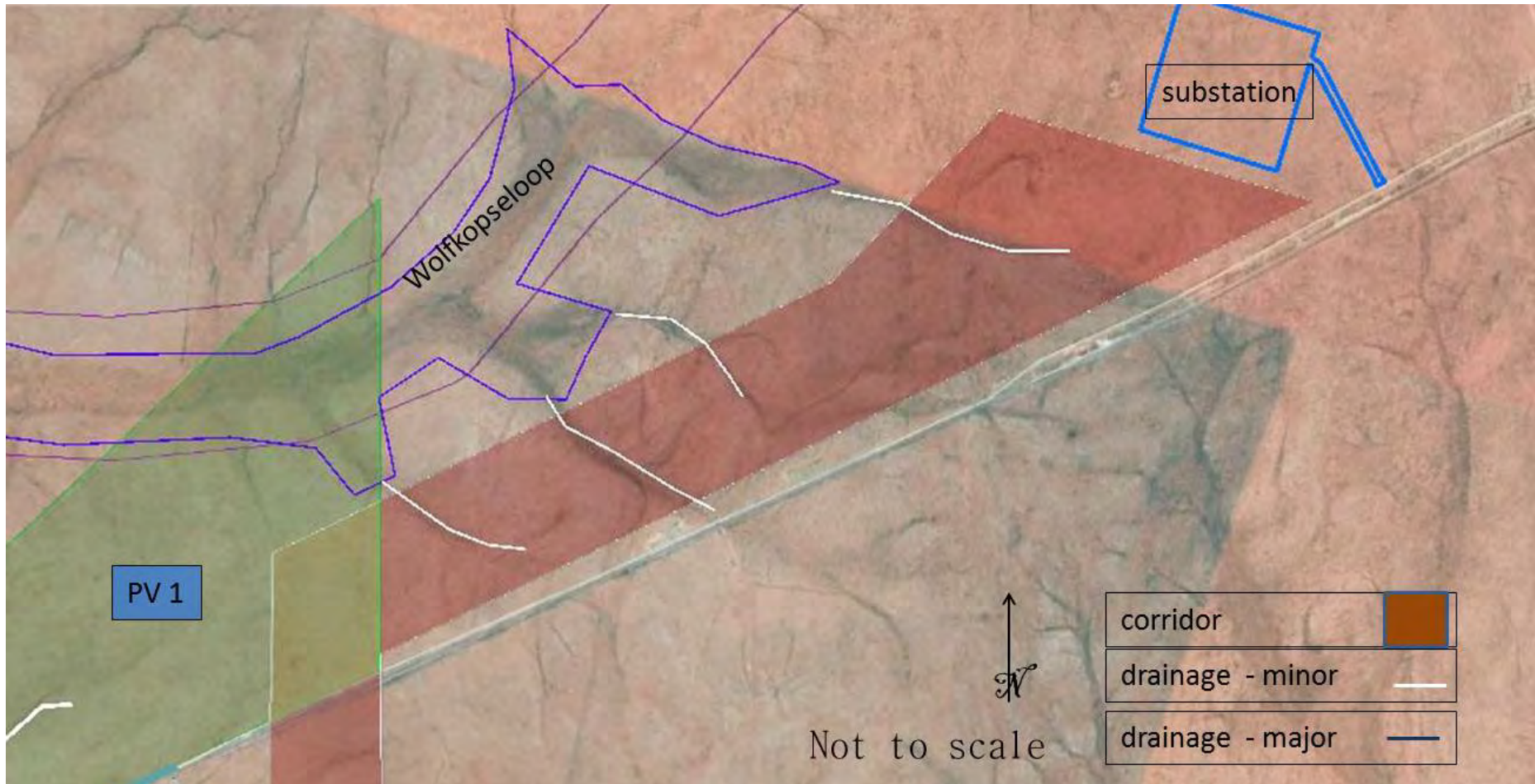
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Appendix D.2: Visual Impact Assessment

VISUAL IMPACT ASSESSMENT

Basic Assessment for the Proposed Development of a 132 kV Transmission Line (Kenhardt PV 1 – Transmission Line) to service the proposed 75 MW Solar Photovoltaic Facility (Kenhardt PV 1) on the remaining extent of Onder Rugzeer Farm 168, north-east of Kenhardt, Northern Cape Province

Report prepared for:

CSIR – Environmental Management Services

P O Box 17001

Congella, Durban, 4013

South Africa

Report prepared by:

Henry Holland

8 Cathcart Street

Grahamstown, 6139

South Africa

June 2016

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

SPECIALIST EXPERTISE

CURRICULUM VITAE – HENRY HOLLAND

Profession: GIS Consultant
Date of Birth: 26 December 1968

BIOGRAPHICAL SKETCH

Henry has been doing GIS related work since 1992 when he started his M.Sc. in Geology. Since finishing his Masters he worked in Angola establishing a GIS department for a diamond exploration company, after which he worked on a freelance basis for eight years doing GIS related work and computer programming. In 2005 he established the Maphis Trust which provides geospatial services for a range of environmental and geological companies and projects. Henry has been involved in Visual Impact Assessments (VIAs) since 1997.

TERTIARY EDUCATION

1996	M. Sc. Geology/GIS	Rhodes University
1986	B.Sc. Hons	UOFS

KEY EXPERIENCE

The table below presents an abridged list of Henry's project experience relevant to this project:

Completion Date	Project Description	Role	Client
2015	Umgeni Water Lovu and Tongaat Desalination Plants EIAs, KwaZulu-Natal	Author	CSIR
2015	Inyanda-Roodeplaat WEF, Uitenhage, EC	Author	SRK
2015	OTGC Oil Storage Terminal BA – Visual Impact, Durban, KZN	Author	CSIR
2014	Mainstream Dealesville Solar Plants VIA, Freestate Province	Author	CSIR
2014	Mulilo Solar Plants VIA, Northern Cape	Author	CSIR
2014	Frontier SRMOP EIA, Saldanha, WC	Author	CSIR
2013	Ishwati Emoyeni Wind Energy Facility VIA, Western Cape	Author	CSIR
2013	Venter Fert Composting and Fertiliser Plant	Author	Public Process Consultants
2013	Kipeto Power Line, Kenya	Author	Kipeto Energy Ltd.
2012	Ngqura Manganese Export Facility VIA, Coega, Eastern Cape	Author	CSIR
2012	Toliara Sands Mining Project VIA, Toliara, Madagascar	Author	CES
2012	Mkuze Biofuel Power Plant VIA, Mkuze, KwaZulu-Natal	Author	CSIR
2012	Vleesbaai WEF VIA, Western Cape	Author	CSIR
2012	Saldanha Desalination Plant VIA, Saldanha Bay, Western Cape	Author	CSIR
2012	Mossel Bay WEF, Western Cape	Author	CES
2012	Keimoes Solar Energy Facility, NC	Author	CSIR
2012	Douglas Solar Energy Facility, NC	Author	CSIR
2012	Richards Bay WEF VIA, KZN	Author	CES
2012	Hluhluwe WEF VIA, KZN	Author	CES

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

Completion Date	Project Description	Role	Client
2012	Plan8 Grahamstown Wind Farm VIA, Eastern Cape	Author	CES
2012	Kipeto Wind Farm VIA, Kenya	Author	Galetech Energy Developments Ltd.
2011	Coega IDZ Zone 12 Wind Farm	Author	CSIR
2011	Haverfontein Wind Farm, Mpumalanga	Author	CES
2011	Middleton Wind Farm, Cookhouse	Author	CES
2011	Broadlands PV Plant, Humansdorp	Author	CSIR
2011	Ubuntu Wind Farm, Jeffrey's Bay	Author	CSIR
2011	Lushington Park Wind Farm, East London	Author	CES
2011	Chaba Wind Farm, Komga	Author	CES
2010	Thomas River Wind Farm and PV Park VIA, Stutterheim	Author	CES
2010	Eskom Power Line VIA, Kouga	Author	CES
2010	Laguna Bay Resort VIA	Author	CES
2010	Kouga Wind Farm VIA	Author	Arcus GIBB
2010	Electrawinds Coega Wind Farm VIA	Author	CSIR
2010	Innowind Coega Wind Farm VIA	Author	CES
2010	Jeffrey's Bay Wind Farm VIA, Jeffrey's Bay	Author	CSIR
2010	Cookhouse Wind Farm VIA, Cookhouse	Author	CES
2009	Waainek Wind Farm VIA, Grahamstown	Author	CES
2009	Coega Wind Turbine BA (Visual Input)	Author	CSIR
2009	Sierra Leone Ethanol Plant VIA	Author	CSIR
2009	NamWater Desalination Plant VIA, Swakopmund, Namibia	Author	CSIR
2009	Nooitgedagt/Coega Water Supply VIA, Motherwell	Author	SRK
2009	CDM Brewery VIA, Nampula, Mozambique	Author	CES
2009	TankaTara Preliminary Visibility Analysis, Addo	Author	CES
2008	Kouga Wind Energy Project VIA, Jeffreys Bay	Author	CSIR
2008	Aston Bay VIA	Author	CES
2008	NPA Boundary Wall VIA, Port Elizabeth	Author	CSIR
2008	Elitheni Coal Mining VIA, Indwe	Author	Savannah Environmental (PTY) Ltd.
2008	Coegakamma Chicken Broiler Housing VIA	Author	Public Process Consultants
2008	Amanzi Country Lifestyle Estate VIA, Uitenhage	Author	Public Process Consultants

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe my qualifications, my experience, and me, and that I am available to work on this project.



Date: 30/05/16

[Signature of staff member and authorized representative of the firm]

Day/Month/Year

Full name of staff member: Henry Holland

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

SPECIALIST DECLARATION

I, Henry Holland, as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that I:

- I act as the independent specialist in this application;
- I perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I have no vested interest in the proposed activity proceeding;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:



Name of Specialist: Henry Holland

Date: 15 February 2016

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

EXECUTIVE SUMMARY

The Visual Impact Assessment specialist study compiled for the proposed 132 kV powerline connecting the proposed Kenhardt PV 1 Solar Photovoltaic (PV) plant near Kenhardt, Northern Cape, to the Eskom grid at the Nieuwehoop Substation was conducted by Henry Holland.

The landscape surrounding the proposed route has a rural agricultural character which has been transformed by extensive stock farming and large scale infrastructure in the form of the Sishen-Saldanha ore railway line and Eskom Nieuwehoop Substation.

The following sensitive visual receptors will potentially be affected by the introduction of the proposed 132 kV powerline into the landscape:

- Residents and viewpoints on farms surrounding the proposed development site. These are highly sensitive visual receptors since they have an active interest in their surrounding landscape; and
- Motorists using the R383 and the Transnet Service Road (i.e. Loop 14) adjacent to the ore railway line. Motorists are classified as low sensitivity visual receptors since they pass through the landscape and their attention is mostly focused on the road.

In terms of the proposed transmission line which will support the Kenhardt PV 1 project, there are unlikely to be highly sensitive visual receptors that will be highly exposed to the power line.

Visual intrusion will be low for visual receptors on surrounding farms since the landscape is already transformed by structures similar to those of the proposed power line.

Motorists using the gravel road adjacent to the Sishen-Saldanha railway line will experience low visual intrusion since their views are already severely impacted by the railway line and substation.

The significance of the potential visual impact of construction activities on existing views of sensitive visual receptors will be low before and after mitigation since the consequence of the impact is rated as moderate and its extent is rated as local.

The significance of the impact that the proposed development will potentially have on the landscape during the operational phase is rated as very low since its consequence is rated as slight (the landscape already contains large scale electrical infrastructure) and its extent is local.

The significance of the visual intrusion of the proposed development on the views of sensitive visual receptors during the operational phase is rated as very low since very few sensitive visual receptors are likely to be affected by the development and its visual intrusion on their views is low. The consequence of the impact is expected to be slight, its duration long term and its extent local.

The significance of the potential visual impact of decommissioning activities is rated as low before mitigation since these activities are very similar to construction activities but should be shorter in duration.

The cumulative landscape impact of various solar energy projects and their associated electrical infrastructure in the surrounding landscape will have a slight consequence since the landscape character has been extensively altered by the railway line and Nieuwehoop Substation. The

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

significance of the cumulative impact is very low since the landscape is rapidly changing due to the introduction of large scale and highly visible rail and electrical infrastructure.

The significance of the cumulative visual impact on existing views of sensitive visual receptors is rated as very low due to the existing and new structures which have severely limited potential scenic views in the region.

Overall, the proposed transmission line will fit in with the landscape as it exists now as well as with plans for the future of the surrounding landscape. The overall significance of the visual impact of the proposed 132 kV powerline is low.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

COMPLIANCE WITH THE APPENDIX 6 OF THE 2014 EIA REGULATIONS

Requirements of Appendix 6 – GN R982	Addressed in the Specialist Report
1. (1) A specialist report prepared in terms of these Regulations must contain-	Preliminary Section of this report
a) details of- <ul style="list-style-type: none"> i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae; 	
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix I of the BA Report, Preliminary Section of this report and Section 1.1.6 of this report
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1.1
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 1.1.3
e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	Section 1.1.3
f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	Section 1.3
g) an identification of any areas to be avoided, including buffers;	Section 1.3
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Figure 1.1 and Section 1.3
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.1.4
j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	Section 1.7
k) any mitigation measures for inclusion in the EMPr;	Section 1.9
l) any conditions for inclusion in the environmental authorisation;	None
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 1.9
n) a reasoned opinion- <ul style="list-style-type: none"> i. as to whether the proposed activity or portions thereof should be authorised; and ii. if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan; 	Section 1.10
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	None
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Not Applicable
q) any other information requested by the competent authority.	None

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LIST OF ABBREVIATIONS

DEA	Department of Environmental Affairs
EIA	Environmental Impact Assessment
CPV	Concentrated Photovoltaic
DEM	Digital Elevation Model
GIS	Geographic Information System
PV	Photovoltaic
VIA	Visual Impact Assessment

GLOSSARY

Definitions	
<i>Cumulative viewshed</i>	A viewshed which indicates in some way how much of a development is visible from a particular viewpoint. In a raster based cumulative viewshed each pixel value will indicate how many points within the development area are visible. A power line development could, for example, use pylons as points to generate a cumulative viewshed for the development. Each pixel value in the viewshed will be a count (accumulation) of the number of pylons that will potentially be visible from that pixel.
<i>Digital Elevation Model (DEM)</i>	A digital or computer representation of the topography of an area.
<i>Landscape baseline</i>	A description of the existing elements, features, characteristics, character, quality and extent of the landscape (GLVIA, 2002).
<i>Landscape character</i>	The distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement. It creates the particular sense of place of different areas of the landscape (GLVIA, 2002).
<i>Landscape impacts</i>	Change in the elements, characteristics, character and qualities of the landscape as the result of development (GLVIA, 2002). These effects can be positive or negative, and result from removal of existing landscape elements, addition of new elements, or the alteration of existing elements.
<i>Sense of place</i>	That distinctive quality that makes a particular place memorable to the visitor, which can be interpreted in terms of the visual character of the landscape. The unique quality or character of a place, whether natural, rural or urban. Relates to uniqueness, distinctiveness or strong identity (Oberholzer 2005).
<i>Viewer sensitivity</i>	The assessment of the receptivity of viewer groups to the visible landscape elements and visual character and their perception of visual quality and value. The sensitivity of viewer groups depends on their activity and awareness within the affected landscape, their preferences, preconceptions and their opinions.
<i>Viewshed</i>	A viewshed is an area of land, water, and other environmental elements that is visible from a fixed vantage point. In digital imaging, a viewshed is a binary raster indicating the visibility of a viewpoint for an area of interest. A pixel with a value of unity indicates that the viewpoint is visible from that pixel, while a value of zero indicates that the viewpoint is not visible from the pixel.
<i>Visual exposure</i>	Visual exposure refers to the relative visibility of a project or feature in the landscape (Oberholzer, 2005). Exposure and visual impact tend to diminish exponentially with distance.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

Definitions	
<i>Visual impact assessment</i>	A specialist study to determine the visual effects of a proposed development on the surrounding environment. The primary goal of this specialist study is to identify potential risk sources resulting from the project that may impact on the visual environment of the study area, and to assess their significance. These impacts include landscape impacts and visual impacts.
<i>Visual intrusion</i>	Visual intrusion indicates the level of compatibility or congruence of the project with the particular qualities of the area – its 'sense of place'. This is related to the idea of context and maintaining the integrity of the landscape (Oberholzer 2005).
<i>Visual receptors</i>	Visual receptors include viewer groups such as the local community, residents, workers, the broader public and visitors to the area, as well as public or community areas from which the development is visible.
<i>Visual resource</i>	Visual resource is an encompassing term relating to the visible landscape and its recognisable elements which, through their coexistence, result in a particular landscape and visual character

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

VISUAL IMPACT ASSESSMENT

This report presents the findings of the Visual Impact Assessment that was prepared by Mr. Henry Holland as part of the Basic Assessment (BA) for the proposed Kenhardt PV 1 – Transmission Line project within the Northern Cape Province.

1.1 INTRODUCTION AND METHODOLOGY

1.1.1 *Scope and Objectives*

As noted in Section A of the BA Report, the Project Applicant intends to develop three 75 Megawatt (MW) Solar Photovoltaic (PV) Facilities (referred to as Kenhardt PV 1, Kenhardt PV 2, and Kenhardt PV 3) on the remaining extent of Onder Rugzeer Farm 168. The farm is located 30 km north-east of Kenhardt and 80 km south of Upington within the Kheis Local Municipality, Northern Cape Province. These three 75 MW Solar PV Facilities require a Scoping and Environmental Impact Assessment (EIA). An EIA Process has been conducted separately for each proposed PV facility. However, a separate BA Process has also been conducted to assess the proposed construction of transmission lines for each proposed 75 MW Solar PV facility. The proposed transmission lines will extend from the proposed Kenhardt PV 1, Kenhardt PV 2 and Kenhardt PV 3 projects to Portion 3 of Farm Gemsbok Bult 120. The proposed transmission lines will also traverse (aboveground) the Remainder of Boven Rugzeer 169 and Portion 4 of Onder Rugzeer Farm 168. As noted above, this Visual Impact Assessment is being undertaken as part of the requisite BA Process for the proposed transmission line to service the proposed Kenhardt PV 1 project.

The overall scope and objectives of this Visual Impact Assessment are to:

- Determine the current conditions in sufficient detail so that there is a baseline against which impacts can be identified and measured;
- Identify potential impacts that may occur during the construction, operational and decommissioning phases of development, as well as impacts associated with future environmental changes if the “no-go” option is implemented (both positive and negative);
- Assess the impacts, in terms of direct, indirect and cumulative impacts;
- Provide recommendations with regards to potential monitoring programmes;
- Determine mitigation and/or management measures which could be implemented to as far as possible reduce the effect of negative impacts and enhance the effect of positive impacts; and
- Incorporate and address all issues and concerns raised by I&APs and the public.

1.1.2 *Terms of Reference*

The Terms of Reference for the Visual Impact Assessment are as follows:

- Review detailed information relating to the project description and precisely define the environmental risks to the landscape and the risks to sensitive viewers, as well as the consequences thereto.
- Conduct a site visit and undertake a Photographic Survey of the surrounding region from which the landscape and visual baselines can be prepared.

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- Compile a baseline description of the visual character/baseline and the landscape of the affected area.
- Undertake data preparation and the visibility analysis, which includes the calculation of viewsheds for various elements of the proposed development. Identify principal viewpoints and sensitive visual receptors.
- Identify and rate potential direct, indirect and cumulative impacts on the landscape and on sensitive viewers/receptors for the construction, operation and decommissioning phases of the proposed project. Study the cumulative impacts of the project by considering the impacts of existing industries within the area, together with the impact of the proposed project.
- Provide input to the Environmental Management Programme (EMPr), including mitigation and monitoring requirements to ensure that the visual impacts on the principal viewpoints and sensitive viewsheds are mitigated.
- Compile an assessment report (i.e. this report) qualifying the results of the fieldwork, risks and potential visual impacts, and impact evaluations, including potential mitigation measures, monitoring requirements as well as relevant recommendations.

1.1.3 Approach and Methodology

This Visual Impact Assessment (VIA) is based on guidelines for visual assessment specialist studies as set out by South Africa's Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) (Oberholzer, 2005), as well as guidelines provided by the Landscape Institute of the UK (GLVIA 2002).

A visibility analysis was conducted for the region surrounding the proposed development site and components of the development relevant to the assessment of the potential visual impact (10 km radius) to identify key representative viewpoints and sensitive visual receptors. A site visit and photographic survey of this region followed to establish a baseline for visual resources to compare the proposed developments against. Spatial Development Frameworks (SDF) and Integrated Development Plans (IDP) for the relevant municipalities were studied to align the VIA with municipal objectives in terms of landscape and visual resources.

The key steps followed in the VIA are presented below:

Site Visit and Photographic Survey

The field survey (conducted on 23-25 October 2015) provided an opportunity to:

- Determine the actual or practical extent of potential visibility of the proposed development, by assessing the screening effect of landscape features;
- Conduct a photographic survey of the landscape surrounding the development;
- Take photos for use in photomontage images;
- Identify sensitive landscape and visual receptors;
- Viewpoints were chosen using the following criteria:
 - High visibility – sites from where most of the solar facility will be visible;
 - High visual exposure – sites at various distances from the proposed site; and
 - Sensitive areas and viewpoints such as nature reserves and game farms from which power lines will potentially be seen.
- Additionally, photo sites were chosen to aid in describing the landscape surrounding, and potentially affected by, the proposed development.

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Field work was conducted in Spring but seasonal differences in vegetation cover and atmospheric conditions are slight and contrasts in texture and colour between development structures and landscape background will not change enough due to seasonal changes to invalidate this assessment.

Landscape Description

A desktop study was conducted to establish and describe the landscape character of the receiving environment. A combination of data analysis using a Geographic Information System (GIS), literature review and photographic survey was used to identify land cover, landforms and land use in order to gain an understanding of the current landscape within which the development will take place (GLVIA 2002). Areas of scenic interest, potential sensitive receptors (viewpoints, residences), preliminary zone of visual influence, and principal representative viewpoints were also identified. Landscape features of special interest were identified and mapped, as were landscape elements that may potentially be affected by the development.

VIA

A GIS ([TNTmips¹](http://www.microimages.com/products/tntmips.htm)) is used to calculate viewsheds for various components of the proposed development. The viewsheds and information gathered during the field survey were used to define criteria such as visibility, viewer sensitivity, visual exposure and visual intrusion for the proposed development. These criteria were, in turn, used to determine the intensity of potential visual impacts on sensitive viewers. All information and knowledge acquired as part of the assessment process was then used to determine the potential significance of the impacts according to the standardised rating methodology as described in Section D of the BA Report for the project.

1.1.4 Assumptions and Limitations

1.1.4.1 Assumptions

Mitigation Measures

Mitigation measures in this report will assume that construction activities are managed and performed in such a way as to minimise its impact on the receiving environment. The following assumptions, in particular, apply since they are relevant to minimising visual impact during the construction phase:

- The contractor will maintain good housekeeping on site to avoid litter and minimise waste;
- Project developers will demarcate construction boundaries and minimise areas of surface disturbance;
- Vegetation and ground disturbance will be minimised and take advantage of existing clearings;
- Construction of new roads will be minimised and existing roads will be used where possible;
- Topsoil from the site will be stripped, stockpiled, and stabilised before excavating earth for the construction of the proposed transmission line;

¹ <http://www.microimages.com/products/tntmips.htm>

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- Vegetation material from vegetation removal will be mulched and spread over fresh soil disturbances to aid in the rehabilitation process;
- Plans will be in place to control and minimise erosion risks;
- Plans will be in place to minimise fire hazards and dust generation; and
- Plans will be in place to rehabilitate cleared areas as soon as possible.

Cumulative Impacts

Cumulative impacts are assessed by adding expected impacts from this proposed development to existing and proposed developments with similar impacts in a 20 km radius (of the proposed Kenhardt PV projects). The existing and proposed developments that were taken into consideration for cumulative impacts include (CSIR 2015):

- Nieuwehoop 400/50 kV Substation located in close proximity to the proposed Solar Energy Facility (under construction);
- 2 x 400 kV power lines from Aries to the Solar CSP near Upington (under construction);
- 400 kV power line from Nieuwehoop Substation to the Solar CSP near Upington;
- Proposed Scatec Solar Kenhardt PV projects (i.e. Kenhardt PV 1, Kenhardt PV 2, and Kenhardt PV 3);
- Proposed Transmission Line to connect the proposed 75 MW Solar PV Facility (Kenhardt PV 2) to the Eskom Nieuwehoop Substation (i.e. Kenhardt PV 2 – Transmission Line);
- Proposed Transmission Line to connect the proposed 75 MW Solar PV Facility (Kenhardt PV 3) to the Eskom Nieuwehoop Substation (i.e. Kenhardt PV 3 – Transmission Line);
- Proposed Mulilo Renewable Project Developments (Pty) Ltd Solar PV projects: Phase 1 (i.e. Boven Solar PV 1 (on the remaining extent of the Farm Boven Rugzeer 169, Kenhardt), Gemsbok Solar PV 1 (on the remaining extent of Portion 3 of the Farm Gemsbok Bult 120, Kenhardt) and Gemsbok Solar PV 2 (on the remaining extent of Portion 3 of the Farm Gemsbok Bult 120, Kenhardt));
- Proposed Mulilo Renewable Project Developments (Pty) Ltd Solar PV projects: Phase 2 (i.e. seven 75 MW PV OR Concentrated PV Solar Energy Facilities and associated infrastructure near Kenhardt); and
- Proposed Strausshiem Solar project (initial phases of EIA Process).

All the developments that have been considered in the assessment of cumulative impacts are also listed in Section D of the BA Report.

1.1.4.2 Limitations

Spatial Data Accuracy

Spatial data used for visibility analysis originate from various sources and scales. Inaccuracy and errors are therefore inevitable. Where relevant these will be highlighted in the report. Every effort was made to minimize their effect.

Viewshed Calculations

Calculation of the viewsheds does not take into account the potential screening effect of vegetation and buildings. Due to the relatively low vegetation cover in the region and the size

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and extent of the solar energy facility, the screening potential of vegetation is likely to be minimal over most distances.

Viewsheds are calculated using a Digital Elevation Model (DEM) which is derived from 1:50000 scale contour lines with a 20 m vertical distance between contours. The DEM has a pixel resolution of 20 m x 20 m and covers a 70 km x 30 km area (within which a study area is located at 5 km radius around the development site).

1.1.5 Source of Information

The VIA is based on the following information:

- Documentation supplied by the client and the CSIR;
- Digital topocadastral data at 1:50 000 scale from the National Geo-spatial Information database²;
- 1:250000 Geology map sheets covering the region;
- Google Earth software and data;
- South African digital land cover dataset of 2002;
- Renewable Energy EIA Application Database for SA, 2015 Quarter 3³;
- Protected Areas Data Release - Third Quarter 2015³;
- Eskom SPOT Building Count data set (de la Rey 2008); and
- 2013 Garmin map data for 'points of interest' layer.

1.1.6 Declaration of Independence of Specialist

Refer to the preliminary section of this report for the Curriculum Vitae of Mr. Henry Holland, which highlights his experience and expertise. The declaration of independence by the specialist is provided in Box 1.1 below (with a full declaration included in the preliminary sections of this report and included in Appendix I of the BA Report).

BOX 1.1: DECLARATION OF INDEPENDENCE

I, Henry Holland, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed Kenhardt PV 1 – Transmission Line Project, application or appeal in respect of which I was appointed, other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.



HENRY HOLLAND

1.2 DESCRIPTION OF PROJECT ASPECTS RELEVANT TO VISUAL IMPACTS

This section describes the aspects of the proposed project that are relevant in terms of potential visual impacts. Figure 1-1 below shows the proposed locality of the Kenhardt PV 1 Solar Facility, the powerline corridor for the PV 1 facility as well as the proposed powerline corridor for all three PV projects.

² <http://www.ngi.gov.za>

³ <http://egis.environment.gov.za/frontpage.aspx?m=27>

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

All maps provided in this report are included in A3 format in Appendix A of this report.

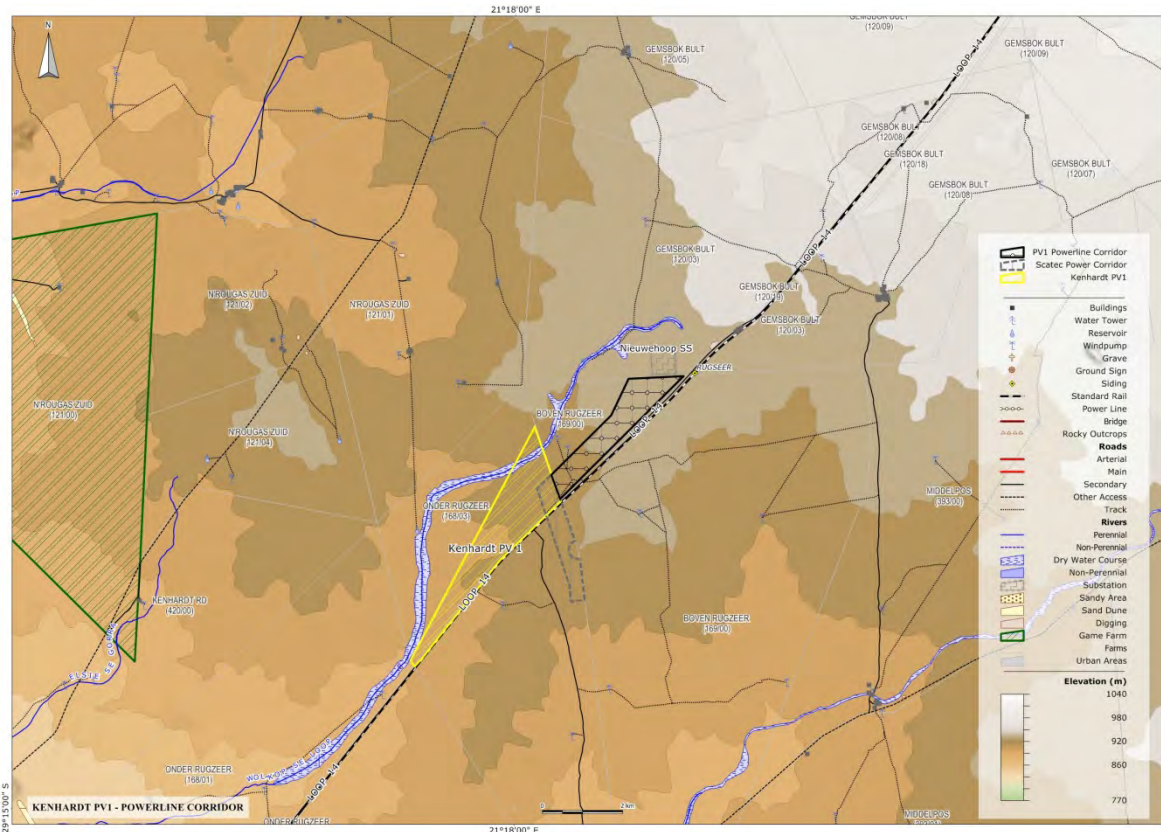


Figure 1-1 Proposed Kenhardt PV 1 solar energy facility site and the proposed power line corridor from the facility to the Eskom grid at the Nieuwehoop Substation.

