APPENDIX J:

Generic Environmental Management Programme for the On-Site Substation

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1. INTRODUCTION

The Project Developer, Kudu Solar Facility 9 (Pty) Ltd (hereafter "Project Applicant" or "Project Developer") is proposing to develop a Solar Photovoltaic (PV) power generation facility and associated Electrical Grid Infrastructure (EGI), north-east of the town of De Aar in the Renosterberg Local Municipality and Pixley Ka Seme District Municipality, in the Northern Cape Province. In total 12 Solar PV Facilities are being proposed (each having a separate Project Applicant). The proposed projects are located approximately 50 km from De Aar and 25 km from Petrusville. The proposed Solar PV Facilities will make use of PV solar technology to generate electricity from energy derived from the sun. Each solar PV Facility will have a range of associated infrastructure, including, but not limited to, an on-site substation complex, Battery Energy Storage System (BESS), and is proposed to connect to the existing Hydra-Perseus 400 kV overhead power line via dedicated proposed 132 kV power lines, an independent Main Transmission Substation (MTS), and a 400 kV Loop-In-Loop-Out (LILO).

Each of the Solar PV Facilities would be its own project and would require its own, separate Environmental Authorisation (EA), Scoping and Environmental Impact Assessment (EIA) Report, and Environmental Management Programme (EMPr). The same applies to the EGI projects, where relevant. The following projects are being proposed:

- **PROJECTS 1 TO 12**: The proposed development of 12 Solar PV Facilities and associated infrastructure (i.e. Kudu Solar Facility 1 to Kudu Solar Facility 12[1]).
- **PROJECTS 13 TO 24**: The proposed development of switching stations and collector stations at each on-site substation complex at each of the 12 Kudu Solar Facilities, and up to 12 x 132 kV overhead power lines running from each Solar PV Facility to the proposed collector stations or up to the proposed MTS.
- **PROJECT 25**: The proposed development of an independent 400/132 kV MTS, including associated infrastructure at the MTS.
- **PROJECT 26**: The proposed development of a 400 kV LILO from the existing Hydra-Perseus 400 kV overhead power line to the proposed MTS.

Projects 13 to 26 will be undertaken at a later stage; whilst Projects 1 to 12 are the subject of the current Applications for EA.

This EMPr has been prepared as part of the requirements of the 2014 National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) EIA Regulations (as amended). **This EMPr covers the proposed Kudu Solar Facility 9 (hereinafter referred to as Kudu Solar Facility or the proposed project) only.** Figure 1 shows the overall locality of the proposed project.

[1] Note that throughout the report the term Solar Facility and PV are used synonymously. For example, Kudu Solar Facility 1 and Kudu PV1 are used interchangeably.

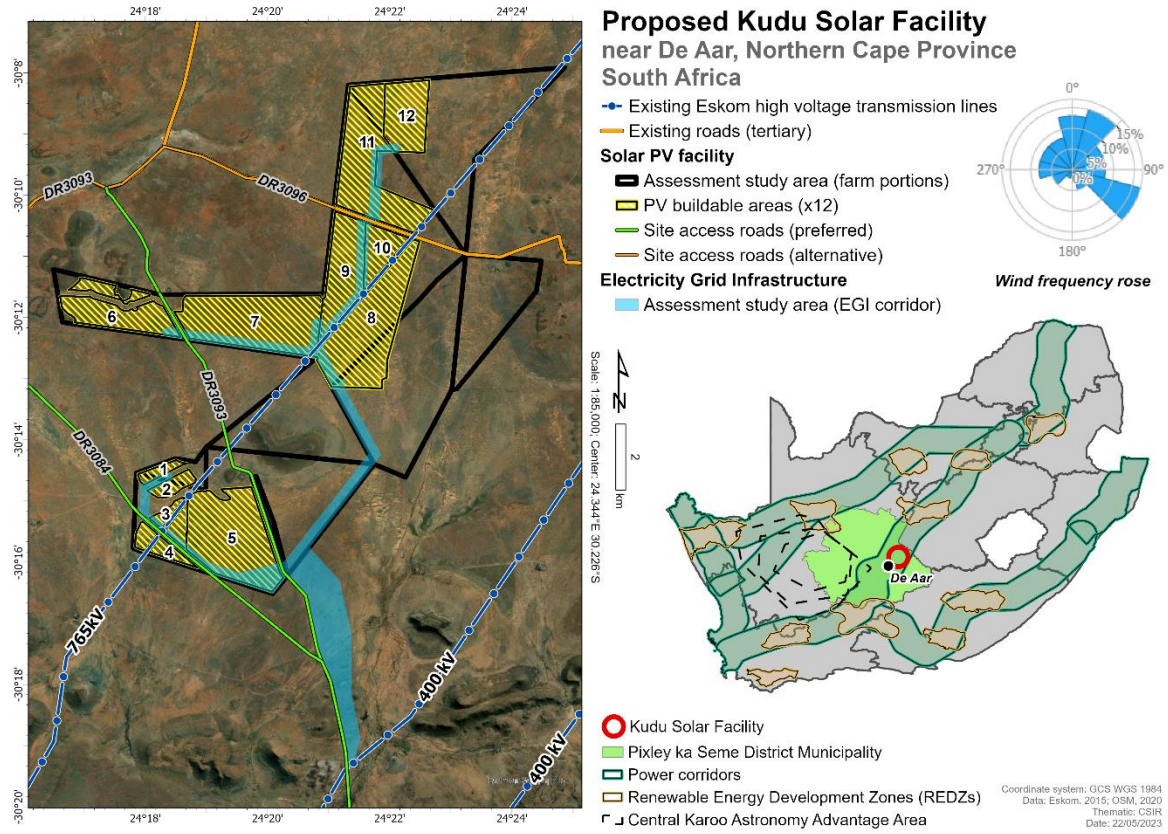


Figure 1: Locality map of the proposed PV Facilities and associated infrastructure situated north-east of the town De Aar in the Northern Cape Province.

1.1 AUTHORS OF THE EMPr

This EMPr has been compiled by the Environmental Assessment Practitioners (EAPs) (Paul Lochner and Rohaida Abed), Environmental Scientist (Helen Antonopoulos), and the various specialists on the team (as indicated in Table 1). The details and expertise of the EAPs and project team members are provided in Appendix A of the EIA Report; whilst those of the specialists are provided in Chapters 6 to 19. The Curriculum Vitae of the EAPs is also included in Appendix A of this EMPr.

Paul Lochner has more than 30 years of experience in environmental assessment and management studies, primarily in the leadership and integration functions. This has included Strategic Environmental Assessments (SEA), EIAs and Environmental Management Plans. Paul is a Registered EAP (2019/745) with the Environmental Assessment Practitioners Association of South Africa (EAPASA). Paul has extensive experience in conducting environmental assessment and management processes throughout South Africa.

Rohaida Abed has 13 years of experience in the Environmental Management field and has been involved in Basic Assessments and EIAs relating to renewable energy, port infrastructure and bulk liquid storage facilities; and has also worked on the SEA for Gas Pipeline and EGI Expansion from

2017 to 2019. She is a registered Professional Natural Scientist (400247/14) with the South African Council for Natural Scientific Professions (SACNASP), and a Registered EAP (2021/4067) with the EAPASA.

Helen Antonopoulos is an Environmental Scientist in the EMS group of the CSIR and holds BSc, BSc Honours, and MSc degrees in Environmental and Geographical Science from the University of Cape Town. She has assisted with compiling BAs and Scoping and EIAs for Solar Facilities in various provinces.

Table 1: Details of the EIA Project Team

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN
Environmental Management Services (CSIR)		
Paul Lochner (*Registered EAP* (2019/745))	CSIR	EAP, Technical Advisor and Quality Assurance
Rohaida Abed (*Pr.Sci.Nat.* and *Registered EAP* (2021/4067))	CSIR	EAP and Project Manager
Helen Antonopoulos	CSIR	Project Officer
Sonto Mkize	CSIR	Project Officer
Phindile Mthembu	CSIR	Project Officer
Luanita Snyman van der Walt *(Pr.Sci.Nat.)*	CSIR	GIS Specialist
Lizande Kellerman *(Pr.Sci.Nat.)*	CSIR	Public Participation Specialist
Specialists		
Johann Lanz (*Pr.Sci.Nat.)*	Private	Agriculture and Soils Compliance Statement
Corné Niemandt *(Pr.Sci.Nat.)* Samuel Laurence *(Pr.Sci.Nat.)* Luke Verburgt	Enviro-Insight cc	Terrestrial Biodiversity, Terrestrial Plant Species, and Terrestrial Animal Species
Toni Belcher *(Pr.Sci.Nat.)* Dana Grobler *(Pr.Sci.Nat)*	Private	Aquatic Biodiversity Impact Assessment
Chris van Rooyen Albert Froneman (*Pr.Sci.Nat.)*	Chris van Rooyen Consulting	Avifauna Impact Assessment
Quinton Lawson (*SACAP, 3686*) Bernard Oberholzer (*SACLAP, 87018*)	QARC and BOLA	Visual Impact Assessment
Dr Jayson Orton (*APHP: Member 43; ASAPA CRM Section: Member 233*)	ASHA Consulting (Pty) Ltd	Heritage Impact Assessment (Archaeology and Cultural Landscape)
Dr John Almond *(PSSA and APHP Member)*	Natura Viva cc	Palaeontology Site Sensitivity Verification Report
Tony Barbour and Schalk van der Merwe	Private	Socio-Economic Impact Assessment
Annebet Krige *(Pr Eng)*	Sturgeon Consulting	Traffic Impact Assessment
Debbie Mitchell *(Pr Eng)*	Ishecon cc	Battery Storage High Level Safety, Health and Environment Risk Assessment
Dale Barrow (*Pr.Sci.Nat.)* Christel van Staden (*Cand.Sci.Nat.)* Shane Teek (*Cand.Sci.Nat.)* Louis Jonk (*Pr.Sci.Nat.)* Julian Conrad	GEOSS South Africa (PTY) Ltd	Geohydrology Assessment
Shane Teek (*Cand.Sci.Nat.)* Dale Barrow (*Pr.Sci.Nat.)* Hardy Luttig	GEOSS South Africa (PTY) Ltd	Geotechnical Assessment

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN
Julian Conrad		
Rohaida Abed *(Pr.Sci.Nat.* and *Registered EAP (2021/4067))* Helen Antonopoulos Lizande Kellerman *(Pr.Sci.Nat.)*	CSIR	Civil Aviation Site Sensitivity Verification
Rohaida Abed *(Pr.Sci.Nat.* and *Registered EAP (2021/4067))* Helen Antonopoulos Lizande Kellerman *(Pr.Sci.Nat.)*	CSIR	Defence Site Sensitivity Verification

1.2 PROJECT DESCRIPTION

The proposed projects will make use of PV technology to generate electricity from solar energy. Once a Power Purchase Agreement (PPA) is awarded, the proposed facility will generate electricity for a minimum period of 20 years. The construction phase for the proposed project is expected to be up to 12 to 18 months. The components of the proposed project are provided in Table 2 below.

Table 2: Description of the key components of the proposed Solar PV Project

Component	Description
Solar Field	
Type of Technology	Solar Photovoltaic (PV) Technology
Generation Capacity (Maximum Installed)	▪ 150 MWac
Total developable area that includes all associated infrastructure within the fenced off area of the PV facility	**Buildable Area / Fenced off Area:** ▪ 285 ha
PV Panel Structure (with the following possible tracking and mounting systems): ▪ Single Axis Tracking structures (aligned north-south); ▪ Dual Axis Tracking (aligned east-west and north-south); ▪ Fixed Tilt Mounting Structure; ▪ Mono-facial Solar Modules; or ▪ Bifacial Solar Modules.	▪ Height: Approximately 3.5 m (maximum)
Building Infrastructure	
Auxiliary Buildings	▪ Type: These include, but are not limited to, Operation and Maintenance (O&M) building / centre, site office, workshop, staff lockers, bathrooms/ablutions, warehouses, guard houses, etc. ▪ Cumulative Footprint: Approximately up to 5000 m^2 ▪ Height: Up to 10 m
Inverter/Transformer Stations	▪ Preliminary average number of stations: 27 ▪ Height: Approximately 3 m ▪ Footprint: Approximately 220 m^2 each
On-site Substation Complex	▪ Components of the on-site substation complex: ○ On-site Independent Power Producer (IPP) or Facility Substation (~1 ha).

Component	Description
	○ Lithium Ion or Redox Flow Battery Energy Storage System. Refer to the details below. ○ Switching Station and Collector Station (~2 ha). **This forms part of Projects 13 – 24 and will be assessed as part of separate processes**. ▪ Footprint of the on-site substation complex: Up to approximately 8 ha ▪ Height of the on-site substation complex: Up to 10 m ▪ Capacity of the on-site substation complex: This varies according to the detailed design and requirements from potential clients, however a capacity stepping up from 22 kV or 33 kV to 132 kV is estimated.
Associated Infrastructure	
Battery Energy Storage System (BESS)	▪ Technology: Lithium-Ion BESS or Redox Flow BESS (both options have been considered in the Scoping and EIA Process; and both options have been deemed acceptable by the specialists; however the preferred option is Lithium Ion BESS). ▪ Footprint: Approximately 1 ha ▪ Height: Up to 10 m ▪ Capacity: Up to 500 MW / 500 MWh
On-site medium voltage internal cables	▪ Placement: Underground or above ground in certain sections ▪ Capacity: 22 or 33 kV ▪ Depth: Maximum depth of 1.5 m
Underground low voltage cables or cable trays	▪ Depth: Maximum depth of 1.5 m
Access roads (including upgrading and widening of existing roads, where relevant)	▪ Details: Existing roads will be used as far as practically achievable to access the site. The Traffic Specialist has noted that the main roads leading to the proposed project site are of a sufficient width. However, upgrading of the main access point from the R48 will be required. This is specifically at the intersection of the TR38/01 (i.e. R48) and DR3093, which will require an existing island of approximately 60 m^2 to be removed and surfaced to accommodate the turning movements of vehicles.
Internal roads	▪ Details: New internal service roads will need to be established (i.e. new roads within the fenced off area of the PV Facility, and new roads between the closest existing road and the PV Facility to gain access). These would either comprise farm roads (compacted dirt/gravel) or paved roads. ▪ Width: ○ Within the PV Facility: Up to 5 m ○ Between the existing road and PV Facility: Up to 8 m
Fencing around the PV Facility Perimeter	▪ Type: Could be palisade or mesh or fully electrified ▪ Height: Up to 3 m
Storm water channels	▪ Details to be confirmed once the Engineering, Procurement and Construction (EPC) contractor has been selected and the design is finalised. Where necessary, a detailed storm water management plan would need to be developed.
Panel cleaning and maintenance area	▪ The type of panels to be used (and panel cleaning) will be confirmed during detailed design/engineering phase. The

Component	Description
	panel cleaning and maintenance area will form part of the O&M Auxiliary Buildings (located at the on-site substation complex).
Work area during the construction phase (i.e. laydown area)	▪ Temporary Laydown: Up to 7 ha. ▪ The need for a permanent laydown area will be confirmed during the detailed design/engineering phase.
Water Requirements	▪ Approximately 9 000 m^3 of water is estimated to be required per year for the construction phase. ▪ Approximately 1 000 m^3 of water is estimated to be required per year for the operational phase. ▪ Water requirements during the decommissioning phase are unknown at this stage. ▪ Potential sources: Local municipality, third-party water supplier, existing boreholes or drilled boreholes on site.
Construction Period	▪ 12 – 18 months
Operational Period	▪ Once the commercial operation date is achieved, the proposed facility will generate electricity for a minimum period of 20 years.

The proposed 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, where applicable, has been assessed in the specialist studies (included in Chapters 6 to 19 of this EIA Report). Management and mitigation measures required to address all the impacts are included within this EMPr.

1.3 STRUCTURE OF THE EMPR AND DEFINITION OF STUDY AREA AND SITE

The following EMPrs have been compiled for the proposed project:

- **EMPr for the proposed solar facility and all associated infrastructure:**
  - This EMPr is included as Appendix I of this EIA Report.
  - This EMPr covers all the key project components listed in Table 2 above, except for the on-site substation complex, switching station and collector station. The latter two components will be addressed in separate processes.

- **EMPr for the on-site substation complex to be located at the proposed project site (i.e. this EMPr):**
  - This EMPr is included as Appendix J of this EIA Report, and it complies with the Generic EMPr published for substation development (Government Gazette 42323, GN 435, dated 22 March 2019). This EMPr covers the On-site Independent Power Producer (IPP) or Facility Substation.

The **study area** for all the proposed Kudu Solar Facilities is the **full extent** of the **eight affected farm properties** on which the proposed PV Facilities are planned to be constructed. These farm properties[2] are listed in Table 3. The full extent of these properties (i.e. 8 150 hectares (ha)) has been assessed by the specialists to identify environmental sensitivities and no-go areas. Refer to Chapter 2 of the EIA Report for a list of affected farm properties for each proposed solar facility.

Table 3: Farm portions associated with the Kudu Solar Facilities

FARM PORTION	SG CODE
Remaining Extent of the Farm Bas Berg No. 88	C05700000000008800000
Remaining Extent of Portion 3 of the Farm Bas Berg No. 88	C05700000000008800003
Portion 4 (Portion of Portion 3) of the Farm Bas Berg No. 88	C05700000000008800004
Remaining Extent of Portion 2 (Middel Plaats) (a Portion of Portion 1) of the Farm Grasspan No. 40	C05700000000004000002
Remaining Extent of the Farm Annex Wolve Kuil No. 41	C05700000000004100000
Portion 1 (Wolve Kuil West) of the Farm Annex Wolve Kuil No. 41	C05700000000004100001
Portion 2 of the Farm Wolve Kuil No. 43	C05700000000004300002
Remaining Extent of the Farm Wolve Kuilen No. 42	C05700000000004200000

In this EMPr, the following spatial parameters apply to the management actions, unless where specified differently:

- The study area is referred to as the larger assessed area (i.e., 8 150 ha);
- The site as the footprint of the on-site substation complex, which covers an area of up to 8 ha, which includes the on-site IPP or facility substation; BESS and the switching station and collector station.

1.4 ENVIRONMENTAL SENSITIVITIES

Chapters 6 to 19 of the EIA Report provides a detailed description of the environmental features and sensitive areas that were identified and assessed in detail by the specialists for consideration in the layout and location of the proposed project.

Based on the findings of the specialist studies, an environmental sensitivity map has been produced. This map shows the sensitivities on site (e.g., terrestrial, aquatic, avifaunal, visual, agricultural, and heritage features) within the larger assessed area that was identified. Based on this map, the preferred location for the proposed solar facility avoids the sensitive features that were identified by the specialists. Based on the boundaries of the assessed area and the constraints of the environmental sensitivities, a site layout has also been preliminarily determined for this project (Appendix F of this EMPr).

[2] The farm property details are based on the information captured in the Title Deeds. All references made to these properties in this report should be considered as such.

Appendix E of this EMPr includes the environmental sensitivity map for the study area which indicates the environmental sensitive areas and features identified during the EIA Process (as described above). A combined project layout and sensitivity map is included in Appendix G of this EMPr.

1.5 IMPACTS IDENTIFIED DURING THE EIA PROCESS

Based on the specialist studies (as shown in Table 2), the following main direct potential impacts, as indicated in Table 4, were identified and appropriate management and mitigation measures included within the EMPr (where required) to ensure the potential impacts are suitably addressed and managed during all phases of the project. It should be noted that other impacts for which specialist studies were not undertaken but where mitigation or management actions may be required, are also included in the EMPr.

Table 4: Impacts identified in the EIA Process

KEY IMPACT	IMPACTS IDENTIFIED
Agriculture	**Negative Impacts** **Construction Phase** ▪ Loss of agricultural potential by occupation of land; ▪ Loss of agricultural potential by soil degradation; and ▪ Loss of agricultural potential by dust generation. **Decommissioning Phase** ▪ Loss of agricultural potential by soil degradation; and ▪ Loss of agricultural potential by dust generation. **Positive Impacts** **Construction, Operational, and Decommissioning Phases** ▪ Increased financial security for farming operations; and ▪ Improved security against stock theft and other crime due to the presence of security infrastructure and security personnel at the energy facility.
Visual	**Construction Phase** ▪ Potential effect of dust and noise from trucks and construction machinery during the construction period, and the effect of this on nearby farmsteads and visitors to the area. ▪ Potential visual effect of haul roads, access roads, stockpiles and construction camps in the visually exposed landscape. **Operational Phase** ▪ Potential visual intrusion of solar arrays and related infrastructure on receptors including glint and glare. ▪ Potential visual impact of an industrial type activity on the pastoral / rural character and sense of place of the area. **Decommissioning Phase** ▪ Potential visual effect of any remaining structures, platforms and disused roads on the landscape.

KEY IMPACT	IMPACTS IDENTIFIED
Heritage and Cultural Landscape	**Construction Phase** ▪ Potential impacts to archaeology; ▪ Potential impacts to graves; and ▪ Potential impacts to the cultural landscape. **Operational Phase** ▪ Potential impacts to the cultural landscape. **Decommissioning Phase** ▪ Potential impacts to the cultural landscape.
Palaeontology	The study area has been confirmed as low to very low palaeo-sensitivity. Provided that the Chance Fossil Finds Protocol is incorporated into the EMPrs and fully implemented during the construction phase of the solar PV facility, there are no objections on palaeontological heritage grounds to authorisation of the proposed project. Pending the discovery of significant new fossil finds before or during construction, no further specialist palaeontological studies, reporting, monitoring or mitigation are recommended for the proposed project. The Chance Fossil Finds Protocol has been incorporated into this EMPr (Appendix C). Other standard palaeontology impact management actions for the construction and decommissioning phases are also covered in Section 7.8 of this EMPr.
Terrestrial Biodiversity and Species	**Construction Phase** ▪ Fragmentation and loss of habitat and sensitive features; ▪ Loss of protected species; ▪ Introduction and spread of alien invasive species; ▪ Increased erosion and soil compaction; and ▪ Littering and General Pollution. **Operational Phase** ▪ Increase in alien invasive species; ▪ Loss of species composition and diversity; and ▪ Littering and General Pollution. **Decommissioning Phase** ▪ Alien invasive species management; and ▪ Loss of habitat.
Aquatic Biodiversity and Species	**Construction Phase** ▪ Disturbance of aquatic habitat and impact on aquatic biota; ▪ Removal of indigenous aquatic vegetation and associated loss of aquatic ecological integrity and functionality; ▪ Water supply for construction and stress on available water resources; ▪ Road crossing structures may impede flow in the aquatic features; ▪ Alien vegetation infestation within the aquatic features due to disturbance; and ▪ Increased sedimentation and contamination of surface water runoff may result from construction activities. **Operational Phase** ▪ Ongoing disturbance of aquatic features and associated vegetation along access roads or adjacent to the infrastructure that needs to be maintained; ▪ Modified runoff characteristics from hardened surfaces has the potential to result in erosion of adjacent watercourses; and ▪ Water supply and water quality impacts (e.g. contamination from sewage) as a result of the operation of the proposed Solar Facility and associated infrastructure.

KEY IMPACT	IMPACTS IDENTIFIED
	Decommissioning Phase ▪ Increased disturbance of aquatic habitat due to the increased activity; and ▪ Increased sedimentation and contamination of surface water runoff.
Avifauna	**Construction Phase** ▪ Displacement due to disturbance associated with the construction of the solar PV plant and associated infrastructure. **Operational Phase** ▪ Displacement due to habitat transformation associated with the presence of the solar PV plant and associated infrastructure ▪ Collisions with the solar panels ▪ Entrapment in perimeter fences ▪ Electrocutions in the onsite substation complex ▪ Electrocution of priority species on the internal 33kV powerlines. **Decommissioning Phase** ▪ Displacement due to disturbance associated with the decommissioning of the solar PV plant and associated infrastructure.
Socio-Economic	**Negative Impacts** **Construction Phase** ▪ Impacts associated with the presence of construction workers on local communities; ▪ Impacts related to the potential influx of job seekers; ▪ Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site; ▪ Increased risk of grass fires associated with construction related activities; ▪ Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles; and ▪ Impact on productive farmland. **Operational Phase** ▪ Visual impacts and associated impacts on sense of place; ▪ Potential impact on property values; and ▪ Potential impact on tourism. **Decommissioning Phase** ▪ Social Impacts associated with retrenchment, including loss of jobs and source of income. **Positive Impacts** **Construction Phase** ▪ Creation of employment and business opportunities, and opportunity for skills development and on-site training. **Operational Phase** ▪ Establishment of infrastructure to improve energy security and support renewable sector; ▪ Creation of employment opportunities; ▪ Benefits associated with socio-economic contributions to community development; and ▪ Benefits for local landowners.
Geohydrology	**Construction Phase** ▪ Potential lowering of the groundwater level from construction requirements; ▪ Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages.

KEY IMPACT	IMPACTS IDENTIFIED
	Operational Phase ▪ Potential lowering of the groundwater level from operational requirements. ▪ Potential impact of groundwater quality as a result of using cleaning agents for cleaning the solar panels. ▪ Groundwater quality deterioration as a result of electrolyte that will be used for the Battery Energy Storage System (BESS). **Decommissioning Phase** ▪ Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages. ▪ Potential lowering of the groundwater level from decommissioning requirements.
Geotechnical	**Construction Phase** ▪ Displacement of geologic materials; and ▪ Contamination of geologic materials as a consequence of the construction activities. **Operational and Decommissioning Phase** ▪ Increased unnatural hard surfaces; and ▪ Contamination of geologic materials as a consequence of typical maintenance and decommissioning activities.
Traffic	**Construction** ▪ Potential congestion and delays on the surrounding road network; ▪ Potential impact on traffic safety and increase in accidents with other vehicles or animals; ▪ Potential change in the quality of the surface condition of the roads; and ▪ Potential noise and dust pollution. **Operational** ▪ The traffic generated during the operational phase are mainly related to the staff that will be transported to and from the sites and are not anticipated to have a significant traffic impact on the surrounding road network. **Decommissioning Phases** ▪ Potential congestion and delays on the surrounding road network; ▪ Potential impact on traffic safety and increase in accidents with other vehicles or animals; ▪ Potential change in the quality of the surface condition of the roads; and ▪ Potential noise and dust pollution.
BESS	Various risks were identified in terms of safety, health and the environment due to the proposed BESS. Note that this not applicable to the IPP substation.

2. APPROACH TO PREPARING THE EMPr

2.1 COMPLIANCE WITH RELEVANT LEGISLATION

The NEMA requires that an EMPr be submitted where a BA or EIA is being undertaken for an Application for EA. The content of an EMPr must either contain the information set out in Appendix 4 of the 2014 NEMA EIA Regulations (as amended), or must be a generic EMPr relevant to an application as identified and gazetted by the Minister in a government notice. As part of the 2016 EGI SEA, a generic EMPr was also compiled for the development and expansion of (a) overhead electricity transmission and distribution infrastructure; and (b) substation infrastructure for the transmission and distribution of electricity. On 2 March 2018, these two Generic EMPrs were

gazetted in Government Gazette 41473, GN 162 and GN 163, for public comment for a period of 45 days. On 22 March 2019, these two Generic EMPrs were gazetted for implementation in Government Gazette 42323, GN 435. This Generic EMPr for substations is relevant to the proposed IPP Substation. This EMPr therefore subscribes to the requirements of the gazetted EMPr (Gazette 42323, GN 435).

Since the Generic EMPr has been gazetted and are applicable to the proposed project, the following has been undertaken:

- Section 1 of Part B of the gazetted Generic EMPr contains a pre-approved template with aspects that are common to the development of substation infrastructure. This section will be completed by the contractor, with each completed page signed and dated by the holder of the EA prior to commencement of the activity. This section will not be submitted to the DFFE as it has already been pre-approved gazetted. To allow I&APs access to the pre-approved EMPr template for consideration, the template is being released with the EIA Report for comment. It is included in Appendix D of this EMPr.

- Section 2 of Part B of the gazetted Generic EMPr has been completed to include site specific information, a preliminary infrastructure layout and development footprint site map, and a declaration that the Applicant will comply with the pre-approved template provided in Part B: Section 1 of the gazetted EMPr. This is being submitted to the DFFE for review during the 30-day comment period, and has been included in Section 4 (site specific information), Section 5 (preliminary infrastructure layout) and Section 6 (declaration of the Applicant) of this EMPr.

- Part C of the gazetted Generic EMPr has been compiled and included in Section 7 of this EMPr. It includes site specific impact management outcomes and impact management actions that are not included in the pre-approved generic EMPr. It is being submitted to the DFFE together with the EIA Report, for consideration. This section has been prepared by the EAP, with input from relevant specialists. This section of the EMPr is a supplement to the gazetted EMPr and provides site specific mitigation measures identified in the specialist studies. It was confirmed with the DFFE Interpretation Query Unit in February 2020 that if Part C the gazetted Generic EMPr is required, the impact management outcomes and impact management actions must be provided; whilst the columns under the headings, “Implementation” and “Monitoring” can only be completed by the relevant parties after the EA is issued (as per Part B – Section 1).

2.2 CONTENT OF THIS EMPR

This Site Specific EMPr includes the following:

- Section 4: Site specific information;
- Section 5: Preliminary infrastructure layout and development footprint site map;
- Section 6: Declaration that the Applicant will comply with the pre-approved template provided in Part B: Section 1 of the gazetted EMPr (which is included in Appendix D of this EMPr);
- Section 7: Site-Specific EMPr as required by Part C of the gazetted EMPr.

The Site-Specific EMPr follows the same template as that of Part B – Section 1 of the gazetted EMPr, as recommended. Where applicable, each section of the Site-Specific EMPr is divided into the following four phases of the project cycle:

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

The overall goal for environmental management for the proposed project is to plan, design, construct and operate the project in a manner that:

- Minimises the ecological footprint of the project on the local environment;
- Minimises impacts on fauna, flora and freshwater ecosystems;
- Facilitates harmonious co-existence between the project and other land uses in the area;
- Enhances the socio-economic benefits in the local area; and
- Contributes to the environmental baseline and understanding of environmental impacts of electrical grid infrastructure in a South African context.

The EMPr includes the findings and recommendations of the EIA Process and specialist studies. However, the EMPr is considered a “living” document and must be updated with additional information or actions during the design, construction, operational and decommissioning phases if applicable.

3. ROLES AND RESPONSIBILITIES

Since the Generic EMPrs are applicable for the on-site substation complex, it is best to adopt the definitions of the roles and responsibilities as captured in the gazette Generic EMPr of GN 435. This will allow consistency of the management of the project from an environmental perspective and will avoid any contradiction in terms of the roles and responsibilities. The generic roles and responsibilities required for key role players are those of the:

- Project Developer / Developer’s Project Manager (DPM);
- Developer Site Supervisor (DSS);
- Environmental Control Officer (ECO);
- Developer’s Environmental Officer (DEO);
- Contractor; and
- Contractor’s Environmental Officer (CEO).

The definitions of the roles and responsibilities are included in Appendix B of this EMPr. Note that the intent of Appendix B of this EMPr is to give a generic outline of what these roles typically require. It is expected that this will be appropriately defined at a later stage.

4. SITE SPECIFIC INFORMATION

4.1 CONTACT DETAILS AND DESCRIPTION OF THE PROJECT

4.1.1 Details of the Applicant

Project: Kudu Solar Facility 9 – EMPr for the On-Site Substation

Name of Applicant	Kudu Solar Facility 9 (Pty) Ltd
Name of Applicant Representative	Du Toit Malherbe
Telephone Number:	021 276 3620
Fax Number:	N/A
Postal Address:	Unit B1, Mayfair Square, Century Way, Century City, Cape Town
Physical Address:	Unit B1, Mayfair Square, Century Way, Century City, Cape Town, 7441

4.1.2 Details and Expertise of the EAP

Company of the EAP	Council for Scientific and Industrial Research (CSIR)
Name of EAP	Paul Lochner
Telephone Number:	021 888 2486 or 084 442 3646
Fax Number:	021 888 2693
Email Address:	PLochner@csir.co.za
Expertise of the EAP (Curriculum Vitae included):	**Qualifications:** ▪ B.Sc. Civil Engineering (awarded with Honours), University of Cape Town ▪ M. Phil. Environmental Science, University of Cape Town **Experience:** ▪ Paul has more than 30 years of experience in environmental assessment and management. **Professional Registration and Affiliations:** ▪ Registered EAP (2019/745) with the Environmental Assessment Practitioners Association of South Africa (EAPASA) ▪ International Association for Impact Assessment, South African Affiliate. **Curriculum Vitae of Paul Lochner is included in Appendix A of this EMPr.**

4.1.3 Project Name

Project Name	Scoping and Environmental Impact Assessment (EIA) Process for the Proposed Development of a Solar Photovoltaic (PV) Facility (Kudu Solar Facility 9) and associated infrastructure, near De Aar, Northern Cape Province

4.1.4 Description of the Project

Refer to Section 1.2 of this EMPr for a detailed description of the proposed project.

4.1.5 Project Location

The on-site substation complex for the proposed project will take place on Portion 1 (Wolve Kuil West) of the Farm Annex Wolve Kuil No. 41.

Table 5: Mid-point coordinates of the on-site substation complex

Decimal degree		Degrees, minutes, seconds	
Latitude (y)	**Longitude (x)**	**Latitude (S)**	**Longitude (E)**
-30,20203366	24,34877136	30° 12' 07.32119326" S	24° 20' 55.57690934" E

5. LAYOUT AND DEVELOPMENT FOOTPRINT SITE MAP

This section includes maps of sensitivities, as well as the preliminary infrastructure layout. As noted above, the feature and sensitivity map were prepared based on specialist feedback and existing databases. Individual feature and sensitivity maps are included in the specialist studies (Chapter 6 to 19 of the EIA Report). Refer to Appendix G of this EMPr for the combined sensitivity and layout map for the proposed Kudu Solar Facility.

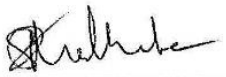
6. APPLICANT DECLARATION

PROJECT APPLICANT DECLARATION

The proponent/applicant or holder of the EA affirms that he/she will abide and comply with the prescribed impact management outcomes and impact management actions as stipulated in Part B: section 1 of the generic EMPr and have the understanding that the impact management outcomes and impact management actions are legally binding. The proponent/applicant or holder of the EA affirms that he/she will provide written notice to the CA 14 days prior to the date on which the activity will commence of commencement of construction to facilitate compliance inspections.

Signature Proponent/Applicant/Holder of EA

Date:



26 May 2023

Kudu Solar Facility 9 (Pty) Ltd

7. PROJECT SPECIFIC EMPR

7.1 ALIEN INVASIVE VEGETATION MANAGEMENT PLAN

Impact Management Outcomes: Ensure the appropriate removal of alien invasive vegetation from the proposed project area and minimise the establishment and spread of alien invasive plants due to the project activities. Avoid establishment and reduce the spread of alien invasive plants due to the project activities. Limit the disturbance of aquatic habitats.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
DESIGN PHASE						
▪ Compile a method statement that makes use of alien clearing methods as provided by the Working for Water Programme and outlined on the Department of Forestry, Fisheries and the Environment (DFFE) website[3]. The method statement should also take into account the relevant legislation under the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEM: BA)).	To be completed post EA by relevant parties.					
CONSTRUCTION PHASE						
▪ Invasive alien plant growth should be monitored on an ongoing basis within the project site and immediate surrounds to ensure that the disturbed areas associated within project activities do not become infested with invasive alien plants. ▪ Implement an ongoing monitoring programme for alien invasive vegetation for the construction phase to detect and quantify any alien invasive species that may become established within the construction site. ▪ Ensure proper management of soil stockpiles. Do not import soil stockpiles from areas with alien plants to ensure proper management of stockpiles. ▪ Undertake rehabilitation of disturbed areas as soon as possible after construction. Stockpile the shallow topsoil layer separately from the subsoil layers. Reinstate the topsoil layers (containing seed and vegetative material) when construction is complete to allow the plants to rapidly re-colonise the bare soil areas. ▪ Keep clearance and disturbance of indigenous vegetation to a minimum. ▪ Ensure that the footprint required for the proposed project activities (such as temporary stockpiling, earthworks, storage areas, site establishment etc.) is clearly demarcated and kept at a minimum.	To be completed post EA by relevant parties.					

[3] https://www.dffe.gov.za/projectsprogrammes/wfw/resources#mannuals

Impact Management Outcomes: Ensure the appropriate removal of alien invasive vegetation from the proposed project area and minimise the establishment and spread of alien invasive plants due to the project activities. Avoid establishment and reduce the spread of alien invasive plants due to the project activities. Limit the disturbance of aquatic habitats.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ 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. ▪ All construction machinery and plant equipment delivered to site for use during the construction phase should be cleaned in order to limit the introduction of alien species. ▪ Construction materials brought onto the site should be free of alien plant seed. Sources of alien seed should be prevented from being brought onto the site with imported materials.						
OPERATIONAL PHASE						
▪ Implement an ongoing monitoring programme for alien invasive vegetation for the operational phase to detect and quantify any alien invasive species that may become established within the operational site. ▪ Invasive alien plant growth and signs of erosion should be monitored on an ongoing basis to ensure that the disturbed areas do not become infested with invasive alien plants. Ongoing control of invasive alien plants within the site should be undertaken. ▪ Invasive alien plant material that has been cleared should be removed from the riparian zones and not left on the river banks or burnt within the riparian zone and buffer area. ▪ 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.	To be completed post EA by relevant parties.					
DECOMMISSIONING PHASE						
▪ Implement an ongoing monitoring programme for alien invasive vegetation for the decommissioning phase to detect and quantify any alien invasive species that may become established within the decommissioning site. ▪ Control of invasive alien plants within the site should be undertaken according to the approved method statement. ▪ Mitigation and follow-up monitoring of residual impacts (alien vegetation growth and erosion) may be required. ▪ All natural areas must be rehabilitated with species indigenous to the area. Re-seed with locally sourced seed of indigenous grass species that were recorded on site pre-construction.	To be completed post EA by relevant parties.					

7.2 TRAFFIC MANAGEMENT PLAN

Impact Management Outcomes: Manage impact that additional traffic generation will have on road network. Limit the deterioration of the road condition due to construction, operational and decommissioning phase traffic. Limit the release of noise, pollutants and dust emissions.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
DESIGN PHASE						
▪ If abnormal loads need to be transported by road to the site, a permit will need to be applied for in terms of Section 81 of the National Road Traffic Act and authorisation needs to be obtained from the relevant road authorities to modify the road reserve to accommodate turning movements at intersections (if necessary). ▪ It is not anticipated that any widening of the intersection at TR38/01 and DR3093 will be required, however, the existing island will need to be removed (approximately 60 m^2) to accommodate the turning movements of the abnormal load vehicles. ▪ The route to the sites should be further investigated to ensure that abnormal loads are not obstructed at any point by geometric, height and width limitations along the route. ▪ Discussions must be held with the relevant landowners on which the internal access farm road leading to the sites is located, prior to commencement to confirm requirements and details of the agreement. ▪ Ensure that the requirements for use of the internal farm access roads leading to the sites are addressed and considered in the design, as and where applicable. ▪ Provide a Transport Traffic Plan to the Provincial and Municipal Road Department (if required). ▪ A Road Maintenance Plan should be developed for the internal farm access roads (i.e. internal private roads leading off the DR3093) that will be used. The plan should address requirements such as, but not limited to, grading, dust suppressant mechanisms, drainage (where required), signage, and speed limits. The Road Maintenance Plan must ensure regular maintenance of the roads. The Road Maintenance Plan must be communicated with the relevant authorities, where required, and must be provided to the surrounding community forum prior to commencement of construction.	To be completed post EA by relevant parties.					
CONSTRUCTION PHASE						
▪ Plan and stagger delivery trips and schedule deliveries so that they occur outside of peak traffic periods, where possible. ▪ Suitable parking areas should be designated for construction trucks and vehicles at the construction site camp in order to promote order and improve safety. ▪ The use of public transport (buses and/or minibus taxis) to convey construction personnel to the site should be encouraged.	To be completed post EA by relevant parties.					

Impact Management Outcomes: Manage impact that additional traffic generation will have on road network. Limit the deterioration of the road condition due to construction, operational and decommissioning phase traffic. Limit the release of noise, pollutants and dust emissions.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Staff trips should occur outside of peak hours, where possible. ▪ Ensure that the existing island removal at the intersection of TR38/01 and DR3093 is undertaken in an environmental conscious manner, once the relevant authorisations from the road authorities are obtained. Ensure that construction vehicles always remain within a demarcated area at the intersection, and that local road officials are informed of the planned island removal process. ▪ Well maintained vehicles should be used together with well-trained drivers during the construction phase. Vehicle maintenance and driver competency should be monitored. Proof of driver competency as well as the vehicle checks should be verified and undertaken to ensure that vehicles are roadworthy and hence, do not pose a safety risk. The Contractors must ensure that construction vehicles are roadworthy, properly serviced and maintained, and respect the vehicle safety standards implemented by the Project Developer. ▪ To ensure reduced speeds along the roads, implement speed control mechanisms within the construction site by means of a stop and go system, implement speed limits and placement of road signage for the speed limits. ▪ Adhere to all speed limits applicable to all roads used. ▪ Road kill monitoring programme (inclusive of wildlife collisions record keeping) should be established. ▪ Implement clear and visible signage indicating movement of vehicles at intersections within the construction site and in the vicinity of the nearby farm steads. ▪ Ensure that there is regular maintenance of the internal farm access roads (i.e. internal private roads leading off the DR3093) that will be used, by the contractor during the construction phase in line with the agreed maintenance plan. ▪ Ensure that the upgrading of the internal farm access roads (i.e. internal private roads leading off the DR3093 that are impacted on by the proposed project and will be used), is undertaken to suitable standards as specified by the civil engineer and in accordance with the maintenance plan. ▪ Ensure that the internal farm access roads (i.e. internal private roads leading off the DR3093 that are impacted on by the proposed project and will be used) are restored to its original pre-construction road condition.						

Impact Management Outcomes: Manage impact that additional traffic generation will have on road network. Limit the deterioration of the road condition due to construction, operational and decommissioning phase traffic. Limit the release of noise, pollutants and dust emissions.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Construction activities will have a higher impact than the normal road activity and therefore the internal farm access roads (i.e. internal private roads leading off the DR3093) to site should be inspected on a weekly basis for structural damage. ▪ Implement management strategies for dust generation e.g. apply dust suppressant on the gravel roads on the construction site, exposed areas and stockpiles. Avoid the use of potable water for dust suppression during the construction phase and consider the use of alternative approved sources, where possible. ▪ Vehicles must not be overloaded during the construction phase in order to reduce impacts on the road structures, particularly the access roads leading to the site. Random visual inspection of vehicles should be undertaken in order to monitor for overloading. The inspections should also verify if the trucks are covered with appropriate material (such as tarpaulin) if and where possible. ▪ Implement management strategies for dust generation e.g. apply dust suppressant on the gravel roads on the construction site, exposed areas and stockpiles. Avoid the use of potable water for dust suppression during the construction phase and consider the use of alternative approved sources, where possible. ▪ 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. ▪ Avoid using old and unmaintained construction equipment (which generate high sound levels and greater exhaust emissions) and ensure equipment is well maintained.						
OPERATIONAL PHASE						
▪ Well maintained vehicles should be used together with well-trained drivers during the operational phase, as required. Vehicle maintenance and driver competency should be monitored. Proof of driver competency as well as the vehicle checks should be verified and undertaken to ensure that vehicles are roadworthy and hence, do not pose a safety risk. Vehicles must be roadworthy, visible, adequately marked, properly serviced and maintained, and operated by an appropriately licensed operator. ▪ Adhere to all speed limits applicable to all roads used. ▪ Implement clear and visible signage and signals indicating movement of vehicles at intersections and in the vicinity of the nearby farm steads. ▪ The use of public transport (buses and/or minibus taxis) or carpooling to convey operational personnel to the site should be encouraged. ▪ Limit access to the site to personnel.	To be completed post EA by relevant parties.					