1.2.1 Construction and Decommissioning Phases

Elements of the construction and decommissioning phases of the proposed powerline that will have a potential visual impact include:

- Some construction activities will potentially be exposed above the skyline due to the height of the pylons, and as such it is likely to be more intrusive on views;
- Laydown areas for equipment will be required, although these will be temporary;
- Access roads, maintenance roads and power line servitudes will potentially require clearing of vegetation;
- Soil stockpiles and removed vegetation heaps will be visible;
- Alien invasive plant species may contrast strongly with surrounding vegetation;
- An increase in human activity in a remote area is likely to be noticed even by only a small number of visual receptors. Relatively large construction equipment and vehicles will be operating during these phases of development, and an increase in traffic on roads in the region is likely;
- Exposure of large areas of soil, and worker and equipment traffic will increase dust generation which will increase construction visibility; and
- Construction or improvement of access roads will be more visible than the operational roads.

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1.2.2 Operational Phase

The proposed power line pylons are expected to extend up to 30 m high for 132 kV lines (as a maximum height – they are most often between 22 m and 28 m high). The power lines can potentially intrude on scenic views and due to the linear nature of the development the potential for scenic views can be affected for a large region. The proposed power line for Kenhardt PV 1 will only be approximately 4 km long. Maintenance of the servitude is unlikely to happen often since vegetation cover within the general area is low.

It is important to note that a complete, detailed project description is included in Section A of the BA Report. The proposed transmission line and electrical infrastructure BA project will include the following connectivity options:

- The construction of a single 132 kV transmission line from each Kenhardt PV facility to the Eskom Nieuwehoop Substation; or
- Connect the Kenhardt PV 2 and Kenhardt PV 3 projects via separate 22 kV/33 kV transmission lines to the proposed Kenhardt PV 1 on-site substation which will link via a 132 kV line to the Eskom Nieuwehoop Substation; or
- Construct one 132 kV transmission line from the Kenhardt PV 1 project to the Eskom Nieuwehoop Substation and connect the Kenhardt PV 2 and Kenhardt PV 3 facilities together via medium voltage transmission lines to either the on-site substation of Kenhardt PV 2 or PV 3, followed by the construction of one 132 kV transmission line from the on-site substation to the Eskom Nieuwehoop Substation.

The above proposed transmission lines will be constructed within an electrical infrastructure corridor (as shown in Figure 1-1), which has been assessed in this report. Viewsheds were calculated for points over the whole corridor even though not all of the corridor will be used. The assessment was therefore done for a worst case scenario.

1.3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

The topography in the region surrounding the proposed development site is relatively flat with low open hills (Figure 1-2). Outcrops of erosion resistant rocks form occasional steep low hills which are distinctive in the landscape and often form a distant backdrop to views. The Hartbees River, a tributary of the Orange River, passes just south of Kenhardt. Wolfkop Se Loop and Rugseer River are tributaries of the Hartbees River which pass through the study area (Figure 1-3 b and c). Rivers in this region only flow during heavy rain and are normally dry riverbeds.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

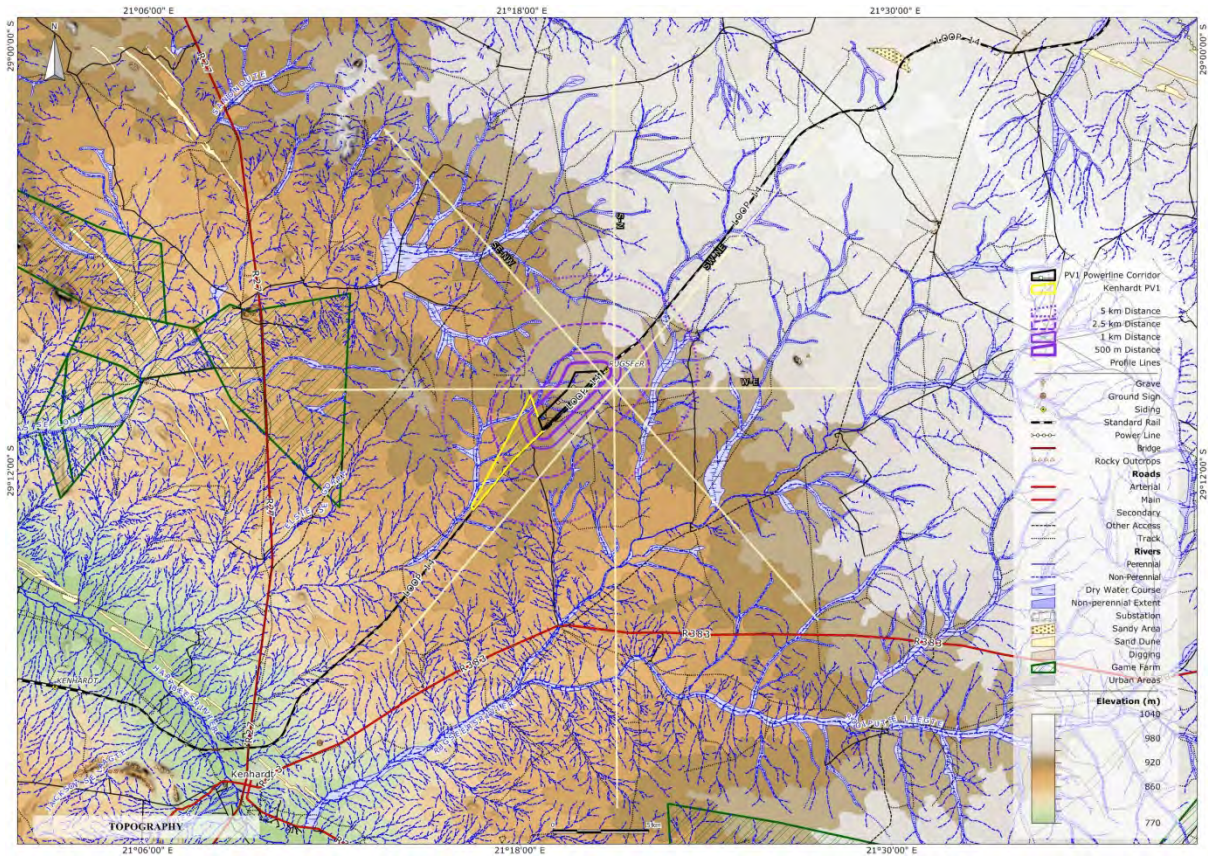


Figure 1-2 Topographic Map of the Region.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

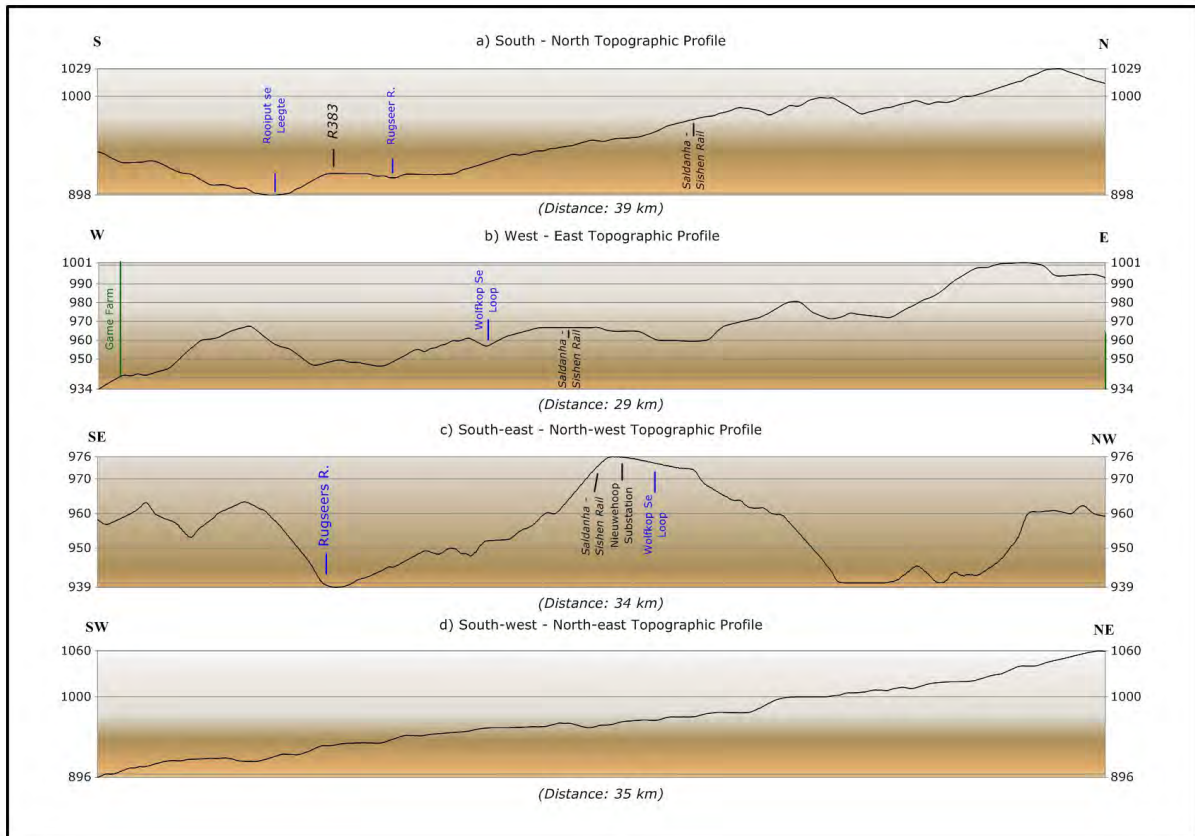


Figure 1-3 a) South-North Topographic Profile, b) East-West Topographic Profile, c) South-east North-west Topographic Profile, d) South-west – North-east Topographic Profile. Topographic profiles as indicated on the topographic map above.

The geological history of the region is complex with multiple metamorphic and deformation events (Figure 1-4). The region is therefore underlain by sedimentary and igneous rocks which were transformed into their metamorphic equivalents. The study area is located on migmatite (Kenhardt Migmatite) which is mostly overlain by more recent sediments of the Gordonia Group (Kalahari sands). A large number of pegmatites are found in the region and in some cases are mined for semi-precious stones. The steep, dark coloured hills around Kenhardt are quartzites which are relatively erosion-resistant rocks.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

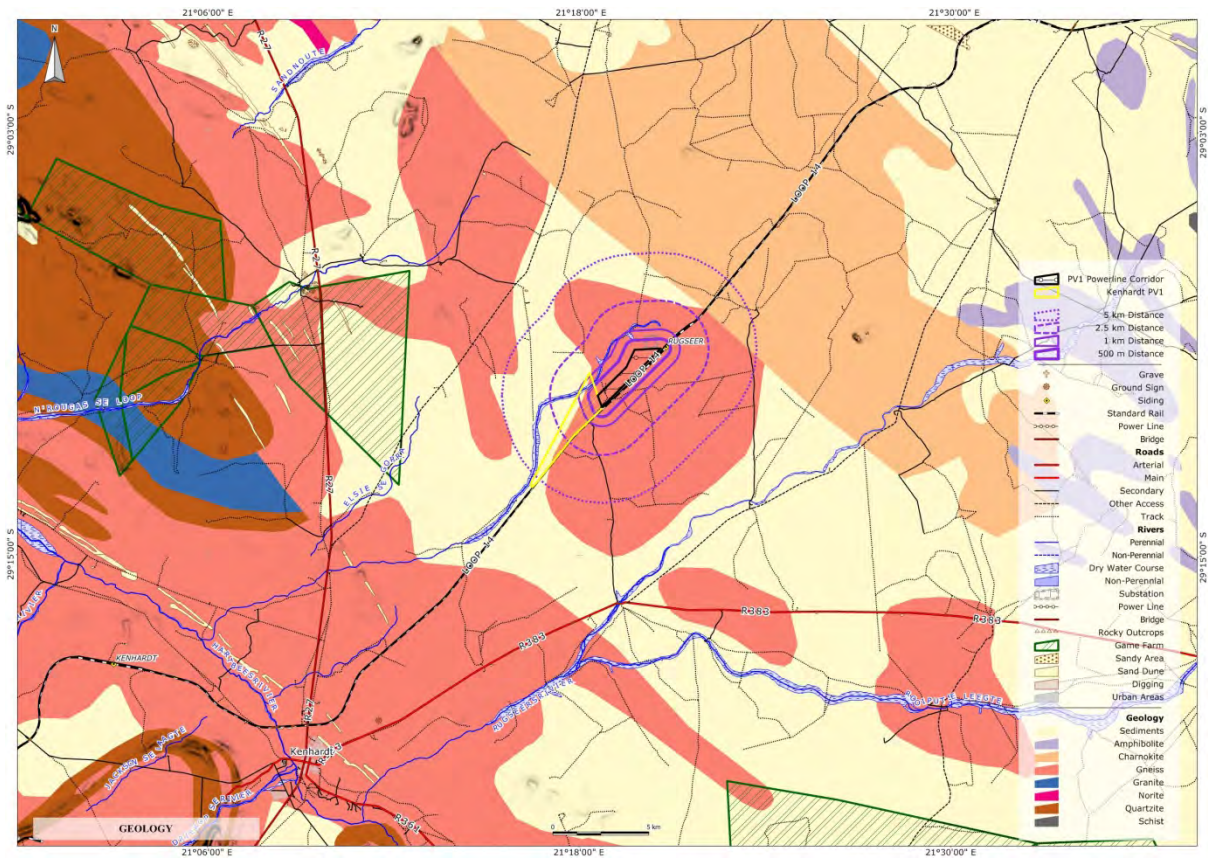


Figure 1-4 Simplified geology of the region.

The study area is covered in grassland with low shrubs (Bushmanland Arid Grassland) which has been transformed by live-stock grazing (Figure 1-5). Sheep farming is the main agricultural activity. The vegetation produces a mottled background to most views which is relatively effective at making some development types such as power lines and pylons blend in with the background. There are no protected areas in the region and none are planned by the ZF Mgcawu District Municipality (Siyanda DM 2012) but there are a number of game farms in the surrounding landscape.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

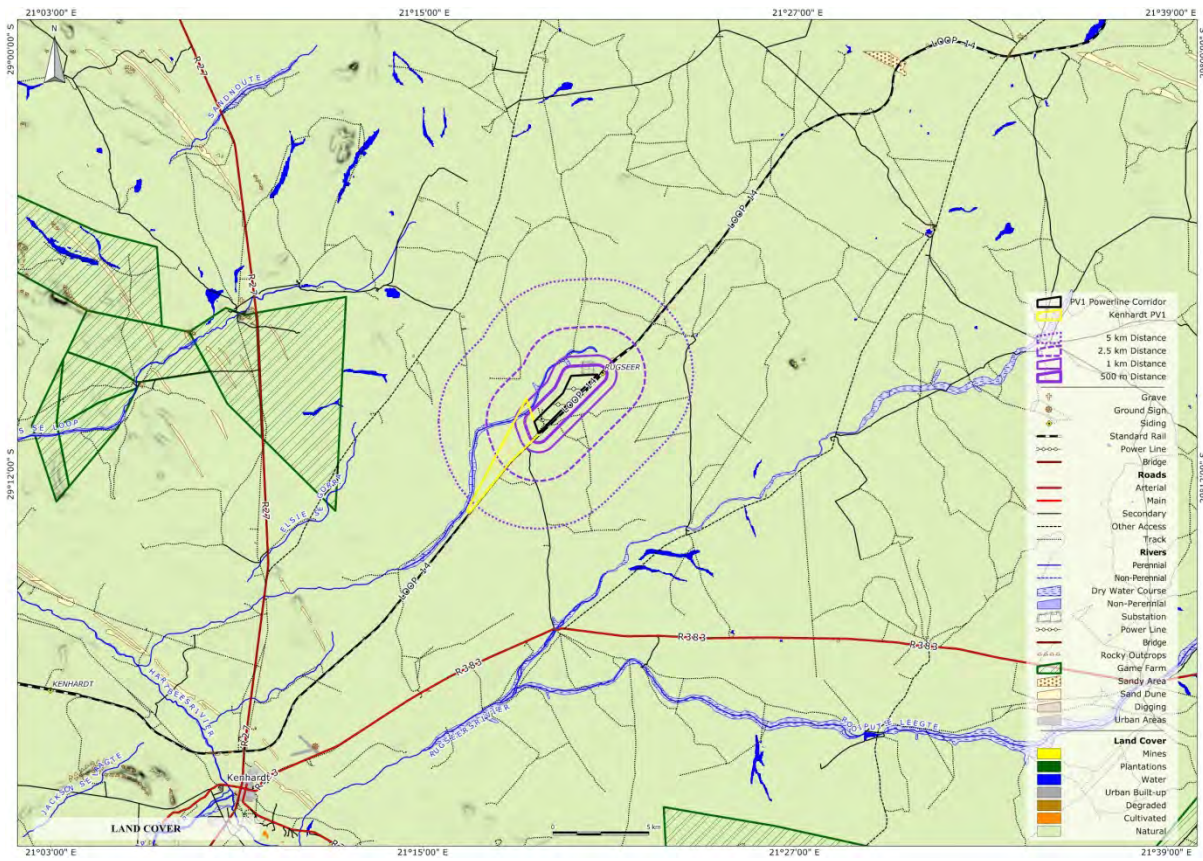


Figure 1-5 Land cover map of the region.

Kenhardt provides a service centre for the surrounding agricultural community (Figure 1-6). It is located approximately 30 km south-west of the proposed development site on the R27 provincial road. The road is often used by motorists travelling from Cape Town to the Northern Cape tourist destinations along the Orange River. The R383 is a gravel road between Kenhardt and Marydale. The Sishen-Saldanha railway passes through the property on which the proposed Kenhardt PV plants (subject to a separate EIA Process) and the proposed transmission lines will be built and is a major feature in the landscape. A private (Transnet) gravel road runs adjacent to the rail tracks and provides limited access to the proposed site. A railway siding, Rugseer, is located near the proposed project site. The Eskom Nieuwehoop Substation is being constructed on a site just west of the Rugseer siding. Proposed 400 kV transmission lines from Ferrum Substation near Upington and from Aries Substation southwest of Kenhardt will connect to Nieuwehoop Substation and will potentially become highly visible features of the landscape.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

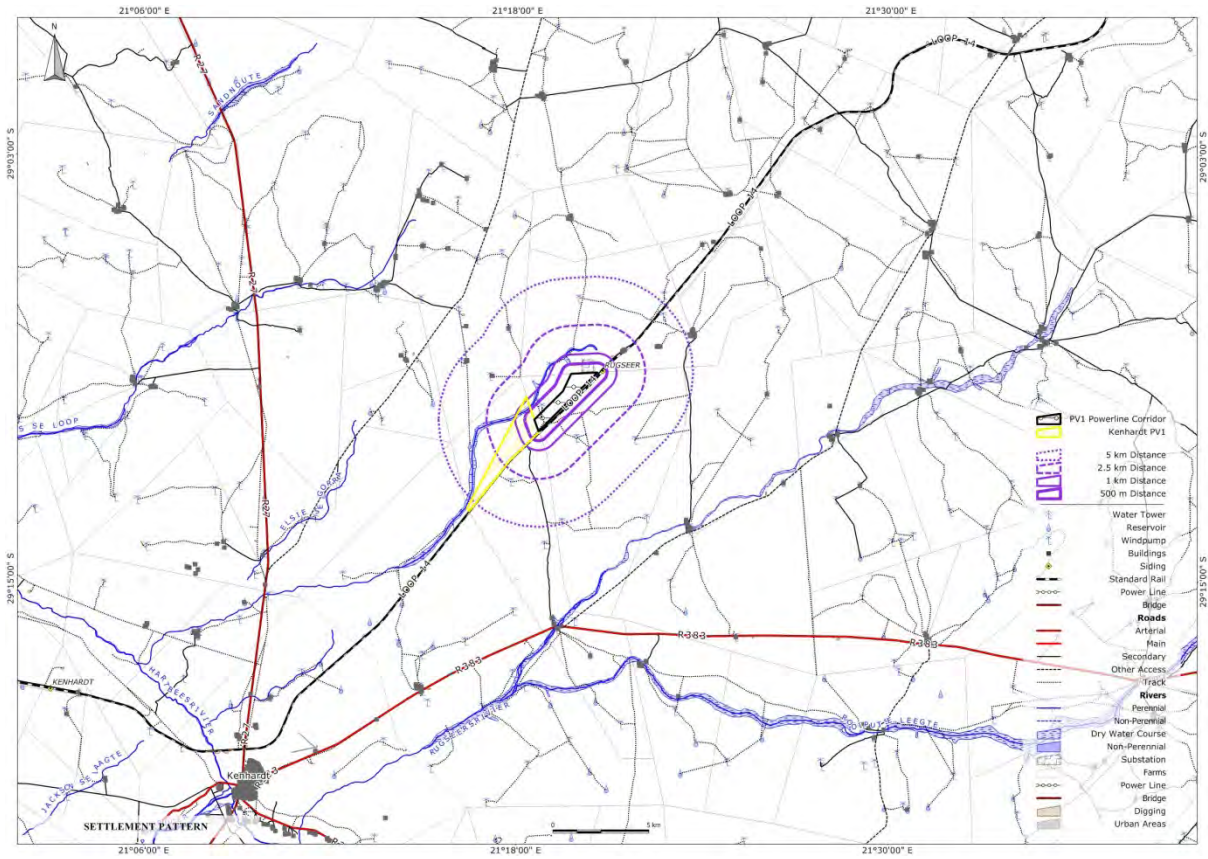


Figure 1-6 Prominent man-made structures and settlement patterns in the landscape.

The landscape surrounding the proposed site has a rural agricultural character. It is in a remote part of the country and is sparsely populated, but it has been transformed to some extent by extensive stock farming as well as by large scale infrastructure in the form of the Sishen-Saldanha ore railway line.

The topography and vegetation of the region is such that opportunities for screening the proposed development from public views are very limited. The specific location of the powerline within the corridor will not affect the visibility of the development enough to alter the significance of the potential visual impact. The Transnet road adjacent to the Sishen-Saldanha ore railway line will bring motorists into areas where they will be highly exposed to the proposed development (i.e. in close proximity to the powerline). However, there are very few motorists using this road – it is a private road that belongs to Transnet but it is also used by farmers to access their properties.

In light of the above there are no specific areas on the proposed site that should be avoided in terms of visual considerations.

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1.4 APPLICABLE LEGISLATION AND PERMIT REQUIREMENTS

The following legislation and local and district municipal plans are applicable to the proposed project:

- The National Environmental Management Act (NEMA) and the Regulations in terms of Chapter 5 of NEMA. (Act 107 of 1998);
- The Protected Areas Act (PAA) (Act 57 of 2003, Section 17) which refers to the conservation and protection of natural landscapes;
- The Provincial Spatial Development Framework for the Northern Cape (Office of the Premier of the Northern Cape 2012) - The PSDF identifies a Solar Corridor where solar projects will be given priority – the Kenhardt PV projects do not fall within this corridor;
- ZF Mgcawu SDF (Siyanda DM 2012) – The Solar Corridor is seen as an initiative that “*should be pursued vigorously.*” The corridor follows the main routes from Prieska to Upington and further along the N10 although the SDF map on p.221 of the SDF the corridor is extended along the N14 west. There are also a number of solar energy projects outside these corridors. Proposal SB7 for Southern Bushmanland relates to solar projects: “*Sensitively place solar projects within the Solar Corridor with due regard to the visual impact of these facilities and the siting principles in Section 6.3.7.*” Siting principles address wind farms rather than solar plants;
- !Kheis Rural SDF (!Kheis Municipality 2014) – Natural scenic beauty of the municipality and production of solar energy are both seen as opportunities based on its existing bio-physical conditions. Tourism opportunities for this municipality potentially relevant to the proposed development include agricultural tourism, landscape tourism and game farms. Solar energy projects are suggested for the remote areas of the municipality although no indication is given where this should be (other than the Solar Corridor);
- Kai !Garib SDF (Kai !Garib Municipality 2012) – Kenhardt and its surrounding rural area is seen as an agricultural region with a scenic environment and important cultural heritage. Dust pollution is seen as a factor that “*must be taken into consideration with future developments.*” Solar projects are mainly located along the Orange River and within the Solar Corridor, but there are projects south-west of Kenhardt indicated on the resources map. This is presumably the Aries solar plant;
- Renewable Energy Development Zones (REDZ) (CSIR 2014) – The Kenhardt PV and transmission line projects are located in Focus Area 7 – Upington Solar which was identified by the Strategic Environmental Assessment (SEA) as a potential development zone for solar energy. Landscape and visual specialists were involved in the Scoping Assessments of the Focus Areas.

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1.5 IDENTIFICATION OF KEY ISSUES

1.5.1 *Key Issues Identified During the BA Process*

The potential visual issues identified during the BA Process include:

- Construction Phase: Visual intrusion of construction activities on existing views of sensitive visual receptors in the surrounding landscape.
- Operational Phase: Landscape impact of the proposed 132 kV powerline on a rural agricultural landscape;
- Operational Phase: Visual intrusion of the proposed 132 kV powerline on the views of sensitive visual receptors; and
- Decommissioning Phase: Visual intrusion of decommissioning activities on existing views of sensitive visual receptors.

To date, no specific comments have been raised by I&APs that relate to visual impacts. The comments regarding glare from the PV panels (raised by Transnet Freight Rail) are addressed in the separate EIA Reports. All comments and responses are included in Appendix E.3 of the finalised BA Report.

1.5.2 *Identification of Potential Impacts*

Features at risk of impact in a VIA are the landscape and sensitive visual receptors in the landscape.

1.5.2.1 **Landscape**

A landscape impact occurs when a development alters the existing landscape character. If the landscape character is highly sensitive to the development type then the intensity of the impact will be high. A high intensity landscape impact, for instance, will be highly significant if the landscape character type is scarce as well as highly valued by the community (local, regional, national and international). The landscape impact does not depend only on the existing sensitive visual receptors since it can also affect future visual receptors and communities beyond the local or regional context.

As noted above, the existing landscape character of the surrounding region is rural-agricultural with large scale infrastructure such as the Sishen-Saldanha railway and the Eskom Nieuwehoop Substation. The remote sense of place has been severely impacted by the railway, Rugseer Siding and substation. As a result the landscape character has a low sensitivity to the proposed development.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

1.5.2.2 Sensitive Visual Receptors

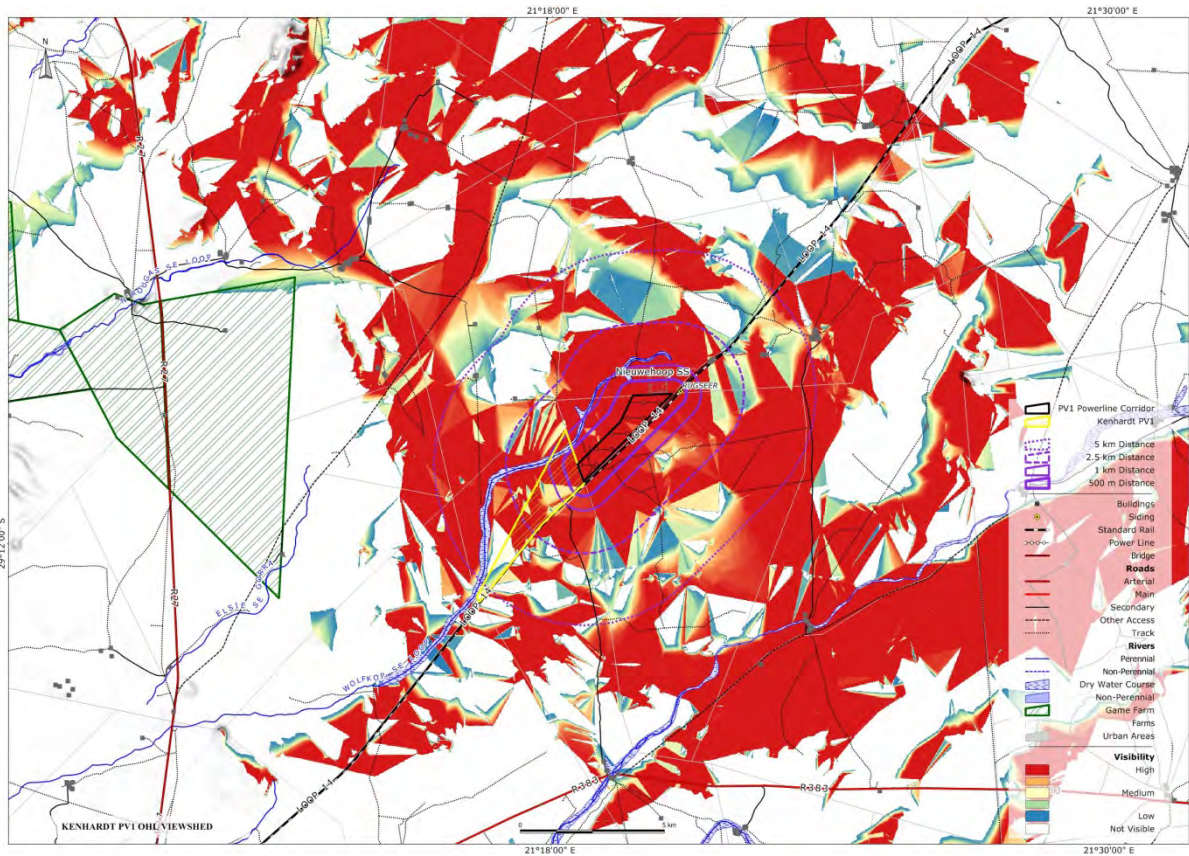


Figure 1-7 Viewshed of the proposed power line corridor between the Kenhardt PV 1 facility and the Eskom Nieuwehoop Substation.