Impact Management Outcomes: Manage impact that additional traffic generation will have on road network. Limit the deterioration of the road condition due to construction, operational and decommissioning phase traffic. Limit the release of noise, pollutants and dust emissions.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ The main access roads to site should be inspected on a weekly basis for structural damage. ▪ Ensure that there is regular maintenance of the internal farm access roads (i.e. internal private roads leading off the DR3093) that will be used, by the operator during the operational phase in line with the agreed maintenance plan. ▪ Implement management strategies for dust generation e.g. apply dust suppressant on gravel roads on the operational site, exposed areas and stockpiles. ▪ Vehicles must not be overloaded during the operational phase (where applicable) in order to reduce impacts on the road structures. Random visual inspection of vehicles should be undertaken in order to monitor for overloading (where applicable).						
DECOMMISSIONING PHASE						
▪ Ensure that the traffic mitigation and management measures are adhered to during the decommissioning phase.	To be completed post EA by relevant parties.					

7.3 TERRESTRIAL BIODIVERSITY

Impact Management Outcomes: To reduce the loss of and impact on fauna. Ensure compliance with relevant Provincial and National legislation in respect of habitat and species permits. Allow for ecological succession and animal re-colonisation. Reduced loss of natural vegetation and veld degradation within the development footprint and the surrounding area. Minimise impacts on protected species. Reduce the amount of littering and pollution within and around the construction and operational site. Reduced erosion and soil compaction caused by construction activities. To reduce incidental mortality and injury of fauna within the construction area. Rehabilitation post-construction by replacing topsoil and re-seeding. To reduce the impact and loss of fauna from site as a result of their exclusion from the area due to fencing. The avoidance of electrical light pollution through prudent positioning of external lighting. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
DESIGN PHASE						
▪ Provide critter paths through the fence line to allow species access to site and in order to escape. ▪ Ensure that the live electrical fence wire is not placed at ground level. ▪ Reduce direct mortalities by allowing for fauna to cross the roads. Where applicable, this can be achieved by constructing fauna underpasses under the roads (large culverts or large open-ended concrete pipes laid into the raised roads). These underpasses should be used	To be completed post EA by relevant parties.					

Impact Management Outcomes: To reduce the loss of and impact on fauna. Ensure compliance with relevant Provincial and National legislation in respect of habitat and species permits. Allow for ecological succession and animal re-colonisation. Reduced loss of natural vegetation and veld degradation within the development footprint and the surrounding area. Minimise impacts on protected species. Reduce the amount of littering and pollution within and around the construction and operational site. Reduced erosion and soil compaction caused by construction activities. To reduce incidental mortality and injury of fauna within the construction area. Rehabilitation post-construction by replacing topsoil and re-seeding. To reduce the impact and loss of fauna from site as a result of their exclusion from the area due to fencing. The avoidance of electrical light pollution through prudent positioning of external lighting. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
in conjunction with "fauna barriers" which prevent the most susceptible small fauna from crossing the roads on the surface by directing them towards the underpasses where they can cross under the roads safely. It is important to note that utilization of underpasses is strongly dependent on animal body size (larger culverts are more successful) and the surrounding habitat. ▪ Reduce exterior lighting to that necessary for safe operation and implement operational strategies to reduce spill light. Use down-lighting from non-UV lights* where possible, as light emitted at one wavelength has a low level of attraction to insects. This will reduce the likelihood of attracting insects and their predators. Insects generally see 3 colours of light, Ultraviolet (UV), blue and green. Bright white or bluish lights (mercury vapor, white incandescent and white florescent) are the most attractive to insects. Yellowish, pinkish, or orange (sodium vapor, halogen, dichroic yellow) are the least attractive to most insects. ▪ Ensure the necessary permits or licenses are identified and applied for as applicable for removal of indigenous vegetation, especially for protected species. Provincially protected species must be avoided during the construction activities where it will be impacted on by construction activities. Alternatively, permits for the rescue i.e. removal and translocation or destruction, where relevant, of any of these protected species must be applied for and granted by the provincial authority. ▪ Await response and provision of permit (as required) from the relevant Authorities prior to the removal of the indigenous species (if required). Once these permits are obtained, search and rescue must be undertaken for the relevant indigenous species prior to the commencement of construction activities. ▪ Ensure that the footprint required for the proposed project activities is kept at a minimum.						
CONSTRUCTION PHASE						
▪ Sensitive habitats and areas outside of the project development area should be clearly demarcated as no go areas during the construction phase to avoid accidental impacts. ▪ Vegetation clearing close to the watercourse should be minimised and where necessary, appropriate storm water management should be put in place to limit erosion potential of exposed soil, such as placing sedimentation trapping to prevent exposed soils from spilling into the watercourse (if necessary).	To be completed post EA by relevant parties.					

Impact Management Outcomes: To reduce the loss of and impact on fauna. Ensure compliance with relevant Provincial and National legislation in respect of habitat and species permits. Allow for ecological succession and animal re-colonisation. Reduced loss of natural vegetation and veld degradation within the development footprint and the surrounding area. Minimise impacts on protected species. Reduce the amount of littering and pollution within and around the construction and operational site. Reduced erosion and soil compaction caused by construction activities. To reduce incidental mortality and injury of fauna within the construction area. Rehabilitation post-construction by replacing topsoil and re-seeding. To reduce the impact and loss of fauna from site as a result of their exclusion from the area due to fencing. The avoidance of electrical light pollution through prudent positioning of external lighting. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ The watercourse and its buffer areas should be demarcated and fenced off prior to construction to exclude the watercourse from development activities. ▪ Workers should not be allowed outside the demarcated construction areas or camps or beyond the boundaries of the solar PV facility itself, i.e. they will not be allowed to wander across the undeveloped parts of each site. No development or activities should take place in the high sensitivity areas. ▪ Buffer zones are allocated to sensitive or important habitat features to alleviate the effect of habitat loss, habitat fragmentation, disturbances, increased isolation and edge effects. No development should take place within High sensitivity areas or buffer zones. Accordingly, the Koppies habitat (where relevant) should be avoided. ▪ No construction related activities, such as the site camp, storage of materials, temporary roads or ablution facilities may be located in the high sensitivity areas. ▪ Minimise loss of natural vegetation. ▪ Only clear areas designated for development. ▪ The proposed project footprint must be demarcated to reduce unnecessary disturbance beyond the proposed project area. ▪ Unnecessary impacts on surrounding natural vegetation must be avoided during construction. No construction vehicles should be allowed to drive around the veld. All construction vehicles should strictly remain on properly demarcated roads. ▪ Undertake re-vegetation and rehabilitation of disturbed areas as soon as possible after construction. Stockpile the shallow topsoil layer separately from the subsoil layers. Reinstate the topsoil layers (containing seed and vegetative material) when construction is complete to allow the plants to rapidly re-colonise the bare soil areas. Re-seed with locally-sourced seed of indigenous grass species that were recorded on site during the pre-construction phase. ▪ The collection, hunting or harvesting of any plants (or 'veldkos'), fuel wood or animals at the site during construction should be strictly forbidden and the staff should be educated to prevent this from happening. ▪ Indigenous vegetation must not be removed or damaged.						

Impact Management Outcomes: To reduce the loss of and impact on fauna. Ensure compliance with relevant Provincial and National legislation in respect of habitat and species permits. Allow for ecological succession and animal re-colonisation. Reduced loss of natural vegetation and veld degradation within the development footprint and the surrounding area. Minimise impacts on protected species. Reduce the amount of littering and pollution within and around the construction and operational site. Reduced erosion and soil compaction caused by construction activities. To reduce incidental mortality and injury of fauna within the construction area. Rehabilitation post-construction by replacing topsoil and re-seeding. To reduce the impact and loss of fauna from site as a result of their exclusion from the area due to fencing. The avoidance of electrical light pollution through prudent positioning of external lighting. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Fires should only be allowed within fire-safe demarcated areas. Open fires must be prohibited. Appropriate fire safety training should also be provided to staff that are to be on site for the duration of the construction phase. ▪ A plant rescue operation must be initiated to confirm that no SSC are located within the development footprint. ▪ Should any of the listed / protected species need to be removed, the requisite provincial and/or national permits must be obtained prior to the removal of the species. ▪ Establish a recording method in order to monitor the construction activities, including species presence within site, mortalities and observations. ▪ All staff should be subjected to an induction training program where appropriate conservation principles, safety procedures, snake bite avoidance and first aid treatment are taught. Several staff members should complete a snake handling course to safely remove snakes from construction areas. ▪ All staff operating motor vehicles must undergo an environmental induction training course that includes instruction on the need to comply with speed limits, to respect all forms of wildlife (especially reptiles and amphibians) and, wherever possible, prevent accidental road kills of fauna. Drivers not complying with speed limits should be subject to penalties. ▪ Excavated trenches must be left open for as short a time as possible to avoid acting as dispersal barriers or traps. ▪ All open excavated trenches must have escape points with an angle of less than 45° to allow for trapped animals to escape. ▪ Equipment with low noise emissions must be used to not disrupt ecological life cycles (breeding, migration, feeding) of animals. Do not unnecessarily disturb faunal species, especially during the breeding season and juveniles. ▪ The site camp must not be located in high sensitivity areas and their buffer zones. ▪ Ablution facilities must be located outside sensitive areas and their buffer zones. ▪ Dangerous goods may not be stored within 100 m of a watercourse. ▪ Portable ablution facilities must be regularly cleaned and maintained in good working condition.						

Impact Management Outcomes: To reduce the loss of and impact on fauna. Ensure compliance with relevant Provincial and National legislation in respect of habitat and species permits. Allow for ecological succession and animal re-colonisation. Reduced loss of natural vegetation and veld degradation within the development footprint and the surrounding area. Minimise impacts on protected species. Reduce the amount of littering and pollution within and around the construction and operational site. Reduced erosion and soil compaction caused by construction activities. To reduce incidental mortality and injury of fauna within the construction area. Rehabilitation post-construction by replacing topsoil and re-seeding. To reduce the impact and loss of fauna from site as a result of their exclusion from the area due to fencing. The avoidance of electrical light pollution through prudent positioning of external lighting. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Any spillage from ablution facilities must be cleaned up immediately and disposed of in an appropriate manner. ▪ Hydrocarbon fuels must be stored in a secure, bunded area. ▪ Vehicles must be in good working condition, with no oil, water, or fuel leaks. Vehicles must be regularly inspected, and any problems corrected. ▪ Refuelling may only take place in an appropriate, bunded area. Refuelling may not take place in sensitive areas. ▪ Hydrocarbon spills must be contained and cleaned up immediately. Spill kits must be available on site in case of accidental spillage. ▪ Utilise existing access routes as far as possible. ▪ Confine the movement of vehicles to the access routes to and from the site and to the construction areas. ▪ Do not drive in the natural veld. ▪ Rehabilitate new vehicle tracks and areas where the soil has been compacted as soon as possible. ▪ Monitor the entire site for signs of erosion. ▪ Refer to the Aquatic Biodiversity Specialist Assessment Report for mitigation measures relevant to watercourse crossings and development close to watercourses. ▪ All vehicle speeds associated with the project should be monitored and should be limited to 40 km/h (maximum) during the construction phase. ▪ Conduct inspections of the fence line to address any animals that may be affected by the fence, i.e. stuck or casualties. ▪ A roadkill monitoring programme (inclusive of wildlife collisions record keeping) should be established. Where needed, Animex fences must be installed to direct animals to safe road crossings. Finally, mitigation should be adaptable to the onsite situation which may vary over time. ▪ Re-vegetation of disturbed surfaces must occur immediately after construction activities are completed. Allow natural vegetation recruitment from the topsoil unless the vegetation cover is insufficient. Re-seed with locally-sourced seed of indigenous grass species that						

Impact Management Outcomes: To reduce the loss of and impact on fauna. Ensure compliance with relevant Provincial and National legislation in respect of habitat and species permits. Allow for ecological succession and animal re-colonisation. Reduced loss of natural vegetation and veld degradation within the development footprint and the surrounding area. Minimise impacts on protected species. Reduce the amount of littering and pollution within and around the construction and operational site. Reduced erosion and soil compaction caused by construction activities. To reduce incidental mortality and injury of fauna within the construction area. Rehabilitation post-construction by replacing topsoil and re-seeding. To reduce the impact and loss of fauna from site as a result of their exclusion from the area due to fencing. The avoidance of electrical light pollution through prudent positioning of external lighting. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
were recorded on site pre-construction or by using a commercial seed mix indigenous to the area.						
OPERATIONAL PHASE						
▪ Monitor rehabilitation efforts post-construction phase. ▪ Avoidance of damage to infrastructure by faunal activity as well as impact on fauna as a result of the site infrastructure. ▪ Identify impact of burrowing and other faunal activities on the fence line and operations activities. ▪ Undertake the management of faunal intrusion through the fence, including possible mortalities. ▪ Conduct inspections of the fence line to address any animals that may be affected by the fence, i.e. stuck or casualties. ▪ The operational personnel and staff should be made aware of the presence of fauna within the proposed project area. ▪ Driving is not allowed at night, where possible. ▪ Vehicles must be in good working condition, with no oil, water, or fuel leaks. ▪ Vehicles must be regularly inspected, and any problems corrected. ▪ Refuelling may only take place in an appropriate, designated bunded area. ▪ Any spillages must be reported immediately and dealt with appropriately. ▪ Spill kits must be available on site in case of accidental spillage.	To be completed post EA by relevant parties.					
DECOMMISSIONING PHASE						
▪ The loss of vegetation is unavoidable within the approved layout development footprint, but sensitive areas must be avoided. ▪ Implement appropriate rehabilitation measures to restore each habitat to a natural state after decommissioning. ▪ The effort must benefit the potential faunal species that may find refuge on the site. ▪ All natural areas must be rehabilitated with species indigenous to the area. Re-seed with locally-sourced seed of indigenous grass species that were recorded on site pre-construction.	To be completed post EA by relevant parties.					

Impact Management Outcomes: To reduce the loss of and impact on fauna. Ensure compliance with relevant Provincial and National legislation in respect of habitat and species permits. Allow for ecological succession and animal re-colonisation. Reduced loss of natural vegetation and veld degradation within the development footprint and the surrounding area. Minimise impacts on protected species. Reduce the amount of littering and pollution within and around the construction and operational site. Reduced erosion and soil compaction caused by construction activities. To reduce incidental mortality and injury of fauna within the construction area. Rehabilitation post-construction by replacing topsoil and re-seeding. To reduce the impact and loss of fauna from site as a result of their exclusion from the area due to fencing. The avoidance of electrical light pollution through prudent positioning of external lighting. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.						

7.4 AQUATIC BIODIVERSITY

Impact Management Outcomes: Limit the disturbance of aquatic habitats. Minimise potential to modify flow/hydraulics-related impacts and increase the potential for erosion. Limit the potential for contamination/pollution of aquatic ecosystems.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
DESIGN PHASE						
▪ Ensure the final layout avoids watercourses and recommended buffers as far as possible; utilisation should be made of existing disturbed areas where possible. The medium-sensitivity aquatic habitats should be avoided in the layout design, with only low-sensitivity habitats being disturbed during construction. Note that this has been achieved in the EIA Phase, whereby the recommended development setbacks (i.e. recommended setback from the wider floodplain adjacent to the larger rivers) have been adopted in the identification of the development footprints. The recommended avoidance areas have been avoided. ▪ Some access roads do cross water courses for the entire project, which would be acceptable provided the recommended mitigation is implemented. For road crossings, the sensitivities are not regarded as no-go. ▪ Construction sites and laydown areas should be located within the assessed buildable areas/development footprints. ▪ A comprehensive stormwater management plan should be compiled for the compacted surfaces within the site by the project engineer with input from the freshwater specialist. The plan should aim to reduce the intensity of runoff from the developed area, particularly on the steeper slopes and reduce the intensity of the discharge into the adjacent drainage	To be completed post EA by relevant parties.					

Impact Management Outcomes: Limit the disturbance of aquatic habitats. Minimise potential to modify flow/hydraulics-related impacts and increase the potential for erosion. Limit the potential for contamination/pollution of aquatic ecosystems.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
lines. Where necessary measures to dissipate flow intensity or protect erosion should be included in the plan. The plan should encourage infiltration rather than runoff and should prevent the impedance of surface or sub-surface flows. The plan should also mitigate any contaminated runoff from the construction and operation activities from being discharged into any of the aquatic features within the site. ▪ Stormwater run-off infrastructure must be designed to mitigate both the flow and water quality impacts of any stormwater leaving the developed areas. The runoff should rather be dissipated over a broad area covered by natural vegetation or managed using appropriate shaping of the road with berms or channels and swales adjacent to hardened surfaces where necessary. Should any erosion features develop, they should be stabilised immediately. ▪ Adequate erosion mitigation measures should be incorporated into designs. ▪ Use existing crossings, as best as possible and where allowable. The existing road infrastructure, particularly within the floodplain, should be utilised as far as possible to access new infrastructure to minimise the overall disturbance. It is recommended that any new linear type of infrastructure crossings over watercourses be placed where there are existing structures or road crossings within the watercourse corridors, where possible. For any new infrastructure placed within the watercourses: The structure should not impede or concentrate the flow in the watercourse, and should prevent blockages and erosion. It is recommended that low-water crossings should be utilised. Any rubble or waste associated with the construction works within the aquatic features should be removed once construction is complete. ▪ A sustainable water supply should be sought. Water consumption requirements for the construction and operation of the proposed project if not obtained from an authorised water user within the area, must be authorised by the Department of Water and Sanitation (DWS). ▪ No liquid waste should be discharged into any of the aquatic features within the site without the approval of the DWS. Wastewater should be properly contained on-site and removed to a licensed wastewater treatment facility that can treat the wastewater.						
CONSTRUCTION PHASE						
▪ Avoid disturbing aquatic habitats as far as possible. ▪ Minimise works within aquatic ecosystems as far as possible. ▪ For all project-related components within the site, the aquatic features of medium sensitivity should be treated as no-go areas during the construction phase.	To be completed post EA by relevant parties.					

Impact Management Outcomes: Limit the disturbance of aquatic habitats. Minimise potential to modify flow/hydraulics-related impacts and increase the potential for erosion. Limit the potential for contamination/pollution of aquatic ecosystems.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Any activities that require construction within the delineated aquatic features and the recommended buffers should be described in method statements that are approved by the Environmental Control Officer (ECO). ▪ Rehabilitation of any disturbed areas within the aquatic features and the recommended buffer areas should be undertaken immediately following completion of the disturbance activity according to rehabilitation measures as included in a method statement for that specific activity as described above. ▪ Any works within aquatic features should be undertaken in the dry season where possible. ▪ Sediment traps should be used where necessary. ▪ Ablution facilities should not be placed within 100m of any of the aquatic features delineated within the site; ▪ Liquid dispensing receptacles (e.g. lubricants, diesel, shutter oil etc.) must have drip trays beneath them/beneath the nozzle fixtures. Material safety data sheets (MSDS) must be available on site (if required) where products are stored so that in the event of an incident, the correct action can be taken. Depending on the types of materials stored on site during the construction activities, suitable product recovery materials must be readily available. Vehicles should ideally be washed at their storage yard as opposed to on site. ▪ Clearing of indigenous vegetation should not take place within the aquatic features and the recommended buffers. ▪ Rehabilitate disturbed aquatic habitats once construction works are complete by revegetating them with suitable local indigenous vegetation. ▪ Water use for construction should be minimised as much as possible. The water should be obtained from an existing water allocation or other viable water sources for construction purposes. ▪ Good housekeeping and site management measures must be implemented at the laydown areas and the construction site and monitored by the appointed ECO. ▪ Rationalise infrastructure as far as possible by sharing the infrastructure or using existing disturbed areas. ▪ Manage stormwater impacts.						
OPERATIONAL PHASE						
▪ Ongoing monitoring of the road crossing structures, in particular before the rainfall period, should be undertaken to ensure that the integrity of the structures is intact and that they are not blocked with sediment or debris. Ongoing monitoring post large rainfall events should also be undertaken to identify and address any erosion occurring within the watercourses.	To be completed post EA by relevant parties.					

Impact Management Outcomes: Limit the disturbance of aquatic habitats. Minimise potential to modify flow/hydraulics-related impacts and increase the potential for erosion. Limit the potential for contamination/pollution of aquatic ecosystems.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Sewage generated within the site should be discharged to a conservancy tank that is properly serviced and regularly evacuated to nearby wastewater treatment works. ▪ Limit disturbance and rehabilitate disturbed areas. ▪ Ensure there is sufficient stormwater management to prevent erosion of watercourses. ▪ Limit and monitor water use.						
DECOMMISSIONING PHASE						
▪ For all project-related components within the site, the aquatic features of medium sensitivity should be demarcated by the appointed ECO before the commencement of the decommissioning activities and treated as no-go areas during the decommissioning phase. ▪ Minimise works within aquatic ecosystems. If the project layout avoided these areas, the decommissioning works would also be able to avoid aquatic habitats as delineated. Note that all aquatic areas recommended for avoidance have been avoided in the EIA phase layout identification. ▪ Any activities that require decommissioning activities within the delineated aquatic features and the recommended buffers should be described in method statements that are approved by the ECO. ▪ Rehabilitate and revegetate disturbed areas, where required. ▪ Rehabilitation of any disturbed areas within the aquatic features and the recommended buffer areas should be undertaken immediately following the completion of the disturbance activity according to rehabilitation measures as included in a method statement for that specific activity. ▪ The road network should be returned to that resembling pre-construction, with all additional roads removed where possible. ▪ Decommissioning activities within aquatic features should be undertaken in the dry season where possible. ▪ Sediment traps should be used where necessary. ▪ Laydown areas should be placed within the approved PV footprint and layout. ▪ Good housekeeping measures should be implemented as per the project EMPr and monitored by the appointed ECO. This should specifically address on-site stormwater management and prevention of pollution during decommissioning. Any stormwater that does arise within the decommissioning site must be handled appropriately to trap sediments and pollutants.	To be completed post EA by relevant parties.					

7.5 AVIFAUNA

Impact Management Outcomes: Prevent mortality of avifauna. Prevent displacement of avifauna. Prevention of electrocution mortality. Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Construction Environmental Management Programme (CEMPr). Prevent unnecessary displacement of avifauna by ensuring that the rehabilitation of transformed areas is implemented by an appropriately qualified rehabilitation specialist, according to the recommendations of the botanical specialist study. Prevention of electrocution mortality. Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Decommissioning EMPr.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
DESIGN PHASE						
▪ A single perimeter fence should be used [4]. ▪ A 1 km all infrastructure exclusion zone around the Verreaux's Eagle nest at -30.227660° 24.329773° must be implemented to provide unhindered access to the nest (Refer to the sensitivity maps provided in the Avifauna Specialist Assessment Report). ▪ Design the facility with underground cables as much as possible.	To be completed post EA by relevant parties.					
CONSTRUCTION PHASE						
▪ A site-specific CEMPr must be implemented, which gives an appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the CEMPr and should apply good environmental practice during construction. The CEMPr must specifically include the following: o No off-road driving; o Maximum use of existing roads, where possible and the construction of new roads should be kept to a minimum as far as practical; o Measures to control noise and dust according to latest best practice; o Restricted access to the rest of the property, the activity should as far as possible be restricted to the development footprint; o Strict application of all recommendations in the ecological and botanical specialist studies, especially pertaining to the limitation of the footprint.	To be completed post EA by relevant parties.					
OPERATIONAL PHASE						
▪ The recommendations of the botanical specialist must be strictly implemented, especially as far as limiting the vegetation clearance to what is absolutely necessary, and rehabilitation of transformed areas are concerned. ▪ Develop a Habitat Restoration Plan (HRP). ▪ Monitor rehabilitation via site audits and site inspections to ensure compliance. Record and report any non-compliance.	To be completed post EA by relevant parties.					

[4] If a fence is used consisting of an outer diamond mesh fence and inner electric fence with a separation distance of approximately 100 mm or less, it should not pose any risk of entrapment for large terrestrial species and can be considered a single fence.

Impact Management Outcomes: Prevent mortality of avifauna. Prevent displacement of avifauna. Prevention of electrocution mortality. Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Construction Environmental Management Programme (CEMPr). Prevent unnecessary displacement of avifauna by ensuring that the rehabilitation of transformed areas is implemented by an appropriately qualified rehabilitation specialist, according to the recommendations of the botanical specialist study. Prevention of electrocution mortality. Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Decommissioning EMPr.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ It is recommended that if on-going impacts are recorded as part of routine inspections once operational, site-specific mitigation (insulation) be applied reactively. This is an acceptable approach because Red List priority species are unlikely to frequent the substation and be electrocuted.						
DECOMMISSIONING PHASE						
▪ A site-specific Decommissioning EMPr (DEMPr) must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the DEMPr and should apply good environmental practice during decommissioning. The DEMPr must specifically include the following: o No off-road driving; o Maximum use of existing roads during the decommissioning phase and the construction of new roads should be kept to a minimum as far as practical; o Measures to control noise and dust according to latest best practice; o Restricted access to the rest of the property, the activity should as far as possible be restricted to the development footprint; o Strict application of all recommendations in the ecological and botanical specialist studies, especially as far as limitation of the activity footprint is concerned.	To be completed post EA by relevant parties.					

7.6 VISUAL IMPACTS

Impact Management Outcomes: Minimise exposure of visual receptors to visual impacts. To minimise visual impacts on the exposed landscape, nearby farmsteads and visitors to the area. To reduce the visual intrusion of the operation infrastructure on the surrounding landscape and receptors. Minimise exposure of visual receptors to impacts associated with decommissioning.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
DESIGN PHASE						
▪ Review signed off designs to ensure that: o The substation is located in an unobtrusive low-lying area, away from public roads, where possible.	To be completed post EA by relevant parties.					

Impact Management Outcomes: Minimise exposure of visual receptors to visual impacts. To minimise visual impacts on the exposed landscape, nearby farmsteads and visitors to the area. To reduce the visual intrusion of the operation infrastructure on the surrounding landscape and receptors. Minimise exposure of visual receptors to impacts associated with decommissioning.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
○ Muted natural colours and non-reflective finishes are used for structures generally. ○ Internal access roads are designed to be as narrow as possible, and existing roads or tracks used as far as possible. ○ Outdoor/security lighting to be fitted with reflectors to obscure the light source, and minimise light spillage. ○ Outdoor signage to be discrete and commercial / billboard signage avoided.						
CONSTRUCTION PHASE						
▪ Ensure that visual management measures are included as part of the EMPr and monitored by an ECO. ▪ Ensure construction camps, stockpiles, temporary laydown areas and batching plants are located in visually unobtrusive areas, away from public roads and outside of identified no-go areas unless otherwise approved by the visual specialists. ▪ Implementation of dust suppression and litter control measures. ▪ Rehabilitation efforts to commence immediately after construction activities are completed.	To be completed post EA by relevant parties.					
OPERATIONAL PHASE						
▪ Ensure that visual mitigation measures are monitored by management on an on-going basis, including the maintenance of rehabilitated areas, as well as control of any signage, lighting and waste at the proposed project, with interim inspections by the responsible Environmental Officer or Manager	To be completed post EA by relevant parties.					
DECOMMISSIONING PHASE						
▪ Ensure that procedures for the removal of structures during decommissioning are implemented, including recycling of materials and rehabilitation of the site to a visually acceptable standard, and signed off by the delegated authority. ▪ It is assumed that some access roads and concrete pads would remain. Those that are not required should be ripped and regraded, and vegetation or cropland reinstated to match the surroundings. ▪ Exposed or disturbed areas to be revegetated to blend with the surroundings.	To be completed post EA by relevant parties.					

7.7 HERITAGE IMPACTS (ARCHAEOLOGY AND CULTURAL LANDSCAPE

Impact Management Outcomes: Avoid impacts (preferred) or locate and sample or rescue sites/burials before disturbance. Rescue information, artefacts or burials before extensive damage occurs. Minimise landscape scarring. Minimise intrusion into the cultural landscape. Minimise contrast and light pollution.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
CONSTRUCTION PHASE						
▪ Reporting chance finds of graves and dense clusters of artefacts as early as possible to an archaeologist and/or the South African Heritage Resources Agency (SAHRA) (https://www.sahra.org.za/contact/), protect in situ and stop work in immediate area and appoint archaeologist to exhume or sample as needed (where relevant). ▪ Ensure disturbance is kept to a minimum and does not exceed project requirements. Minimise the duration of the activities. At the end of the construction period, rehabilitate areas, not needed during operation. ▪	To be completed post EA by relevant parties.					
OPERATIONAL PHASE						
▪ Reporting chance finds of graves and dense clusters of artefacts as early as possible to an archaeologist and/or the SAHRA (https://www.sahra.org.za/contact/), protect in situ and stop work in immediate area and appoint archaeologist to exhume or sample as needed (where relevant) ▪ Ensure that all maintenance vehicles and operational activities stay within designated areas. ▪ Paint buildings in earthy colours to reduce contrast. Make use of motion detectors and downlighting to reduce night-time light pollution.	To be completed post EA by relevant parties.					
DECOMMISSIONING PHASE						
▪ Reporting chance finds of graves and dense clusters of artefacts as early as possible to an archaeologist and/or the SAHRA (https://www.sahra.org.za/contact/), protect in situ and stop work in immediate area and appoint archaeologist to exhume or sample as needed (where relevant) ▪ Ensure disturbance is kept to a minimum and does not exceed project requirements. Minimise the duration of the activities. Rehabilitate the entire site once the infrastructure has been removed.	To be completed post EA by relevant parties.					

7.8 PALAEONTOLOGY

Impact Management Outcomes: Safeguarding, recording, and sampling of palaeontological materials encountered or exposed during construction and decommissioning (Chance Fossil Finds).						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
CONSTRUCTION AND DECOMMISSIONING PHASE						
▪ If any fossiliferous deposits are exposed by surface clearance or excavations during the construction and decommissioning phases of the development, the Chance Fossils Finds Protocol outlined in Appendix C of this EMPr must be fully implemented. The ECO must familiarise themselves with the Chance Fossils Finds Protocol and ensure that it is kept on file on site. ▪ The ECO should be made aware of the possibility of important fossil remains being found or unearthed during the construction phase. Ensure that monitoring of all bedrock excavations (> 1 m) and major cleared sites for fossil remains is undertaken on an on-going basis by the ECO during the construction and decommissioning phases. ▪ Significant fossil finds should be safeguarded and reported as soon as possible to the South African Heritage Resources Agency (SAHRA) (Contact details: 111 Harrington Street, Cape Town, 8001. PO Box 4637, Cape Town, 8000. Tel: 021 462 4502. Fax: 021 462 4509. Email: info@sahra.org.za).	To be completed post EA by relevant parties.					

7.9 GEOTECHNICAL

Impact Management Outcomes: Manage displacement of geological materials, and thus disturbance of existing soil conditions, impact on vegetation and potential soil erosion. To minimize the contamination of geologic materials caused by spillages/leakages. To minimise soil erosion by appropriately managing the displacement of geological materials, thereby minimising disturbance of existing soil conditions. To minimise erosion caused by the creation of unnatural hard surfaces i.e., road surfaces and stormwater drainage.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
DESIGN PHASE						
▪ Stormwater Management Plan must be developed in the pre-construction phase by a qualified professional. It should detail the stormwater structures and management interventions that must preferably be installed to manage the increase of surface water flows directly into any natural systems, where possible and lawful (in consultation with	To be completed post EA by relevant parties.					

Impact Management Outcomes: Manage displacement of geological materials, and thus disturbance of existing soil conditions, impact on vegetation and potential soil erosion. To minimize the contamination of geologic materials caused by spillages/leakages. To minimise soil erosion by appropriately managing the displacement of geological materials, thereby minimising disturbance of existing soil conditions. To minimise erosion caused by the creation of unnatural hard surfaces i.e., road surfaces and stormwater drainage.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
suitably qualified professionals). Effective stormwater management must include effective stabilisation (e.g., gabions and Reno mattresses) of exposed soil. ▪ Ensure that the design allows for suitable stormwater management systems to be installed along roads and other areas in order to divert water away from zones where the proposed infrastructure is to be constructed. Drainage systems should be designed by an appropriately qualified professional. Drainage in the region should be designed appropriately. ▪ Investigate and confirm the geotechnical suitability of each structure (or other appropriate level of investigation) prior to construction (i.e., determine that soil with an adequate bearing capacity is obtained beneath each footing). Such investigations would not be required to fulfil the requirements of this Environmental Impact Assessment (EIA) process. However, it would be necessary prior to construction. ▪ The seismicity in the region should be considered during design. ▪ Favour dolerite as an aggregate (as opposed to Karoo sandstones and mudstones). Subject to investigation. ▪ Any road cuttings should be designed by and appropriately qualified professional.						
CONSTRUCTION PHASE						
▪ Drainage in the region should be managed appropriately. ▪ Stormwater systems should be monitored throughout the first few months of use during the construction phase during which any erosion/sedimentation must be resolved through any additional interventions that may be necessary (e.g., extension, energy dissipaters, spreaders, etc.). It is recommended that rehabilitation commence soon after construction at the optimal time for vegetation establishment. ▪ Only strip vegetation necessary for the next phase of construction. ▪ Install temporary drainage to divert stormwater away from active construction activities, where required. ▪ Where impacted through construction-related activities, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled. ▪ Sloped areas stabilised using designed structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly. ▪ Any rehabilitation should be scheduled to ensure rehabilitation can take place at the optimal time for vegetation establishment.	To be completed post EA by relevant parties.					

Impact Management Outcomes: Manage displacement of geological materials, and thus disturbance of existing soil conditions, impact on vegetation and potential soil erosion. To minimize the contamination of geologic materials caused by spillages/leakages. To minimise soil erosion by appropriately managing the displacement of geological materials, thereby minimising disturbance of existing soil conditions. To minimise erosion caused by the creation of unnatural hard surfaces i.e., road surfaces and stormwater drainage.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Where earthwork is being undertaken near any watercourses, slopes must be stabilised using suitable materials, e.g., sandbags or geotextile fabric, to prevent sand and rock from entering the channel. ▪ Appropriate rehabilitation and re-vegetation measures for any disturbed watercourse banks must be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilised as soon as development allows. ▪ During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented, e.g. including ensuring that construction equipment is well maintained. ▪ Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. ▪ Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used. ▪ If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilt material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.						
OPERATIONAL PHASE						
▪ Install drainage to divert stormwater away from activities, roads/tracks, structures and erected structures, where required. ▪ Implement the stormwater management plan. Generic management for typical infrastructure of the proposed development, including similar erosion control and stormwater management during the construction phase, and no regular maintenance activities to take place outside of the authorised footprint and all vehicles to remain on authorised roads and tracks. ▪ During the execution of the operations, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that construction equipment is well maintained. ▪ Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover/bunding. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. ▪ Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used.	To be completed post EA by relevant parties.					

Impact Management Outcomes: Manage displacement of geological materials, and thus disturbance of existing soil conditions, impact on vegetation and potential soil erosion. To minimize the contamination of geologic materials caused by spillages/leakages. To minimise soil erosion by appropriately managing the displacement of geological materials, thereby minimising disturbance of existing soil conditions. To minimise erosion caused by the creation of unnatural hard surfaces i.e., road surfaces and stormwater drainage.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.						
DECOMMISSIONING PHASE						
▪ Only drive and park vehicles where necessary. ▪ It is recommended that the natural topography to be reinstated and land rehabilitation to near natural state is achieved, i.e., removal of foundations and backfilling of any resultant voids within the soil, as well as removal of hard surfaced areas. Replacement soil should be sourced locally to ensure homogeneity. ▪ Reinstate natural topography where cut-to-fill embankments have been constructed. ▪ Implement generic environmental management procedures for infrastructure. ▪ During the execution of the decommissioning, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g., including ensuring that equipment is well maintained. ▪ Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. ▪ Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used. ▪ If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.	To be completed post EA by relevant parties.					

7.10 GEOHYDROLOGY

Note from the CSIR: The use of existing boreholes to source groundwater (if available and suitable) is only the third most likely water use option. Water sourced from the local municipality is the first option in terms of viability and the second is to source water from a third party, but consideration of other options is vital. Potential environmental impacts pertaining to local groundwater resources have been considered in the EIA, and various management inputs have been recommended to ensure safe and sustainable management of the groundwater resources in the area. However, these impact management actions are not mandatory if water is indeed sourced from the local municipality or via a third party. The recommendations in this section only apply if groundwater will be used for the project. The management inputs are captured in two phases. Phase 1 will be required to determine if the groundwater is of a suitable quality and quantity; and Phase 2 will only be required if the groundwater quality and quantity are determined more accurately and confirmed it is suitable for use.

Impact Management Outcomes: Avoid over-abstraction of groundwater resources. Minimise the potential of groundwater contamination.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
DESIGN PHASE						
▪ Undertake a **Phase 1** programme to determine if the groundwater is of a suitable quality and quantity for use during construction, operations and decommissioning. The following should be undertaken: • Undertake a full laboratory analysis to confirm that the groundwater can be used for potable and domestic purposes, and determine the treatment required. This Geohydrology Assessment has confirmed that the groundwater is generally of good quality in terms of pH, EC and TDS. • Undertake necessary tests to confirm if the groundwater is suitable for construction and concrete batching. • Conduct scientific yield tests to determine sustainable abstraction volumes from boreholes that are to be utilised. ▪ Undertake a **Phase 2** programme once the groundwater quality and quantity are determined more accurately and confirmed it is suitable for use. The following steps will be required for sustainable management of ground water resources: • Acquire any historical monitoring data for the region. • Determine the volume of groundwater abstracted by farmers annually prior to construction by flow meters. • Ensure water saving techniques are instated and adhered to. • Ensure that environmentally safe cleaning agents that breakdown naturally and do not cause adverse effects are used.	To be completed post EA by relevant parties.					

Impact Management Outcomes: Avoid over-abstraction of groundwater resources. Minimise the potential of groundwater contamination.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
• In the event that the entire Kudu Solar Facility development is constructed simultaneously, adherence to the recommended mitigation measures should be strictly followed to prevent over-abstraction. • Instate an appropriate monitoring program including monitoring of groundwater quality, water levels (ideally by water level loggers and hand readings using a dip meter), and abstracted volumes. These data should be reported on at the least biannually. ▪ Yield test all monitoring boreholes according to SANS 10299-4:2003, Part 4 – Test pumping of water boreholes. This includes a Step Test, Constant Discharge Test and recovery monitoring.						
CONSTRUCTION PHASE						
▪ Adhere to the borehole's safe yield and to monitor water levels and flow. Boreholes must be correctly yield tested according to the National Standard (SANS 10299-4:2003, Part 4 – Test pumping of water boreholes). This includes a Step Test, Constant Discharge Test and recovery monitoring. ▪ A monitoring program needs to be adhered to so as to determine and remain below safe abstraction rates. This monitoring programme must only be implemented if groundwater will be used on site for construction purposes. ▪ Vehicles must be regularly serviced and maintained to check and ensure there are no leakages. ▪ Any engines that stand in one place for an excessive length of time must have drip trays. Diesel fuel storage tanks, if required, should be above ground on an impermeable surface in a bunded area. ▪ Vehicles and equipment should also be refuelled on an impermeable surface. A designated area should be established at the construction site camp for this purpose, if off-site refuelling is not possible. ▪ If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, and reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes	To be completed post EA by relevant parties.					
OPERATIONAL PHASE						
▪ Adhere to the borehole's safe yield and to monitor water levels and flow. ▪ Boreholes must be correctly yield tested according to the National Standard (SANS 10299-4:2003, Part 4 – Test pumping of water boreholes). This includes a Step Test, Constant Discharge Test and recovery monitoring. ▪ Use environmentally safe cleaning agents that breakdown naturally and do not cause adverse effects.	To be completed post EA by relevant parties.					

Impact Management Outcomes: Avoid over-abstraction of groundwater resources. Minimise the potential of groundwater contamination.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
DECOMMISSIONING PHASE						
▪ Adhere to the borehole's safe yield and to monitor water levels and flow. ▪ Boreholes must be correctly yield tested according to the National Standard (SANS 10299-4:2003, Part 4 – Test pumping of water boreholes). This includes a Step Test, Constant Discharge Test and recovery monitoring. ▪ Vehicles must be regularly serviced and maintained to check and ensure there are no leakages. ▪ Any engines that stand in one place for an excessive length of time must have drip trays. Diesel fuel storage tanks, if required, should be above ground on an impermeable surface in a bunded area. ▪ Vehicles and equipment should also be refuelled on an impermeable surface. A designated area should be established at the construction site camp for this purpose, if off-site refuelling is not possible. ▪ If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, and reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes	To be completed post EA by relevant parties.					

7.11 SOCIO-ECONOMIC

Impact Management Outcomes: Maximise potential job creation and business opportunities for locals. Minimise the increase of social ills and risky behaviours associated with workforce influx to the area. Minimise the impact of the construction activities on the safety, livestock and farm workers and infrastructure. Minimise noise, dust, safety impacts and damage to roads due to the heavy construction activities. Improve energy security in South Africa by generating additional energy. Enhance benefits for affected landowners. Minimise visual impact and impact on sense of place, potential impact on property values, and potential impact on tourism.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
DESIGN PHASE						
▪ Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase. ▪ Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However,	To be completed post EA by relevant parties.					

Impact Management Outcomes: Maximise potential job creation and business opportunities for locals. Minimise the increase of social ills and risky behaviours associated with workforce influx to the area. Minimise the impact of the construction activities on the safety, livestock and farm workers and infrastructure. Minimise noise, dust, safety impacts and damage to roads due to the heavy construction activities. Improve energy security in South Africa by generating additional energy. Enhance benefits for affected landowners. Minimise visual impact and impact on sense of place, potential impact on property values, and potential impact on tourism.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area. ▪ Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria. ▪ Before the construction phase commences (i.e. during the planning phase), the proponent should meet with representatives from the Renosterberg Local Municipality (RLM) and Emthanjeni Local Municipality (ELM) to establish the existence of a skills database for the area. If such as database exists, it should be made available to the contractors appointed for the construction phase. ▪ The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project. ▪ Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase. ▪ The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. ▪ The proponent should liaise with the RLM and ELM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work. ▪						
CONSTRUCTION PHASE						
▪ Implement the SEP during the construction phase. ▪ Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area. ▪ Where feasible, efforts should be made to employ local contactors that are compliant with BBBEE criteria.	To be completed post EA by relevant parties.					

Impact Management Outcomes: Maximise potential job creation and business opportunities for locals. Minimise the increase of social ills and risky behaviours associated with workforce influx to the area. Minimise the impact of the construction activities on the safety, livestock and farm workers and infrastructure. Minimise noise, dust, safety impacts and damage to roads due to the heavy construction activities. Improve energy security in South Africa by generating additional energy. Enhance benefits for affected landowners. Minimise visual impact and impact on sense of place, potential impact on property values, and potential impact on tourism.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ If a skills database for the RLM and ELM exists, ensure that it is being considered by contractors appointed for the construction phase. ▪ Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase. ▪ The SEP and CHSSP should include a Grievance Mechanism that enables stakeholders to report and resolve incidents. ▪ Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories. ▪ The proponent should consider the option of establishing a Monitoring Committee (MC) for the construction phase that include representatives from local landowners, farming associations, and the local municipality. This MC should be established prior to commencement of the construction phase and form part of the SEP. ▪ The proponent and contractor should develop a Code of Conduct (CoC) for construction workers. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be subject to appropriate disciplinary action and/or dismissed. All dismissals must comply with the South African labour legislation. The CoC should be signed by the proponent and the contractors before the contractors move onto site. The CoC should form part of the CHSSP. ▪ The proponent and the contractor should implement an HIV/AIDS, COVID-19, and Tuberculosis (TB) awareness programme for all construction workers at the outset of the construction phase. The programmes should form part of the CHSSP. ▪ The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contactor to effectively manage and monitor the movement of construction workers on and off the site. ▪ The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end. ▪ The proponent, in consultation with the LM, should investigate the option of establishing a MC to monitor and identify potential problems that may arise due to the influx of job seekers to the area. ▪ The proponent should implement a policy that no employment will be available at the gate.						