The viewshed map (Figure 1-7) shows that potentially affected sensitive visual receptors are mainly limited to farmsteads, dwellings and viewpoints on farms surrounding the proposed powerline route. Motorists using the R27 are unlikely to have views of the power lines, and the settlement of Kenhardt is located outside the viewsheds. Approximately 5 km of the R383 (4 minutes at 80 km/h) will be within the viewshed but these sections are more than 10 km from the proposed transmission line route. Motorists using the gravel road adjacent to the Sishen-Saldanha railway line (i.e. the Transnet Service Road – Loop 14) will potentially be in the viewshed for 24 km and will potentially pass within 100 m of the proposed transmission line route.

Sensitive visual receptors therefore include:

- Residents and viewpoints on farms surrounding the proposed transmission line route;
- Motorists using the Transnet road adjacent to the Sishen-Saldanha railway line.

Residents on surrounding farms are highly sensitive to changes in their views since they have an active interest in the landscape. Viewpoints are unlikely to be valued for their scenic views (towards the proposed development) since the landscape has been affected by large structures such as the railway line and substation. Viewpoints on surrounding farms are therefore seen as moderately sensitive.

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Traffic on the R383 and Loop 14 (i.e. Transnet Road adjacent to the Sishen-Saldanha railway line) are very limited and these roads are unlikely to be used often by tourists. Motorists will consist mostly of residents and workers on farms along the routes. They will be focusing their attention on the road and are seen as low sensitivity visual receptors.

1.5.2.3 Potential Impacts Identified for the Construction Phase

- Potential visual intrusion of construction activities (discussed in Section 1.2.1) on existing views of sensitive visual receptors.

1.5.2.4 Potential Impacts Identified for the Operational Phase

- Potential landscape impact of the proposed 132 kV powerline on a rural agricultural landscape; and
- Potential visual intrusion of the proposed 132 kV powerline on the views of sensitive visual receptors.

1.5.2.5 Potential Impacts Identified for the Decommissioning Phase

- Potential visual intrusion of decommissioning activities (discussed in Section 1.2.1) on views of sensitive visual receptors.

1.5.2.6 Cumulative Impacts

- Cumulative impact of solar energy generation projects and large scale electrical infrastructure on the existing rural-agricultural landscape; and
- Cumulative visual impact of solar energy generation projects and large scale electrical infrastructure on existing views of sensitive visual receptors in the surrounding landscape.

1.6 VISUAL IMPACT CONCEPTS AND ASSESSMENT CRITERIA

The assessment of potential impacts for the proposed Kenhardt PV 1 – Transmission Line project is conducted in the following steps:

- Identification of visual impact criteria (key theoretical concepts);
- Conducting a visibility analysis; and
- Assessment of impacts of the project on the landscape and on receptors (viewers) taking into consideration factors such as viewer sensitivity, visual exposure and visual intrusion.

Potential visual impacts are assessed using a number of criteria which provide the means to measure the intensity of the impacts. The intensity or consequence and other criteria such as spatial extent and duration of the impact are then used to determine its potential significance (Oberholzer, 2005). The visibility of the project is an indication of where in the region the development will potentially be visible from. The rating is based on viewshed area size and is an indication of how much of a region will potentially be visually affected by the development. A high visibility rating does not necessarily signify a high visual impact, although it can if the region is densely populated with sensitive visual receptors. Viewer (or visual receptor) sensitivity is a measure of how sensitive potential viewers of the development are to changes in

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their views. Visual receptors are identified by looking at the viewshed of the proposed development, and include scenic viewpoints, residents, motorists and recreational users of facilities within the viewshed. Their distance from the development (visual exposure) and the composition of their existing views (visual intrusion) will determine impact intensity/consequence.

1.6.1 Visibility Ratings

Visibility is the geographic area from which the proposed project will be visible, or view catchment area (Figure 1-7). The number of visual receptors in the viewshed has an influence on the visibility rating (Oberholzer, 2005).

- *High* - visible from a large area (e.g. several square kilometres).
- *Moderate* – visible from an intermediate area (e.g. several hectares).
- *Low* – visible from a small area around the project site.

The visibility of the project is high in terms of the definition above since the viewshed area is approximately 26 km² (within 5 km of the proposed transmission line corridor). The actual viewshed is likely to be similar to the calculated viewshed since existing vegetation in the region is low and will not affect the visibility of the proposed development. However, there are only 17 buildings within 5 km of the proposed transmission line corridor that will be affected (not all of which are residences), which indicate a low number of potentially affected visual receptors. Visibility for this project is therefore **low**.

1.6.2 Visual Exposure

Visual exposure refers to the relative visibility of a project or feature in the landscape and is related to the distance between the observer and the project (Oberholzer 2005). Exposure and visual impact tend to diminish exponentially with distance since the observed element comprises a smaller part of the view. Visual exposure is classified as follows:

- *High* – dominant or clearly noticeable;
- *Moderate* – recognisable to the viewer; and
- *Low* – not particularly noticeable to the viewer

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

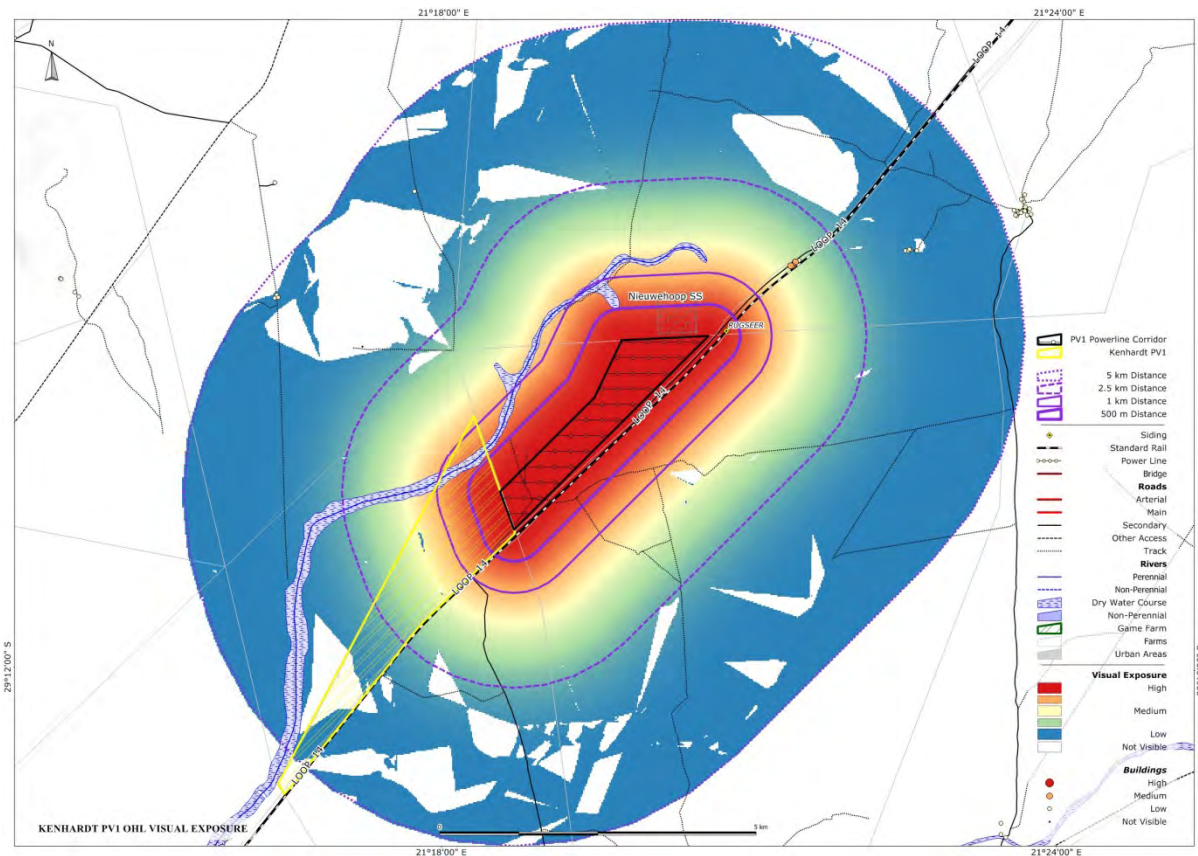


Figure 1-8 Visual exposure for sensitive visual receptors within 5 km of the proposed transmission line route.

1.6.2.1 Residents and Viewpoints on Surrounding Farms

There are no buildings that will be highly exposed to the proposed powerline and most high visual exposure is limited to parts of the immediately surrounding farms (within 1.5 km of the proposed powerline route) (Figure 1-8). There are 5 buildings, all at the Rugseer Siding, that are in moderately exposed areas of the viewshed.

1.6.2.2 Motorists

The R383 is more than 5 km from the development site and motorists using this road will experience low visual exposure to the proposed powerline when they are in the viewshed. A 7 km (approximately 5 minutes at 80 km/h) section of the Transnet Service Road (Loop 14) will be highly exposed to the development.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

1.6.3 Visual Intrusion

Visual intrusion indicates the level of compatibility or congruence of the project with the particular qualities of the area – its *sense of place*. This is related to the idea of context and maintaining the integrity of the landscape (Oberholzer, 2005). It can be ranked as follows:

- *High* – results in a noticeable change or is discordant with the surroundings;
- *Moderate* – partially fits into the surroundings, but is clearly noticeable; and
- *Low* – minimal change or blends in well with the surroundings.

1.6.3.1 Photographic Survey

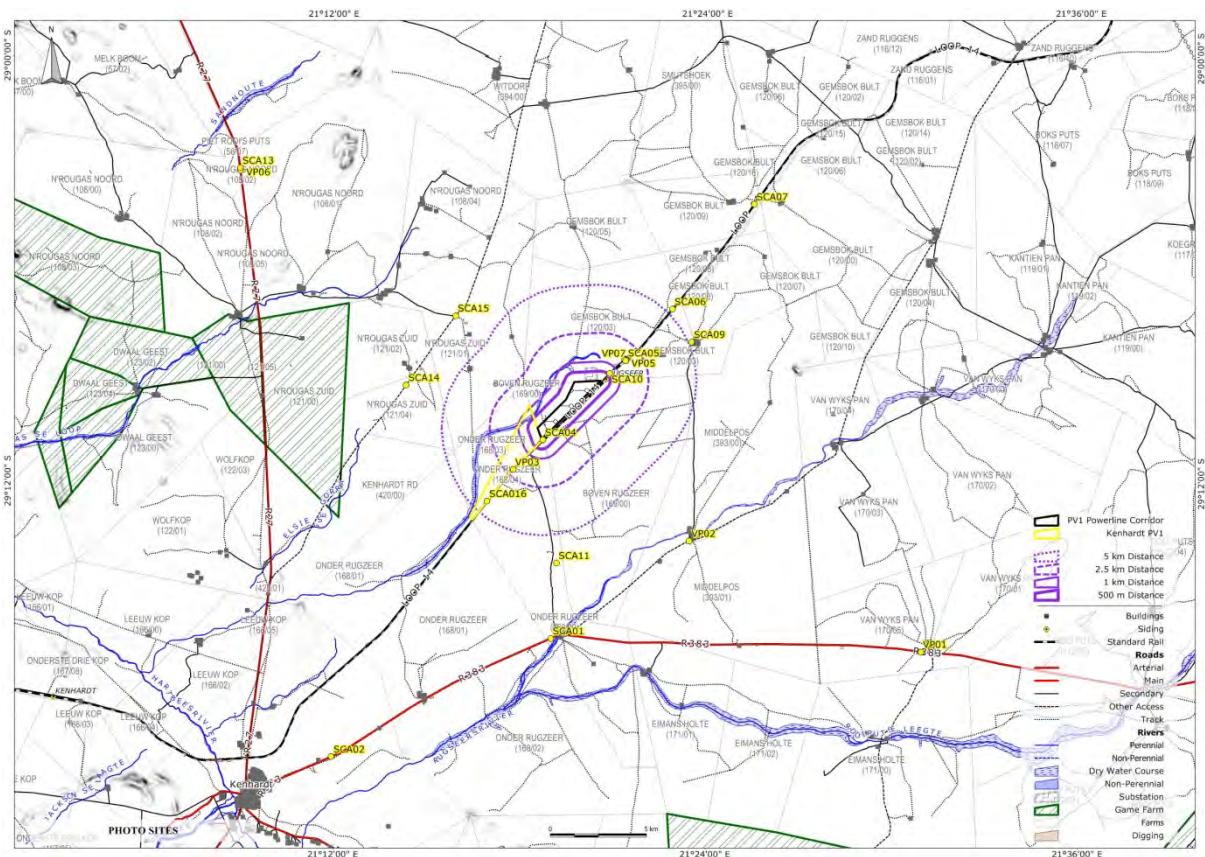


Figure 1-9 Sites visited during photographic survey (SCA - October 2015; VP - June 2014)

Sites from which landscape photographs were taken are shown in Figure 1-9. Sites with the prefix 'VP' refers to a photographic survey done in June 2014 for a different project in the same region, while 'SCA' refers to the survey done in October 2015 for this project. The discussion below refers to photograph sites on the map.

The landscape surrounding the proposed power line route is agricultural, with sheep farming the predominant land use. It is not pristine wilderness and the natural landscape has been affected by grazing as well as a number of man-made structures not normally associated with agricultural landscapes. The proposed power line corridor runs parallel and adjacent to the Sishen-Saldanha railway line (Figure 1-10). The railway line is an enormous structure and

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several very long (up to 4 km) ore trains pass through the landscape daily. Rail wagons are 4 m high and locomotives up to 5 m (Figure 1-11). The siding at Rugseer is a relatively large structure and its tower is highly visible in the landscape (Figure 1-12 and Figure 1-13). The Eskom Nieuwehoop Substation is currently under construction. It is another large structure and is a prominent new element in the landscape (Figure 1-14).



Figure 1-10 View north-west from viewpoint SCA04 along the proposed transmission line route. The new Eskom Nieuwehoop Substation is central in view and the tower at Rugseer Siding is to the right.



Figure 1-11 Empty ore train (Photo site VP03)

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Figure 1-12 The tower at the Rugseer Siding as seen from photo site SCA011.



Figure 1-13 View from photo site SCA014 eastwards. The tower at Rugseer Siding is visible on the left and the new substation more towards the centre.

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Figure 1-14 Eskom Nieuwehoop Substation currently under construction (Photo site SCA010)

1.6.3.2 Residents and Viewpoints on Surrounding farms

The proximity of the proposed development to the railway line and the substation means that existing views towards the development are already impacted. The number of highly sensitive visual receptors that will potentially be affected by the proposed transmission line is very low. They will experience **low** visual intrusion on existing views since the substation and railway line have structures similar to those of the proposed development.

1.6.3.3 Motorists

Motorists using the R383 are unlikely to notice the proposed power line at the distances they will be from it when within its viewshed. Views from Loop 14 will experience **low** visual intrusion since the other structures in views along the road are similar to those of the proposed power line and the power line will not seem discordant with the surrounding landscape.

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Table 1-1 Visual Impact Criteria and Impact Intensity for the Kenhardt PV 1 – Transmission Line project.

Development Alternative	Sensitive Viewer	Criteria	Rating	Reasoning
Kenhardt PV 1 – Transmission Line	Residents and viewpoints on surrounding farms.	Visual Sensitivity	High	Residents are actively interested in their surrounding landscape and spend much of their time there.
		Visual Exposure	Low	There are no buildings in high visual exposure areas of the viewshed.
		Visual Intrusion	Low	The proposed power line will fit in with other large structures in the landscape.
		Impact Intensity	Low	Low visual exposure to the power line and low visual intrusion on existing views.
	Motorists	Visual Sensitivity	Low	They pass through a landscape and their attention will not be focused on the landscape.
		Visual Exposure	High	For motorists using the gravel road adjacent to the Sishen-Saldanha railway line (Loop 14). They will be highly exposed to the proposed development for approximately 7 km (or 5 minutes at 80 km/h)
		Visual Intrusion	Low	Low visual intrusion on views due to other large structure in existing views that are similar to the power line.
		Impact Intensity	Low	Low visual intrusion on existing views for low sensitivity visual receptors.

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1.7 ASSESSMENT OF IMPACTS AND IDENTIFICATION OF MANAGEMENT ACTIONS

1.7.1 *Construction Phase: Potential visual intrusion of construction activities on existing views of sensitive visual receptors*

1.7.1.1 Significance Statement

The spatial extent of the potential impact will be **local** since sensitive visual receptors further than 2 km from the proposed transmission line route will at most experience low visual exposure. The consequence of the potential impact will be **moderate** since construction will introduce activities and elements that are incongruent with the quiet rural nature of the region. The impact will be of **very short-term** duration since the proposed transmission line is only approximately 4 km long. Reversibility of the impact will be **high** and its irreplaceability **low**. The impact status will be **negative** since construction is normally viewed as cluttered and untidy. The probability of the impact occurring is **likely** since there are very few sensitive visual receptors that will be affected.

The significance of the potential impact without the implementation of mitigation measures is rated as **low** since the impact is predicted to be very short term in nature and there are very few highly sensitive visual receptors that will be affected.

1.7.1.2 Mitigation Measures

Assumptions regarding the management of construction activities are discussed in Section 1.1.4.1 of this report. Mitigation measures in addition to the best practice guidelines are:

- Night time construction should be avoided where possible; and
- Night lighting of the construction sites should be minimised within requirements of safety and efficiency.

The significance of the impact after mitigation will remain **low** with the implementation of mitigation measures.

1.7.2 *Operational Phase: Potential landscape impact of the proposed 132 kV powerline on a rural agricultural landscape*

1.7.2.1 Significance Statement

The spatial extent of the potential impact will be **local** since it is unlikely to affect the landscape beyond 2 km from the proposed transmission line route. The consequence of the potential impact will be **slight** since the landscape character is impacted by the Sishen-Saldanha railway line and existing large scale electrical infrastructure in the form of the Eskom Nieuwehoop Substation. The impact will be **long term** and will cease only once the power line has been removed. The potential impact will diminish over time as other power lines to the substation are built and the electrical infrastructure becomes a more dominant element of the landscape. The reversibility of the impact is **high**. The irreplaceability of the landscape character type is **low** because it is a compromised landscape and other areas where the rural agricultural landscape is less altered exist in the region. The impact status will be **negative** since the rural sense of place of the region will change. The probability of the impact occurring is **likely** depending on

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how far development of the power lines planned for the Eskom Nieuwehoop Substation has progressed by the time the proposed 132 kV line is built.

The significance of the potential impact before mitigation is rated as **very low** since the impact is localized and has a slight consequence. No mitigation measures are recommended.

1.7.3 Operational Phase: Potential visual intrusion of the proposed 132 kV power line on the views of sensitive visual receptors

1.7.3.1 Significance Statement

The spatial extent of the potential impact will be **local** since only sensitive visual receptors within 2 km of the proposed development are likely to be affected and there are very few within this distance of the proposed transmission line route. The consequence of the impact will be rated as **slight** since very few highly sensitive visual receptors will potentially be affected and visual intrusion is expected to be low. The potential impact is rated with **long term** duration since it will only end once the project ends. The reversibility of the potential impact is rated as **high** since it is unlikely that vegetation will have to be removed for the servitude (considering the sparse vegetative cover within the general area). The visual resources of the region are already impacted by stock farming activities, the ore railway line passing through it and the Eskom Nieuwehoop Substation. The irreplaceability of the visual resources is therefore seen as **low**. The impact status will be **negative** since powerlines detract from the scenic potential of views. The probability of the impact occurring is **likely** since there are motorists that will pass within 1 km of the proposed transmission line route.

The significance of the impact (without the implementation of mitigation measures) is rated as **very low** since very few sensitive visual receptors are likely to be affected by the proposed development.

1.7.3.2 Mitigation Measures

It is recommended that the type of power line towers used for the proposed power line should be similar to existing power line towers in the landscape where possible.

The significance of the impact after mitigation will remain **very low** with the implementation of mitigation measures.

1.7.4 Decommissioning Phase: Potential visual intrusion of decommissioning activities on views of sensitive visual receptors

1.7.4.1 Significance Statement

The spatial extent of the potential impact will be **local** since sensitive visual receptors further than 2 km from the proposed transmission line route will at most experience low visual exposure. The consequence of the impact will be **moderate** since activities similar to those during the construction phase will intrude on views of sensitive visual receptors. The impact duration should be shorter than for the construction phase – **very short-term**. The reversibility of the impact is **high** and the irreplaceability **low**. The impact status will be **negative** since this phase will be perceived as cluttered and untidy. The probability of the impact occurring is **likely** since there are very few sensitive visual receptors that will be affected.

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The significance of the impact without the implementation of mitigation measures is rated as **low** since the impact is temporary and there are very few highly sensitive visual receptors that will be affected.

1.7.4.2 Mitigation Measures

The following mitigation measures have been recommended:

- Disturbed and transformed areas should be contoured to approximate naturally occurring slopes to avoid lines and forms that will contrast with the existing landscapes;
- Stockpiled topsoil should be reapplied to disturbed areas and these areas should be re-vegetated using a mix of indigenous species in such a way that the areas will form as little contrast in form, line, colour and texture with the surrounding undisturbed landscape;
- Edges of re-vegetated areas should be feathered to reduce form and line contrasts with surrounding undisturbed landscape;
- Working at night should be avoided, where possible; and
- Night lighting of reclamation sites should be minimised within requirements of safety and efficiency.

The significance of the impact after mitigation will remain **low** with the implementation of mitigation measures.

1.7.5 *Cumulative impact of solar energy generation projects and large scale electrical infrastructure on the existing rural-agricultural landscape*

1.7.5.1 Significance Statement

The introduction of a large railway line, siding and tower has changed the landscape character of the region by reducing its sense of remoteness. This is further changing with the addition of a large substation and a network of high-voltage power lines which are highly visible structures due to their height and linear extent. The substation and powerlines are being constructed and therefore represent a definite change in landscape character. Several large solar energy facilities and associated electrical infrastructure (such as transmission lines) are being proposed for the region immediately surrounding the proposed Kenhardt PV 1 – Transmission Line project area (within 20 km of the site – as described in Section 1.1.4.1 of this report and Section D of the BA Report). In the event that some of them are built, large areas of natural vegetation and stock farming land will be transformed into fields covered in thousands of solar panels. Solar fields and their associated electrical infrastructure will become a common feature of the landscape and the rural-agricultural landscape character will have a significant power generation component (as well as large scale electrical infrastructure). Additional power lines in the same region will cause a cumulative impact of **slight** consequence since the landscape character will already contain large scale electrical infrastructure.

The spatial extent of the cumulative impact is **regional** (within 20 km of the Kenhardt PV 1 – Transmission Line development). The duration of the potential impact is rated as **long term** since the cumulative impact will last for as long as the transmission line is in the landscape. The **status** of the impact is neutral since the overall change in landscape character will be negligible and the probability of it occurring is **unlikely** (assuming that several solar energy projects and associated electrical infrastructure are built in the surrounding landscape).

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The significance of this cumulative impact (without the implementation of mitigation measures) on the landscape is rated as **very low**. No mitigation is recommended.

1.7.6 Cumulative visual impact of solar energy generation projects and large scale electrical infrastructure on existing views of sensitive visual receptors in the surrounding landscape

1.7.6.1 Significance Statement

The original visual resources of the region under assessment were represented by open, long distance views of arid landscape with low hills and sparse vegetation cover. There were limited opportunities for scenic vistas but the sense of place was remote wilderness. Subsequent stock farming practices have reduced the visual resources by impacting on the vegetation and wilderness. The railway line and associated infrastructure (including the new substation and electrical infrastructure), have further altered the sense of place of the region and reduced the opportunities for scenic views. The addition of large fields covered in structures will similarly reduce existing visual resources and solar fields will become common elements of views in the region. The proposed power line will cause low visual intrusion on views since it will not seem out of place in the landscape and the cumulative visual impact is rated with a **slight** consequence.

The spatial extent of the cumulative impact is **regional** (within 20 km of the Kenhardt PV 1 – Transmission Line development). The duration of the impact is rated as **long term** since the cumulative impact will last for as long as the transmission line is in the landscape. The **status** of the impact is negative since the visual resources of the region are reduced, and the probability of it occurring is **likely** since there may still be highly sensitive visual receptors that will be affected.

The significance of the cumulative impact (without the implementation of mitigation measures) is rated as **very low**. No mitigation is recommended.

1.8 IMPACT ASSESSMENT SUMMARY

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Table 1-2 Impact assessment summary table for the Construction Phase

Construction Phase													
Direct Impacts													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Construction activities	Loss of visual resources	Negative	Local	Very Short Term	Moderate	Likely	High	Low	Mitigation measures associated with construction activities. Night time construction should be avoided where possible. Night lighting of the construction sites should be minimised within requirements of safety and efficiency.	Low	Low	5	High

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Table 1-3 Impact assessment summary table for the Operational Phase

Operational Phase													
Direct Impacts													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Landscape impact	Change of landscape character	Negative	Local	Long Term	Slight	Likely	High	Low	None specified	Very Low	Not Applicable	5	High
Visual intrusion of the proposed 132 kV powerline on views of sensitive visual receptors	Change in existing views of sensitive visual receptors.	Negative	Local	Long Term	Slight	Likely	High	Low	Towers should be similar to those in existing landscape.	Very Low	Very Low	5	High

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE):
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Table 1-4 Impact assessment summary table for the Decommissioning Phase

Decommissioning Phase													
Direct Impacts													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Visual impact of decommissioning activities on existing views of sensitive visual receptors	Impact on visual resources	Negative	Local	Very Short-Term	Moderate	Likely	High	Low	Rehabilitation of cleared and disturbed areas. Working at night should be avoided, where possible. Night lighting of reclamation sites should be minimised within requirements of safety and efficiency	Low	Low	4	High

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Table 1-5 Cumulative impact assessment summary table

Cumulative Impacts													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Cumulative impact on the landscape of the region.	Change in landscape character	Neutral	Regional	Long term	Slight	Unlikely	High	Low	None	Very Low	Not Applicable	5	High
Cumulative impact on sensitive visual receptors.	Visual intrusion	Negative	Regional	Long Term	Slight	Likely	High	Low	None	Very Low	Not Applicable	5	High

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1.9 INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAMME

1.9.1 *Planning and Design*

There are some mitigation measures that require input during the design and planning phase of the project in order to reduce visual intrusion of construction activities. These include plans to minimize fire hazards and dust.

1.9.2 *Construction Phase*

Adherence to the erosion, dust, fire and light plans is necessary to minimise visual intrusion of construction activities and should be monitored regularly by the construction manager. Construction boundaries should be clearly demarcated and monitored, and good housekeeping on site should be maintained. Rehabilitation of temporary cleared areas should commence as soon as possible and the rehabilitation process should be regularly monitored by the Environmental Officer.

1.9.3 *Operational Phase*

Powerline pylons should be similar to those existing in the landscape already if possible.

1.9.4 *Decommissioning Phase*

The decommissioning phase of the project will potentially cause similar visual impacts as that during the construction phase and as such similar mitigation measures apply. The successful completion of this phase should leave the project site in a similar condition, visually, as before construction commenced. This can be accomplished by appropriate landscaping and revegetation of disturbed areas.

1.10 CONCLUSION AND RECOMMENDATIONS

The landscape surrounding the proposed site has a rural agricultural character which has been transformed by extensive stock farming and large scale infrastructure in the form of the Sishen-Saldanha ore railway line and the Eskom Nieuwehoop Substation. The significance of the landscape impact of the proposed power line (during the operational phase) is rated as very low since its extent is local and the consequence of the impact is rated as slight.

Very few sensitive visual receptors will potentially be affected by the proposed power line:

- Residents and viewpoints on farms surrounding the proposed development site. These are highly sensitive visual receptors since they have an active interest in their surrounding landscape; and
- Motorists using the R383 and the Transnet Service Road (Loop 14) adjacent to the Sishen-Saldanha ore railway line. Motorists are classified as low sensitivity visual receptors since they pass through the landscape and their attention is mostly focused on the road.

Visual intrusion on the existing views of highly sensitive visual receptors will be low since the proposed power line will fit into the existing landscape which already contains the Eskom Nieuwehoop Substation and Sishen-Saldanha railway line which contain similar structures. The

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significance of the potential visual impact (during the operational phase) is rated as very low since it has local extent and slight consequence.

The significance of cumulative impacts on the surrounding landscape character is rated as very low since the landscape is rapidly changing due to the introduction of large scale and highly visible rail and electrical infrastructure.

The significance of the cumulative visual impact on sensitive visual receptors is similarly rated as very low due to the existing and new structures which have severely limited potential scenic views in the region.

The proposed power line will fit in with the landscape as it exists now as well as with plans for the future of the surrounding landscape. The overall significance of the visual impact of the proposed 132 kV powerline is low. The specific location of the powerlines within the proposed corridor will not alter the significance of their potential visual impact on sensitive visual receptors and from a visual impact perspective there is no reason for this corridor not to be used and no conditions are recommended for inclusion in the environmental authorisation.