Impact Management Outcomes: Maximise potential job creation and business opportunities for locals. Minimise the increase of social ills and risky behaviours associated with workforce influx to the area. Minimise the impact of the construction activities on the safety, livestock and farm workers and infrastructure. Minimise noise, dust, safety impacts and damage to roads due to the heavy construction activities. Improve energy security in South Africa by generating additional energy. Enhance benefits for affected landowners. Minimise visual impact and impact on sense of place, potential impact on property values, and potential impact on tourism.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property as a result of the construction phase will be compensated for. The agreement should be signed before the construction phase commences. ▪ All farm gates must be closed after passing through. ▪ Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site. ▪ The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to project construction workers. This should be contained in the CoC to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below). ▪ The proponent should implement a Grievance Mechanism that provides local farmers with an effective and efficient mechanism to address issues related to damage to farm infrastructure, stock theft and poaching etc. ▪ Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained in the CoC, specifically consequences of stock theft and trespassing on adjacent farms. ▪ Contractors appointed by the proponent must ensure that construction workers who are found guilty (by the courts) of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the CoC. ▪ It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site. ▪ Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas. ▪ Smoking on site should be confined to designated areas. ▪ Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy summer months.						

Impact Management Outcomes: Maximise potential job creation and business opportunities for locals. Minimise the increase of social ills and risky behaviours associated with workforce influx to the area. Minimise the impact of the construction activities on the safety, livestock and farm workers and infrastructure. Minimise noise, dust, safety impacts and damage to roads due to the heavy construction activities. Improve energy security in South Africa by generating additional energy. Enhance benefits for affected landowners. Minimise visual impact and impact on sense of place, potential impact on property values, and potential impact on tourism.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle and fire extinguishers placed at designated locations across the site. ▪ Contractor should provide fire-fighting training to selected construction staff. ▪ As per the conditions of the CoC, in the event of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused by the project to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities. ▪ Timing of construction activities should be planned to avoid / minimise impact on key farming activities. ▪ The proponent should establish a MC to monitor the construction phase and the implementation of the recommended mitigation measures. The MC should be established before the construction phase commences, and should include key stakeholders, including representatives from local farmers and the contractor(s). The MC should also address issues associated with damage to roads and other construction related impacts. ▪ Ongoing communication with landowners and road users during construction period. This should be outlined in the SEP. ▪ The proponent should implement a Grievance Mechanism that provides local farmers and other road users with an effective and efficient mechanism to address issues related to construction related impacts, including damage to local gravel farm roads. ▪ Implementation of a road maintenance programme throughout the construction phase to ensure that the affected private roads are maintained in a good condition and repaired once the construction phase is completed (for roads where the developer/contractor has legal mandate to undertake such maintenance). ▪ Repair of all affected road portions at the end of construction period where required (for roads where the developer/contractor has legal mandate to undertake such repairs). In the event of damage to public roads affected by construction traffic the proponent should engage with the relevant road authorities to ensure that damage is repaired before the operational phase commences. ▪ Dust suppression measures must be implemented on un-surfaced roads, such as wetting on a regular basis and ensuring that vehicles used to transport building materials are fitted with tarpaulins or covers.						

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Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ All vehicles must be roadworthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits. ▪ The loss of high-quality agricultural land should be avoided and or minimised by careful planning of the final layout of the proposed facility. The recommendations of the agricultural / soil assessment should be implemented. *Note: During the EIA Phase, no sensitive areas for avoidance were identified by the Agricultural specialist. The study area is predominately low to medium sensitivity from an agricultural perspective*. ▪ Affected landowners should be consulted about the timing of construction related activities in advance. ▪ The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be minimised. ▪ An ECO should be appointed to monitor the establishment phase of the construction phase. ▪ All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase. ▪ The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. The specifications for the rehabilitation programme should be included in the EMPr. ▪ The implementation of the Rehabilitation Programme should be monitored by the ECO.						
OPERATIONAL PHASE						
▪ Maximise the number of employment opportunities for local community members. ▪ Implement training and skills development programs for members from the local community. ▪ Maximise opportunities for local content and procurement. ▪ The enhancement measures to enhance local employment and business opportunities during the construction phase also apply to the operational phase. ▪ The proponent should investigate providing training and skills development to enable locally based service providers to provide the required services for the operational phase. ▪ Enter into and implement rental agreements with affected landowners for the use of the land for the establishment of the proposed project. ▪ The loss of high-quality agricultural land should be avoided and/or minimised by careful planning in the final layout. The recommendations of the agricultural / soil assessment should be implemented. *Note: During the EIA Phase, no sensitive areas for avoidance were*	To be completed post EA by relevant parties.					

Impact Management Outcomes: Maximise potential job creation and business opportunities for locals. Minimise the increase of social ills and risky behaviours associated with workforce influx to the area. Minimise the impact of the construction activities on the safety, livestock and farm workers and infrastructure. Minimise noise, dust, safety impacts and damage to roads due to the heavy construction activities. Improve energy security in South Africa by generating additional energy. Enhance benefits for affected landowners. Minimise visual impact and impact on sense of place, potential impact on property values, and potential impact on tourism.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
identified by the Agricultural specialist. The study area is predominately low to medium sensitivity from an agricultural perspective. ▪ The RLM or PKSDM should be consulted as to the structure and identification of potential trustees to sit on the Community Trust. The key departments in the RLM or PKSDM that should be consulted include the Municipal Managers Office, IDP Manager and LED Manager, where possible. ▪ Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community. ▪ Strict financial management controls, including annual audits, should be instituted to manage the funds generated for the Community Trust from the proposed project. ▪ The recommendations contained in the VIA should be implemented. ▪ Ensure that an open communication strategy is created and maintained between the Project Developer and owners (or managers) of nearby or adjacent farms where hunting takes place in order to ensure that the Project Developer are made aware of planned hunts. ▪ Ensure that operational personnel are made aware of the planned hunts and are trained on the necessary protocols to be taken.						
DECOMMISSIONING PHASE						
▪ The proponent should ensure that retrenchment packages are provided for all staff retrenched when the plant is decommissioned. ▪ All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning. ▪ Revenue generated from the sale of scrap metal during decommissioning should be allocated to aid in funding closure and rehabilitation of disturbed areas.	▪ To be completed post EA by relevant parties.					

APPENDIX A: CV OF THE EAP

CV OF PAUL LOCHNER

Employer: Council for Scientific and Industrial Research (CSIR)
PO Box 320, Stellenbosch, 7600, South Africa
Phone: +27 21 888 2486 (w)
Email: plochner@csir.co.za
Date of Birth: 13 June 1969
Nationality: South African

BIOSKETCH

Paul Lochner is an environmental assessment practitioner at the CSIR in Stellenbosch, with 29 years of experience in a wide range of environmental assessment and management studies. His particular experience is in environmental planning and assessment for renewable energy, electricity grid infrastructure, desalination, oil & gas, wetlands & coastal zone management, and industrial & port development. He has been closely involvement in the research and application of Strategic Environmental Assessment in South Africa, and also has wide experience in Environmental & Social Impact Assessment, Environmental Management Programs and Environmental Screening Studies. For the past 13 years he has been the leader of a group of approximately 10 to 20 environmental scientists that has been at the forefront of advancing environmental assessment in South Africa.

PROFESSIONAL PROFILE

- Commenced work at CSIR in 1992, after completing a B.Sc. degree in Civil Engineering and a Masters in Environmental Science, both at the University of Cape Town. CSIR is a national science council. His initial work at focused on wetlands and estuarine management; environmental engineering in the coastal zone; and coastal zone management plans.
- As the market for environmental assessment work grew, he led Environmental Impact Assessments (EIAs), in particular for coastal and large-scale industrial developments; Strategic Environmental Assessments (SEAs) for new industrial development zones; and Environmental Management Plans (EMPs) for wetlands, estuaries and coastal developments. He has been the project leader for several SEAs and EIAs over the past 28 years.
- In 1998-2000, he was the project manager for CSIR's three year research program into Strategic Environmental Assessment (SEA). This led to him being a lead author of the *Guideline Document for SEA* in South Africa, published by CSIR and the national Department of Environmental Affairs (DEA) in February 2000.
- In 1999-2000, he was project manager for the legal, institutional, policy, financial and socio-economic component of the Cape Action Plan for the Environment ("CAPE"), a large-scale GEF-funded study to ensure sustainable conservation of the Cape Floral Kingdom. It was prepared for WWF-South Africa and required extensive interaction with experts, government and civil society.
- Over the past 24 years has been closely involved with several environmental studies for industrial and port-related projects in the Coega Industrial Development Zone (IDZ), near Port Elizabeth. This included the SEA for the establishment of the Coega IDZ in 1996/7.
- He is a leading expert in Environmental Management Programs (EMPs), both the preparation of EMPs as well as overseeing the implementation thereof. In recognition of his experience in this domain, he was appointed by the Western Cape government to write the *Guidelines for EMPs* that is still being used in the province.
- He has prepared EMPs for wetlands and estuaries, such as for the establishment of the Rietvlei Nature Reserve and Intaka Island Nature Reserve, both in Cape Town.
- He has experience in overseeing the implementation of EMPs, and has been the chairperson of the Environmental Monitoring Committee for the Intaka Island Nature Reserve in Cape Town since 1996. He is also Chairperson of the Intaka Island Environmental Trust.
- He has undertaken more than 30 environmental assessments for the renewable energy sector, in particular for wind and solar photovoltaic energy projects.
- He has been part of almost all environmental studies for medium to large scale reverse osmosis sea water desalination plants conducted in the past 10 years in South Africa and Namibia. This includes site selection study and EIA for the Namwater desalination plant near Swakopmund in Namibia, the two Umgeni Water plants at Tongaat and Lovu on the KwaZulu-Natal coast, and desalination plants at Coega, Saldanha and Cape Town.
- Since 2008, Paul has been the leader and manager of the Environmental Management Services (EMS) group within CSIR. This group consists environmental scientists, planners and engineers, with offices in Stellenbosch, Cape Town and Durban.
- He has extensive experience in conducting environmental assessments in accordance with requirements of international lenders, such as the World Bank performance requirements, International Finance Corporation (IFC) performance standards and the Equator Principles.

- Over the past eight years, he has been project leader on national-scale SEAs being conducted for national DEA and other government departments in support of the Strategic Integrated Projects (SIPs) of government and the National Development Plan for South Africa. These SEAs provided strategic geospatial planning for new large-scale national infrastructure priorities. The SEA methodology applied was highly innovative and has received national and international awards. The studies have generated new environmental planning tools to support responsible decision-making, and the SEA outcomes have been converted into national legislation and informed policy-making.
- He has authored more than 15 international journal publications, peer reviewed conference proceedings and published national guidelines (a publications record is available on request).

PERSONAL SKILLS AND CAPABILITIES

- Holistic understanding of environmental and social aspects at policy, program and project levels
- Ability to lead, inspire and motivate a team of environmental scientists in a consulting business
- Coordination of experts from diverse disciplines to support evidence-based decision-making
- Ability to integrate of environmental, social and economic aspects within a systems model
- Design of innovative processes to respond effectively to proposals and meet needs of clients
- Review and quality assurance for environmental assessment processes and reports
- Project management, financial management, report writing and communication skills.

EDUCATION

- BSc (Civil Engineering) awarded with Honours, *University of Cape Town*, 1990
- MPhil (Environmental Science), *University of Cape Town,* 1992

EMPLOYMENT

- Environmental scientist at CSIR (Stellenbosch) from October 1992 to present.
- Group Leader of CSIR Environmental Management Services since August 2008.

PROFESSIONAL REGISTRATION

- Environmental Assessment Practitioners Association of South Africa (EAPASA), Registration no. 2019/745.

PROFESSIONAL MEMBERSHIP AND POSITIONS HELD

- Member of the International Association for Impact Assessment (IAIA)
- 1996 to 1999: Committee Member of the Western Cape Branch of the International Association for Impact Assessment (IAIA) and Chairperson in 1997-1998.
- 1996 to present: Chairperson of Blouvlei Intaka Island Environmental Committee at Century City, Cape Town, which oversees management of the Intaka Island Nature Reserve
- 2010 to present: Chairperson of Intaka Island Environmental Trust, that oversees the operation of the Eco-centre and education program at the Intaka Island Nature Reserve
- 2017: Conference Organising Committee member and Program Director for IAIA South Africa national conference, August 2017, Goudini.

RECENT PROFESSIONAL AWARDS

- 2018: International Association for Impact Assessment (IAIA) regional award for contribution to the development of Strategic Environmental Assessment in South Africa, awarded at the annual international conference of IAIA in May 2018, held in Durban, South Africa.
- 2017: CSIR Implementation Unit “Directors award” for outstanding contribution by an individual.
- 2017: CSIR Implementation Unit award for Collaboration, for the role of the Shale Gas SEA team in coordinating expertise from across CSIR.
- 2015: CSIR Implementation Unit award for “outstanding contribution by a team” for the Wind and Solar Photovoltaic SEA and Electricity Grid SEA.

TRACK RECORD OF PROFESSIONAL EXPERIENCE

This is an abbreviated record of experience. A full record is available on request. Projects are located in South Africa unless otherwise stipulated.

Duration	Project description	Role	Client
2023 - ongoing	**Power-to-X (PtX) Pathways Grant** for green hydrogen analysis to support policy development and private sector investment for south Africa	Co-author & researcher	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
2022 - ongoing	**Green hydrogen market opportunities** for South Africa: Analyses of lighthouse projects and guidance for Environmental & Social Impact Assessments	Co-author & researcher	GIZ (CSIR is part of consulting team with GFA)

Duration	Project description	Role	Client
2022 - ongoing	**EIA and Basic Assessments** for 1760 MW of wind and solar PV facilities near Beaufort West	Project leader	Genesis Eco-Energy Developments (Pty) Ltd
2022-2023	**EIAs** for 720 MW Kaladokhwe wind energy facilities (x3) near Cradock	Project leader	Atlantic Energy Partners
2022-2023	**Environmental Screening** for 1GW offshore wind energy planning off KwaZulu Natal, South Africa	Reviewer	Progression Energy, USA
2022-2023	**Environmental assessment training and support (phase 2)** for renewable energy planning and the IPP sector for the Eastern Cape province	Project leader	Dept of Economic Development, Environmental Affairs & Tourism, Eastern Cape
2022 – 2023	**EIA and Basic Assessment** for the Enertrag Vhuvhili 300 MW solar PV facility and electricity grid connection for Sasol, Secunda	Project leader	Enertrag (to supply green energy under contract to Sasol)
2022 - ongoing	**Review of permitting and governance** for the Mogalakwena Mine, Limpopo	Project leader	Anglo American Platinum
2021- ongoing	**Advisory services for environmental permitting** for Anglo American's Carbon Neutrality and Smart Power projects in South Africa, Namibia, Botswana and Zimbabwe	Project leader	Anglo American Platinum
2021- ongoing	**Permitting strategy for innovative pilot projects** for the Mogalakwena platinum mine	Project leader	Anglo American Platinum
2022	**Opportunities and constraints analysis for offshore wind potential for South Africa -** inventory and collation of spatial data	Project leader	World Bank
2021-2022	**Environmental assessment training and support (phase 1)** to provincial government in the independent power producer sector in the Eastern Cape province	Project leader	Dept of Economic Development, Environmental Affairs & Tourism, Eastern Cape
2021	**Renewable Energy Feasibility Plan** for the Atlantis Special Economic Zone, Cape Town	Lead co-leader	Atlantis Special Economic Zone
2021	**Basic Assessment** for 1350 MW Aardvark solar PV facilities near Copperton	Project leader	ABO Wind renewable energies (Pty) Ltd
2020-2021	**Basic Assessments** for 1575 MW Solar Photovoltaic Facilities and associated Electrical Grid Infrastructure near Touws River, Western Cape	Project leader	Veroniva
2020	**Independent expert review** of appeals against the EA for exploration drilling for oil and gas within Offshore Block ER236 off the coast of KwaZulu-Natal	Lead author	DEFF Appeals Directorate
2020	**Independent expert review** of the appeals against the EA issued for the Inyanda-Roodeplaat Wind Energy Facility of 187 MW proposed near Port Elizabeth	Lead author	DEFF Appeals Directorate
2019-2020	**Environmental scoping** for a Desalination Plant and Water Carriage System for water supply to Windhoek and the central coastal area of Namibia	Project author	NamWater (Namibia) and KfW Development Bank (Germany)
2019-2020	**Environmental Performance Compliance Study** for Foundries in South Africa	Project reviewer	National Foundries Technology Network
2019	**Independent Expert review** of the ecology study as part of the EIA and EMPR for diamond prospecting at Bloemhof Dam Nature Reserve, North West province	Independent reviewer	DEA Appeals Office
2018-2019	**Greater Saldanha Bay Strategic Environmental Assessment (SEA):** Phase 1 Monitoring and Decision Support System	Project leader	Western Cape provincial government
2018-2019	**Environmental Screening Study** for a proposed 100 to 150 megalitre/day desalination facility for City of Cape Town, Phase 1: Pre-feasibility study	Project co-leader	City of Cape Town and iX Engineers
2018-2019	**EIA for 150 MW wind power project in Ghana**	Proposal and EIA Quality Assurance	Volta River Authority and Seljen Consult Ltd
2019	**Environmental Assessment** for the Kenhardt solar PV facility and electrical infrastructure (100 MW x 3), Northern Cape	Project leader	Scatec Solar Africa (Pty) Ltd

Duration	Project description	Role	Client
2017-2019	**SEA for Wind & Solar Photovoltaic Energy** development in South Africa (Phase 2)	Project reviewer	DEA & national Dept of Energy (DOE)
2017-2019	**SEA for Energy Corridors** and development of a gas pipeline network for South Africa	Project reviewer	DEA, DOE, iGas, Eskom (national electricity utility)
2017-2019	**SEA for Aquaculture** Development in South Africa (marine and freshwater)	Project leader	DEA and national Dept of Agriculture Forestry and Fisheries (DAFF)
2018	**Environmental Assessments** for the Vryburg Solar project (115 MW x 3) in the Vryburg Renewable Energy Development Zone (REDZ)	Co-project manager and co-author	Veroniva & Scatec
2018	**EIA** for West Bank Waste Water Treatment works **marine outfall pipeline,** East London	Independent reviewer	WSP and Buffalo City Municipality
2017-2018	**Site selection and environmental screening** for a proposed 120 – 150 ML/day desalination plant for the City of Cape Town	Project leader	City of Cape Town and iX Engineers
2017-2018	**EIA and EMP for Icyari Coltan Mine**, Rwanda	Project reviewer	Mawarid Mining Rwanda Ltd (MMRL), UAE
2016-2017	**SEA for the Square Kilometre Array** radio-telescope in the Karoo, South Africa	Project leader	DEA and DST
2016-2017	**SEA for Shale Gas Development** in the Karoo region of South Africa	Project co-leader	DEA and other government departments
2015-2016	**SEA for the development of Electrical Grid Infrastructure** for South Africa	Project leader	DEA and Eskom (national electricity utility)
2017	EIA for the 75 MW x 12 **solar photovoltaic** energy projects near Dealesville, Free State	Project leader	Mainstream Renewable Power SA
2014-2015	EIA for Ishwati Emoyeni 140 MW **wind energy project** and supporting electrical infrastructure at Murraysburg, Western Cape	Project leader	Windlab South Africa
2012-2015	**SEA for identification of renewable energy zones** for wind and solar photovoltaic projects in South Africa	Project leader	DEA and other national government departments
2012-2013	**Environmental Screening Study (ESS) for a desalination plant** for the City of Cape Town	Project leader	City of Cape Town & WorleyParsons
2012-2013	EIA for the **desalination plant** for the Saldanha area	Project leader	West Coast District Municipality & WorleyParsons
2012-2013	EIA for the **manganese export terminal** at the Port of Ngqura and Coega Industrial Development Zone (IDZ)	Project leader	Transnet
2011 - 2012	EIA (x2) for **100 MW solar photovoltaic** project at Blocuso and 100 MW solar PV project at Roode Kop in the Northern Cape	Project leader	Mainstream Renewable Power
2011 – 2012	EIA (x2) for 75 MW **solar photovoltaic project** at GlenThorne and 75 MW project at Valleydora, in the Free State	Project leader	Solaire Direct
2010-2011	More than 10 Basic Environmental Assessments (BAs) for **solar photovoltaic projects** in the Western Cape, Northern Cape, Eastern Cape and Free State	Project leader	Conducted for Dutch, German, French and South African companies
2010/2011	**EIA for a 100 MW wind project at Zuurbron and a 50 MW wind project Broadlands** in the Eastern Cape	Project leader	WindCurrent SA (German-based company)
2010/2011	**EIA for the proposed 143 MW Biotherm wind energy project near Swellendam**, Western Cape, South Africa	Project leader	Biotherm South Africa (Pty) Ltd
2010-2011	**EIAs (x4) for the proposed InnoWind wind energy projects near Swellendam, Heidelberg, Albertinia and Mossel Bay (totalling approx 210 MW),** Western Cape, South Africa	Project leader	InnoWind South Africa (Pty) Ltd
2009-2010	**EIA for the proposed Electrawinds wind energy facility** of 45-75 MW capacity in the Coega IDZ, Eastern Cape	Project leader	Electrawinds N.V. (Belgium)
2009-2010	**EIA for proposed 180 MW Jeffreys Bay wind energy project,** Eastern Cape	Project Leader and co-author	Mainstream Renewable Power South Africa
2009-2010	**EIA for the proposed 70 megalitre/day desalination plant** at Mile 6 near Swakopmund, Namibia	Project leader	NamWater, Namibia
2009	**ESS for a proposed Deepwater Port,** Container Hub and Industrial Development Zone, Ghana	Project Manager	Project Management International Pty Ltd

Duration	Project description	Role	Client
2009	**EMP for the Operational Phase of the Berg River Dam**, Franschoek, South Africa	Project leader and report co-author	TCTA (national water supply utility), South Africa
2006	**Environmental Impact Assessment** (**EIA)** for extension of Port of Ngqura, Eastern Cape	Project Leader and co-author	Transnet National Port Authority
2004-2005	**Environmental and Social Impact Assessment (ESIA) report** for the proposed alumina refinery near Sosnogorsk, Komi Republic, Russia	Project manager and co-author	Komi Aluminium Russia, IFC, European Bank for Reconstruction & Development (EBRD)
2005	**Guideline for Environmental Management Plans (EMPs)** for the Western Cape province	Author	Dept of Environmental Affairs & Development Planning, Western Cape
2003	**Environmental Management Plan** for the Operational Phase of the wetlands and canals at Century City, Cape Town	Project leader and lead author	Century City Property Owners' Association
2002	**Environmental Impact Assessment** for the proposed Pechiney aluminium smelter at Coega, South Africa	Project Manager and lead author	Pechiney, France
1999-2000	**Cape Action Plan for the Environment**: a biodiversity Strategy and Action Plan for the Cape Floral Kingdom - legal, institutional, policy, financial and socio-economic component	Project manager and contributing writer	World Wide Fund for Nature (WWF): South Africa and Global Environment Facility (GEF)
1999	**Management Plan** for the coastal zone between the Eerste and Lourens River, False Bay, South Africa	Project manager and lead author	Heartland Properties and Somchem (a Division of Denel)
1998	**Environmental Assessment** of the Mozal Matola Terminal Development proposed for the Port of Matola, Maputo, Mozambique	Project manager and author	SNC-Lavalin-EMS
1996-1997	**Strategic Environmental Assessment (SEA)** for the proposed Industrial Development Zone and Harbour at Coega, Port Elizabeth, South Africa	SEA project manager and report writer	Coega IDZ Initiative Section 21 Company
1995-1996	**Environmental Impact Assessment and EMP** for Development Scenarios for Thesen Island, Knysna, South Africa	Project manager and report writer	Thesen and Co.
1996	**Environmental Impact Assessment** for the Blouvlei wetlands at Century City, Cape Town	Project manager and report writer	Ilco Homes Ltd (now Monex Ltd)
1995	**Environmental Impact Assessment** for the Saldanha Steel Project, South Africa	Report author and project manager	Saldanha Steel Project
1994	**Environmental Impact Assessment** for the upgrading of resort facilities on Frégate Island, Seychelles	Project management, co-author, process facilitator	Schneid Israelite and Partners
1994	**Environmental Impact Assessment** for exploration drilling in offshore Area 2815, Namibia	Project manager and lead author	Chevron Overseas (Namibia) Limited
1994	**Management Plan** for the Rietvlei Wetland Reserve, Cape Town	Project manager and lead author	Southern African Nature Foundation (now WWF-SA)

RECENT JOURNAL PUBLICATIONS AND PEER REVIEWED PAPERS

A comprehensive list of publications including recent journal publications, book chapters and peer reviewed conference papers, is available on request.