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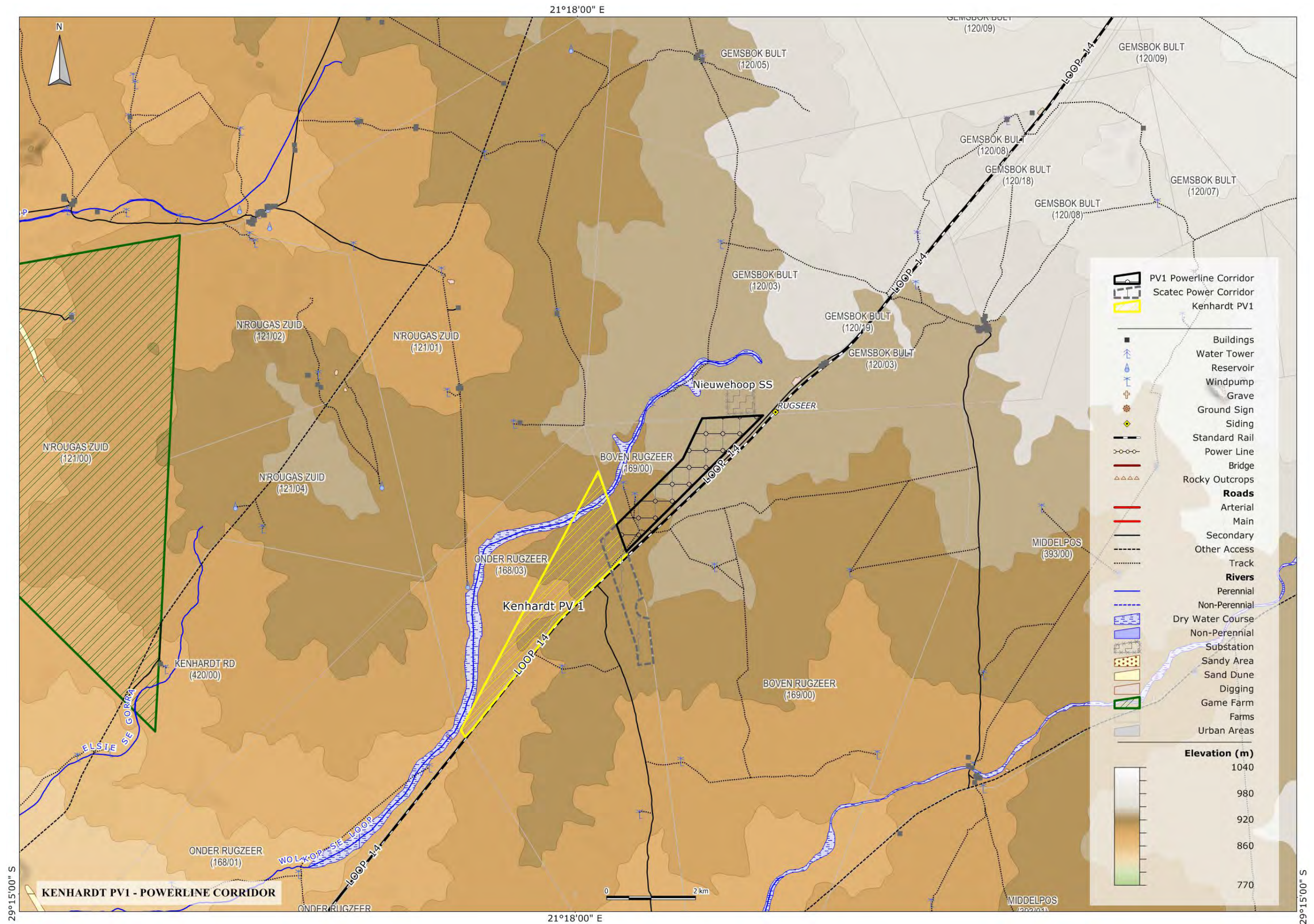
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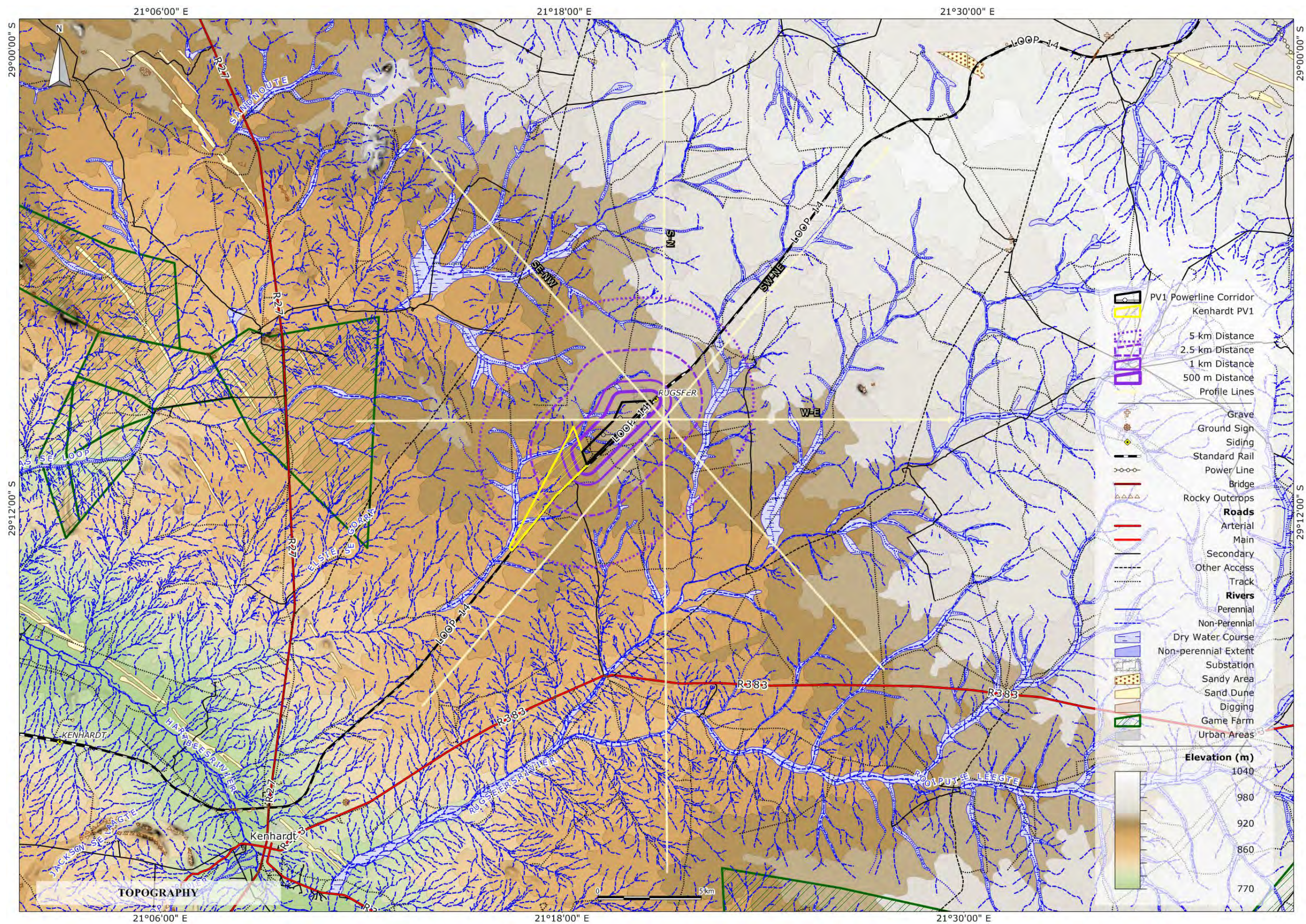
1.12.1 Appendix A – Maps in A3 Format

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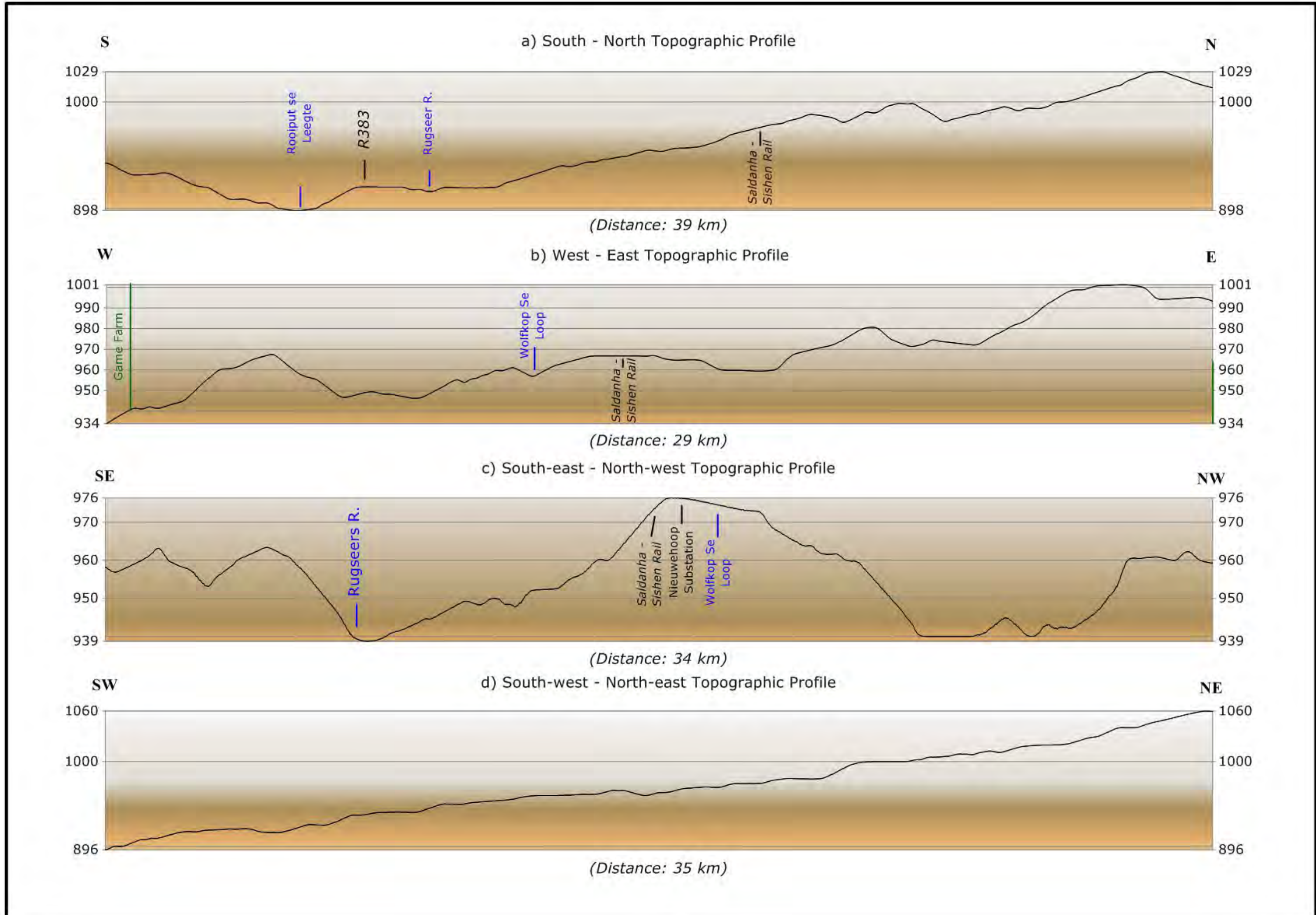
Map 1 Proposed Kenhardt PV 1 solar energy facility site and the proposed 132 kV overhead power line corridor connecting from the facility with to the Eskom grid at the Nieuwehoop Substation.

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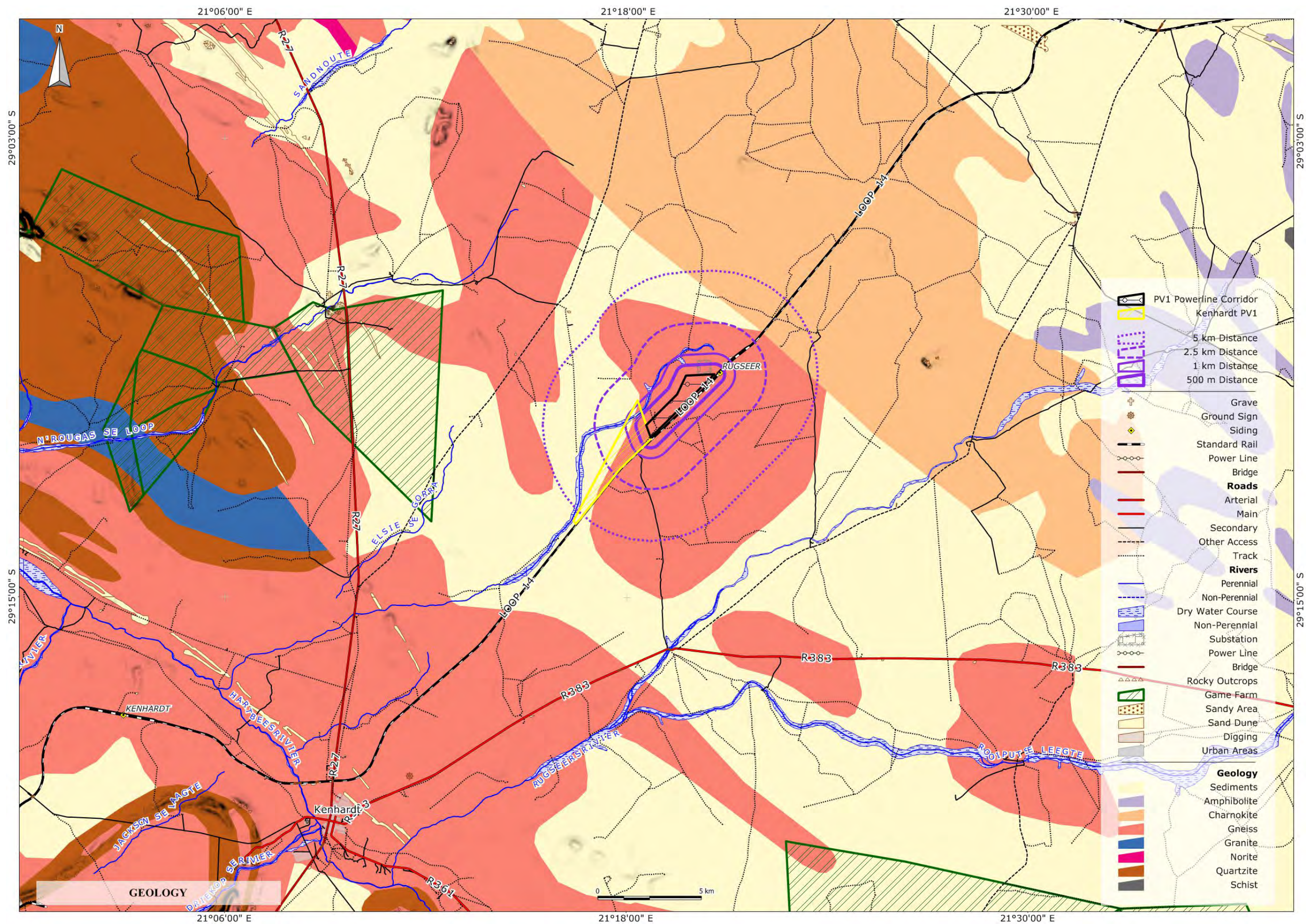
Map 2 Topographic Map of the Region.

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Map 3 a) South-North Topographic Profile, b) East-West Topographic Profile, c) South-east – North-west Topographic Profile, d) South-west – North-east Topographic Profile. Topographic profiles as indicated on the topographic map above.

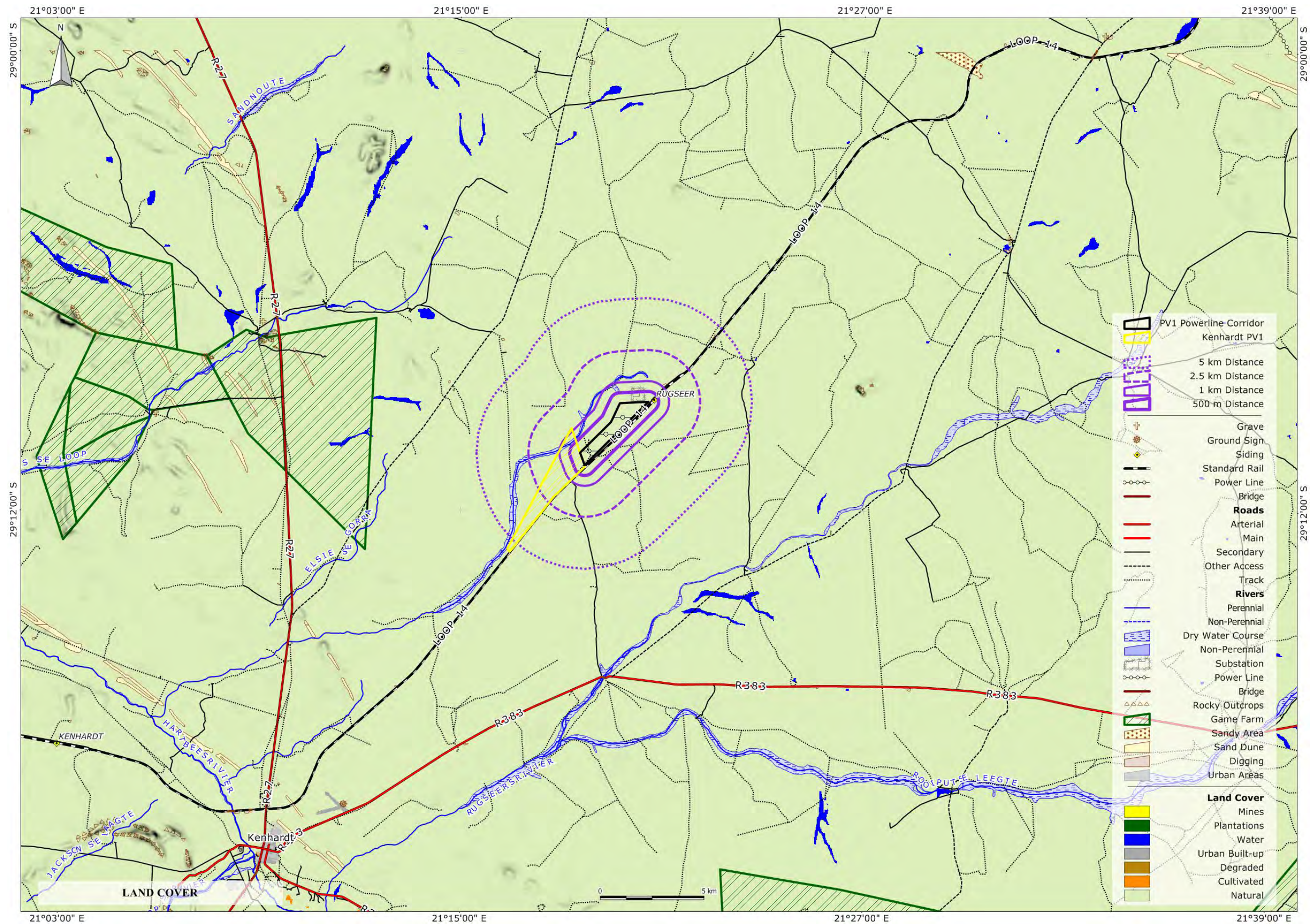
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Map 4 Simplified geology of the region.

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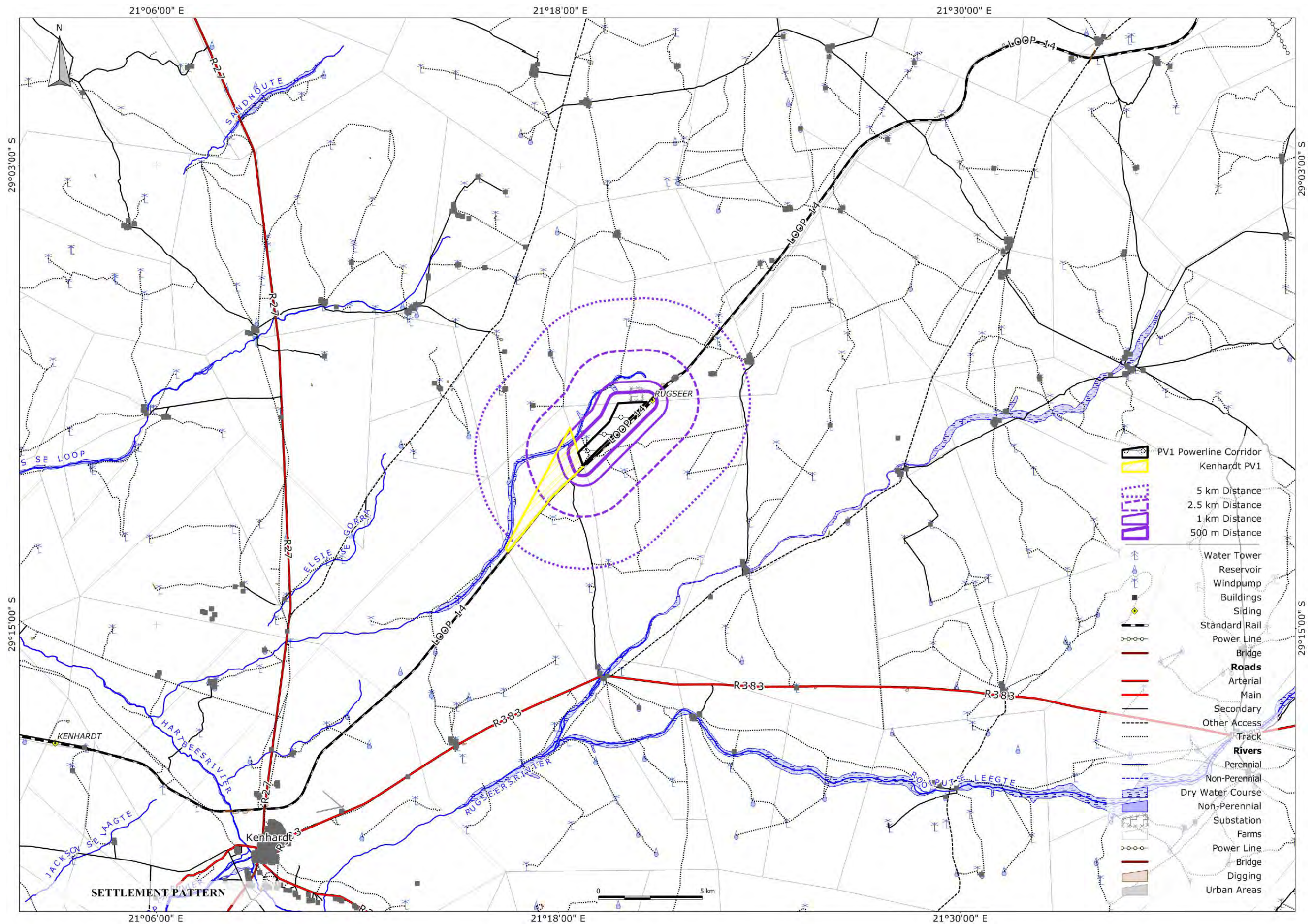
Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT



Map 5 Land cover map of the region.

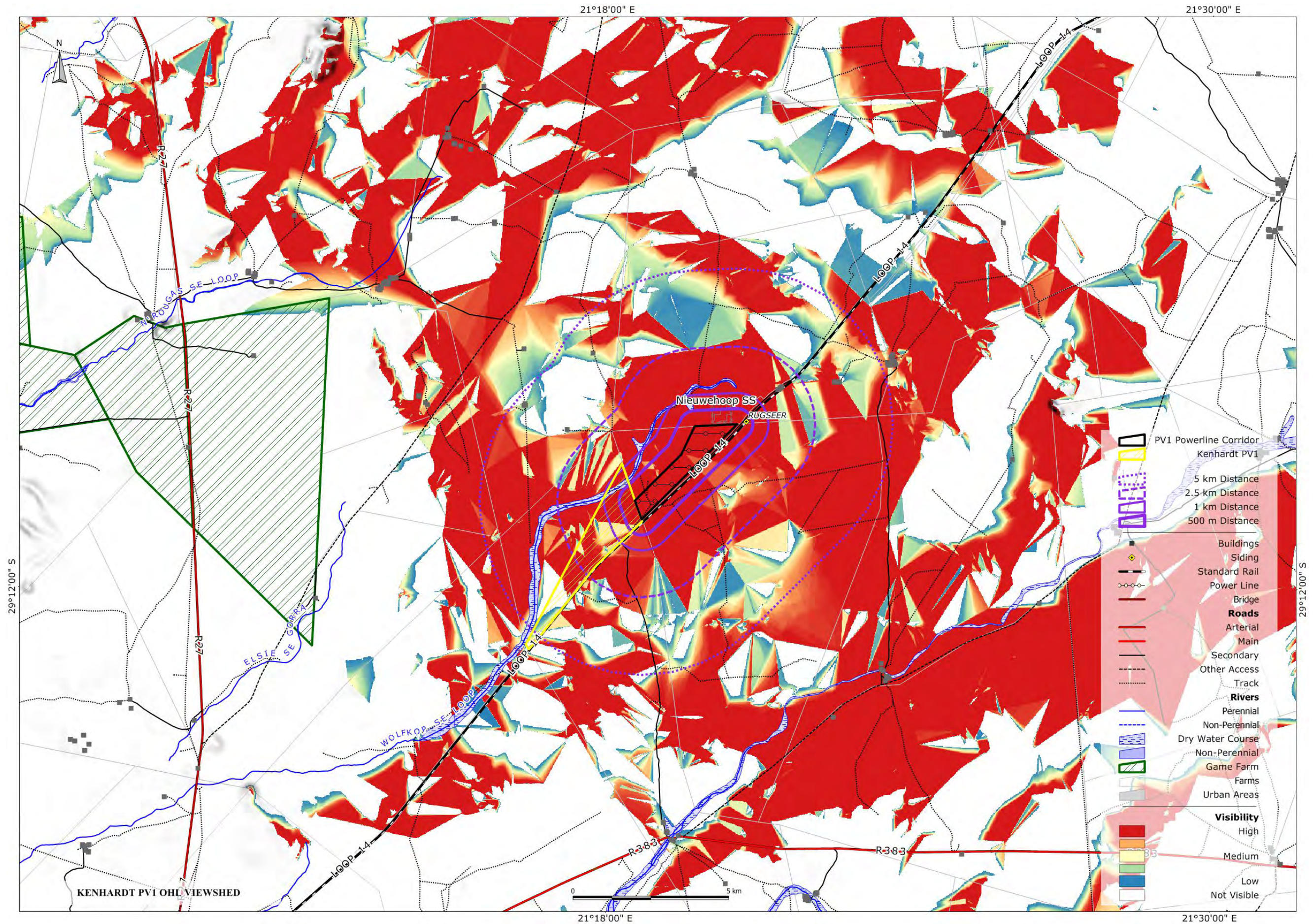
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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT



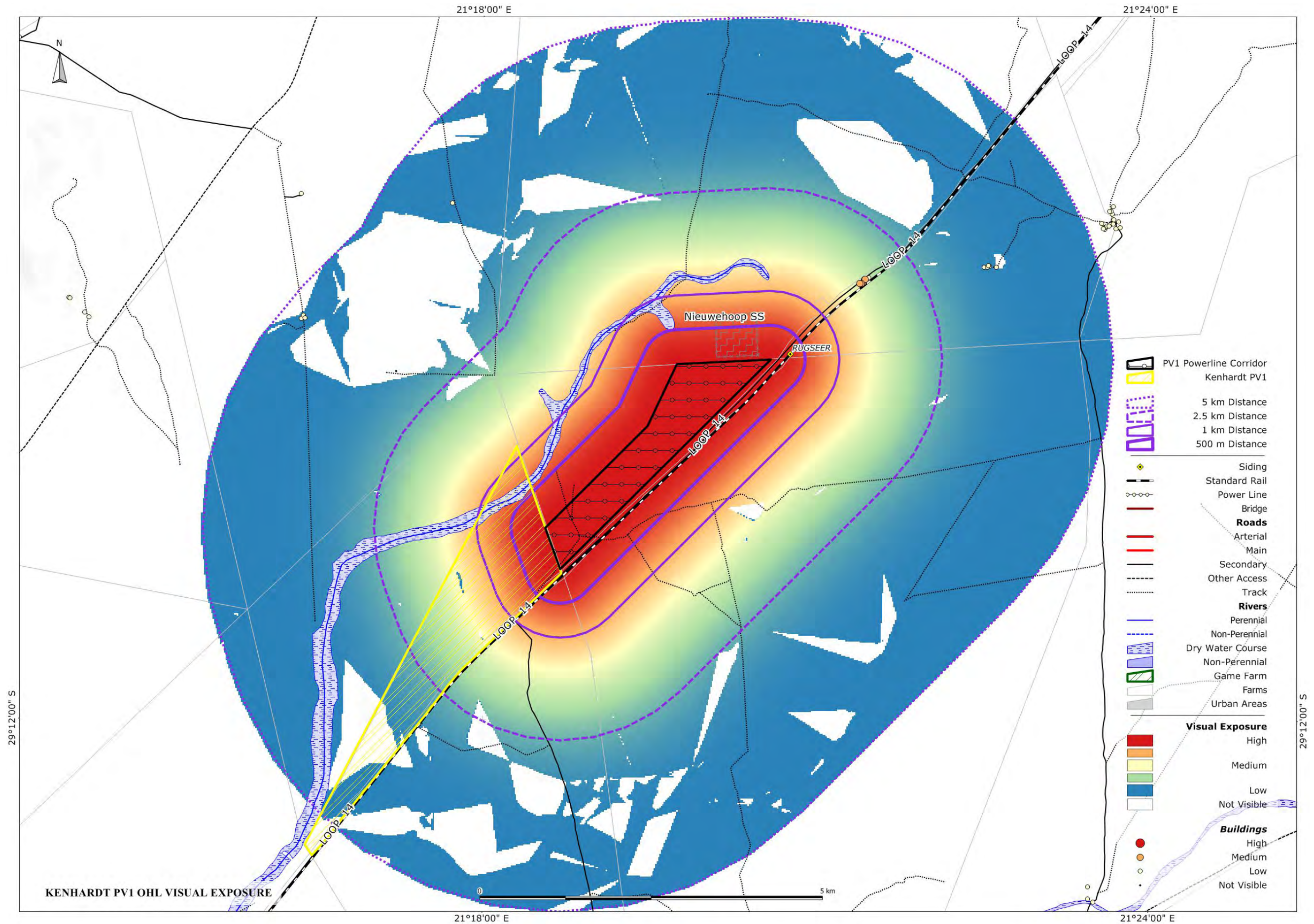
Map 6 Prominent man-made structures and settlement patterns in the landscape.

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Map 7 Viewshed of the 132 kV proposed power line corridor between the proposed Kenhardt PV 1 facility and the Eskom grid at the Nieuwehoop Substation.

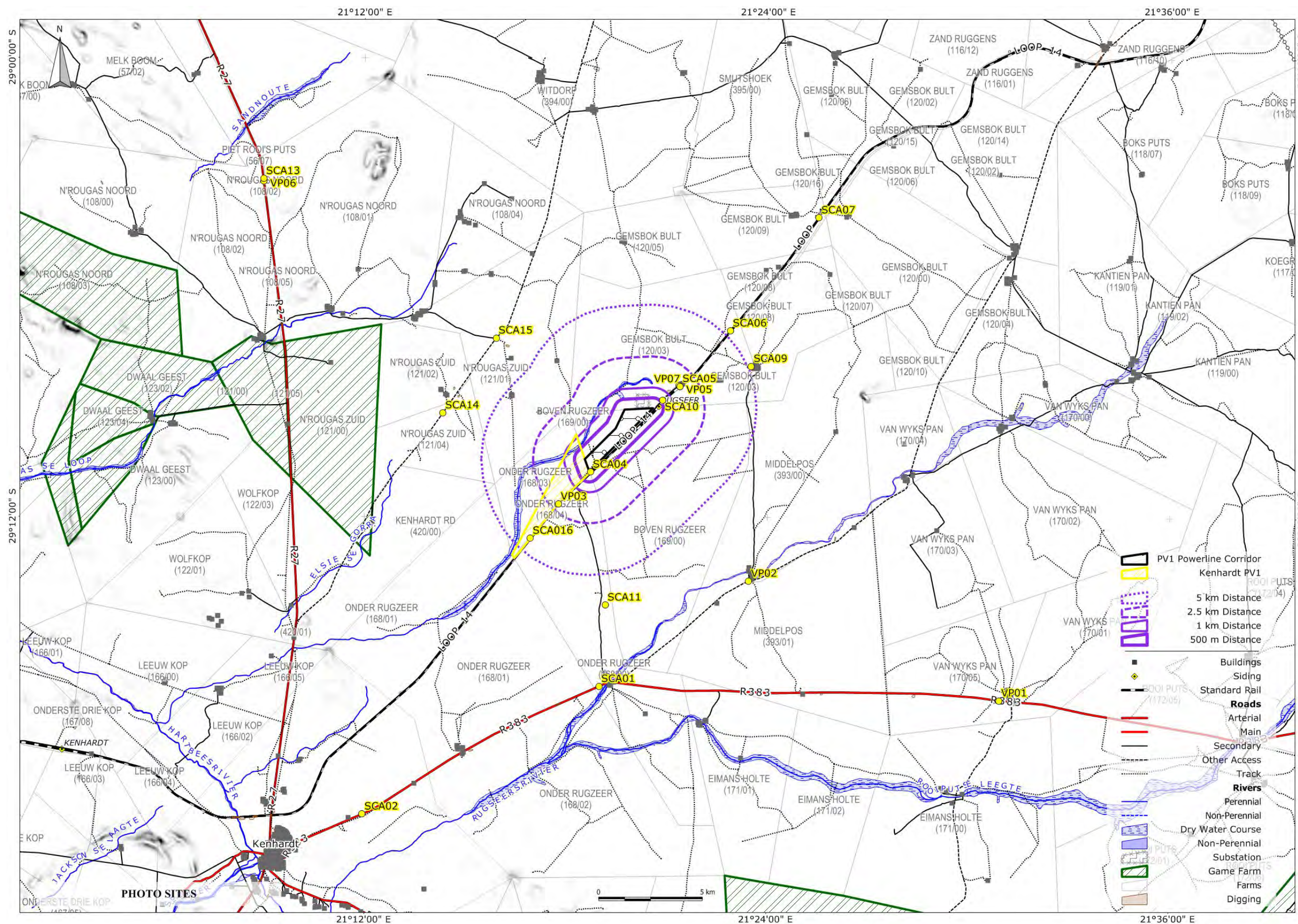
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Map 8 Visual exposure for sensitive visual receptors within 5 km of the proposed transmission line route.

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Map 9 Sites visited during photographic survey (SCA - October 2015; VP - June 2014)

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Appendix D.3: Heritage Impact Assessment (Archaeology and Cultural Landscape)

HERITAGE IMPACT ASSESSMENT FOR A PROPOSED 132 kV POWER LINE (KENHARDT PV 1 – TRANSMISSION LINE) ON FARMS 168/REM, 168/4, 169/REM and 120/3, KENHARDT MAGISTERIAL DISTRICT, NORTHERN CAPE

Required under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999).

Report for:

CSIR Environmental Management Services

P.O. Box 17001, Congella, Durban, 4013

Tel: 031 242 2300

Email: RAbed@csir.co.za

On behalf of:

Scatec Solar SA 330 (Pty) Ltd



Dr Jayson Orton

ASHA Consulting (Pty) Ltd

6A Scarborough Road, Muizenberg, 7945

Tel: (021) 788 8425 | 083 272 3225

Email: jayson@asha-consulting.co.za

First Draft: 10 November 2015

Final Report: 03 February 2016 (with a minor amendment in May 2016)

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EXECUTIVE SUMMARY

ASHA Consulting (Pty) Ltd was appointed by the Council for Scientific and Industrial Research (CSIR) to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed construction of electrical infrastructure (including transmission lines) stretching over parts of the remainder of farm Onder Rugzeer 168, the Remainder of Boven Rugzeer 169, Portion 4 of Onder Rugzeer 168 and Portion 3 of farm Gemsbok Bult 120, in the Kenhardt Magisterial District. The proposed infrastructure will serve to link the proposed Kenhardt PV 1 solar energy facility (assessed under a separate Environmental Impact Assessment (EIA) Process) with the Eskom Nieuwehoop Substation presently under construction on Gemsbok Bult 120/3. This Heritage Impact Assessment (HIA) is being undertaken as part of the Basic Assessment (BA) for a transmission corridor that would accommodate the proposed electrical infrastructure (referred to as the Kenhardt PV 1 – Transmission Line project).

The area is relatively flat, although gently undulating terrain occurs in places. A pan occurs at the northern end of the proposed corridor, while a small rocky koppie occurs in the southern part of the corridor. Vegetation is low and sparse with ground visibility being excellent.

Archaeological material in the form of background scatter was located across much of the general area but impacts to this material would be of very low significance. No archaeological sites or graves were found along the alignment of the proposed transmission line corridor but sites may be expected in association with the pan and koppie which, because of a change to the project, were not covered by the survey. Although sites of high significance are unlikely to occur, these two areas should be avoided with buffers of 75 m radius from the centre of the pan and 120 m radius from the summit of the koppie as a precautionary measure. The landscape was identified as a heritage resource but, because of the presence of electrical and other infrastructure in the area, the significance of new impacts is considered to be very low and no mitigation is suggested.

The significance of the potential impacts to archaeological resources and graves was rated as being very low, while the impacts to the landscape are also rated with a very low significance (without the implementation of mitigation measures). Aside from avoiding the pan and koppie, no mitigation measures are suggested.

The proposed project should be allowed to proceed but subject to the following conditions:

- The pan and koppie should be avoided with buffers of 75 m from the centre of the pan and 120 m from the summit of the koppie;
- The construction crew should be informed of the possibility of encountering graves and should be encouraged to report any suspicious-looking stone features prior to disturbance; and
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

Glossary

Background Scatter: Artefacts whose spatial position is conditioned more by natural forces than by human agency.

Early Stone Age: Period of the Stone Age extending approximately between 2 million and 200 000 years ago.

Later Stone Age: Period of the Stone Age extending over the last approximately 20 000 years.

Middle Stone Age: Period of the Stone Age extending approximately between 200 000 and 20 000 years ago.

Abbreviations

ASAPA: Association of Southern African Professional Archaeologists

BAR: Basic Assessment Report

CRM: Cultural Resources Management

CSIR: Council for Scientific and Industrial Research

EMPr: Environmental Management Programme

ESA: Early Stone Age

GPS: Global Positioning System

HIA: Heritage Impact Assessment

LSA: Later Stone Age

MSA: Middle Stone Age

NEMA: National Environmental Management Act (No. 107 of 1998)

NHRA: National Heritage Resources Act (No. 25) of 1999

NID: Notification of Intent to Develop

SAHRA: South African Heritage Resources Agency

SAHRIS: South African Heritage Resources Information System

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

COMPLIANCE WITH THE APPENDIX 6 OF THE 2014 EIA REGULATIONS

Requirements of Appendix 6 – GN R982	Addressed in the Specialist Report
1. (1) A specialist report prepared in terms of these Regulations must contain-	Section 1.4 & Appendix 1
a) details of-	
i. the specialist who prepared the report; and	
ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Section 1.5 & Appendix 2
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.3
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 3.2
e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	Section 3
f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	Section 6.2
g) an identification of any areas to be avoided, including buffers;	Sections 7 & 11
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 11
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 3.5
j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	Sections 7 & 8
k) any mitigation measures for inclusion in the EMPr;	Section 11
l) any conditions for inclusion in the environmental authorisation;	Sections 11 & 13
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 11
n) a reasoned opinion-	Sections 12 & 13
i. as to whether the proposed activity or portions thereof should be authorised; and	
ii. if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	Section 6.1
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Section 6.1
q) any other information requested by the competent authority.	n/a

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

1. INTRODUCTION

ASHA Consulting (Pty) Ltd was appointed by the Council for Scientific and Industrial Research (CSIR) to conduct an assessment of the potential impacts to heritage resources that might occur through the proposed construction of electrical infrastructure (including transmission lines) stretching over parts of the remainder of farm Onder Rugzeer 168, the Remainder of Boven Rugzeer 169, Portion 4 of Onder Rugzeer 168 and Portion 3 of farm Gemsbok Bult 120, in the Kenhardt Magisterial District (Figures 1 & 2). The proposed infrastructure will serve to link the proposed Kenhardt PV 1 solar energy facility (assessed under a separate Environmental Impact Assessment (EIA) Process) with the Eskom Nieuwehoop Substation presently under construction on Gemsbok Bult 120/3. This Heritage Impact Assessment (HIA) is being undertaken as part of the Basic Assessment (BA) for a transmission corridor that would accommodate the proposed electrical infrastructure (referred to as the Kenhardt PV 1 – Transmission Line project).

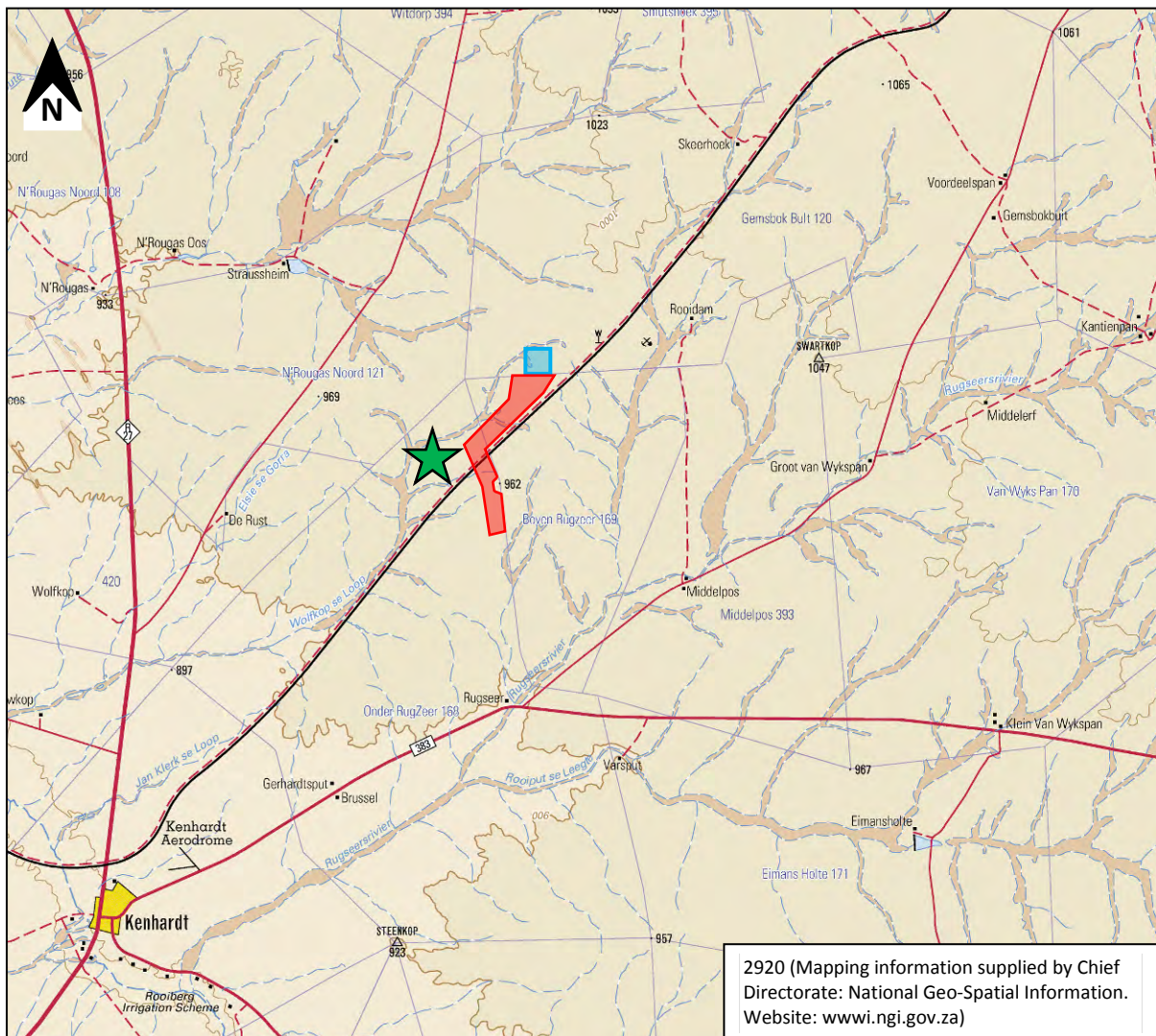


Figure 1: Map showing the location of the proposed transmission line corridor (red) as well as the PV facility (green star) and substation (blue polygon) that it would link to.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

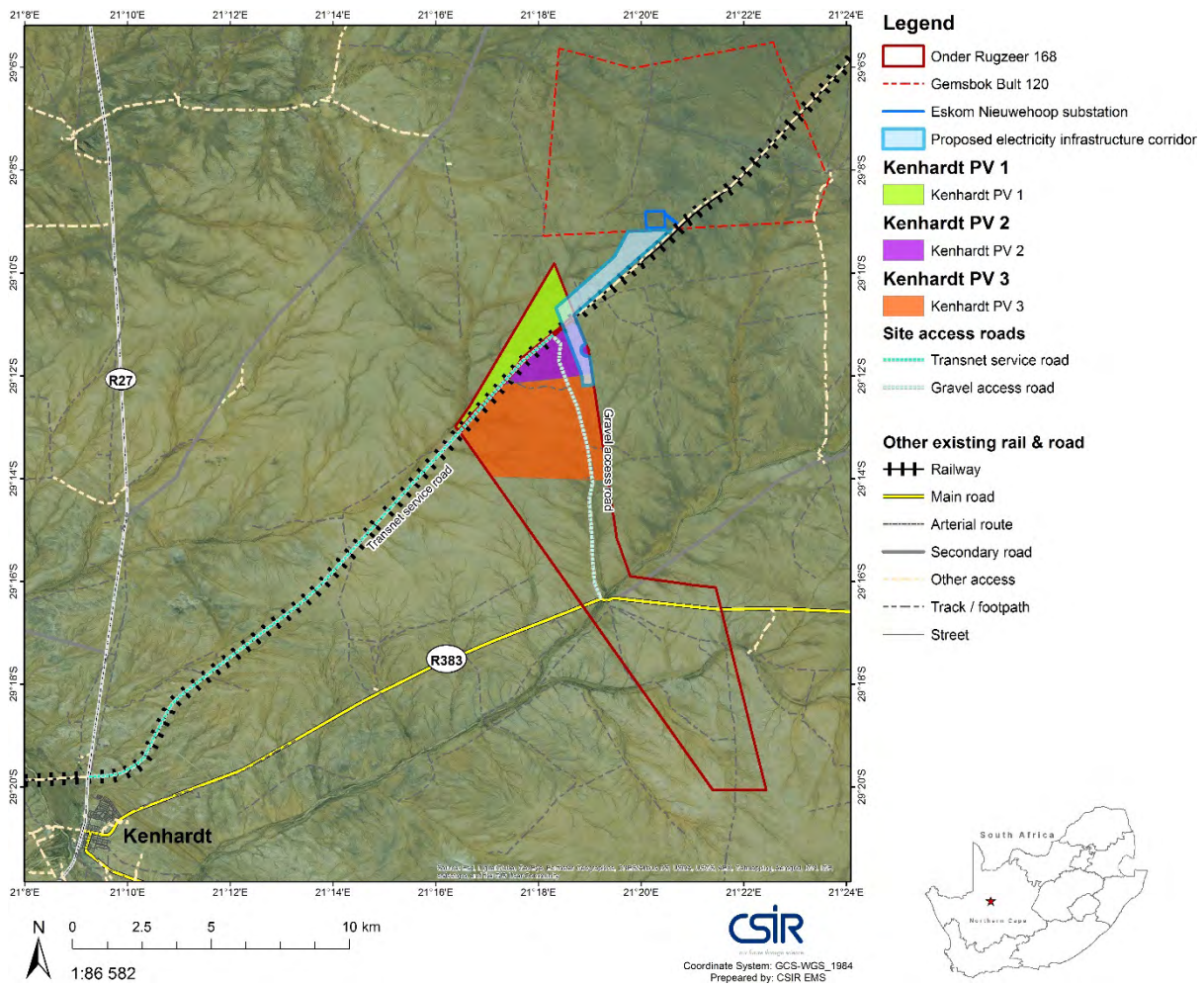


Figure 2: Map showing the location of the proposed transmission line corridor (blue) in relation to the three proposed PV facilities and the Eskom Nieuwehoop Substation.

1.1. Project Description

The following proposed transmission line and electrical infrastructure connectivity options have been considered in the BA Processes for the three transmission line projects:

- Each PV facility will be connected by a separate short 132 kV transmission line to the Eskom Nieuwehoop Substation that is currently being constructed on Farm Gembok Bult (remaining extent of Portion 3 of Farm 120); or
- Connect the Kenhardt PV 2 and Kenhardt PV 3 projects via separate 22/33 kV transmission lines to the proposed Kenhardt PV 1 on-site substation which will link via a 132 kV line to the Eskom Nieuwehoop Substation; or
- Construct one 132 kV transmission line from the Kenhardt PV 1 project to the Eskom Nieuwehoop Substation and connect the Kenhardt PV 2 and Kenhardt PV 3 facilities together via medium voltage transmission lines to either the on-site substation of Kenhardt PV 2 or PV 3, followed by the construction of one 132 kV transmission line from the on-site substation to the Eskom Nieuwehoop Substation.

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All transmission lines and connectivity options (as described above) for the Kenhardt PV 1, PV 2 and PV 3 transmission line projects will be constructed within an electrical infrastructure corridor (as shown in Figure 1), which has been assessed in this report.

The proposed transmission lines are expected to be overhead, with concrete foundations and steel tower structures. The BA Process also includes the construction of associated electrical infrastructure at the Eskom Nieuwehoop Substation (including but not limited to an additional feeder bay, Busbars, transformer bay and extension to the platform at the substation).

A detailed project description is provided in Section A of the BA Report. Any aspect of the development as proposed might have a negative impact on heritage resources and thus the entire project is relevant to the HIA.

1.2. Terms of Reference

ASHA Consulting (Pty) Ltd was requested to conduct a field study and produce a HIA that would meet the requirements of the heritage authorities.

The HIA was based on the following broad Terms of Reference:

- Describe the affected environment and determine the status quo in terms of its heritage sites, heritage features and archaeology.
- Undertake a desktop study on the archaeology, cultural landscape and heritage sites within the proposed project area. Highlight any gaps in the baseline data.
- Based on the project description, define the environmental risks to the archaeology and heritage features.
- Undertake a detailed field examination of the archaeological sites and heritage features within or in the region of the development area. Record sites of archaeological relevance (photos, maps, aerial or satellite images, Global Positioning System (GPS) co-ordinates, and stratigraphic columns).
- Provide a sensitivity map indicating the presence of sensitive areas, “no-go” areas, setbacks/buffers, as well as the identification of red flags or risks associated with heritage and archaeological impacts.
- Evaluate the potential for occurrence of archaeological features within the study area.
- Identify relevant protocols, legal and permit requirements relating to heritage and archaeological impacts likely to be generated as a result of the proposed project.
- Identify and rate potential direct, indirect and cumulative impacts of the proposed project on the archaeological heritage during the construction, operational and decommissioning phases of the project.
- Comply with the requirements of the relevant heritage authority in order to obtain a letter of approval, in terms of the National Heritage Resources Act (Act 25 of 1999).
- Compile a report providing a review of heritage resources within the study area based on the desktop study and data from fieldwork and analysis.
- Provide input to the Environmental Management Programme (EMPr), including mitigation and monitoring requirements to ensure that the impacts on the

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archaeological features and heritage features are limited. Provide recommendations and suggest appropriate mitigation measures (if required), for the recording, sampling and dating of any archaeological sites that could potentially be destroyed as a result of the proposed project.

1.3. Scope and Purpose of the Report

An HIA is a means of identifying any significant heritage resources before development begins so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue impacts to the fragile heritage of South Africa. This HIA report aims to fulfil the requirements of the heritage authorities such that a comment can be issued for consideration by the National Department of Environmental Affairs (DEA) who will review the BA and grant or withhold authorisation. The HIA report will outline any mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of authorisation should this be granted.

1.4. The Author

Dr Jayson Orton has an MA (UCT, 2004) and a D.Phil (Oxford, UK, 2013), both in archaeology, and has been conducting HIAs and archaeological specialist studies in the Western Cape and Northern Cape provinces of South Africa since 2004 (Please refer to the Curriculum Vitae included as Appendix 1 of this report). He has also conducted research on aspects of the Later Stone Age in these provinces and published widely on the topic. He is accredited with the Association of Southern African Professional Archaeologists (ASAPA) Cultural Resources Management (CRM) section (Member #233) as follows:

- Principal Investigator: Stone Age, Shell Middens & Grave Relocation; and
- Field Director: Colonial Period & Rock Art.

1.5. Declaration of Independence

The declaration of independence by the specialist is provided below with a full declaration included in Appendix 2 of this HIA Report.

DECLARATION OF INDEPENDENCE

I, Dr Jayson Orton, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed Kenhardt PV 1 – Transmission Line Project, application or appeal in respect of which I was appointed, other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.

JAYSON ORTON



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2. HERITAGE LEGISLATION AND PERMIT REQUIREMENTS

The National Heritage Resources Act (NHRA) No. 25 of 1999 protects a variety of heritage resources as follows:

- Section 34: structures older than 60 years;
- Section 35: palaeontological, prehistoric and historical material (including ruins) more than 100 years old;
- Section 36: graves and human remains older than 60 years and located outside of a formal cemetery administered by a local authority; and
- Section 37: public monuments and memorials.

Following Section 2, the definitions applicable to the above protections are as follows:

- Structures: “any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith”;
- Palaeontological material: “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”;
- Archaeological material: a) “material remains resulting from human activity 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”; b) “rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation”; c) “wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation”; and d) “features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found”;
- Grave: “means a place of interment and includes the contents, headstone or other marker of such a place and any other structure on or associated with such place”; and
- Public monuments and memorials: “all monuments and memorials a) “erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government”; or b) “which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual.”

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While landscapes with cultural significance do not have a dedicated Section in the NHRA, they are protected under the definition of the National Estate (Section 3). Section 3(2)(c) and (d) list “historical settlements and townscapes” and “landscapes and natural features of cultural significance” as part of the National Estate. Furthermore, Section 3(3) describes the reasons a place or object may have cultural heritage value; some of these speak directly to cultural landscapes.

Section 38 (2a) states that if there is reason to believe that heritage resources will be affected then an impact assessment report must be submitted. This report fulfils that requirement.

Under the National Environmental Management Act (No. 107 of 1998; NEMA), as amended, the project is subject to a BAR. Ngwao-Boswa Ya Kapa Bokoni (Heritage Northern Cape; for built environment and cultural landscapes) and the South African Heritage Resources Agency (SAHRA; for archaeology and palaeontology) are required to provide comment on the proposed project in order to facilitate final decision making by the DEA. Comments from SAHRA are included in Appendix E.3 of the finalised BA Report, with corresponding responses.

3. METHODS

3.1. Literature Survey and Information Sources

A survey of available literature was carried out to assess the general heritage context into which the development would be set. This literature included published material, unpublished commercial reports and online material, including reports sourced from the South African Heritage Resources Information System (SAHRIS). The 1:250 000 map was sourced from the Chief Directorate: National Geo-Spatial Information.

3.2. Field Survey

The corridor was surveyed in the field along with the proposed PV facilities on 28 to 31 October 2015. This was during late Spring, although in this dry area seasonality has no effect on the visibility of heritage resources – visibility was excellent. The survey sought to conduct a landscape survey where certain landscape features known to be more sensitive were located and searched. During the survey, the positions of finds were recorded on a hand-held GPS receiver set to the WGS84 datum. Photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape setting of the proposed development.

The survey was conducted by the author in the company of Mr Matthew Shaw, an archaeology Masters student.

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3.3. Impact Assessment

For consistency, the impact assessment was conducted through application of a scale supplied by the CSIR as shown in Section D of the BA Report.

3.4. Grading

Section 7 of the NHRA provides for the grading of heritage resources into those of National (Grade 1), Provincial (Grade 2) and Local (Grade 3) significance. Grading is intended to allow for the identification of the appropriate level of management for any given heritage resource. Grade 1 and 2 resources are intended to be managed by the national and provincial heritage resources authorities, while Grade 3 resources would be managed by the relevant local planning authority. These bodies are responsible for grading, but anyone may make recommendations for grading.

It is intended that the various provincial authorities formulate a system for the further detailed grading of heritage resources of local significance but this is generally yet to happen. Heritage Western Cape (2012), however, uses a system in which resources of local significance are divided into Grade 3A, 3B and 3C. These approximately equate to high, medium and medium-low local significance, while sites of low or very low significance (and generally not requiring mitigation or other interventions) are referred to as ungradeable. For convenience, the Heritage Western Cape system is employed here.

3.5. Assumptions and Limitations

The study is carried out at the surface only and hence any completely buried archaeological sites will not be readily located. Similarly, it is not always possible to determine the depth of archaeological material visible at the surface. Another limitation was introduced by a change to the project description after the fieldwork had been completed. This meant that only part of the currently proposed corridor was surveyed. Given the nature of the surface geology, and types of heritage resources typically encountered in the landscape, none of these limitations are likely to have significantly affected the outcome of the report.

With regards to cumulative impacts, various other solar energy facilities, electrical transmission lines have been proposed in the immediate area. A new substation is presently under construction, while three solar energy facilities have been granted Environmental Authorisation, although it is unknown when/if they will be built. The list of developments considered in the cumulative impact assessment is provided in Section D of the BA Report.

4. PHYSICAL ENVIRONMENTAL CONTEXT

4.1. Site Context

The site is located in a remote area some 23 km northeast of Kenhardt. It is located along the Sishen-Saldanha Railway Line and its gravel service road. Although major power lines are

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not currently present in the area, a large substation is currently under construction at the north-eastern end of the proposed electrical corridor – this is the Eskom Nieuwehoop Substation (Figure 3). Three PV facilities have already been granted authorisation in close proximity to the substation setting a precedent for electrical development in the area, although it is unknown when/if they will be built. The land is otherwise generally undeveloped and used for small stock grazing. Farm tracks and fences criss-cross the general area and occasional wind pumps occur.



Figure 3: View towards the northeast of the Eskom Nieuwehoop Substation currently under construction at the northern end of the electrical corridor.

4.2. Site Description

The site is generally quite flat with occasional very low rocky outcrops. The vegetation is sparse and largely less than knee-high; trees are rare. The surface is coated mostly with fine gravel which is a product of the weathering bedrock. Very ephemeral stream beds cross the site, but these are generally only evident because of the elevated vegetation density and slightly larger bushes along their alignments. Figures 4 to 6 show examples of the landscape in the broader study area as seen on the remainder of Onder Rugzeer Farm 168.



Figure 4: View of an ephemeral stream bed with its slightly elevated vegetation density.

5. CULTURAL HERITAGE CONTEXT

This section of the HIA contains the desktop study and establishes what is already known about heritage resources in the vicinity of the study area. What was found during the field

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survey as presented below may then be compared with what is already known in order to gain an improved understanding of the significance of the newly reported resources.



Figure 5: Example of overgrazed land with very sparse vegetation.

Figure 6: Example of gravel surface and one of the few trees in the study area.

5.1. Archaeological Aspects

Bushmanland is well known for the vast expanses of gravel that occur in places and which frequently contain stone artefacts in varying densities (Beaumont *et. al* 1995). Such material is referred to as 'background scatter' and is invariably of very limited significance. At times, however, the scatter can become very dense and mitigation work is occasionally called for. The artefacts located in these contexts are largely Early Stone Age (ESA) and Middle Stone Age (MSA) and are not associated with any other archaeological materials – these would have long since decomposed and disappeared. Previous experience immediately east of the present site suggests that such dense accumulations of artefacts are unlikely to occur in this area.