CV VERSION: Paul Lochner, May 2023

CV OF ROHAIDA ABED

Name of firm **CSIR**
Name of staff **Rohaida Abed**
Profession **Environmental Assessment Practitioner**
Position in firm **Environmental Assessment Practitioner**
Nationality **South African**

BIOGRAPHICAL SKETCH

Rohaida Abed is an Environmental Assessment Practitioner in the CSIR Environmental Management Services team based in Durban. She has 12 years of experience in the Environmental Management field, and has been involved in various transport infrastructure related projects as an Environmental Control Officer, which included monitoring compliance with Environmental Authorizations and Environmental Management Plans. She has also been conducting Environmental Assessments relating to Port infrastructure, Bulk Liquid Storage facilities and renewable energy in the capacity of Project Manager.

She has been involved in Screening Studies, Applications for Amendments to Environmental Authorisations, Environmental Management Programmes, Legislative Reviews and reviewing Specialist Studies. She was also the Project Manager for the Gas Pipeline and Electricity Grid Infrastructure Expansion Strategic Environmental Assessment (SEA) for the National DEA, DOE, DPE, iGas, Transnet and Eskom.

TERTIARY EDUCATION

Year	Degree	Institution
2007 - 2009	Master of Science (Environmental Science)	University of KwaZulu-Natal
2006 - 2006	Bachelor of Science Honours (Environmental Science)	University of KwaZulu-Natal
2003 - 2005	Bachelor of Science (Environmental Science)	University of KwaZulu-Natal

PROFESSIONAL REGISTRATION

- Registered Professional Natural Scientist (Pr.Sci.Nat.) in Environmental Science (Registration Number: 400247/14) with the South African Council of Natural Scientific Professions (SACNASP) in July 2014.
- Environmental Assessment Practitioners Association of South Africa (EAPASA), Registration Number 2021/4067
- Member of the International Association for Impact Assessment South Africa (IAIAsa) – Membership number: 5840

EMPLOYMENT RECORD

Period	Employer	Position
October 2011 – to present	CSIR	Environmental Assessment Practitioner
May 2010 – September 2011	Henwood & Nxumalo Consulting Engineers	Environmental Scientist
March 2010 – April 2010	EnAq Consulting	Environmental Officer
2006 – 2008	University of KwaZulu-Natal	Academic Demonstrator

LIST OF KEY PROJECT EXPERIENCE

Date	Project Description	Role	Client
2022- ongoing	Review of permitting and governance for the Mogalakwena Mine, Limpopo (Confidential)	Project Manager	Anglo American
2021 – current	Advisory services for environmental permitting for Anglo American's Carbon Neutrality and Smart Power projects in South Africa, Namibia, Botswana and Zimbabwe (Confidential)	Project Manager and Lead Author	Anglo American
2021 – current	Pilot Study on Permitting (Confidential)	Project Manager and Author	Anglo American
2021 – current	Scoping and Environmental Impact Assessment Processes for the Proposed Development of 12 Solar Photovoltaic (PV) Facilities (Kudu Solar Facility 1 to 12), near De Aar in the Northern Cape Province	Project Manager and Author	ABO Wind renewable energies (Pty) Ltd

Date	Project Description	Role	Client
2021 - current	Scoping and Environmental Impact Assessment Processes for the Proposed Development of six Solar Photovoltaic (PV) Facilities; Aardvark Solar 1, Aardvark Solar 2, Aardvark Solar 3, Aardvark Solar 4, Aardvark Solar 5 and Aardvark Solar 6, near Copperton in the Northern Cape Province	Project Leader and Project Reviewer	ABO Wind renewable energies (Pty) Ltd
2021 - current	Basic Assessment Processes for electricity grid infrastructure to support the six Solar Photovoltaic (PV) Facilities; Aardvark Solar 1, Aardvark Solar 2, Aardvark Solar 3, Aardvark Solar 4, Aardvark Solar 5 and Aardvark Solar 6, near Copperton in the Northern Cape Province	Project Leader and Project Reviewer	ABO Wind renewable energies (Pty) Ltd
2021 – current	Environmental Compliance and Performance Improvement for Foundries: Phase 2	Project Team Member	NFTN and NCPC
2021	EMPr Update and Financial Close Gap Analysis for the Gemsbok Solar PV2, Gemsbok Solar PV5 and Gemsbok Solar PV6 projects near Kenhardt, Northern Cape	Project Reviewer, Author and Team Member	Mulilo Total Coega (PTY) Ltd
2020 – current	Basic Assessment for the Proposed Square Kilometre Array (SKA) fibre optic cable between Beaufort West and Carnarvon,	Project Reviewer and Contributor	South African National Research Network
2020 – current	Scoping and Environmental Impact Assessment Processes for the Proposed Development of three Wind Energy Facilities; Kwagga 1, Kwagga 2, and Kwagga 3, near Beaufort West in the Western Cape Province	Project Reviewer and Team Member	ABO Wind renewable energies (Pty) Ltd
2020 – current	Basic Assessment Processes for the Proposed Development of seven Solar Photovoltaic (PV) Energy Facilities; namely Rinkhals 1, Rinkhals 2, Rinkhals 3, Rinkhals 4, Rinkhals 5, Rinkhals 6, and Rinkhals 7, near Kimberley in the Free State and Northern Cape Provinces	Project Reviewer and Team Member	ABO Wind renewable energies (Pty) Ltd
2020 - current	Four Basic Assessments for the Proposed Gromis and Komas Wind Energy Facilities and Power Lines in the Northern Cape	Project Reviewer, Author and Team Member	Enertrag
2020 - 2021	Four Basic Assessment Processes for the Proposed Development of nine 175 MW Solar Photovoltaic Facilities, associated Infrastructure, and Electrical Grid Infrastructure (i.e. Witte Wall PV 1, Witte Wall PV 2, Grootfontein PV 1, Grootfontein PV 2, Grootfontein PV 3, Hoek Doornen PV 1, Hoek Doornen PV 2, Hoek Doornen PV 3, and Hoek Doornen PV 4), near Touws River, Western Cape	Project Manager and Lead Author	Veroniva (PTY) Ltd
2020	Independent review of an EIA Project (Confidential)	Project Manager and Lead Author	National DFFE Appeals Directorate
2020	Two Integrated Social & Ecological Screening Study to assess the suitability of two sites for the development of a Seawater Desalination Facility (Reverse Osmosis) and associated infrastructure	Project Reviewer and Author	iX Engineers (Pty) Ltd
2020	Amendment to the Environmental Authorisations for the Development of the Kenhardt PV 1, PV 2 and PV 3 Solar Energy Facilities near Kenhardt, Northern Cape Province	Project Manager	Scatec Solar SA 163 (PTY) Ltd
2019 – 2021	Environmental Compliance and Performance Improvement for Foundries: Phase 1	Project Team Member	NFTN and NCPC
2019	Equator Principles Review of the Final EIA Report for the proposed Bulk Liquid Storage and Handling Facility in Zone 8 of the Coega IDZ, Port of Ngqura	Project Manager	Oiltanking Grindrod Calulo (PTY) Ltd
2019	Three Basic Assessment Processes: Proposed development of three Distribution Lines and electrical grid infrastructure to connect to the proposed Sutherland WEF, Sutherland 2 WEF and Rietrug WEF to the National Grid, near Sutherland in the Northern and Western Cape	Co-Project Manager	South Africa Mainstream Renewable Power Developments (Pty) Ltd

Date	Project Description	Role	Client
2019	Three Applications for Substantive Amendment to the Environmental Authorisations for the proposed Sutherland WEF, Sutherland 2 WEF and Rietrug WEF, near Sutherland in the Northern and Western Cape	Project Team Member	South Africa Mainstream Renewable Power Developments (Pty) Ltd
2019	Three Basic Assessment Processes for the proposed development of three 100 MW Solar PV Facilities (Kenhardt PV 4, PV 5, and PV 6) and associated Electricity Grid Infrastructure on the remaining extent of Onder Rugzeer Farm 168, north-east of Kenhardt, Northern Cape.	Project Advisor and Reviewer	Scatec Solar SA 163 (PTY) Ltd
2019	Notification of Environmental Authorisation Process for the Proposed Construction, Operation and Decommissioning of a Seawater Reverse Osmosis Plant and Associated Infrastructure at Tongaat on the KwaZulu-Natal North Coast.	Project Manager	Umgeni Water Amanzi
2018	Three Basic Assessment Processes for the proposed development of three transmission Lines and three 115 MW Solar PV Facilities (Vryburg PV 1, PV 2, and PV 3) near Vryburg, North-West.	Project Advisor and Mentor	Veroniva (Pty) Ltd; and ABO Wind renewable energies (Pty) Ltd
2017 – 2019	Strategic Environmental Assessment (SEA) for a Phased Gas Pipeline Network for South Africa	Project Manager	National DEA, DOE, DPE, Transnet, iGas and Eskom
2017 – 2019	Strategic Environmental Assessment (SEA) for the expansion of Electricity Grid Infrastructure (EGI) for South Africa	Project Manager	National DEA, DOE, DPE, Transnet, iGas and Eskom
2017	Application for the non-substantive Amendment to the Environmental Authorisation for the proposed Bulk Liquid Storage and Handling Facility at Maydon Wharf, Port of Durban, KwaZulu-Natal	Project Manager	Oiltanking Grindrod Calulo (PTY) Ltd
2017	Notification of the outcome of the Appeal Processes and Re-Issued EAs for the three 75 MW Solar PV Facilities (Kenhardt PV 1, PV 2, and PV 3) and three transmission Lines and electrical infrastructure (i.e. Kenhardt PV 1 – Transmission Line, Kenhardt PV 2 – Transmission Line, and Kenhardt PV 3 – Transmission Line), north-east of Kenhardt, Northern Cape.	Project Manager	Scatec Solar SA 163 (PTY) Ltd
2016 – 2017	Basic Assessment Processes: Proposed development of three Distribution Lines and electrical grid infrastructure to connect to the proposed Sutherland WEF, Sutherland 2 WEF and Rietrug WEF to the National Grid, near Sutherland in the Northern and Western Cape	Project Manager	South Africa Mainstream Renewable Power Developments (Pty) Ltd
2016 - 2017	Screening Assessment for the proposed storage of Dangerous Goods at an existing Storage Terminal at Maydon Wharf, Port of Durban, KwaZulu-Natal	Project Manager	Oiltanking Grindrod Calulo Terminals (PTY) Ltd
2016	Application for the non-substantive Amendment to the Environmental Authorisation for the proposed Bulk Liquid Storage and Handling Facility in Zone 8 of the Coega IDZ, Port of Ngqura	Project Manager	Oiltanking Grindrod Calulo (PTY) Ltd
2016	Application for the non-substantive Amendment to the Environmental Authorisation for the proposed Victoria West Renewable Energy Facility, Northern Cape	Project Manager	South Africa Mainstream Renewable Power Developments (Pty) Ltd
2016	Scoping and EIA Process: Proposed Development of the Teekloof WEF, near Victoria West, Northern Cape.	Project Assistant	South Africa Mainstream Renewable Power Developments (Pty) Ltd
2016	Scoping and EIA Process: Proposed Development of the Platberg WEF, near Victoria West, Northern Cape.	Project Assistant	South Africa Mainstream Renewable Power Developments (Pty) Ltd
2016	Appeal Processes for the three 75 MW Solar PV Facilities (Kenhardt PV 1, PV 2, and PV 3) and three transmission Lines and electrical infrastructure (i.e. Kenhardt PV 1 – Transmission Line, Kenhardt PV 2 – Transmission Line, and	Project Consultant	Scatec Solar SA 163 (PTY) Ltd

Date	Project Description	Role	Client
	Kenhardt PV 3 – Transmission Line), north-east of Kenhardt, Northern Cape.		
2015 – ongoing	Environmental Management Plan for the Proposed Construction of a Bulk Liquid Storage and Handling Facility in the Port of Cape Town, Western Cape	Project Manager	Oiltanking Grindrod Calulo Terminals (PTY) Ltd
2015 – 2016	Basic Assessment Process for the Proposed development of three Transmission Lines and electrical infrastructure to connect to the proposed 75 MW Solar PV Facilities (Kenhardt PV 1, PV 2, and 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.	Project Manager	Scatec Solar SA 163 (PTY) Ltd
2015 – 2016	Scoping and EIA Process for the Proposed development of three 75 MW Solar PV Facilities (Kenhardt PV 1, PV 2, and PV 3) on the remaining extent of Onder Rugzeer Farm 168, north-east of Kenhardt, Northern Cape.	Project Manager	Scatec Solar SA 163 (PTY) Ltd
2015 – 2016	EIA for a Gas-To-Power project and associated infrastructure, forming part of the proposed Uyekraal Gas-to-Power Development, Saldanha Bay, Western Cape	Project Manager	Mulilo Thermal Developments
2015 - 2016	Environmental Impact Assessment Process for the Proposed Construction, Operation and Decommissioning of a Seawater Reverse Osmosis Plant and Associated Infrastructure at Tongaat and Lovu on the KwaZulu-Natal North Coast and South Coast	Project Assistant	Umgeni Water Amanzi
2015	Public Participation Process for the Application for non-substantive Amendment to the Environmental Authorisation for the proposed Landside Structures and Infrastructure to the Bulk Liquid Storage and Handling Facility in the Port of Ngqura	Project Manager	Transnet Capital Projects
2014 – 2016	Basic Assessment for the Proposed Decommissioning and Upgrade of a Bulk Liquid Storage and Handling Facility at Maydon Wharf, Port of Durban, KwaZulu-Natal	Project Manager	Oiltanking Grindrod Calulo Terminals (PTY) Ltd
2013 – 2016	Basic Assessment for the decommissioning of unused infrastructure at the Port of Ngqura	Project Manager	Transnet Capital Projects
2013 – 2014	Environmental Impact Assessment for the Provision of Marine Infrastructure, including a General Cargo Berth and Liquid Bulk Berths at the Port of Ngqura	Project Manager	Transnet Capital Projects
2012 - 2014	Environmental Impact Assessment for the proposed Manganese Export Terminal in Zones 8, 9 and 11 of the Coega IDZ, including the Port of Ngqura, and surrounding area	Project Assistant	Hatch Africa (PTY) Ltd c/o Transnet
2012 - 2014	Basic Assessment for the Provision of Landside Structures and Infrastructure to the Bulk Liquid Storage and Handling Facility in the Port of Ngqura	Project Manager	Eastern Cape Infrastructure Joint Venture c/o Transnet Capital Projects
2011 - 2014	Environmental Impact Assessment for the proposed Bulk Liquid Storage and Handling Facility in Zone 8 of the Coega IDZ, Port of Ngqura	Project Manager	Oiltanking Grindrod Calulo (PTY) Ltd
2010 – 2011	The Repair and Rehabilitation of the Umzinto River Bridge Number 823 on the South Coast of KwaZulu-Natal	Environmental Control Officer	KwaZulu-Natal Department of Transport
2010 – 2011	The Construction of the Kwahlongwa Bridge Number 3257 over the Kwa-Malukaka River on D297 near Umzumbe, South Coast of KwaZulu-Natal	Environmental Control Officer	KwaZulu-Natal Department of Transport
2010 – 2011	The Construction of a bridge and approach roads across the Indaka River at Eludimbi, within the Msinga Local Municipality, KwaZulu-Natal	Environmental Control Officer	KwaZulu-Natal Department of Transport
2010 – 2011	The Extension of the Lion Park Pipeline along the P566 and D2173 in the Manyavu area, KwaZulu-Natal	Environmental Control Officer	Umgeni Water

Date	Project Description	Role	Client
2010 – 2011	The Construction of a bridge and approach roads across the Tugela River at Thulwane, within the Nkandla Local Municipality, KwaZulu-Natal	Environmental Control Officer	KwaZulu-Natal Department of Transport
2010 – 2011	The Construction of a bridge and approach roads across the Mona River at Nqolotshe, within the Hlabisa and Nongoma Local Municipalities, KwaZulu-Natal	Environmental Control Officer	KwaZulu-Natal Department of Transport
2010 – 2011	The Construction of the Mdloti River Bridge (Northbound) on the R102, within the eThekwini Municipality, KwaZulu-Natal.	Environmental Control Officer	KwaZulu-Natal Department of Transport
2010 – 2011	The Upgrade of the R102 from the Duffs Road Interchange to King Shaka International Airport, within the eThekwini Municipality, KwaZulu-Natal.	Environmental Control Officer	KwaZulu-Natal Department of Transport
2010 – 2011	The Construction of the P701 Provincial Road from Ulundi to Empangeni, KwaZulu-Natal	Environmental Control Officer	KwaZulu-Natal Department of Transport
2010	Environmental Impact Assessment for the construction of a bridge and approach roads across the Mona River at Nqolotshe, within the Hlabisa and Nongoma Local Municipalities, KwaZulu-Natal	Project Assistant	KwaZulu-Natal Department of Transport

APPENDIX B: ROLES AND RESPONSIBILITIES

Responsible Person(s)	Role and Responsibilities
Developer's Project Manager (DPM)	Role The Project Developer is accountable for ensuring compliance with the EMPr and any conditions of approval from the competent authority (CA). Where required, an environmental control officer (ECO) must be contracted by the Project Developer to objectively monitor the implementation of the EMPr according to relevant environmental legislation, and the conditions of the environmental authorisation (EA). The Project Developer is further responsible for providing and giving mandate to enable the ECO to perform responsibilities, and he must ensure that the ECO is integrated as part of the project team while remaining independent. Responsibilities - Be fully conversant with the conditions of the EA; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Developer and its Contractor(s); - Issuing of site instructions to the Contractor for corrective actions required; - Monitor the implementation of the EMPr throughout the project by means of site inspections and meetings. Overall management of the project and EMPr implementation; and - Ensure that periodic environmental performance audits are undertaken on the project implementation.
Developer Site Supervisor (DSS)	Role The DSS reports directly to the DPM, oversees site works, liaises with the contractor(s) and the ECO. The DSS is responsible for the day to day implementation of the EMPr and for ensuring the compliance of all contractors with the conditions and requirements stipulated in the EMPr. Responsibilities - Ensure that all contractors identify a contractor's Environmental Officer (cEO); - Must be fully conversant with the conditions of the EA. Oversees site works, liaison with Contractor, DPM and ECO; - Must ensure that all landowners have the relevant contact details of the site staff, ECO and cEO; - Issuing of site instructions to the Contractor for corrective actions required; - Will issue all non-compliances to contractors; and - Ratify the Monthly Environmental Report.
Environmental Control Officer (ECO)	Role The ECO should have appropriate training and experience in the implementation of environmental management specifications. The primary role of the ECO is to act as an independent quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts. In this respect, the ECO is to conduct periodic site inspections, attend regular site meetings, pre-empt problems

Responsible Person(s)	Role and Responsibilities
	and suggest mitigation and be available to advise on incidental issues that arise. The ECO is also required to conduct compliance audits, verifying the monitoring reports submitted by the cEO. The ECO provides feedback to the DSS and Project Manager regarding all environmental matters. The Contractor, cEO and dEO are answerable to the Environmental Control Officer for non-compliance with the Performance Specifications as set out in the EA and EMPr. The ECO provides feedback to the DSS and Project Manager, who in turn reports back to the Contractor and potential and Registered Interested &Affected Parties' (RI&AP's), as required. Issues of non-compliance raised by the ECO must be taken up by the Project Manager, and resolved with the Contractor as per the conditions of his contract. Decisions regarding environmental procedures, specifications and requirements which have a cost implication (i.e. those that are deemed to be a variation, not allowed for in the Performance Specification) must be endorsed by the Project Manager. The ECO must also, as specified by the EA, report to the relevant CA as and when required. <u>Responsibilities</u> The responsibilities of the ECO will include the following: - Be aware of the findings and conclusions of all EA related to the development; - Be familiar with the recommendations and mitigation measures of this EMPr; - Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with them; - Undertake regular and comprehensive site inspections / audits of the construction site according to the generic EMPr and applicable licenses in order to monitor compliance as required; - Educate the construction team about the management measures contained in the EMPr and environmental licenses; - Compilation and administration of an environmental monitoring plan to ensure that the environmental management measures are implemented and are effective; - Monitoring the performance of the Contractors and ensuring compliance with the EMPr and associated Method Statements; - In consultation with the Developer Site Supervisor order the removal of person(s) and/or equipment which are in contravention of the specifications of the EMPr and/or environmental licenses; - Liaison between the DPM, Contractors, authorities and other lead stakeholders on all environmental concerns; - Compile a regular environmental audit report highlighting any non-compliance issues as well as satisfactory or exceptional compliance with the EMPr; - Validating the regular site inspection reports, which are to be prepared by the contractor Environmental Officer (cEO); - Checking the cEO's record of environmental incidents (spills, impacts, legal transgressions etc.) as well as corrective and preventive actions taken; - Checking the cEO's public complaints register in which all complaints are recorded, as well as action taken; - Assisting in the resolution of conflicts; - Facilitate training for all personnel on the site – this may range from carrying out the training, to reviewing the training programmes of the Contractor;

Responsible Person(s)	Role and Responsibilities
	- In case of non-compliances, the ECO must first communicate this to the Senior Site Supervisor, who has the power to ensure this matter is addressed. Should no action or insufficient action be taken, the ECO may report this matter to the authorities as non-compliance; - Maintenance, update and review of the EMPr; - Communication of all modifications to the EMPr to the relevant stakeholders.
developer Environmental Officer (dEO)	Role The dEOs will report to the Project Manager and are responsible for implementation of the EMPr, environmental monitoring and reporting, providing environmental input to the Project Manager and Contractor's Manager, liaising with contractors and the landowners as well as a range of environmental coordination responsibilities. Responsibilities - Be fully conversant with the EMPr; - Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Employees, Contractor(s) ; - Confine the development site to the demarcated area; - Conduct environmental internal audits with regards to EMPr and authorisation compliance (on cEO); - Assist the contractors in addressing environmental challenges on site; - Assist in incident management: - Reporting environmental incidents to developer and ensuring that corrective action is taken, and lessons learnt shared; - Assist the contractor in investigating environmental incidents and compile investigation reports; - Follow-up on pre-warnings, defects, non-conformance reports; - Measure and communicate environmental performance to the Contractor; - Conduct environmental awareness training on site together with ECO and cEO; - Ensure that the necessary legal permits and / or licenses are in place and up to date; - Acting as Developer's Environmental Representative on site and work together with the ECO and contractor.
Contractor	Role The Contractor appoints the cEO and has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract are in line with the EMPr and that Method Statements are implemented as described. External contractors must ensure compliance with this EMPr while performing the onsite activities as per their contract with the Project Developer. The contractors are required, where specified, to provide Method Statements setting out in detail how the impact management actions contained in the EMPr will be implemented during the development or expansion of substation infrastructure for the transmission and distribution of electricity activities.

Responsible Person(s)	Role and Responsibilities
	Responsibilities - project delivery and quality control for the development services as per appointment; - employ a suitably qualified person to monitor and report to the Project Developer's appointed person on the daily activities on-site during the construction period; - ensure that safe, environmentally acceptable working methods and practices are implemented and that equipment is properly operated and maintained, to facilitate proper access and enable any operation to be carried out safely; - attend on site meeting(s) prior to the commencement of activities to confirm the procedure and designated activity zones; - ensure that contractors' staff repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in EMPr, to the satisfaction of the ECO.
contractor Environmental Officer (cEO)	Role Each Contractor affected by the EMPr should appoint a cEO, who is responsible for the on-site implementation of the EMPr (or relevant sections of the EMPr). The Contractor's representative can be the site agent; site engineer; a dedicated environmental officer; or an independent consultant. The Contractor must ensure that the Contractor's Representative is suitably qualified to perform the necessary tasks and is appointed at a level such that she/he can interact effectively with other site Contractors, labourers, the Environmental Control Officer and the public. As a minimum the cEO shall meet the following criteria: Responsibilities - Be on site throughout the duration of the project and be dedicated to the project; - Ensure all their staff are aware of the environmental requirements, conditions and constraints with respect to all of their activities on site; - Implementing the environmental conditions, guidelines and requirements as stipulated within the EA, EMPr and Method Statements; - Attend the Environmental Site Meeting; - Undertaking corrective actions where non-compliances are registered within the stipulated timeframes; - Report back formally on the completion of corrective actions; - Assist the ECO in maintaining all the site documentation; - Prepare the site inspection reports and corrective action reports for submission to the ECO; - Assist the ECO with the preparing of the monthly report; and - Where more than one Contractor is undertaking work on site, each company appointed as a Contractor will appoint a cEO representing that company.

APPENDIX C: CHANCE FOSSIL FIND PROTOCOL FOR PALAEONTOLOGICAL RESOURCES

<table>
<tr><th colspan="3">CHANCE FOSSIL FINDS PROTOCOL: Proposed Kudu Solar PV Facilities and Associated Infrastructure near De Aar</th></tr>
<tr><td>Province & region:</td><td colspan="2">Northern Cape: Pixley Ka Seme District</td></tr>
<tr><td>Responsible Heritage Resources Agency</td><td colspan="2">SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za).</td></tr>
<tr><td>Rock unit(s)</td><td colspan="2">Early to Middle Permian Tierberg and Waterford Formation (Ecca Group), Late Caenozoic calcrete hardpans, alluvium, aeolian sands, pan sediments, surface gravels (Kalahari Group)</td></tr>
<tr><td>Potential fossils</td><td colspan="2">Trace fossil assemblages, petrified wood, microvertebrate remains within Ecca Group sediments.
Potential for concentrations of mammalian fossil remains (bones, teeth, horncores), trace fossils, non-marine molluscs in association with calcrete hardpans.
Fossil mammal bones, teeth, horn cores, freshwater molluscs, plant material in Late Caenozoic alluvium and pan deposits.</td></tr>
<tr><td rowspan="5">Environmental Control Officer (ECO) protocol</td><td colspan="2">1. Once alerted to fossil occurrence(s): alert site foreman, stop work in area immediately (N.B. safety first!), safeguard site with security tape / fence / sand bags if necessary.</td></tr>
<tr><td colspan="2">2. Record key data while fossil remains are still in situ:
• Accurate geographic location – describe and mark on site map / 1: 50 000 map / satellite image / aerial photo
• Context – describe position of fossils within stratigraphy (rock layering), depth below surface
• Photograph fossil(s) in situ with scale, from different angles, including images showing context (e.g. rock layering)</td></tr>
<tr><td>3. If feasible to leave fossils in situ:
• Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation
• Ensure fossil site remains safeguarded until clearance is given by the Heritage Resources Agency for work to resume</td><td>3. If not feasible to leave fossils in situ (emergency procedure only):
• Carefully remove fossils, as far as possible still enclosed within the original sedimentary matrix (e.g. entire block of fossiliferous rock)
• Photograph fossils against a plain, level background, with scale
• Carefully wrap fossils in several layers of newspaper / tissue paper / plastic bags
• Safeguard fossils together with locality and collection data (including collector and date) in a box in a safe place for examination by a palaeontologist
• Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation</td></tr>
<tr><td colspan="2">4. If required by Heritage Resources Agency, ensure that a suitably-qualified specialist palaeontologist is appointed as soon as possible by the developer.</td></tr>
<tr><td colspan="2">5. Implement any further mitigation measures proposed by the palaeontologist and Heritage Resources Agency</td></tr>
<tr><td>Specialist palaeontologist</td><td colspan="2">Record, describe and judiciously sample fossil remains together with relevant contextual data (stratigraphy / sedimentology / taphonomy). Ensure that fossils are curated in an approved repository (e.g. museum / university / Council for Geoscience collection) together with full collection data. Submit Palaeontological Mitigation report to Heritage Resources Agency. Adhere to best international practice for palaeontological fieldwork and Heritage Resources Agency minimum standards.</td></tr>
</table>

APPENDIX D: PRE-APPROVED GENERIC EMPR TEMPLATE FOR SUBSTATION INFRASTRUCTURE (GN 435)

SECTION 5: IMPACT MANAGEMENT OUTCOMES AND IMPACT MANAGEMENT ACTIONS

This section provides a pre-approved generic EMPr template with aspects that are common to the development of substation infrastructure for the transmission and distribution of electricity. There is a list of aspects identified for the development or expansion of substation infrastructure for the transmission and distribution of electricity, and for each aspect a set of prescribed impact management outcomes and associated impact management actions have been identified. Holders of EAs are responsible to ensure the implementation of these outcomes and actions for all projects as a minimum requirement, in order to mitigate the impact of such aspects identified for the development or expansion of substation infrastructure for the transmission and distribution of electricity.

The template provided below is to be completed by providing the information under each heading for each environmental impact management action.

The completed template must be signed and dated on each page by both the contractor and the holder of the EA prior to commencement of the activity. The method statements prepared and agreed to by the holder of the EA must be appended to the template as Appendix 1. Each method statement must also be duly signed and dated on each page by the contactor and the holder of the EA. This template, once signed and dated, is legally binding. The holder of the EA will remain responsible for its implementation.

5.1. Environmental awareness training

Impact management outcome: All onsite staff are aware and understands the individual responsibilities in terms of this EMPr.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All staff must receive environmental awareness training prior to commencement of the activities; – The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course; – Refresher environmental awareness training is available as and when required; – All staff are aware of the conditions and controls linked to the EA and within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr; – The Contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum: a) Safety notifications; and b) No littering. – Environmental awareness training must include as a minimum the following: a) Description of significant environmental impacts, actual or potential, related to their work activities; b) Mitigation measures to be implemented when carrying out specific activities; c) Emergency preparedness and response procedures; d) Emergency procedures; e) Procedures to be followed when working near or within sensitive areas; f) Wastewater management procedures; g) Water usage and conservation; h) Solid waste management procedures; i) Sanitation procedures; j) Fire prevention; and k) Disease prevention. – A record of all environmental awareness training courses undertaken as part of the EMPr must be available; – Educate workers on the dangers of open and/or unattended fires; – A staff attendance register of all staff to have received environmental awareness training must be available. – Course material must be available and presented in appropriate languages that all staff can understand.						

5.2. Site Establishment development

Impact management outcome: Impacts on the environment are minimised during site establishment and the development footprint are kept to demarcated development area.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– A method statement must be provided by the contractor prior to any onsite activity that includes the layout of the construction camp in the form of a plan showing the location of key infrastructure and services (where applicable), including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous materials storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management; – Location of camps must be within approved area to ensure that the site does not impact on sensitive areas identified in the environmental assessment or site walk through; – Sites must be located where possible on previously disturbed areas; – The camp must be fenced in accordance with ***Section 5.5: Fencing and gate installation***; and – The use of existing accommodation for contractor staff, where possible, is encouraged.						

5.3. Access restricted areas

Impact management outcome: Access to restricted areas prevented.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Identification of access restricted areas is to be informed by the environmental assessment, site walk through and any additional areas identified during development; – Erect, demarcate and maintain a temporary barrier with clear signage around the perimeter of any access restricted area, colour coding could be used if appropriate; and – Unauthorised access and development related activity inside access restricted areas is prohibited.						

5.4. Access roads

Impact management outcome: Minimise impact to the environment through the planned and restricted movement of vehicles on site.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– An access agreement must be formalised and signed by the DPM, Contractor and landowner before commencing with the activities; – All private roads used for access to the servitude must be maintained and upon completion of the works, be left in at least the original condition – All contractors must be made aware of all these access routes. – Any access route deviation from that in the written agreement must be closed and re-vegetated immediately, at the contractor's expense; – Maximum use of both existing servitudes and existing roads must be made to minimize further disturbance through the development of new roads; – In circumstances where private roads must be used, the condition of the said roads must be recorded in accordance with ***section 4.9: photographic record***; prior to use and the condition thereof agreed by the landowner, the DPM, and the contractor; – Access roads in flattish areas must follow fence lines and tree belts to avoid fragmentation of vegetated areas or croplands – Access roads must only be developed on a pre-planned and approved roads.						

5.5. Fencing and Gate installation

Impact management outcome: Minimise impact to the environment and ensure safe and controlled access to the site through the erection of fencing and gates where required.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Use existing gates provided to gain access to all parts of the area authorised for development, where possible; – Existing and new gates to be recorded and documented in accordance with **section *4.9: photographic record***; – All gates must be fitted with locks and be kept locked at all times during the development phase, unless otherwise agreed with the landowner; – At points where the line crosses a fence in which there is no suitable gate within the extent of the line servitude, on the instruction of the DPM, a gate must be installed at the approval of the landowner; – Care must be taken that the gates must be so erected that there is a gap of no more than 100 mm between the bottom of the gate and the ground; – Where gates are installed in jackal proof fencing, a suitable reinforced concrete sill must be provided beneath the gate; – Original tension must be maintained in the fence wires; – All gates installed in electrified fencing must be re-electrified; – All demarcation fencing and barriers must be maintained in good working order for the duration of the development activities; – Fencing must be erected around the camp, batching plants, hazardous storage areas, and all designated access restricted areas, where applicable; – Any temporary fencing to restrict the movement of live-stock must only be erected with the permission of the landowner. – All fencing must be developed of high quality material bearing the SABS mark; – The use of razor wire as fencing must be avoided; – Fenced areas with gate access must remain locked after hours, during weekends and on holidays if staff is away from site. Site security will be required at all times; – On completion of the development phase all temporary fences are to be removed; – The contractor must ensure that all fence uprights are appropriately removed, ensuring that no uprights are cut at ground level but rather removed completely.						

5.6. Water Supply Management

Impact management outcome: Undertake responsible water usage**.**						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All abstraction points or bore holes must be registered with the DWS and suitable water meters installed to ensure that the abstracted volumes are measured on a daily basis; – The Contractor must ensure the following: a. The vehicle abstracting water from a river does not enter or cross it and does not operate from within the river; b. No damage occurs to the river bed or banks and that the abstraction of water does not entail stream diversion activities; and c. All reasonable measures to limit pollution or sedimentation of the downstream watercourse are implemented. – Ensure water conservation is being practiced by: a. Minimising water use during cleaning of equipment; b. Undertaking regular audits of water systems; and c. Including a discussion on water usage and conservation during environmental awareness training. d. The use of grey water is encouraged.						

5.7. Storm and wastewater management

Impact management outcome: Impacts to the environment caused by storm water and wastewater discharges during construction are avoided.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Runoff from the cement/ concrete batching areas must be strictly controlled, and contaminated water must be collected, stored and either treated or disposed of off-site, at a location approved by the project manager; – All spillage of oil onto concrete surfaces must be controlled by the use of an approved absorbent material and the used absorbent material disposed of at an appropriate waste disposal facility; – Natural storm water runoff not contaminated during the development and clean water can be discharged directly to watercourses and water bodies, subject to the Project Manager's approval and support by the ECO; – Water that has been contaminated with suspended solids, such as soils and silt, may be released into watercourses or water bodies only once all suspended solids have been removed from the water by settling out these solids in settlement ponds. The release of settled water back into the environment must be subject to the Project Manager's approval and support by the ECO.						

5.8. Solid and hazardous waste management

Impact management outcome: Wastes are appropriately stored, handled and safely disposed of at a recognised waste facility**.**						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All measures regarding waste management must be undertaken using an integrated waste management approach; – Sufficient, covered waste collection bins (scavenger and weatherproof) must be provided; – A suitably positioned and clearly demarcated waste collection site must be identified and provided; – The waste collection site must be maintained in a clean and orderly manner; – Waste must be segregated into separate bins and clearly marked for each waste type for recycling and safe disposal; – Staff must be trained in waste segregation; – Bins must be emptied regularly; – General waste produced onsite must be disposed of at registered waste disposal sites/ recycling company; – Hazardous waste must be disposed of at a registered waste disposal site; – Certificates of safe disposal for general, hazardous and recycled waste must be maintained.						

5.9. Protection of watercourses and estuaries

Impact management outcome: Pollution and contamination of the watercourse environment and or estuary erosion are prevented.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All watercourses must be protected from direct or indirect spills of pollutants such as solid waste, sewage, cement, oils, fuels, chemicals, aggregate tailings, wash and contaminated water or organic material resulting from the Contractor's activities; – In the event of a spill, prompt action must be taken to clear the polluted or affected areas; – Where possible, no development equipment must traverse any seasonal or permanent wetland – No return flow into the estuaries must be allowed and no disturbance of the Estuarine functional Zone should occur; – Development of permanent watercourse or estuary crossing must only be undertaken where no alternative access to tower position is available; – There must not be any impact on the long term morphological dynamics of watercourses or estuaries; – Existing crossing points must be favored over the creation of new crossings (including temporary access)						

Impact management outcome: Pollution and contamination of the watercourse environment and or estuary erosion are prevented.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– When working in or near any watercourse or estuary, the following environmental controls and consideration must be taken: a) Water levels during the period of construction; b) No altering of the bed, banks, course or characteristics of a watercourse c) During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that construction equipment is well maintained; d) Where earthwork is being undertaken in close proximity to any watercourse, slopes must be stabilised using suitable materials, i.e. sandbags or geotextile fabric, to prevent sand and rock from entering the channel; and e) Appropriate rehabilitation and re-vegetation measures for the watercourse banks must be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilised as soon as development allows.						

5.10. Vegetation clearing

Impact management outcome: Vegetation clearing is restricted to the authorised development footprint of the proposed infrastructure.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
General: – Indigenous vegetation which does not interfere with the development must be left undisturbed; – Protected or endangered species may occur on or near the development site. Special care should be taken not to damage such species; – Search, rescue and replanting of all protected and endangered species likely to be damaged during project development must be identified by the relevant specialist and completed prior to any development or clearing; – Permits for removal must be obtained from the relevant CA prior to the cutting or clearing of the affected species, and they must be filed; – The Environmental Audit Report must confirm that all identified species have been rescued and replanted and that the location of replanting is compliant with conditions of approvals; – Trees felled due to construction must be documented and form part of the Environmental Audit Report; – Rivers and watercourses must be kept clear of felled trees, vegetation cuttings and debris; – Only a registered pest control operator may apply herbicides on a commercial basis and commercial application must be carried out under the supervision of a registered pest control operator, supervision of a registered pest control operator or is appropriately trained; – A daily register must be kept of all relevant details of herbicide usage; – No herbicides must be used in estuaries; – All protected species and sensitive vegetation not removed must be clearly marked and such areas fenced off in accordance to ***Section 5.3: Access restricted areas***. – Alien invasive vegetation must be removed and disposed of at a licensed waste management facility.						

5.11. Protection of fauna

Impact management outcome: Disturbance to fauna is minimised.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– No interference with livestock must occur without the landowner's written consent and with the landowner or a person representing the landowner being present; – The breeding sites of raptors and other wild birds species must be taken into consideration during the planning of the development programme; – Breeding sites must be kept intact and disturbance to breeding birds must be avoided. Special care must be taken where nestlings or fledglings are present; – Special recommendations of the avian specialist must be adhered to at all times to prevent unnecessary disturbance of birds; – No poaching must be tolerated under any circumstances. All animal dens in close proximity to the works areas must be marked as Access restricted areas; – No deliberate or intentional killing of fauna is allowed; – In areas where snakes are abundant, snake deterrents to be deployed on the pylons to prevent snakes climbing up, being electrocuted and causing power outages; and						

– No Threatened or Protected species (ToPs) and/or protected fauna as listed according NEMBA (Act No. 10 of 2004) and relevant provincial ordinances may be removed and/or relocated without appropriate authorisations/permits.						

5.12. Protection of heritage resources

Impact management outcome: Impact to heritage resources is minimised.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Identify, demarcate and prevent impact to all known sensitive heritage features on site in accordance with the No-Go procedure in ***Section 5.3: Access restricted areas***; – Carry out general monitoring of excavations for potential fossils, artefacts and material of heritage importance; – All work must cease immediately, if any human remains and/or other archaeological, palaeontological and historical material are uncovered. Such material, if exposed, must be reported to the nearest museum, archaeologist/ palaeontologist (or the South African Police Services), so that a systematic and professional investigation can be undertaken. Sufficient time must be allowed to remove/collect such material before development recommences.						

5.13. Safety of the public

Impact management outcome: All precautions are taken to minimise the risk of injury, harm or complaints.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Identify fire hazards, demarcate and restrict public access to these areas as well as notify the local authority of any potential threats e.g. large brush stockpiles, fuels etc.; – All unattended open excavations must be adequately fenced or demarcated; – Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding; – Ensure structures vulnerable to high winds are secured; – Maintain an incidents and complaints register in which all incidents or complaints involving the public are logged.						

5.14. Sanitation

Impact management outcome: Clean and well maintained toilet facilities are available to all staff in an effort to minimise the risk of disease and impact to the environment.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Mobile chemical toilets are installed onsite if no other ablution facilities are available; – The use of ablution facilities and or mobile toilets must be used at all times and no indiscriminate use of the veld for the purposes of ablutions must be permitted under any circumstances; – Where mobile chemical toilets are required, the following must be ensured: a) Toilets are located no closer than 100 m to any watercourse or water body; b) Toilets are secured to the ground to prevent them from toppling due to wind or any other cause; c) No spillage occurs when the toilets are cleaned or emptied and the contents are managed in accordance with the EMPr; d) Toilets have an external closing mechanism and are closed and secured from the outside when not in use to prevent toilet paper from being blown out; e) Toilets are emptied before long weekends and workers holidays, and must be locked after working hours; f) Toilets are serviced regularly and the ECO must inspect toilets to ensure compliance to health standards; – A copy of the waste disposal certificates must be maintained.						