Of potentially more significance, however, are Later Stone Age (LSA) sites which are commonly located along the margins of water features in Bushmanland. These features include both pans and ephemeral drainage lines. Such sites were identified to the east of the present study area in association with pans but artefact scatters associated with drainage lines were rare (Orton 2014a, 2014b, 2014c). The drainage lines on the present site, however, are more prominent and perhaps more likely to reveal LSA camp sites. These sites would typically contain mostly stone artefacts, but fragments of ostrich eggshell (used as water containers and also as a food source) and pottery are also found at times, while bone is rare and likely confined to sites that are very recent. Similar LSA sites can also be found in association with rocky outcrops but none appear to occur within the present study area. Because of their positions along water courses and adjacent to rocky areas, such sites are often avoided by development proposals because of the need to avoid the relevant natural features. Despite the increased likelihood of locating archaeology along streams, Morris (2009) noted that a search along the banks of the Hartebeest River close to Kenhardt, where he expected elevated frequencies of archaeological material, revealed virtually nothing.

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Another kind of archaeological site fairly commonly encountered in Bushmanland is small rock outcrops that have been quarried as a source of stone material for making stone tools. Several such occurrences were noted to the east where quartz outcrops were frequently flaked (Orton 2014a, 2014b, 2014c).

Rock engravings are known from the broader area (Louw Roux Bushmanland 2013). From the limited information available, these appear to be naturalistic images produced by the Bushmen. Geometric images, produced by the Khoekhoen, are not well known from the area (Orton 2013), although David Morris (pers. comm. 2015) has seen examples in the region. Painted art is also very rare but again, examples are known, particularly on large granite boulders.

5.2. Historical Aspects

The Anglo-Boer War was fought across the Northern Cape, but information on the role of Kenhardt appears difficult to locate. The town was occupied by the Boers in late February 1900 after they convinced the magistrate that they had a large gun and would fire on the town if it did not surrender. They later surrendered to the British who occupied the town on 31st March 1900. By mid-1900 there were perhaps 100 Cape Rebels detained in a camp outside of Kenhardt (Grobler 2004). The British raised a local force known as the Border Scouts in Upington in May 1900. Many were mixed-race individuals, some local farmers, others Kalahari hunters, but all disliked the Boers. The scouts were responsible for a large area of the north-western Cape Colony centred on Upington and Kenhardt. They eventually numbered 786 by January 1901 and were under the command of Major John Birbeck (AngloBoerWar.com 2015; Rodgers 2011). At the beginning of 1902 there were 150 Border Scouts stationed at Kenhardt. Two boers, H.L. Jacobs and A.C. Jooste, were accused of treason and executed in the town on 24 July 1901 (Grobler 2004). A memorial stands there to their honour (Green Kalahari n.d.).

No major action appears to have taken place around Kenhardt, although the Boers are known to have attacked a patrol on 17th May 1901, while the British attacked a Boer position on 25th June 1901 (AngloBoerWar.com 2015).

5.3. Built Environment

The built environment is sparsely represented in Bushmanland because the farms tend to be so large. The vast majority of structures appear to be quite recent in age (20th century) and are of very limited heritage significance. In any case, the development will not affect any buildings.

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5.4. Graves

Graves are also very rare. Some older farms may have small graveyards located close to their farm buildings but, again, these are highly unlikely to be included within the areas proposed for development. Unmarked pre-colonial graves can, in theory, be located anywhere, although they are generally more common in sandy areas where excavation of graves was easier and in more productive areas where population densities would have been higher. It is highly unlikely that pre-colonial graves would be encountered in the study area.

5.5. Other Aspects

The cultural and natural landscape is also of concern. However, the cultural landscape is very poorly developed in this area with fences, water troughs and wind pumps being the primary features. The natural landscape lacks visually interesting and sensitive features. In addition, the proposed site is a long distance from any important roads (it is 11 km from the R27) and is highly unlikely to be visible to anyone other than local residents making use of the gravel road along the railway line. Solar PV facilities are not very tall and, if an earthy coloured paint is used for the buildings, they can be almost invisible from as little as 1 km away.

6. IDENTIFICATION OF KEY ISSUES

6.1. Key Issues Identified

Only one potentially significant heritage issue was identified prior to commencement of the BA Process. This was:

- The potential damage to or destruction of Stone Age archaeological sites occurring in proximity to water courses and pans.

The following comment was also received from the SAHRA on 22 September 2015 (via SAHRIS) based on the review of the Background Information Document. It is important to note that only the points relating to Archaeology and Heritage aspects have been extracted from the SAHRA comment and noted below:

In terms of the National Heritage Resources Act, no 25 of 1999, heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years, structures older than 60 years are protected. They may not be disturbed without a permit from the relevant heritage resources authority. This means that prior to development it is incumbent on the developer to ensure that a Heritage Impact Assessment is done. This must include the archaeological component (Phase 1) and any other applicable heritage components. Appropriate (Phase 2) mitigation, which involves recording, sampling and dating sites that are to be destroyed, must be done as required.

The quickest process to follow for the archaeological component is to contract an accredited specialist (see the web site of the Association of Southern African Professional Archaeologists www.asapa.org.za) to

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provide a Phase 1 Archaeological Impact Assessment Report. This must be done before any large development takes place.

The Phase 1 Impact Assessment Report will identify the archaeological sites and assess their significance. It should also make recommendations (as indicated in section 38) about the process to be followed. For example, there may need to be a mitigation phase (Phase 2) where the specialist will collect or excavate material and date the site. At the end of the process the heritage authority may give permission for destruction of the sites.

Any other heritage resources that may be impacted such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewsapes must also be assessed.

The present HIA meets the requirements of SAHRA in that it aims to satisfy Section 38(3) of the NHRA, the author is an appropriately accredited CRM Section member of ASAPA and recommendations for further studies as may be required are presented.

Additional comments from SAHRA were received on 5 April 2016 during the 30-day review of the BA (and EIA) Reports via SAHRIS. Responses to these comments are included in Appendix E.3 of the finalised BA Report.

6.2. Sensitivity of the site in relation to proposed activity

The broader site is sensitive for the many archaeological artefacts and sites on its surface that could be damaged or destroyed through construction related activities. These include site preparation and all works related to installation of the project components.

6.3. Identification of Potential Impacts

The potential impacts identified during the BA are:

6.3.1. Construction Phase

- Damage to or destruction of archaeological resources and graves; and
- Impacts to the cultural and natural landscape.

6.3.2. Operational Phase

- Impacts to the cultural and natural landscape

6.3.3. Decommissioning Phase

- Impacts to the cultural and natural landscape

6.3.4. Cumulative Impacts

- Damage to or destruction of archaeological resources and graves; and
- Impacts to the cultural and natural landscape.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

7. FINDINGS OF THE HERITAGE STUDY

Heritage resources were found to be very sparsely distributed across the broader landscape and only two areas (neither of which were actually covered by the survey) are likely to be sensitive. The first is the rocky koppie that occurs on the eastern margin of the corridor near its southern end (Figure 7). Fieldwork for another project nearby revealed the presence of Stone Age scatters, a possible grave and a few low stone-built structures on the eastern side of the koppie and which have low-medium heritage significance (Orton 2016). The second area is the small pan that occurs close to the Nieuwehoop Substation at the northern end of the transmission corridor, although just outside its mapped extent. It is generally the case that Stone Age artefacts scatters occur around the vast majority of water sources in the area. Isolated artefacts attributable to the background scatter will also be present but are of no concern. Figure 8 shows the location of the two sensitive landscape features.

The only other heritage resource is the cultural landscape which, in this area, is weakly developed. Because of the other infrastructure already present in the area (substation, railway line), it is already compromised and will not be significantly impacted.



Figure 7: View of the rocky koppie as seen from the northeast.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

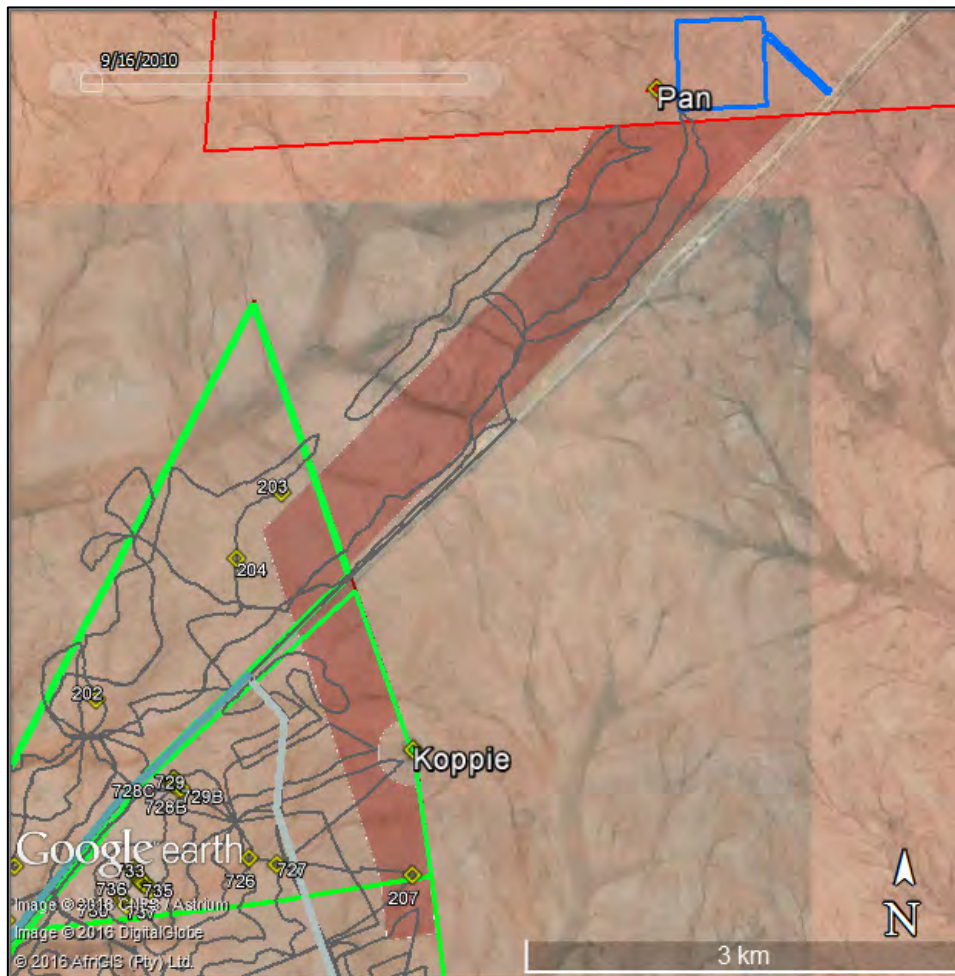


Figure 8: Aerial view of the study area showing the locations of the proposed transmission corridor (shaded red), the finds in the broader area and GPS tracks (grey lines). The green lines show the proposed PV facilities and the blue square the Eskom Nieuwehoop Substation. The pan and koppie of concern are indicated.

7.1. Statement of Significance

Section 38(3)(b) of the NHRA requires an assessment of the significance of all heritage resources. In terms of Section 2(vi), “cultural significance” means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

Although no archaeological resources were recorded in the areas of the corridor surveyed, it is anticipated that resources of low-medium significance for their scientific value will likely be present around the pan and on the rocky koppie. The landscape has low significance for its aesthetic value.

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7.2. Summary of Heritage Indicators and Provisional Grading

No significant heritage resources were recorded along the proposed corridor route but it is anticipated that any that may occur in association with the pan or koppie will not be worth anything more than a provisional 3C grading (i.e. medium-low local significance).

8. ASSESSMENT OF IMPACTS AND IDENTIFICATION OF MANAGEMENT ACTIONS

8.1. Damage to and Destruction of Archaeological Resources and Graves (Construction Phase)

Although no such resources were recorded during the survey, this assessment assumes that resources would be present at the pan and koppie. The potential impact of damage to and destruction of archaeological resources and graves is predicted to be a negative, direct impact. The impact is rated with a site specific spatial extent and a permanent duration. The consequence for graves would be extreme, while for archaeology it would be moderate. Because power lines have such a small surface footprint, the probability of any impact is rated as extremely unlikely (although note that the probability relates to the probability of impacting significant archaeological resources since it is guaranteed that at least some archaeological resources (isolated artefacts) will be directly impacted). The reversibility of the impact and irreplaceability of the resource are respectively rated as non-reversible and high.

Although no archaeological sites or graves were noted along the proposed transmission line corridor, it is possible that sites in surrounding areas could be disturbed during the construction phase if vehicles do not remain within the construction footprint. Archaeological mitigation is not suggested but all activities and vehicles should be confined to the approved footprint so as to minimise impacts to heritage resources in surrounding areas. The significance of the potential impact is expected to be very low (without the implementation of mitigation measures).

8.2. Impacts to the Natural and Cultural Landscape (Construction, Operational and Decommissioning Phases)

The impact of the proposed project on the natural and cultural landscape is expected to occur during the construction, operational and decommissioning phases. These potential impacts are predicted to be negative and direct, with a local spatial extent, and a long-term duration for the construction and operational phases and a short-term duration for the decommissioning phase. The consequence and probability of the impact are respectively rated as slight and very likely. The reversibility of the impact and irreplaceability of the resource are respectively rated as high and moderate for the construction, operational and decommissioning phases.

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The addition of new transmission lines (and associated structures) to the landscape will alter its character from a rural landscape to one more strongly characterized by electrical infrastructure. Given that the precedent has already been set for electrical development, the significance of the potential impact is considered to be very low (without the implementation of mitigation measures). No mitigation is suggested.

8.3. Cumulative Impacts to Archaeological Resources and Graves

All the electrical development in the area will result in many archaeological artefacts and sites and possibly some graves being disturbed and /or destroyed over a wide area. Few of the sites recorded in the region have high cultural significance and it is likely that the vast majority of those that do would be protected from harm because of their proximity to water courses and pans. The locations of graves cannot be predicted and they are difficult to assess. As such, because graves can be very difficult to identify and many may well continue to exist beneath any developments, it is difficult to evaluate any cumulative impacts. The nature of graves as individual and generally isolated heritage resources is such that, although each is significant, the disturbance of multiple examples will not result in a significant cumulative impact. The potential negative cumulative impacts on archaeological resources and graves would occur at a site specific level and would be permanent in duration.

Because no sites of high archaeological significance or graves were found within the present study area, the cumulative impact consequence is rated as moderate with the probability of impacts being extremely unlikely (for the destruction of archaeological resources) and extreme and extremely unlikely (for the destruction of graves). These combine to provide a significance rating of very low for this project (without the implementation of mitigation measures – none have been recommended). The impacts are irreversible and the irreplaceability of archaeological resources and graves is high.

8.4. Cumulative Impacts to the Natural and Cultural Landscape

Given the large amount of other electrical infrastructure planned for the area, the addition of this relatively short transmission line is not expected to make any significant contribution to the cumulative impacts on the landscape. The potential impact is rated with a local spatial extent and a long-term duration. The consequence and probability of the impact are respectively rated as slight and very likely. The reversibility of the impact and irreplaceability of the resource are respectively rated as high and moderate. The impact significance is rated as being very low and no mitigation is suggested.

9. IMPACT ASSESSMENT SUMMARY

The assessment of potential impacts and recommendation of mitigation measures as discussed above are collated in Tables 1 to 4 below. Note that indirect impacts are not assessed because the nature of the identified heritage resources is such that significant indirect impacts are highly unlikely to occur.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

Table 1 Impact assessment summary table for the Construction Phase

Construction Phase													
Direct Impacts													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Construction of the proposed power lines	Destruction of archaeological resources	Negative	Site	Permanent	Moderate	Extremely unlikely	Non-reversible	High	Vehicles to remain within construction corridor	Very low	Very low	5	High
Construction of the proposed power lines	Destruction of graves	Negative	Site	Permanent	Extreme	Extremely unlikely	Non-reversible	High	Vehicles to remain within construction corridor	Very low	Very low	5	High
Construction of the proposed power lines	Impacts to the natural and cultural landscape	Negative	Local	Long term	Slight	Very likely	High	Moderate	None	Very low	Very low	5	High

Table 2 Impact assessment summary table for the Operational Phase

Operational Phase													
Direct Impacts													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Construction of the proposed power lines	Impacts to the natural and cultural landscape	Negative	Local	Long term	Slight	Very likely	High	Moderate	None	Very low	Very low	5	High

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

Table 3 Impact assessment summary table for the Decommissioning Phase

Decommissioning Phase													
Direct Impacts													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
The presence of construction vehicles	Impacts to the natural and cultural landscape	Negative	Local	Short term	Slight	Very likely	High	Moderate	None	Very low	Very low	5	High

Table 4 Cumulative impact assessment summary table

Cumulative Impacts													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Construction of the proposed power lines	Destruction of archaeological resources	Negative	Site	Permanent	Moderate	Extremely unlikely	Non- reversible	High	None	Very low	Very low	5	High
Construction of the proposed power lines	Destruction of graves	Negative	Site	Permanent	Extreme	Extremely unlikely	Non- reversible	High	None	Very low	Very low	5	High
Construction of the proposed power lines	Impacts to the natural and cultural landscape	Negative	Local	Long term	Slight	Very likely	High	Moderate	None	Very low	Very low	5	High

SECTION F: APPENDICES

10. PERMIT REQUIREMENTS

The NHRA does not require the developer to obtain permits prior to construction. However, any archaeological mitigation work (i.e. test excavations, sampling etc.) that may be required (in the event of archaeological resources of significance being found within the development footprint during construction) would need to be conducted under a permit issued to, and in the name of, the appointed archaeologist. The permit application process allows the heritage authorities to ensure that a suitably qualified and experienced archaeologist undertakes the work and that the proposed excavation/sampling methodology is acceptable.

11. INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAMME

11.1. For inclusion in the EMPr

The pan and koppie should be excluded from physical impacts and cordoned off to protect any heritage resources that might be present as shown in Figure 9. Suggested buffers are 75 m radius from the centre of the pan and 120 m radius from the summit of the koppie.

The Environmental Control Officer (ECO) (or Environmental Officer) should meet with workers on site at the start of the construction phase to explain the possibility that graves might be present. During construction all personnel should be vigilant for any unusual stone features and these should be reported to the ECO who should then report the find(s) to an archaeologist.

It should be ensured that all vehicles and construction activities are restricted to within the approved footprint in order to minimise the chances of impacts to other heritage resources located outside of the transmission corridor.

11.2. For inclusion in the Environmental Authorisation

The following points should be included as conditions of authorisation:

- The pan and koppie should be avoided with buffers of 75 m from the centre of the pan and 120 m from the summit of the koppie;
- The construction crew should be informed of the possibility of encountering graves and should be encouraged to report any suspicious-looking stone features prior to disturbance; and
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

SECTION F: APPENDICES

Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

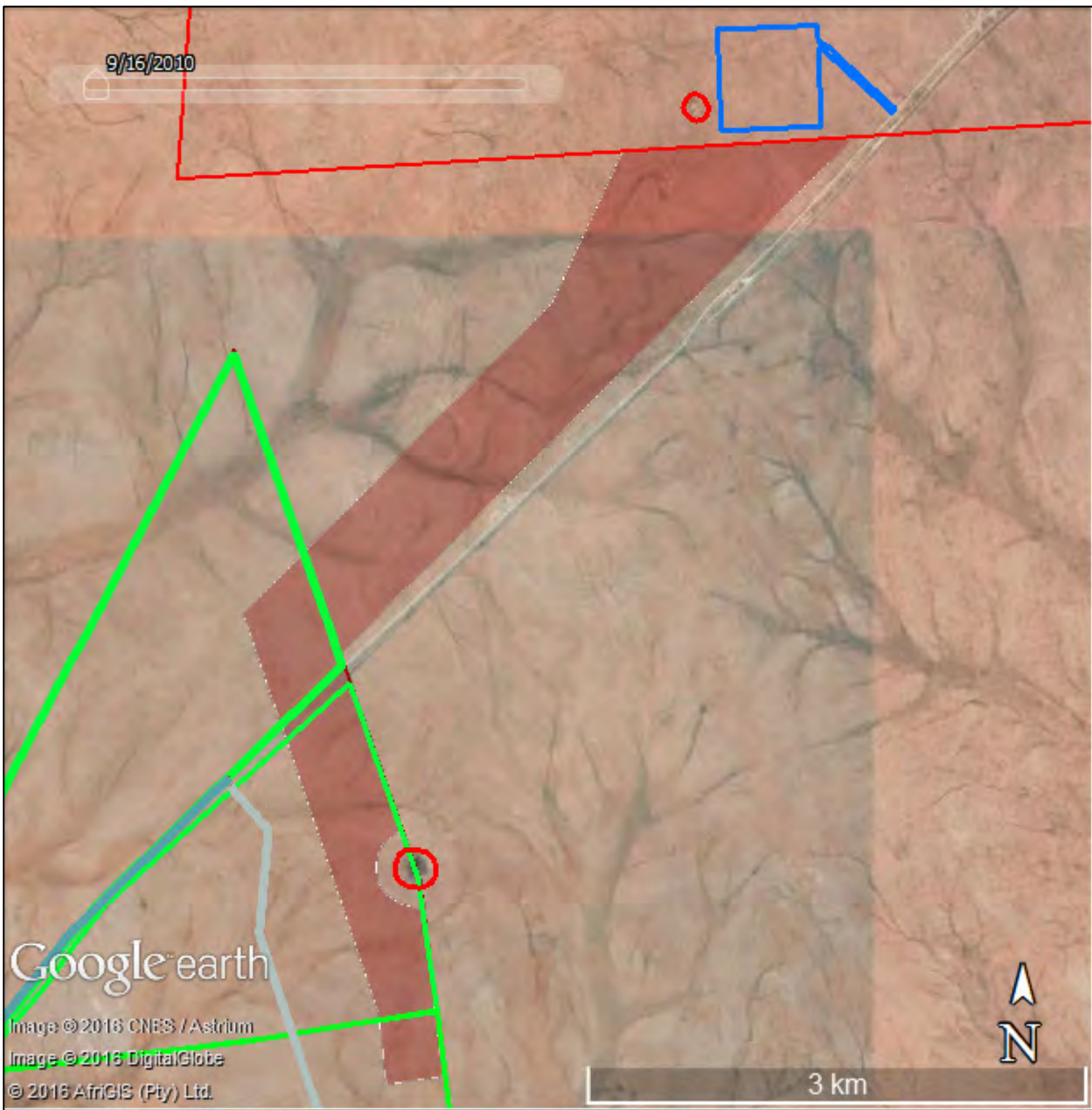


Figure 9: Aerial view of the study area showing the two areas to be avoided (red circles) in relation to the proposed transmission line corridor (shaded red).

12. CONCLUSIONS

So long as the buffers around the pan and the koppie are respected, no significant impacts to heritage resources are expected from the proposed electrical infrastructure in its presently proposed corridor and no archaeological mitigation is suggested. There is therefore no heritage-related reason to not authorise the project.

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13. RECOMMENDATIONS

The proposed project should be allowed to proceed but subject to the following conditions:

- The pan and koppie should be avoided with buffers of 75 m from the centre of the pan and 120 m from the summit of the koppie;
- The construction crew should be informed of the possibility of encountering graves and should be encouraged to report any suspicious-looking stone features prior to disturbance; and
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

14. REFERENCES

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

15. APPENDIX 1 – Curriculum Vitae



Curriculum Vitae

Jayson David John Orton

ARCHAEOLOGIST AND HERITAGE CONSULTANT

Contact Details and personal information:

Address: 6A Scarborough Road, Muizenberg, 7945
Telephone: (021) 788 8425
Cell Phone: 083 272 3225
Email: jayson@asha-consulting.co.za

Birth date and place: 22 June 1976, Cape Town, South Africa
Citizenship: South African
ID no: 760622 522 4085
Driver's License: Code 08
Marital Status: Married to Carol Orton
Languages spoken: English and Afrikaans

Education:

SA College High School	Matric	1994
University of Cape Town	B.A. (Archaeology, Environmental & Geographical Science)	1997
University of Cape Town	B.A. (Honours) (Archaeology)*	1998
University of Cape Town	M.A. (Archaeology)	2004
University of Oxford	D.Phil. (Archaeology)	2013

*Frank Schweitzer memorial book prize for an outstanding student and the degree in the First Class.

Employment History:

Spatial Archaeology Research Unit, UCT	Research assistant	Jan 1996 – Dec 1998
Department of Archaeology, UCT	Field archaeologist	Jan 1998 – Dec 1998
UCT Archaeology Contracts Office	Field archaeologist	Jan 1999 – May 2004
UCT Archaeology Contracts Office	Heritage & archaeological consultant	Jun 2004 – May 2012
School of Archaeology, University of Oxford	Undergraduate Tutor	Oct 2008 – Dec 2008
ACO Associates cc	Associate, Heritage & archaeological consultant	Jan 2011 – Dec 2013
ASHA Consulting (Pty) Ltd	Director, Heritage & archaeological consultant	Jan 2014 –

Memberships and affiliations:

South African Archaeological Society Council member	2004 –
Assoc. Southern African Professional Archaeologists (ASAPA) member	2006 –
ASAPA Cultural Resources Management Section member	2007 –
UCT Department of Archaeology Research Associate	2013 –
Heritage Western Cape APM Committee member	2013 –
UNISA Department of Archaeology and Anthropology Research Fellow	2014 –
Fish Hoek Valley Historical Association	2014 –

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

Professional Accreditation:

ASAPA membership number: 233, CRM Section member
Principal Investigator: Coastal shell middens (awarded 2007)
Stone Age archaeology (awarded 2007)
Grave relocation (awarded 2014)
Field Director: Rock art (awarded 2007)
Colonial period archaeology (awarded 2007)

Fieldwork and project experience:

Extensive fieldwork as both Field Director and Principle Investigator throughout the Western and Northern Cape, and also in the western parts of the Free State and Eastern Cape as follows:

Phase 1 surveys and impact assessments:

- Project types
 - Notification of Intent to Develop applications (for Heritage Western Cape)
 - Heritage Impact Assessments (largely in the Environmental Impact Assessment or Basic Assessment context under NEMA and Section 38(8) of the NHRA, but also self-standing assessments under Section 38(1) of the NHRA)
 - Archaeological specialist studies
 - Phase 1 test excavations in historical and prehistoric sites
 - Archaeological research projects
- Development types
 - Mining and borrow pits
 - Roads (new and upgrades)
 - Residential, commercial and industrial development
 - Dams and pipe lines
 - Power lines and substations
 - Renewable energy facilities (wind energy, solar energy and hydro-electric facilities)

Phase 2 mitigation and research excavations:

- ESA open sites
 - Duinefontein, Gouda
- MSA rock shelters
 - Fish Hoek, Yzerfontein, Cederberg, Namaqualand
- MSA open sites
 - Swartland, Bushmanland, Namaqualand
- LSA rock shelters
 - Cederberg, Namaqualand, Bushmanland
- LSA open sites (inland)
 - Swartland, Franschhoek, Namaqualand, Bushmanland
- LSA coastal shell middens
 - Melkbosstrand, Yzerfontein, Saldanha Bay, Paternoster, Dwarskersbos, Infanta, Knysna, Namaqualand
- LSA burials
 - Melkbosstrand, Saldanha Bay, Namaqualand, Knysna
- Historical sites
 - Franschhoek (farmstead and well), Waterfront (fort, dump and well), Noordhoek (cottage), variety of small excavations in central Cape Town and surrounding suburbs
- Historic burial grounds
 - Green Point (Prestwich Street), V&A Waterfront (Marina Residential), Paarl

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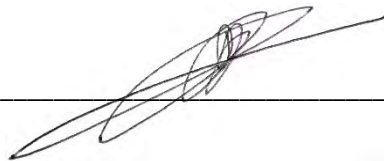
Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

APPENDIX 2 - Specialist Declaration

I, Jayson Orton, as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that I:

- I act as the independent specialist in this application;
- I perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I have no vested interest in the proposed activity proceeding;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist: _____



Name of Specialist: JAYSON ORTON

Date: 01 FEBRUARY 2016

BASIC ASSESSMENT REPORT

Appendix D.4: Desktop Palaeontological Impact Assessment

PALAEONTOLOGICAL IMPACT ASSESSMENT:

**Basic Assessment for the proposed transmission
lines connecting the Kenhardt Solar Photovoltaic
Facilities PV 1, PV 2 and PV 3 on Onder Rugzeer
Farm 168 to the Nieuwehoop Substation on
Gemsbok Bult 120, north-east of Kenhardt, Northern
Cape Province**

Report prepared for:

CSIR – Environmental Management Services

P O Box 17001

Congella, Durban, 4013

South Africa

Report prepared by:

Dr John Almond - Natura Viva cc

P.O. Box 12410

Mill Street, Cape Town, 8010

South Africa

June 2016

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

SPECIALIST EXPERTISE

Dr John Almond has an Honours Degree in Natural Sciences (Zoology) as well as a PhD in Palaeontology from the University of Cambridge, UK. He has been awarded post-doctoral research fellowships at Cambridge University and in Germany, and has carried out palaeontological research in Europe, North America, the Middle East as well as North and South Africa and Madagascar. For eight years he was a scientific officer (palaeontologist) for the Geological Survey / Council for Geoscience in the RSA. His current palaeontological research focuses on fossil record of the Precambrian - Cambrian boundary and the Cape Supergroup of South Africa. He has recently written palaeontological reviews for several 1: 250 000 geological maps published by the Council for Geoscience and has contributed educational material on fossils and evolution for new school textbooks in the RSA.

Since 2002 Dr Almond has also carried out numerous palaeontological impact assessments for developments and conservation areas in the Western, Eastern and Northern Cape, Free State, Northwest, Mpumalanga and Gauteng under the aegis of his Cape Town-based company *Natura Viva* cc. He was a long-standing member of the Archaeology, Palaeontology and Meteorites Committee for Heritage Western Cape (HWC) and an advisor on palaeontological conservation and management issues for the Palaeontological Society of South Africa (PSSA), HWC and SAHRA. He is currently compiling technical reports on the provincial palaeontological heritage of Western, Northern and Eastern Cape for SAHRA and HWC. Dr Almond is an accredited member of PSSA and APHAP (Association of Professional Heritage Assessment Practitioners – Western Cape).

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

SPECIALIST DECLARATION

I, Dr John Edward Almond, as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that I:

- I act as the independent specialist in this application;
- I perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I have no vested interest in the proposed activity proceeding;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realize that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:



Name of Specialist: Dr John Edward Almond

Date: 29 January 2016

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

EXECUTIVE SUMMARY

Scatec Solar SA 330, 350 and 370 (PTY) Ltd is proposing to develop three 75 MW Solar Photovoltaic (PV) Facilities (i.e. Kenhardt PV 1, PV 2 and PV 3) on the remaining extent of Onder Rugzeer Farm 168, situated c. 20 km north-east of Kenhardt, Northern Cape. The associated electrical infrastructure (i.e. transmission lines) that will support the Kenhardt PV Facilities are being assessed as part of a Basic Assessment Process. The following proposed transmission line and electrical infrastructure connectivity options have been considered in the Basic Assessment Process:

- Each PV facility will be connected by a separate short 132 kV transmission line to the Eskom Nieuwehoop Substation that is currently being constructed on Farm Gemsbok Bult (remaining extent of Portion 3 of Farm 120); or
- Connect the Kenhardt PV 2 and Kenhardt PV 3 projects via separate 22/33 kV transmission lines to the proposed Kenhardt PV 1 on-site substation which will link via a 132 kV line to the Eskom Nieuwehoop Substation; or
- Construct one 132 kV transmission line from the Kenhardt PV 1 project to the Eskom Nieuwehoop Substation and connect the Kenhardt PV 2 and Kenhardt PV 3 facilities together via medium voltage transmission lines to either the on-site substation of Kenhardt PV 2 or PV 3, followed by the construction of one 132 kV transmission line from the on-site substation to the Eskom Nieuwehoop Substation.

The above connectivity options occur within an electrical infrastructure corridor.

This present report provides a Palaeontological Impact Assessment of each of the proposed new transmission lines (to support each proposed Kenhardt PV facility), as part of the required Basic Assessment Process.

The corridor for the proposed 132 kV and 33 kV/22 kV transmission lines are underlain at depth by Precambrian basement rocks (c. 1-2 billion years old) assigned to the Namaqua-Natal Province. These ancient igneous and high-grade metamorphic rocks - mainly granites and gneisses of the Keimoes Suite and Jacomynspan Group - crop out at surface in small areas and are entirely unfossiliferous. A large proportion of the basement rocks are mantled by a range of superficial sediments of Late Caenozoic age that may contain sparse fossil remains. These predominantly thin, unconsolidated deposits include small patches of calcretes, gravelly to sandy river alluvium, pan sediments, surface gravels, colluvium (scree) as well as Pleistocene to Recent wind-blown sands of the Gordonia Formation (Kalahari Group). Most of these younger rock units are of widespread occurrence and low palaeontological sensitivity. Scientifically important vertebrate fossil remains (e.g. Pleistocene mammalian bones and teeth) have been recorded within older stratified pan and river sediments elsewhere in the Bushmanland region where they are often associated with stone artefacts, while a limited range of trace fossils (e.g. plant root casts, termitaria and other invertebrate burrows) may be found within calcrete horizons.

No previously recorded areas or sites of exceptional fossil heritage sensitivity or significance have been identified within the Kenhardt PV project area as a whole, including the transmission line corridor. Due to (1) the inferred scarcity of scientifically important fossil remains within the study areas, as well as (2) the small scale of excavations for electrical pylon footings concerned, the overall impact significance of the construction phase of each of the transmission lines is assessed as VERY LOW (before and after mitigation). This applies equally to all 132 kV and 33 kV/22 kV transmission lines under consideration. No significant

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impacts on fossil heritage are anticipated during the operational and decommissioning phases of the proposed transmission lines. The potentially fossiliferous sedimentary rock units represented within the study area (e.g. Gordonian aeolian sands, calcrete) are of widespread occurrence and this is also likely to apply to most of the fossils they contain. It is concluded that the cumulative impacts on fossil heritage resource posed by the transmission lines/corridor, in the context of several alternative energy and other infrastructural developments planned in the region (as explained in the BA Report), is of very low significance. There are no fatal flaws in the proposed developments, nor are there objections to their authorisation as far as fossil heritage conservation is concerned, since significant impacts on scientifically valuable fossils or fossil sites are not anticipated here. The no-go option (no transmission lines) will have a neutral impact on local palaeontological heritage resources. The only proposed condition to accompany environmental authorisation is that the recommendations for monitoring and mitigation included in the EMP are fully complied with.

Given the low palaeontological sensitivity of the eastern Bushmanland region, as determined from desktop and field-based studies, as well as the inferred very low impact significance of the proposed 132 kV and 33 kV/22 kV transmission lines for fossil heritage conservation, no specialist palaeontological monitoring or mitigation is recommended here, pending the discovery of substantial new fossil remains during construction. During the construction phase all substantial bedrock excavations should be monitored for fossil material by the responsible Environmental Control Officer. Should significant fossil remains - such as vertebrate bones and teeth, plant-rich fossil lenses, petrified wood or dense fossil burrow assemblages - be exposed during construction, the responsible Environmental Control Officer should safeguard these, preferably *in situ*. The South African Heritage Resources Authority (SAHRA), should be alerted as soon as possible (Contact details: Mrs Colette Scheermeyer, P.O. Box 4637, Cape Town 8000, Tel: 021 462 4502, Email: cscheermeyer@sahra.org.za), so that appropriate action can be taken by a professional palaeontologist, at the developer's expense. Mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as associated geological data (e.g. stratigraphy, sedimentology, taphonomy) by a professional palaeontologist. The palaeontologist concerned with mitigation work will need a valid fossil collection permit from SAHRA and any material collected would have to be curated in an approved depository (e.g. museum or university collection). These recommendations should be included within the Environmental Management Programmes for the proposed transmission line developments.

For the purposes of this report the entire proposed transmission line corridor was assessed from a palaeontological impact point of view. The applicant is free to select any area within the surveyed area (i.e. the corridor) to construct the transmission lines, provided that the recommended mitigation measures are implemented as applicable.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

COMPLIANCE WITH THE APPENDIX 6 OF THE 2014 EIA REGULATIONS

Requirements of Appendix 6 – GN R982	Addressed in the Specialist Report
1. (1) A specialist report prepared in terms of these Regulations must contain-	
a) details of- <ul style="list-style-type: none"> i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae; 	Preliminary Section of this Report
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix I of the BA Report, Preliminary Section of this Report and Section 1.1.6 of this Report
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Not Applicable
e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	Section 1.1
f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	Section 1.3
g) an identification of any areas to be avoided, including buffers;	Not Applicable
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 1.3
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.1.4
j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	Sections 1.5, 1.6, 1.7 and 1.8
k) any mitigation measures for inclusion in the EMPr;	Section 1.7 and Section 1.8
l) any conditions for inclusion in the environmental authorisation;	Not applicable
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 1.8
n) a reasoned opinion- <ul style="list-style-type: none"> i. as to whether the proposed activity or portions thereof should be authorised; and ii. if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan; 	Section 1.9
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	Not Applicable
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Section 1.5.1
q) any other information requested by the competent authority.	Not applicable

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LIST OF ABBREVIATIONS

DEA	Department of Environmental Affairs
EIA	Environmental Impact Assessment
PIA	Palaeontological Impact Assessment
SAHRA	South African Heritage Resources Agency
Ma / mya	Million years ago

GLOSSARY

Definitions	
<i>Basement Rocks</i>	Ancient igneous and metamorphic rocks (usually unfossiliferous) underlying the sedimentary cover rocks in a given region
<i>Calcrete</i>	Pedogenic limestone (<i>i.e.</i> limestone generated by soil processes within soils and surface rock debris), generally associated with seasonally arid climates.
<i>Fossiliferous</i>	Containing fossil remains
<i>Igneous Rocks</i>	Rocks that have crystallised from a molten state (magma / lava); <i>e.g.</i> granite.
<i>Metamorphic</i>	Rocks that have recrystallized under conditions of altered (usually highly elevated) temperature and pressure; <i>e.g.</i> gneiss.
<i>Precambrian</i>	Older than 541 million years old (mya).
<i>Pleistocene Epoch</i>	Time period between <i>c.</i> 2.6 mya and 10 000 years ago (associated with a series of major glaciations in the northern hemisphere).

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

PALAEONTOLOGICAL IMPACT ASSESSMENT

This report presents the findings of the Palaeontological Impact Assessment that was prepared by Dr. John Almond (of Natura Viva cc) as part of the Basic Assessment (BA) for the proposed Kenhardt PV 1 – Transmission Line, Kenhardt PV 2 – Transmission Line and Kenhardt PV 3 – Transmission Line projects within the Northern Cape Province.

1.1 INTRODUCTION AND METHODOLOGY

1.1.1 *Scope and Objectives*

The proposed 132 kV and 33 kV/22 kV transmission line connections for the proposed Kenhardt PV 1, Kenhardt PV 2 and Kenhardt PV 3 75 MW Solar Photovoltaic (PV) Facility projects overlie potentially fossiliferous sedimentary rocks. A desktop Palaeontological Impact Assessment - or at least a letter of exemption from a palaeontologist to indicate that this is unnecessary – has been requested by the South African Heritage Resources Agency (SAHRA) Archaeology, Palaeontology and Meteorites Unit for the three proposed PV developments and the associated electrical infrastructure (Case IDs: 8204, 8205 and 8206 letters of September 22, 2015; Case Numbers for the transmission line projects are 8207, 8208 and 8209).

Linked to the above, this present report provides desktop assessments of potential impacts on local palaeontological (*i.e.* fossil) heritage within the transmission line corridor between the proposed Kenhardt PV 1, Kenhardt PV 2 and Kenhardt PV 3 75 MW Solar PV Facilities on the remaining extent of Onder Rugzeer Farm 168 and the Eskom Nieuwehoop Substation that is currently being constructed on Farm Gemsbok Bult (remaining extent of Portion 3 of Farm 120), situated *c.* 20 km north-east of Kenhardt, Northern Cape Province. This report contributes to the BA's for the proposed transmission lines and includes recommendations for inclusion in the corresponding Environmental Management Programme (EMPr).

The overall objectives of the specialist study are to:

- Determine the current conditions in sufficient detail so that there is a baseline against which impacts can be identified and measured.
- Identify potential impacts that may occur during the construction, operational and decommissioning phases of the proposed development, as well as impacts associated with future environmental changes if the “no-go” option is implemented (both positive and negative).
- Assess the impacts in terms of direct, indirect and cumulative impacts.
- Provide recommendations with regards to potential monitoring programmes.
- Determine mitigation and/or management measures which could be implemented to as far as possible reduce the effect of negative impacts and enhance the effect of positive impacts.
- Incorporate and address all issues and concerns raised in relation to palaeontological impacts.

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1.1.2 Terms of Reference

The Terms of Reference for the present study, as defined by the CSIR, are as follows:

1. Review detailed information relating to the project description and precisely define the environmental risks to palaeontological heritage, and consequences thereto.
2. Conduct a review of available information pertaining to the study area.
3. Draw on desktop information sources, the knowledge of local experts, information published in the scientific press and information derived from relevant EIAs and similar specialist studies previously conducted within the surrounding area.
4. Prepare and undertake a desktop study on the palaeontology and fossil heritage within the proposed project area, based on:
 - a review of all relevant palaeontological and geological literature, including geological maps and previous reports,
 - location and examination of fossil collections from the study area (e.g. museums), and
 - data on the proposed development (e.g. location of footprint, depth and volume of bedrock excavation envisaged).
5. Describe the type and location of known fossil heritage sites in the study area, and characterize all items that may be affected by the proposed project.
6. Describe the baseline environment and determine the *status quo* in relation to palaeontological impacts.
7. Note fossils and associated sedimentological features of palaeontological relevance (photos, maps, aerial or satellite images, and stratigraphic columns).
8. Analyse the stratigraphy, age and depositional setting of fossil-bearing units.
9. Evaluate the potential for occurrence of palaeontological heritage features within the study area.
10. Incorporate relevant information from other specialist reports/findings, if required.
11. Identify and rank the highlights and sensitivities to development of fossil heritage within study area.
12. Identify and rate potential direct, indirect and cumulative impacts of the proposed project on the palaeontology and fossil heritage during the construction, operational and decommissioning phases of the project. Study the cumulative impacts of the project by considering the impacts of existing industries / solar PV plants within the area (as well as those PV plants that are proposed), together with the impact of the proposed project.
13. Provide recommendations and suggestions regarding fossil heritage management on site, including conservation measures, as well as promotion of local fossil heritage (e.g. for public education, schools) to ensure that the impacts are limited.
14. Provide input to the EMP, including mitigation and monitoring requirements to ensure that the impacts on the archaeological features and heritage features are limited.
15. Provide specific recommendations for further palaeontological mitigation (if any).
16. Compile an illustrated, fully-referenced review of palaeontological heritage within study area based on desktop study.

1.1.3 Approach and Methodology

The approach to a Phase 1 palaeontological heritage study is briefly as follows. In preparing a palaeontological desktop study the potentially fossiliferous rock units (groups, formations etc.) represented within the study area are determined from geological maps and satellite images. The known fossil heritage within each rock unit is inventoried from the published scientific literature, previous palaeontological impact studies in the same region, and the author's field experience and palaeontological database (consultation with professional colleagues as well as

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examination of institutional fossil collections may play a role here. This data is then used to assess the palaeontological sensitivity of each rock unit to development (provisional tabulations of palaeontological sensitivity of all formations in the Western, Eastern and Northern Cape have already been compiled by J. Almond and colleagues (e.g. Almond & Pether 2008). The likely impact of the proposed development on local fossil heritage is then determined on the basis of (1) the palaeontological sensitivity of the rock units concerned and (2) the nature and scale of the development itself, most significantly the extent of fresh bedrock excavation envisaged. When rock units of moderate to high palaeontological sensitivity are present within the development footprint, a Phase 1 field assessment study by a professional palaeontologist is usually warranted to identify any palaeontological hotspots and make specific recommendations for any mitigation required before or during the construction phase of the development. **However, due to the low palaeontological sensitivity of the present study area a Phase 1 field assessment is not required and a desktop assessment is being undertaken instead (i.e. this study).**

On the basis of the desktop and Phase 1 field assessment studies, the likely impact of the proposed development on local fossil heritage and any need for specialist mitigation are then determined. Adverse palaeontological impacts normally occur during the construction rather than the operational or decommissioning phase. Phase 2 mitigation by a professional palaeontologist – normally involving the recording and sampling of fossil material and associated geological information (e.g. sedimentological data) may be required (a) in the pre-construction phase where important fossils are already exposed at or near the land surface and / or (b) during the construction phase when fresh fossiliferous bedrock has been exposed by excavations. To carry out mitigation, the palaeontologist involved will need to apply for a palaeontological collection permit from the relevant heritage management authorities for the Northern Cape, *i.e.* SAHRA (Contact details: Mrs Colette Scheermeyer, P.O. Box 4637, Cape Town 8000, Tel: 021 462 4502, Email: cscheermeyer@sahra.org.za). It should be emphasized that, providing appropriate mitigation is carried out, the majority of developments involving bedrock excavation can make a positive contribution to our understanding of local palaeontological heritage.

1.1.4 Assumptions and Limitations

The accuracy and reliability of palaeontological specialist studies as components of Heritage Impact Assessments are **generally** limited by the following constraints:

1. Inadequate database for fossil heritage for much of South Africa, given the large size of the country and the small number of professional palaeontologists carrying out fieldwork here. Most development study areas have never been surveyed by a palaeontologist.
2. Variable accuracy of geological maps which underpin these desktop studies. For large areas of terrain these maps are largely based on aerial photographs alone, without ground-truthing. The maps generally depict only significant (“mappable”) bedrock units as well as major areas of superficial “drift” deposits (alluvium, colluvium) but for most regions give little or no idea of the level of bedrock outcrop, depth of superficial cover (soil etc.), degree of bedrock weathering or levels of small-scale tectonic deformation, such as cleavage. All of these factors may have a major influence on the impact significance of a given development on fossil heritage and can only be reliably assessed in the field.
3. Inadequate sheet explanations for geological maps, with little or no attention paid to palaeontological issues in many cases, including poor locality information.

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4. The extensive relevant palaeontological “grey literature” - in the form of unpublished university theses, impact studies and other reports (e.g. of commercial mining companies) - that is not readily available for desktop studies.
5. Absence of a comprehensive computerized database of fossil collections in major South African institutions which can be consulted for impact studies. A Karoo fossil vertebrate database is now accessible for impact study work.

In the case of palaeontological desktop studies without supporting Phase 1 field assessments these limitations may variously lead to either:

(a) underestimation of the palaeontological significance of a given study area due to ignorance of significant recorded or unrecorded fossils preserved there, or

(b) overestimation of the palaeontological sensitivity of a study area, for example when originally rich fossil assemblages inferred from geological maps have in fact been destroyed by tectonism or weathering, or are buried beneath a thick mantle of unfossiliferous “drift” (soil, alluvium *etc.*).

Since most areas of South Africa have not been studied palaeontologically, a palaeontological desktop study usually entails inferring the presence of buried fossil heritage within the study area from relevant fossil data collected from similar or the same rock units elsewhere, sometimes at localities far away. Where substantial exposures of bedrocks or potentially fossiliferous superficial sediments are present in the study area, the reliability of a palaeontological impact assessment may be significantly enhanced through field assessment by a professional palaeontologist.

In the case of the Scatec Solar project area near Kenhardt in the Northern Cape, bedrock exposure is limited due to extensive cover by superficial deposits (e.g. alluvium, soils, surface gravels), especially in areas of low relief, as well as by pervasive *bossieveld* vegetation. For this reason, as well as the low palaeontological sensitivity of the sedimentary rocks mapped in the project area, a desktop-level rather than field-based assessment was considered appropriate for this study. Given the uniformity of the bedrock geology and superficial deposits (and hence palaeontological sensitivity) underlying the various transmission line routes under consideration, a single Palaeontological Impact Assessment Report is considered to be suitable and sufficient for the proposed 132 kV transmission lines (*i.e.* a separate study is not needed for each line/corridor).

Despite the lack of palaeontological field data from the project area itself, confidence levels in the conclusions reached in the desktop study are moderately high because of the author’s field experience of the sedimentary rocks represented in the wider Bushmanland region (See reference list for previous palaeontological assessments in the area; e.g. Almond 2009, 2011, 2014a, 2014b, 2014c, 2014d). Recent palaeontological heritage assessments for several other alternative energy developments in the region have been taken into consideration (e.g. the Nieuwehoop Solar Park just to the east of the proposed project area).

In terms of the impact assessment, the methodology adopted is outlined in the BA Report, which also notes the developments within a 20 km radius that have been considered in order to assess cumulative impacts.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

1.1.5 Sources of Information

The information used in this desktop study was based on the following sources:

1. A detailed project outline supplied by the CSIR - Environmental Management Services.
2. Previous desktop palaeontological assessment reports for study areas in the Kenhardt region by the author (Almond 2009, 2011, 2014a, 2014b, 2014c, 2014d). The last two reports assess fossil heritage resources within the Nieuwehoop Solar Park on farms Gembok Bult 120 and Boven Rugzeer 169.
3. A review of the relevant scientific literature, including published geological maps (e.g. 1: 250 000 scale geological map sheet 2920 Kenhardt published by the Council for Geoscience, Pretoria) and accompanying sheet explanations (e.g. Slabbert *et al.* 1999).
4. The author's previous field experience with the formations concerned and their palaeontological heritage (cf Almond and Pether 2008; SAHRIS website).

1.1.6 Declaration of Independence of Specialists

Refer to the preliminary section of this specialist report for the Curriculum Vitae of Dr. John Almond, which highlights his experience and expertise. The declaration of independence by the specialist is provided in Box 1.1 below and included in Appendix I of this BA Report.

BOX 1.1: DECLARATION OF INDEPENDENCE

I, John Almond, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed Kenhardt PV 1 – Transmission Line, Kenhardt PV 2 – Transmission Line and Kenhardt PV 3 – Transmission Line Projects, application or appeal in respect of which I was appointed, other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.



JOHN ALMOND

1.2 DESCRIPTION OF PROJECT ASPECTS RELEVANT TO PALAEOLOGICAL HERITAGE IMPACTS

A detailed description of the proposed project is included in Section A of the BA Report. The proposed transmission line and electrical infrastructure BA project will include the following connectivity options:

- The construction of a single 132 kV transmission line from each Kenhardt PV facility to the Eskom Nieuwehoop Substation; or
- Connect the Kenhardt PV 2 and Kenhardt PV 3 projects via separate 22 kV/33 kV transmission lines to the proposed Kenhardt PV 1 on-site substation which will link via a 132 kV line to the Eskom Nieuwehoop Substation; or

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- Construct one 132 kV transmission line from the Kenhardt PV 1 project to the Eskom Nieuwehoop Substation and connect the Kenhardt PV 2 and Kenhardt PV 3 facilities together via medium voltage transmission lines to either the on-site substation of Kenhardt PV 2 or PV 3, followed by the construction of one 132 kV transmission line from the on-site substation to the Eskom Nieuwehoop Substation.

The above proposed transmission lines will be constructed within an electrical infrastructure corridor (as shown in Figure 1), which has been assessed in this report.

As noted above, the Scatec Solar project area near Kenhardt is located in a region of Bushmanland that is underlain by potentially fossiliferous sedimentary rocks of Late Tertiary or Quaternary age as well as by unfossiliferous basement rocks (as discussed in Section 1.3 of this report). The construction phase of the proposed transmission lines for each PV project will entail excavations into the superficial sediment cover and locally into the underlying bedrock as well. These include, for example, surface clearance operations and small excavations for the electrical pylon footings. All these developments may adversely affect potential, legally-protected fossil heritage resources within the study area by destroying, disturbing or permanently sealing-in fossils at or beneath the surface of the ground that are then no longer available for scientific research or other public good.

The planning, operational and decommissioning phases of the proposed transmission lines are very unlikely to involve additional adverse impacts on local palaeontological heritage, however.

1.3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

In this section of the report an outline of the geology of the corridor of the proposed transmissions line is first given, based on the relevant geological maps and scientific literature. This is followed by a brief review of fossil heritage that has previously been recorded from the sedimentary rock units that are represented within the project area.

1.3.1 Geological context

As mentioned above, the study area for the proposed 132 kV and 33 kV/22 kV transmission lines, located on the farms Onder Rugzeer 168, Boven Rugzeer 169 (only traversing above) and Gemsbok Bult 120, is located some 20 km northeast of Kenhardt, Northern Cape. The area is situated within the semi-arid Bushmanland region at elevations of between c. 930 to 970 m amsl, with a general slope towards the southwest. It is drained by a dendritic network of shallow, southwest-flowing tributary streams of the Hartbeesrivier. The geology of the study area is shown on the 1: 250 000 geology sheet 2920 Kenhardt (Council for Geoscience, Pretoria) (Figure 1). The entire area is underlain at depth by a variety of Precambrian basement rocks that are c. 2 billion years old and are assigned to the **Namaqua-Natal Province**. These ancient igneous and high-grade metamorphic rocks - mainly granites and gneisses - crop out at surface as small patches and are entirely unfossiliferous. The Precambrian crustal rocks are transected by a NW-SE trending fault zone and lie to the north of the major Wolfkop Fault. The basement rock units represented in the transmission line study areas include the **Jacomyns Pan Group** (gneisses of the Sandnoute Formation) and the **Keimoes Suite** (Elsie se Gorra Granite). These rock units are described in the Kenhardt 1: 250 000 sheet explanation by Slabbert *et al.* (1999) and placed in the context of the Namaqua-Natal Province by Cornell *et al.* (2006). However, they are entirely unfossiliferous and so will not be discussed further here.

A large proportion of the basement rocks in the transmission line project area are mantled by a range of superficial sediments of Late Cenozoic age, some of which are included within the

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Kalahari Group. These predominantly thin, unconsolidated deposits include small patches of calcretes (soil limestones), gravelly to sandy river alluvium, pan sediments along certain watercourses, surface gravels, colluvium (scree) as well as – especially – Quaternary to Recent aeolian (wind-blown) sands of the Gordonia Formation (Kalahari Group). According to the geological map, the basement rocks in the transmission line corridor are largely mantled by aeolian sands of the **Gordonia Formation** (“Kalahari sands”) as well as Late Cenozoic alluvial deposits associated with small drainage courses.

The geology of the Late Cretaceous to Recent Kalahari Group is reviewed by Thomas (1981), Dingle *et al.* (1983), Thomas & Shaw (1991), Haddon (2000) and Partridge *et al.* (2006). The thickness of the unconsolidated Kalahari sands in the Bushmanland area is variable and often uncertain. The Gordonia Formation dune sands are considered to range in age from the Late Pliocene/Early Pleistocene to Recent, dated in part from enclosed Middle to Late Stone Age stone tools (Dingle *et al.*, 1983, p. 291). Note that the recent extension of the Pliocene - Pleistocene boundary from 1.8 Ma back to 2.588 Ma would place the older Gordonia Formation sands entirely within the Pleistocene Epoch. A number of older Kalahari formations underlie the young wind-blown surface sands in the main Kalahari depository to the north of the study area. However, at the latitude of the study area near Kenhardt (c. 29° S) Gordonia Formation sands less than 30 m thick are likely to be the main or perhaps only Kalahari sediments present (*cf* isopach map of the Kalahari Group, Figure 6 *in* Partridge *et al.*, 2006). These unconsolidated sands will be locally underlain by thin subsurface gravels along the buried palaeosurface and perhaps by calcretes of Pleistocene or younger age (*cf* Mokalanen Formation).

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

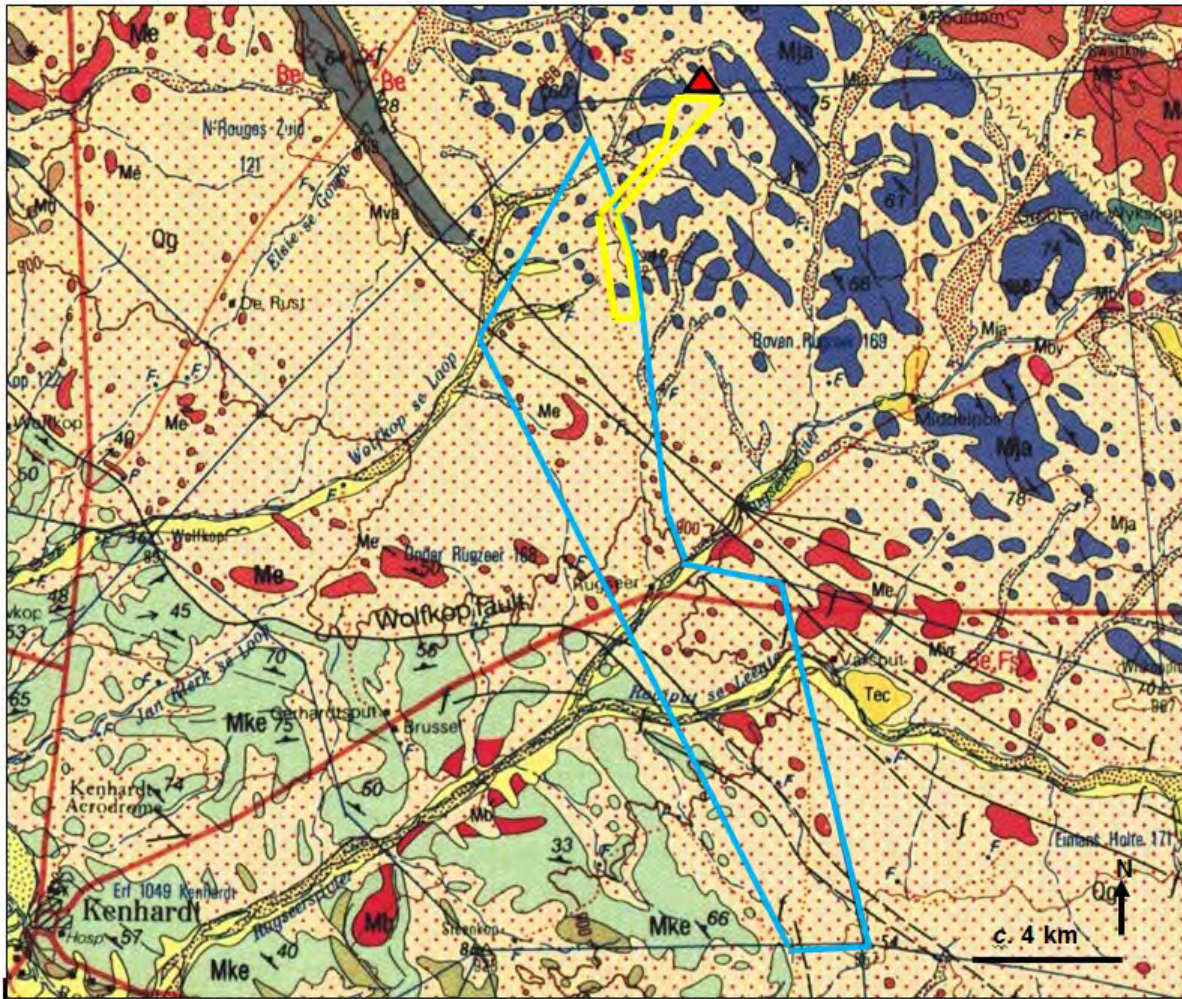


Figure 1. Extract from 1: 250 000 scale geological map sheet 2920 Kenhardt (Council for Geoscience, Pretoria) showing the geology of the Scatec Solar PV Facilities study area on Farm Onder Rugzeer 168 (blue polygon) situated c. 20 km to the NE of Kenhardt, Northern Cape. Eskom Nieuwehoop Substation on Gemsbok Bult 120 (shown by the red triangle) and the proposed electrical infrastructure corridor is shown in yellow.

Linked to Figure 1 above, the main geological units represented within the broader Scatec Solar project area, including the transmission line corridor, include:

PRECAMBRIAN BASEMENT ROCKS:

KEIMOES SUITE:

- Red (Me) = Elsie se Gorra Granite

KORANNALAND SUPERGROUP:

- Brown (Mva) = Valsvlei Formation, Biesje Poort Group
- Grey (Msa) = Sandputs Formation, Biesje Poort Group
- Blue (Mja) = Sandnoute Formation, Jacomyns Pan Group

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VYFBEKER METAMORPHIC SUITE:

- **Pale blue-green (Mke) = Kenhardt Migmatite**

LATE CAENOZOIC SUPERFICIAL SEDIMENTS:

- **Pale yellow with sparse red stipple (Qg) = aeolian sands of the Gordonia Formation (Kalahari Group)**
- **Pale yellow with dense red stipple = alluvial and pan sediments**
- **Dark yellow (Tec) = calcrete**

1.3.2 *Palaeontological Heritage*

The Precambrian basement rocks represented within the study area are igneous granitoids or high grade metamorphic rocks that were last metamorphosed some 1 billion years ago and are entirely unfossiliferous. The sparse fossil record of Late Caenozoic superficial sediments in the Bushmanland region are briefly reviewed here (Refer also to Table 1). Note that, to the author's knowledge, there are no fossil records from the broader Scatec Solar project area itself, including the transmission line corridor, and no palaeontological fieldwork has been undertaken here (See also relevant desktop palaeontological assessments for farms Boven Rugzeer 169 and Gemsbok Bult 120 by Almond 2014c, 2014d).

The diverse superficial deposits within the South African interior, including Bushmanland, have been comparatively neglected in palaeontological terms. However, sediments associated with ancient drainage systems, springs and pans may occasionally contain important fossil biotas, notably the bones, teeth and horn cores of mammals as well as remains of reptiles like tortoises (e.g. Skead 1980, Klein 1984b, Brink 1987, Bousman *et al.* 1988, Bender & Brink 1992, Brink *et al.* 1995, MacRae 1999, Meadows & Watkeys 1999, Churchill *et al.* 2000, Partridge & Scott 2000, Brink & Rossouw 2000, Rossouw 2006, Almond *in* Macey *et al.* 2011). Other late Caenozoic fossil biotas that may occur within these superficial deposits include non-marine molluscs (bivalves, gastropods), ostrich egg shells, trace fossils (e.g. calcretised termitaria, coprolites, invertebrate burrows, rhizcretions), and plant material such as peats or palynomorphs (pollens) in organic-rich alluvial horizons (Scott 2000) and diatoms in pan sediments. In Quaternary deposits, fossil remains may be associated with human artefacts such as stone tools and are also of archaeological interest (e.g. Smith 1999 and references therein). Ancient solution hollows within extensive calcrete hardpans may have acted as animal traps in the past. As with coastal and interior limestones, they might occasionally contain mammalian bones and teeth (perhaps associated with *hyaena dens*) or invertebrate remains such as snail shells.

Diverse fossils associated with the ancient Tertiary drainage systems of the Karoo and Bushmanland region have been summarized by Almond *in* Macey *et al.* (2011). See also articles by Cooke 1949, Wells 1964, Butzer *et al.* 1973, Helgren 1977, Klein 1984, Macrae 1999). They include remains of fish, reptiles, mammals, freshwater molluscs, petrified wood and trace fossils (e.g. De Wit 1990, 1993, De Wit & Bamford 1993, Bamford 2000, Bamford & De Wit 1993, Senut *et al.* 1996).

In the Brandvlei area to the southwest of Kenhardt lies the north-south trending Geelvloer Palaeo-valley, a Mid Tertiary palaeodrainage system that links up with the Commissioners Pan

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– Koa Valley system to the northwest. Here calcretised basal alluvial facies contain bones of hippopotamus-like artiodactyls called anthracotherids indicating a Miocene age (De Wit 1993, 1999, De Wit *et al.* 2000). Anthracotherids are an extinct group of amphibious mammalian herbivores only distantly related to true hippos that were widespread in the Miocene of Africa (Schneider & Marais 2004). Early to Mid-Miocene silicified woods from Brandvlei are referable to a number of extant tree families, including the Dipterocarpaceae that mainly inhabit tropical forests in Africa and Asia today. The fossil woods and associated sediments indicate that warm, tropical to subtropical climates prevailed in the Mid-Miocene and that perennial, low-sinuosity braided river systems supported lush riparian forests (De Wit & Bamford 1993, Bamford & De Wit 1993, Bamford 2000). Wet, weakly seasonal climates are suggested by the structure (indistinct growth rings) and dimensions (trunk diameters of over 50 cm) of the fossil woods (Bamford 2000).

Abraded Plio-Pleistocene fossil woods from relict alluvial terraces of the Sak River just north of Brandvlei include members of the Family Polygalaceae and also indicate humid growth conditions (Bamford & De Wit 1993). These terraces were formed by meandering rivers during intermittent pluvial (i.e. wetter), but still semi-arid, episodes following the onset of generally arid conditions in the western portion of southern Africa towards the end of the Miocene. So far fossils have not been recorded from the Sakrivier system closer to Kenhardt.

Pan sediments in Bushmanland have also recently yielded interesting Pleistocene mammalian faunas in association with age-diagnostic archaeological material. Important fossil mammalian remains assigned to the Florisian Mammal Age (c. 300 000 – 12 000 BP; MacRae 1999) have recently been documented from stratigraphic units designated Group 4 to Group 6 (i.e. calcrete hardpan and below) at Bundu Pan, some 22 km northwest of Copperton (Kiberd 2006 and references therein). These are among very few Middle Pleistocene faunal records from stratified deposits in the southern Africa region (Klein 1980, 1984a, 1984b, 2000) and are therefore of high palaeontological significance. Characteristic extinct Pleistocene species recorded at Bundu Pan are the giant Cape Horse or Zebra (*Equus capensis*) and the Giant Hartebeest (*Megalotragus priscus*). Other extant to extinct taxa include species of warthog, blesbok, black wildebeest, springbok and baboon. There is additionally trace fossil evidence for hyaenids (tooth marks) as well as ostrich egg shell. Preliminary dating and the inferred ecology of the fossil taxa present suggests the presence of standing water within a grassy savanna setting during the 200 - 300 000 BP interval when the Bunda Pan faunal assemblage accumulated. A sequence of Earlier, Middle and Later Stone Age (ESA, MSA and LSA, respectively) artefact assemblages is also recorded from this site. Stratigraphic Groups 4 to 6 (i.e. calcrete hardpan and below) contain a Final Acheulian or transitional ESA/MSA artefact assemblage, while Groups 2 - 3 above the calcrete horizon contain a MSA artefact assemblage. Orton (2012) recorded a single fossil equid tooth associated with a rich MSA artefact assemblage from gravels overlying a calcrete hardpan on the farm Hoekplaas near Copperton. This horizon is probably equivalent to Group 3 of Kiberd's stratigraphy at Bundu Pan, and therefore somewhat younger than the Florisian mammal fauna reported there.

The fossil record of the Kalahari Group as a whole is generally sparse and low in diversity; no fossils are recorded here in the Kenhardt geology sheet explanation by Slabbert *et al.* (1999). The Gordonia Formation dune sands were mainly active during cold, drier intervals of the Pleistocene Epoch that were inimical to most forms of life, apart from hardy, desert-adapted species. Porous dune sands are not generally conducive to fossil preservation. However, mummification of soft tissues may play a role here and migrating lime-rich groundwaters derived from underlying lime-rich bedrocks may lead to the rapid calcretisation of organic structures such as burrows and root casts. Occasional terrestrial fossil remains that might be expected within this unit include calcretized rhizoliths (root casts) and termitaria (e.g.

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Basic Assessment for the Proposed Development of a Transmission Line and associated electrical infrastructure (KENHARDT PV 1 - TRANSMISSION LINE): BASIC ASSESSMENT REPORT

Hodotermes, the harvester termite), ostrich egg shells (*Struthio*), tortoise remains and shells of land snails (e.g. *Trigonephrus*) (Almond in Macey *et al.* 2011, Almond & Pether 2008). Other fossil groups such as freshwater bivalves and gastropods (e.g. *Corbula*, *Unio*), ostracods (seed shrimps), charophytes (stonewort algae), diatoms (microscopic algae within siliceous shells) and stromatolites (laminated microbial limestones) are associated with local watercourses and pans. Microfossils such as diatoms may be blown by wind into nearby dune sands (Du Toit 1954, Dingle *et al.*, 1983). These Kalahari fossils (or subfossils) can be expected to occur sporadically but widely, and the overall palaeontological sensitivity of the Gordonia Formation is therefore considered to be low. Underlying calcretes might also contain trace fossils such as rhizoliths, termite and other insect burrows, or even mammalian trackways. Mammalian bones, teeth and horn cores (also tortoise remains, and fish, amphibian or even crocodiles in wetter depositional settings) may be expected occasionally expected within Kalahari Group sediments and calcretes, notably those associated with ancient alluvial gravels (See Koa River Valley above). The younger (Pleistocene to Recent) fluvial and alluvial sands and gravels within the proposed development area are unlikely to contain many, if any, substantial fossil or subfossil remains.

Table 1: Fossil heritage recorded from the major rock units that are represented within the broader Scatec Solar study area near Kenhardt (including transmission line corridor to Nieuwehoop Substation)

GEOLOGICAL UNIT	ROCK TYPES AND AGE	FOSSIL HERITAGE	PALAEONT-OLOGICAL SENSITIVITY
LATE CAENOZOIC SUPERFICIAL SEDIMENTS, especially ALLUVIAL AND PAN SEDIMENTS	fluvial, pan, lake and terrestrial sediments, including diatomite (diatom deposits), pedocretes (e.g. calcrete), colluvium (slope deposits such as scree), aeolian sands (Gordonia Formation, Kalahari Group) LATE TERTIARY, PLEISTOCENE TO RECENT	bones and teeth of wide range of mammals (e.g. mastodont proboscideans, rhinos, bovids, horses, micromammals), fish, reptiles (crocodiles, tortoises), ostrich egg shells, fish, freshwater and terrestrial molluscs (unionid bivalves, gastropods), crabs, trace fossils (e.g. calcretised termitaria, horizontal invertebrate burrows, stone artefacts), petrified wood, leaves, rhizoliths, stromatolites, diatom floras, peats and palynomorphs.	GENERALLY LOW BUT LOCALLY HIGH (e.g. Tertiary alluvium associated with old river courses)
Basement granites and gneisses NAMAQUA-NATAL PROVINCE	Highly-metamorphosed sediments, intrusive granites MID-PROTEROZOIC (c.1- 2 billion years old)	none	ZERO

1.4 APPLICABLE LEGISLATION AND PERMIT REQUIREMENTS

All South African fossil heritage, including palaeontological sites and specimens, is protected by law (National Heritage Resources Act (Act 25 of 1999)) and fossils cannot be collected, damaged, destroyed or disturbed without a permit from SAHRA or the relevant Provincial Heritage Resources Agency.

As mentioned previously, where palaeontological mitigation of a development project is required, the palaeontologist concerned with mitigation work would need a valid fossil collection permit from SAHRA and any material collected would have to be curated in an approved depository (e.g. museum or university collection). All palaeontological specialist work should conform to international best practice for palaeontological fieldwork and the study (e.g. data

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recording fossil collection and curation, final report) should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies recently developed by SAHRA (2013).

The present palaeontological heritage assessment falls under Sections 35 and 38 (Heritage Resources Management) of the National Heritage Resources Act (Act 25 of 1999), and it will also inform the EMP for these projects.

The various categories of heritage resources recognised as part of the National Estate in Section 3 of the National Heritage Resources Act (Act 25 of 1999) include, among others:

- geological sites of scientific or cultural importance;
- palaeontological sites; and
- palaeontological objects and material, meteorites and rare geological specimens.

According to Section 35 of the National Heritage Resources Act, dealing with archaeology, palaeontology and meteorites:

- 1) The protection of archaeological and palaeontological sites and material and meteorites is the responsibility of a provincial heritage resources authority.
- 2) All archaeological objects, palaeontological material and meteorites are the property of the State.
- 3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.
- 4) No person may, without a permit issued by the responsible heritage resources authority—
 - i. destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
 - ii. destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;
 - iii. trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or
 - iv. bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.
- 5) When the responsible heritage resources authority has reasonable cause to believe that any activity or development which will destroy, damage or alter any archaeological or palaeontological site is under way, and where no application for a permit has been submitted and no heritage resources management procedure in terms of section 38 has been followed, it may-
 - a) serve on the owner or occupier of the site or on the person undertaking such development an order for the development to cease immediately for such period as is specified in the order;
 - b) carry out an investigation for the purpose of obtaining information on whether or not an archaeological or palaeontological site exists and whether mitigation is necessary;
 - c) if mitigation is deemed by the heritage resources authority to be necessary, assist the person on whom the order has been served under paragraph (a) to apply for a permit as required in subsection (4); and
 - d) recover the costs of such investigation from the owner or occupier of the land on which it is believed an archaeological or palaeontological site is located or from the person

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proposing to undertake the development if no application for a permit is received within two weeks of the order being served.

1.5 IDENTIFICATION OF KEY ISSUES

1.5.1 Key Issues Identified During the Scoping Phase

The only key issue identified by the specialist during the Project Initiation Phase is the potential loss of palaeontological heritage resources (fossils, fossil sites including their geological context) through surface clearance and excavations into sedimentary rocks during the construction phase of the transmission line projects.

The Scoping Report was released for a 30-day comment period which extended from 25 September 2015 to 27 October 2015. The Addendum to the Scoping Report was also released for a 30-day comment period, extending from 6 October 2015 to 5 November 2015. The BA (and EIA) Reports were also released for a 30-day comment period extending from 3 March 2016 to 5 April 2016.

To date, only two comments were raised by the SAHRA regarding impacts on palaeontological heritage posed by the proposed Scatec Solar development. No further comments have been received in relation to palaeontological impacts.

The following comment was received from the SAHRA on 22 September 2015 (via SAHRIS) based on the review of the Background Information Document (in relation to the Kenhardt PV 1, PV 2 and PV 3 projects, Case References 8204, 8205 and 8206. It is important to note that only the points relating to palaeontological aspects have been extracted from the SAHRA comments and noted below:

- *The PalaeoSensitivity Map on SAHRIS (<http://www.sahra.org.za/sahris/map/palaeo>) indicates moderate palaeontological sensitivity for the proposed area. Therefore, the SAHRA Archaeology, Palaeontology and Meteorites Unit requires a desktop Palaeontological Impact Assessment to be undertaken to assess whether or not the development will impact upon palaeontological resources - or at least a letter of exemption from a Palaeontologist is needed to indicate that this is unnecessary. If the area is deemed sensitive, a full Phase 1 Palaeontological Impact Assessment will be required and if necessary a Phase 2 rescue operation might be necessary.*

As noted above, based on the low palaeontological sensitivity of the area, this desktop Palaeontological Impact Assessment is being undertaken during the BA Phase (i.e. prior to the commencement of construction of the Kenhardt PV and Transmission Line projects (subject to the issuing of an Environmental Authorisation)). As mentioned above, this specialist assessment is conducted by Dr. John Almond in order to assess the significance of potential impacts of the proposed project on palaeontological resources (which is discussed in Section 1.6 of this report).

As noted above, comments from SAHRA were also received on 5 April 2016 during the 30-day review of the BA (and EIA) Reports via SAHRIS. Responses to these comments are included in Appendix E.3 of the finalised BA Report.

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1.5.2 Identification of Potential Impacts

The potential impacts identified during the BA Phase are:

1.5.3 Construction Phase

- Potential loss of palaeontological heritage resources through disturbance, damage or destruction of fossils and fossil sites (including associated geological contextual data) through surface clearance and excavation activities during the construction phase.

1.5.4 Operational Phase

No significant impacts on palaeontological heritage are anticipated during the operational phase of the proposed transmission line developments.

1.5.5 Decommissioning Phase

No significant impacts on palaeontological heritage are anticipated during the decommissioning phase of the developments.

1.5.6 Cumulative Impacts

- Potential cumulative loss of palaeontological heritage resources through disturbance, damage or destruction of fossils and fossil sites (including associated geological contextual data) through surface clearance and excavation activities during the construction phase of proposed 132 kV and 33 kV/22 kV transmission lines in the context of several alternative energy projects planned within the broader Kenhardt region and other key electrical infrastructure developments within a 20 km radius of the proposed project site.

1.6 ASSESSMENT OF IMPACTS AND IDENTIFICATION OF MANAGEMENT ACTIONS

In this section of the report potential impacts of the construction, operational and decommissioning phases of the proposed 132 kV and 33 kV/22 kV transmission lines on palaeontological heritage are outlined and recommendations for any necessary monitoring or mitigation are provided. Possible cumulative impacts in the light of other alternative energy development proposals in the Kenhardt region are also evaluated.

1.6.1 Potential Impacts (Construction Phase)

The construction phase of the proposed 132 kV and 33 kV/22 kV transmission lines will entail surface clearance for excavations into the superficial sediment cover (aeolian sands, surface gravels, stream alluvium *etc.*), which may contain fossil remains, and in some cases also into the underlying unfossiliferous bedrock. These include numerous shallow excavations for electrical pylon footings. As a result, fossils at the ground surface or buried beneath it may be disturbed, damaged, destroyed or sealed-in while their scientifically informative sedimentary context will also be disturbed or destroyed. Once constructed, the operational and decommissioning phases of the proposed transmission lines will not involve further adverse impacts on palaeontological heritage, however.

Desktop analysis of the fossil records of the various rock units underlying the broader proposed project area indicates that the majority of these units are of zero to low palaeontological sensitivity (as discussed in Section 1.3.2 and Table 1 of this report). The basement rocks are

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entirely unfossiliferous while the overlying Late Caenozoic superficial sediments (wind-blown sands, alluvium, gravels *etc.*) are of low to very low palaeontological sensitivity. Construction of the proposed transmission lines, especially given their short length (between 4 and 9 km) and the small pylon footings envisaged is therefore unlikely to entail significant impacts on local fossil heritage resources.

The inferred impacts of each of the proposed transmission lines on local fossil heritage are assessed in Tables 2, 4 and 6 below. These assessments apply only to the construction phase of the proposed developments since further impacts on fossil heritage during the operational and decommissioning phases of the transmission lines are not anticipated. **The results of the assessments are identical, due to the essential similarity in the underlying geology (Figure 1).**

The destruction, damage or disturbance out of context of fossils and fossil sites preserved at the ground surface or below ground represents a *direct negative* impact that is confined to the development footprint (*site specific*). Such impacts are made only during the construction period, and can usually be partially mitigated but cannot be fully rectified; *i.e.* they are *non-reversible* and of *permanent* duration. Since several of the sedimentary units represented within the study area do contain fossils of some sort, some level impact on fossil heritage is probable (*likely*). However, because of the generally very sparse occurrence of well-preserved, scientifically-valuable fossils within the superficial sediments, and because most of the fossils encountered are likely to be of widespread occurrence (low irreplaceability) the consequence of these impacts is rated as *slight*.

No previously recorded areas or sites of exceptional fossil heritage sensitivity or significance have been identified within the proposed project area as a whole, including the transmission line corridor. Due to the inferred scarcity of exceptional fossil remains within the study area, as well as the shortness of all transmission lines and the small pylon footings envisaged, the overall impact significance of the construction phase of the proposed projects is assessed as *VERY LOW* (without mitigation) in all three cases. Because of the paucity of palaeontological field studies within this part of Bushmanland, confidence levels for this desktop palaeontological heritage assessment are only moderate (medium).

Specialist palaeontological monitoring and mitigation for this project are not recommended, pending the discovery of new fossil sites during development, given the uniformly low impact significance. The Environmental Control Officer responsible for the construction phase of the project should be aware of the necessity of conserving fossils and should monitor all substantial excavations into sedimentary rocks for fossil remains. Proposed mitigation of chance fossil finds during the construction phase involves safeguarding of the fossils (preferably *in situ*) by the responsible Environmental Control Officer, reporting of finds to the SAHRA and, where appropriate, judicious sampling and recording of fossil material and associated geological data by a qualified palaeontologist (as discussed in Section 1.8 of this report). Should these recommended mitigation measures be fully implemented, the impact significance of the transmission line developments would remain *VERY LOW* but small residual negative impacts (*e.g.* loss of undetected fossils) would remain. However, these negative impacts would be partially offset through the improved scientific understanding of local palaeontological heritage in a hitherto poorly-studied region of South Africa which would be considered as a significant *positive* outcome.

There are no fatal flaws in the proposed transmission line development proposals as far as fossil heritage is concerned.

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1.6.2 Potential Impacts (Operational and Decommissioning Phases)

No significant impacts on fossil heritage resources are anticipated during the operational and decommissioning phases of the proposed transmission lines.

1.6.3 Cumulative Impacts

The palaeontological heritage impact significance of all the transmission lines proposed by Scatec Solar to service the three proposed PV solar energy developments near Kenhardt (within a 20 km radius of the proposed project) is rated equally as very low. The potentially fossiliferous sedimentary rock units represented within the broader project area are of widespread occurrence and this is also likely to apply to most of the fossils they contain. It is concluded that the cumulative impact on fossil heritage resources posed by the proposed transmission lines to the northeast of Kenhardt is of a low significance.

Given the generally low palaeontological sensitivity of the basement and overlying sedimentary rocks in the broader eastern Bushmanland region, significant cumulative impacts on fossil heritage are not anticipated here as a result of the proposed transmission lines in the context of various alternative energy and other infrastructure developments that have been proposed in the region (refer to the several recent palaeontological impact assessments undertaken by the author for projects near Kenhardt that are listed in the references, especially Almond 2014c, 2014d).

1.7 IMPACT ASSESSMENT SUMMARY

The assessment of impacts on palaeontological heritage resources for each proposed transmission line, as well as recommended mitigation and monitoring measures, as discussed above, are collated in Tables 2 to 7 below.

The no-go option (no solar developments and associated transmission lines) will have a neutral impact on local palaeontological heritage resources.

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Table 2: Impact assessment summary table for the Construction Phase (Proposed Transmission Line for Kenhardt PV 1)

Construction Phase													
Direct Impacts													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Surface clearance and excavations into superficial sediments	Loss of fossil heritage at or beneath ground surface	Negative	Site	Permanent	Slight	Likely	Non-reversible	Low	<ul style="list-style-type: none"> Undertake monitoring of all substantial excavations into sedimentary rocks for fossil remains and safeguard any finds in situ. Appoint a professional palaeontologist to record and sample any chance fossil finds. 	Very low	Very low	5	Medium

Table 3: Cumulative impact assessment summary table (Proposed Transmission Line for Kenhardt PV 1)

Cumulative Impacts													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Surface clearance and excavations into superficial sediments	Loss of fossil heritage at or beneath ground surface	Negative	Site	Permanent	Slight	Likely	Non-reversible	Low	<ul style="list-style-type: none"> Undertake monitoring of all substantial excavations into sedimentary rocks for fossil remains and safeguard any finds in situ. Appoint a professional palaeontologist to record and sample any chance fossil finds. 	Very low	Very low	5	Medium

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Table 4: Impact assessment summary table for the Construction Phase (Proposed Transmission Line for Kenhardt PV 2)

Construction Phase													
Direct Impacts													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Surface clearance and excavations into superficial sediments	Loss of fossil heritage at or beneath ground surface	Negative	Site	Permanent	Slight	Likely	Non-reversible	Low	<ul style="list-style-type: none"> Undertake monitoring of all substantial excavations into sedimentary rocks for fossil remains and safeguard any finds in situ. Appoint a professional palaeontologist to record and sample any chance fossil finds 	Very low	Very low	5	Medium

Table 5: Cumulative impact assessment summary table (Proposed Transmission Line for Kenhardt PV 2)

Cumulative Impacts													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Surface clearance and excavations into superficial sediments	Loss of fossil heritage at or beneath ground surface	Negative	Site	Permanent	Slight	Likely	Non-reversible	Low	<ul style="list-style-type: none"> Undertake monitoring of all substantial excavations into sedimentary rocks for fossil remains and safeguard any finds in situ. Appoint a professional palaeontologist to record and sample any chance fossil finds 	Very low	Very low	5	Medium

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Table 6: Impact assessment summary table for the Construction Phase (Proposed Transmission Line for Kenhardt PV 3)

Construction Phase													
Direct Impacts													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Surface clearance and excavations into superficial sediments	Loss of fossil heritage at or beneath ground surface	Negative	Site	Permanent	Slight	Likely	Non-reversible	Low	<ul style="list-style-type: none"> Undertake monitoring of all substantial excavations into sedimentary rocks for fossil remains and safeguard any finds in situ. Appoint a professional palaeontologist to record and sample any chance fossil finds 	Very low	Very low	5	Medium

Table 7: Cumulative impact assessment summary table (Proposed Transmission Line for Kenhardt PV3)

Cumulative Impacts													
Aspect/ Impact Pathway	Nature of Potential Impact/ Risk	Status	Spatial Extent	Duration	Consequence	Probability	Reversibility of Impact	Irreplaceability	Potential Mitigation Measures	Significance of Impact and Risk		Ranking of Residual Impact/ Risk	Confidence Level
										Without Mitigation/ Management	With Mitigation/ Management (Residual Impact/ Risk)		
Surface clearance and excavations into superficial sediments	Loss of fossil heritage at or beneath ground surface	Negative	Site	Permanent	Slight	Likely	Non-reversible	Low	<ul style="list-style-type: none"> Undertake monitoring of all substantial excavations into sedimentary rocks for fossil remains and safeguard any finds in situ. Appoint a professional palaeontologist to record and sample any chance fossil finds 	Very low	Very low	5	Medium

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1.8 INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAM

Given the low palaeontological sensitivity of the proposed project area - including the transmission line corridors to the Eskom Nieuwehoop Substation - as determined from desktop analysis, as well as the inferred very low impact significance of the projects for fossil heritage conservation, no specialist palaeontological monitoring or mitigation is recommended here, pending the discovery of substantial new fossil remains during construction.

During the construction phase all substantial bedrock excavations should be monitored for fossil material by the responsible Environmental Control Officer (ECO). Should significant fossil remains - such as vertebrate bones and teeth, plant-rich fossil lenses, petrified wood or dense fossil burrow assemblages - be exposed during construction, the responsible ECO should safeguard these, preferably *in situ*. The SAHRA should be alerted as soon as possible (Contact details: Mrs Colette Scheermeyer, P.O. Box 4637, Cape Town 8000, Tel: 021 462 4502, Email: cscheermeyer@sahra.org.za), so that appropriate action can be taken by a professional palaeontologist, at the developer's expense. Mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as associated geological data (e.g. stratigraphy, sedimentology, taphonomy) by a professional palaeontologist.

The palaeontologist concerned with mitigation work will need a valid fossil collection permit from SAHRA and any material collected would have to be curated in an approved depository (e.g. museum or university collection). All palaeontological specialist work should conform to international best practice for palaeontological fieldwork and the study (e.g. data recording fossil collection and curation, final report) should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies recently developed by SAHRA (2013).

No monitoring of mitigation is required during the operational and decommissioning phases of the transmission line developments.

These mitigation recommendations should be incorporated into the EMP for each of the proposed transmission lines associated with the Kenhardt Solar PV energy facilities proposed by Scatec Solar.

1.9 CONCLUSION AND RECOMMENDATIONS

The corridor for the proposed transmission lines are underlain at depth by Precambrian basement rocks (c. 1-2 billion years old) assigned to the Namaqua-Natal Province. These ancient igneous and high-grade metamorphic rocks - mainly granites and gneisses of the Keimoes Suite and Jacomynspan Group - crop out at surface in small areas and are entirely unfossiliferous. A large proportion of the basement rocks are mantled by a range of superficial sediments of Late Caenozoic age that may contain sparse fossil remains. These predominantly thin, unconsolidated deposits include small patches of calcretes, gravelly to sandy river alluvium, pan sediments, surface gravels, colluvium (scree) as well as Pleistocene to Recent wind-blown sands of the Gordonia Formation (Kalahari Group). Most of these younger rock units are of widespread occurrence and low palaeontological sensitivity. Scientifically important vertebrate fossil remains (e.g. Pleistocene mammalian bones and teeth) have been recorded within older stratified pan and river sediments elsewhere in the Bushmanland region where they are often associated with stone artefacts, while a limited range of trace fossils (e.g. plant root casts, termitaria and other invertebrate burrows) may be found within calcrete horizons.

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No previously recorded areas or sites of exceptional fossil heritage sensitivity or significance have been identified within the Scatec Solar project area as a whole, including the new transmission line corridor. Due to the inferred scarcity of scientifically important fossil remains within the study areas, as well as the small scale of excavations for electrical pylon footings concerned, the overall impact significance of the construction phase of the transmission lines is assessed as VERY LOW (before and after mitigation). This applies equally to all proposed transmission lines under consideration. No significant impacts on fossil heritage are anticipated during the operational and decommissioning phases of the proposed transmission lines. The potentially fossiliferous sedimentary rock units represented within the study area (e.g. *Gordonia* aeolian sands, calcrete) are of widespread occurrence and this is also likely to apply to most of the fossils they contain. It is concluded that the cumulative impacts on fossil heritage resources posed by the proposed transmission lines, in the context of several alternative energy and other infrastructural developments planned in the region (as explained in the BA Report), is of very low significance. There are no fatal flaws in the proposed developments, nor are there objections to its authorisation as far as fossil heritage conservation is concerned, since significant impacts on scientifically valuable fossils or fossil sites are not anticipated here. The no-go option (no transmission lines) will have a neutral impact on local palaeontological heritage resources. The only proposed condition to accompany environmental authorisation is that the recommendations for monitoring and mitigation included in the EMPr are fully complied with.

Given the low palaeontological sensitivity of the eastern Bushmanland region, as determined from desktop and field-based studies, as well as the inferred very low impact significance of the proposed transmission lines for fossil heritage conservation, no specialist palaeontological monitoring or mitigation is recommended here, pending the discovery of substantial new fossil remains during construction. Mitigation measures and monitoring recommendations for inclusion in the EMPr are discussed in Sections 1.6 and 1.8 of this report.

For the purposes of this report the entire proposed transmission line corridor was assessed from a palaeontological impact point of view. The applicant is free to select any area within the surveyed area (i.e. the corridor) to construct the transmission lines, provided that the recommended mitigation measures are implemented as applicable.

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