5.15. Prevention of disease

Impact Management outcome: All necessary precautions linked to the spread of disease are taken.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Undertake environmentally-friendly pest control in the camp area; – Ensure that the workforce is sensitised to the effects of sexually transmitted diseases, especially HIV AIDS; – The Contractor must ensure that information posters on AIDS are displayed in the Contractor Camp area; – Information and education relating to sexually transmitted diseases to be made available to both construction workers and local community, where applicable; – Free condoms must be made available to all staff on site at central points; – Medical support must be made available; – Provide access to Voluntary HIV Testing and Counselling Services.						

5.16. Emergency procedures

Impact management outcome: Emergency procedures are in place to enable a rapid and effective response to all types of environmental emergencies.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Compile an Emergency Response Action Plan (ERAP) prior to the commencement of the proposed project; – The Emergency Plan must deal with accidents, potential spillages and fires in line with relevant legislation; – All staff must be made aware of emergency procedures as part of environmental awareness training; – The relevant local authority must be made aware of a fire as soon as it starts; – In the event of emergency necessary mitigation measures to contain the spill or leak must be implemented (see ***Hazardous Substances section 5.17***).						

5.17. Hazardous substances

Impact management outcome: Safe storage, handling, use and disposal of hazardous substances.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– The use and storage of hazardous substances to be minimised and non-hazardous and non-toxic alternatives substituted where possible; – All hazardous substances must be stored in suitable containers as defined in the Method Statement; – Containers must be clearly marked to indicate contents, quantities and safety requirements; – All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers; – Bunded areas to be suitably lined with a SABS approved liner; – An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis; – All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS); – All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet; – Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available; – The Contractor must ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers; – The tanks/ bowsers must be situated on a smooth impermeable surface (concrete) with a permanent bund. The impermeable lining must extend to the crest of the bund and the volume inside the bund must be 130% of the total capacity of all the storage tanks/ bowsers (110% statutory requirement plus an allowance for rainfall); – The floor of the bund must be sloped, draining to an oil separator; – Provision must be made for refueling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained; – All empty externally dirty drums must be stored on a drip tray or within a bunded area; – No unauthorised access into the hazardous substances storage areas must be permitted; – No smoking must be allowed within the vicinity of the hazardous storage areas; – Adequate fire-fighting equipment must be made available at all hazardous storage areas; – Where refueling away from the dedicated refueling station is required, a mobile refueling unit must be used. Appropriate ground protection such as drip trays must be used; – An appropriately sized spill kit kept onsite relevant to the scale of the activity/s involving the use of hazardous substance must be available at all times; – The responsible operator must have the required training to make use of the spill kit in emergency situations; – An appropriate number of spill kits must be available and must be located in all areas where activities are being undertaken; – In the event of a spill, contaminated soil must be collected in containers and stored in a central location and disposed of according to the National Environmental Management: Waste Act 59 of 2008. Refer to ***Section 5.7*** for procedures concerning ***storm and wastewater management*** and ***5.8*** for ***solid and hazardous waste management.***						

5.18. Workshop, equipment maintenance and storage

Impact management outcome: Soil, surface water and groundwater contamination is minimised.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Where possible and practical all maintenance of vehicles and equipment must take place in the workshop area; – During servicing of vehicles or equipment, especially where emergency repairs are effected outside the workshop area, a suitable drip tray must be used to prevent spills onto the soil. The relevant local authority must be made aware of a fire as soon as it starts;						

– Leaking equipment must be repaired immediately or be removed from site to facilitate repair; – Workshop areas must be monitored for oil and fuel spills; – Appropriately sized spill kit kept onsite relevant to the scale of the activity taking place must be available; – The workshop area must have a bunded concrete slab that is sloped to facilitate runoff into a collection sump or suitable oil / water separator where maintenance work on vehicles and equipment can be performed; – Water drainage from the workshop must be contained and managed in accordance Section ***5.7: Storm and wastewater management***.						

5.19. Batching plants

Impact management outcome: Minimise spillages and contamination of soil, surface water and groundwater**.**						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Concrete mixing must be carried out on an impermeable surface; – Batching plants areas must be fitted with a containment facility for the collection of cement laden water. – Dirty water from the batching plant must be contained to prevent soil and groundwater contamination – Bagged cement must be stored in an appropriate facility and at least 10 m away from any water courses, gullies and drains; – A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted; – Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licenced disposal facility; – Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site; – Sand and aggregates containing cement must be kept damp to prevent the generation of dust (Refer to ***Section 5.20: Dust emissions***) – Any excess sand, stone and cement must be removed or reused from site on completion of construction period and disposed at a registered disposal facility; – Temporary fencing must be erected around batching plants in accordance with Section ***5.5: Fencing and gate installation***.						

5.20. Dust emissions

Impact management outcome: Dust prevention measures are applied to minimise the generation of dust.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Take all reasonable measures to minimise the generation of dust as a result of project development activities to the satisfaction of the ECO; – Removal of vegetation must be avoided until such time as soil stripping is required and similarly exposed surfaces must be re- vegetated or stabilised as soon as is practically possible; – Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present; – During high wind conditions, the ECO must evaluate the situation and make recommendations as to whether dust-damping measures are adequate, or whether working will cease altogether until the wind speed drops to an acceptable level; – Where possible, soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind; – Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO; – Vehicle speeds must not exceed 40 km/h along dust roads or 20 km/h when traversing unconsolidated and non-vegetated areas; – Straw stabilisation must be applied at a rate of one bale/10 m² and harrowed into the top 100 mm of top material, for all completed earthworks; – For significant areas of excavation or exposed ground, dust suppression measures must be used to minimise the spread of dust.						

5.21. Blasting

Impact management outcome: Impact to the environment is minimised through a safe blasting practice.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Any blasting activity must be conducted by a suitably licensed blasting contractor; and – Notification of surrounding landowners, emergency services site personnel of blasting activity 24 hours prior to such activity taking place on Site.						

5.22. Noise

Impact Management outcome: Prevent unnecessary noise to the environment by ensuring that noise from development activity is mitigated.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– The Contractor must keep noise level within acceptable limits, Restrict the use of sound amplification equipment for communication and emergency only; – All vehicles and machinery must be fitted with appropriate silencing technology and must be properly maintained; – Any complaints received by the Contractor regarding noise must be recorded and communicated. Where possible or applicable, provide transport to and from the site on a daily basis for construction workers; – Develop a Code of Conduct for the construction phase in terms of behaviour of construction staff. Operating hours as determined by the environmental authorisation are adhered to during the development phase. Where not defined, it must be ensured that development activities must still meet the impact management outcome related to noise management.						

5.23. Fire prevention

Impact management outcome: Prevention of uncontrollable fires.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Designate smoking areas where the fire hazard could be regarded as insignificant; – Firefighting equipment must be available on all vehicles located on site; – The local Fire Protection Agency (FPA) must be informed of construction activities; – Contact numbers for the FPA and emergency services must be communicated in environmental awareness training and displayed at a central location on site; – Two way swop of contact details between ECO and FPA.						

5.24. Stockpiling and stockpile areas

Impact management outcome: Reduce erosion and sedimentation as a result of stockpiling.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All material that is excavated during the project development phase (either during piling (if required) or earthworks) must be stored appropriately on site in order to minimise impacts to watercourses, watercourses and water bodies; – All stockpiled material must be maintained and kept clear of weeds and alien vegetation growth by undertaking regular weeding and control methods; – Topsoil stockpiles must not exceed 2 m in height; – During periods of strong winds and heavy rain, the stockpiles must be covered with appropriate material (e.g. cloth, tarpaulin etc.); – Where possible, sandbags (or similar) must be placed at the bases of the stockpiled material in order to prevent erosion of the material.						

5.25. Civil works

Impact management outcome: Impact to the environment minimised during civil works to create the substation terrace.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Where terracing is required, topsoil must be collected and retained for the purpose of re-use later to rehabilitate disturbed areas not covered by yard stone; – Areas to be rehabilitated include terrace embankments and areas outside the high voltage yards; – Where required, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled; – These areas can be stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly;						

Impact management outcome: Impact to the environment minimised during civil works to create the substation terrace.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Rehabilitation of the disturbed areas must be managed in accordance with ***Section 5.35: Landscaping and rehabilitation***; – All excess spoil generated during terracing activities must be disposed of in an appropriate manner and at a recognised landfill site; and – Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes.						

5.26. Excavation of foundation, cable trenching and drainage systems

Impact management outcome: No environmental degradation occurs as a result of excavation of foundation, cable trenching and drainage systems.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All excess spoil generated during foundation excavation must be disposed of in an appropriate manner and at a licensed landfill site, if not used for backfilling purposes; – Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes; – Management of equipment for excavation purposes must be undertaken in accordance with ***Section 5.18: Workshop, equipment maintenance and storage***; and – Hazardous substances spills from equipment must be managed in accordance with ***Section 5.17: Hazardous substances***.						

5.27. Installation of foundations, cable trenching and drainage systems

Impact management outcome: No environmental degradation occurs during the installation of foundation, cable trenching and drainage system.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Batching of cement to be undertaken in accordance with **Section *5.19: Batching plants***; and – Residual solid waste must be disposed of in accordance with **Section *5.8: Solid waste and hazardous management***.						

5.28. Installation of equipment (circuit breakers, current Transformers, Isolators, Insulators, surge arresters, voltage transformers, earth switches)

Impact management outcome: No environmental degradation occurs as a result of installation of equipment.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Management of dust must be conducted in accordance with Section ***5. 20: Dust emissions***; – Management of equipment used for installation must be conducted in accordance with Section **5*.18: Workshop, equipment maintenance and storage***; – Management hazardous substances and any associated spills must be conducted in accordance with Section ***5.17: Hazardous substances***; and – Residual solid waste must be recycled or disposed of in accordance with ***Section 5.8: Solid waste and hazardous management***.						

5.29. Steelwork Assembly and Erection

Impact management outcome: No environmental degradation occurs as a result of steelwork assembly and erection.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– During assembly, care must be taken to ensure that no wasted/unused materials are left on site e.g. bolts and nuts – Emergency repairs due to breakages of equipment must be managed in accordance with ***Section 5. 18: Workshop, equipment maintenance and storage*** and ***Section 5.16: Emergency procedures***.						

5.30. Cabling and Stringing

Impact management outcome: No environmental degradation occurs as a result of stringing.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Residual solid waste (off cuts etc.) shall be recycled or disposed of in accordance with **Section *5.8: Solid waste and hazardous Management***; – Management of equipment used for installation shall be conducted in accordance with **Section 5*.18: Workshop, equipment maintenance and storage***; – Management hazardous substances and any associated spills shall be conducted in accordance with ***Section 5.17: Hazardous substances***.						

5.31. Testing and Commissioning (all equipment testing, earthing system, system integration)

Impact management outcome: No environmental degradation occurs as a result of Testing and Commissioning.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Residual solid waste must be recycled or disposed of in accordance with ***Section 5.8: Solid waste and hazardous management***.						

5.32. Socio-economic

Impact management outcome: enhanced socio-economic development.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Develop and implement communication strategies to facilitate public participation; – Develop and implement a collaborative and constructive approach to conflict resolution as part of the external stakeholder engagement process; – Sustain continuous communication and liaison with neighboring owners and residents – Create work and training opportunities for local stakeholders; and – Where feasible, no workers, with the exception of security personnel, must be permitted to stay over-night on the site. This would reduce the risk to local farmers.						

5.33. Temporary closure of site

Impact management outcome: Minimise the risk of environmental impact during periods of site closure greater than five days.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Bunds must be emptied (where applicable) and need to be undertaken in accordance with the impact management actions included in ***sections 5.17: Hazardous substances and 5.18: Workshop, equipment maintenance and storage***; – Hazardous storage areas must be well ventilated; – Fire extinguishers must be serviced and accessible. Service records to be filed and audited at last service; – Emergency and contact details displayed must be displayed; – Security personnel must be briefed and have the facilities to contact or be contacted by relevant management and emergency personnel; – Night hazards such as reflectors, lighting, traffic signage etc. must have been checked; – Fire hazards identified and the local authority must have been notified of any potential threats e.g. large brush stockpiles, fuels etc.; – Structures vulnerable to high winds must be secured; – Wind and dust mitigation must be implemented; – Cement and materials stores must have been secured; – Toilets must have been emptied and secured; – Refuse bins must have been emptied and secured; – Drip trays must have been emptied and secured.						

5.34. Dismantling of old equipment

Impact management outcome: Impact to the environment to be minimised during the dismantling, storage and disposal of old equipment commissioning.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All old equipment removed during the project must be stored in such a way as to prevent pollution of the environment; – Oil containing equipment must be stored to prevent leaking or be stored on drip trays; – All scrap steel must be stacked neatly and any disused and broken insulators must be stored in containers; – Once material has been scrapped and the contract has been placed for removal, the disposal Contractor must ensure that any equipment containing pollution causing substances is dismantled and transported in such a way as to prevent spillage and pollution of the environment; – The Contractor must also be equipped to contain and clean up any pollution causing spills; and – Disposal of unusable material must be at a licensed waste disposal site.						

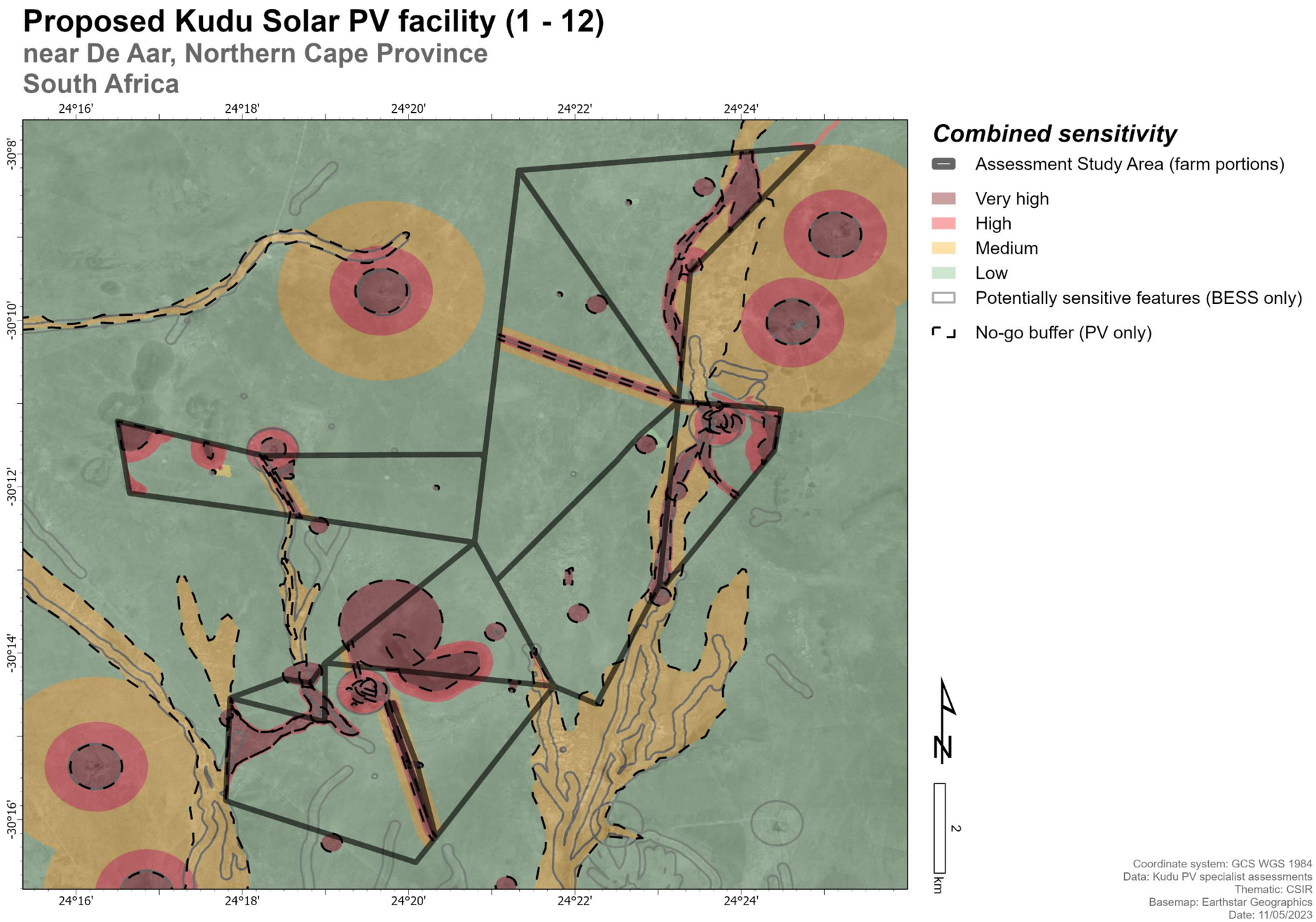
5.35. Landscaping and rehabilitation

Impact management outcome: Areas disturbed during the development phase are returned to a state that approximates the original condition.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All areas disturbed by construction activities must be subject to landscaping and rehabilitation; All spoil and waste must be disposed of to a registered waste site; – All slopes must be assessed for contouring, and to contour only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983 – All slopes must be assessed for terracing, and to terrace only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983; – Berms that have been created must have a slope of 1:4 and be replanted with indigenous species and grasses that approximates the original condition; – Where new access roads have crossed cultivated farmlands, that lands must be rehabilitated by ripping which must be agreed to by the holder of the EA and the landowners; – Rehabilitation of access roads outside of farmland; – Indigenous species must be used for with species and/grasses to where it compliments or approximates the original condition; – Stockpiled topsoil must be used for rehabilitation (refer to ***Section 5.24: Stockpiling and stockpiled areas***); – Stockpiled topsoil must be evenly spread so as to facilitate seeding and minimise loss of soil due to erosion; – Before placing topsoil, all visible weeds from the placement area and from the topsoil must be removed; – Subsoil must be ripped before topsoil is placed; – The rehabilitation must be timed so that rehabilitation can take place at the optimal time for vegetation establishment; – Where impacted through construction related activity, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled; – Sloped areas stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly; – Spoil can be used for backfilling or landscaping as long as it is covered by a minimum of 150 mm of topsoil. – Where required, re-vegetation including hydro-seeding can be enhanced using a vegetation seed mixture as described below. A mixture of seed can be used provided the mixture is carefully selected to ensure the following: a) Annual and perennial plants are chosen; b) Pioneer species are included; c) Species chosen must be indigenous to the area with the seeds used coming from the area; d) Root systems must have a binding effect on the soil; e) The final product must not cause an ecological imbalance in the area						

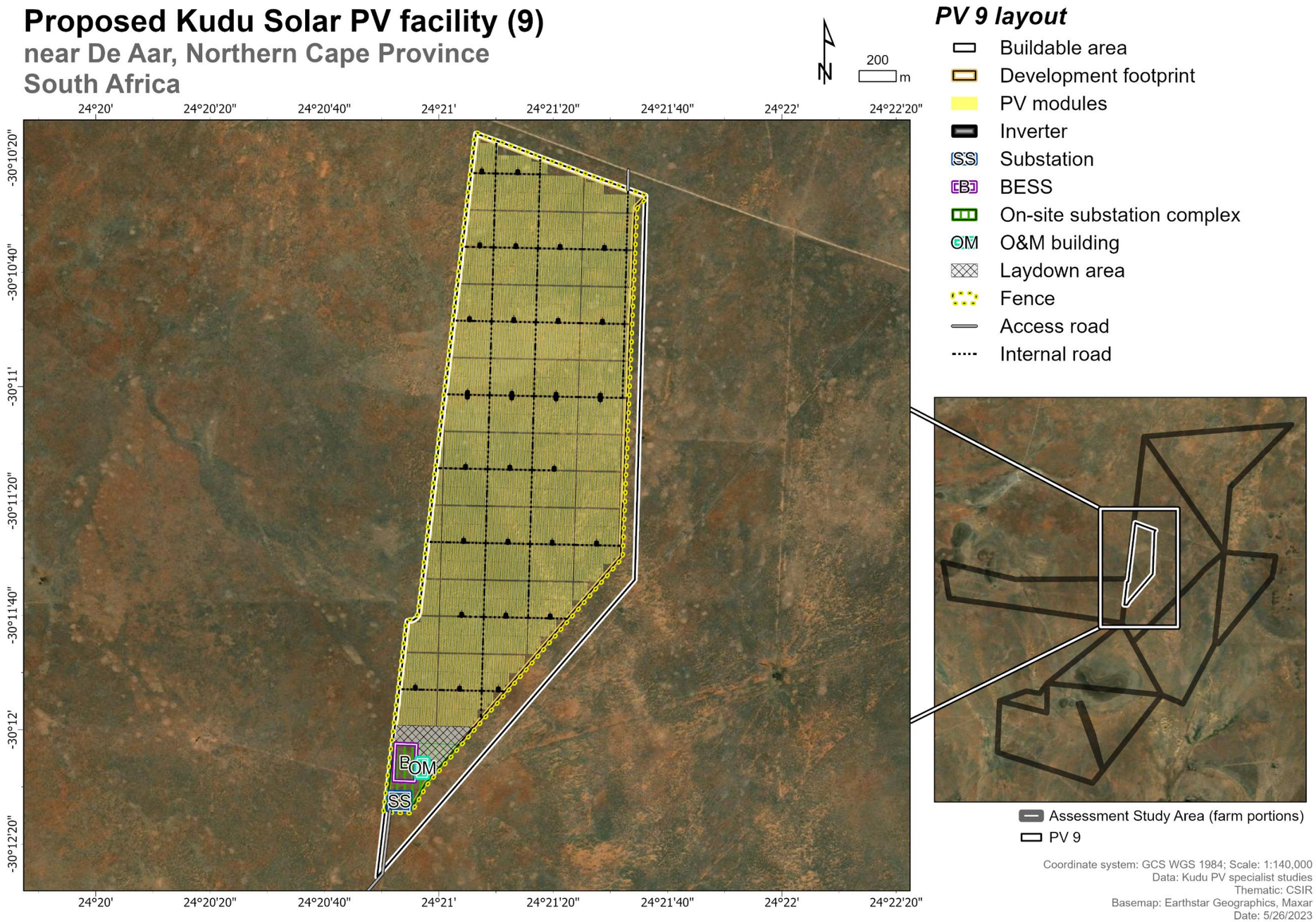
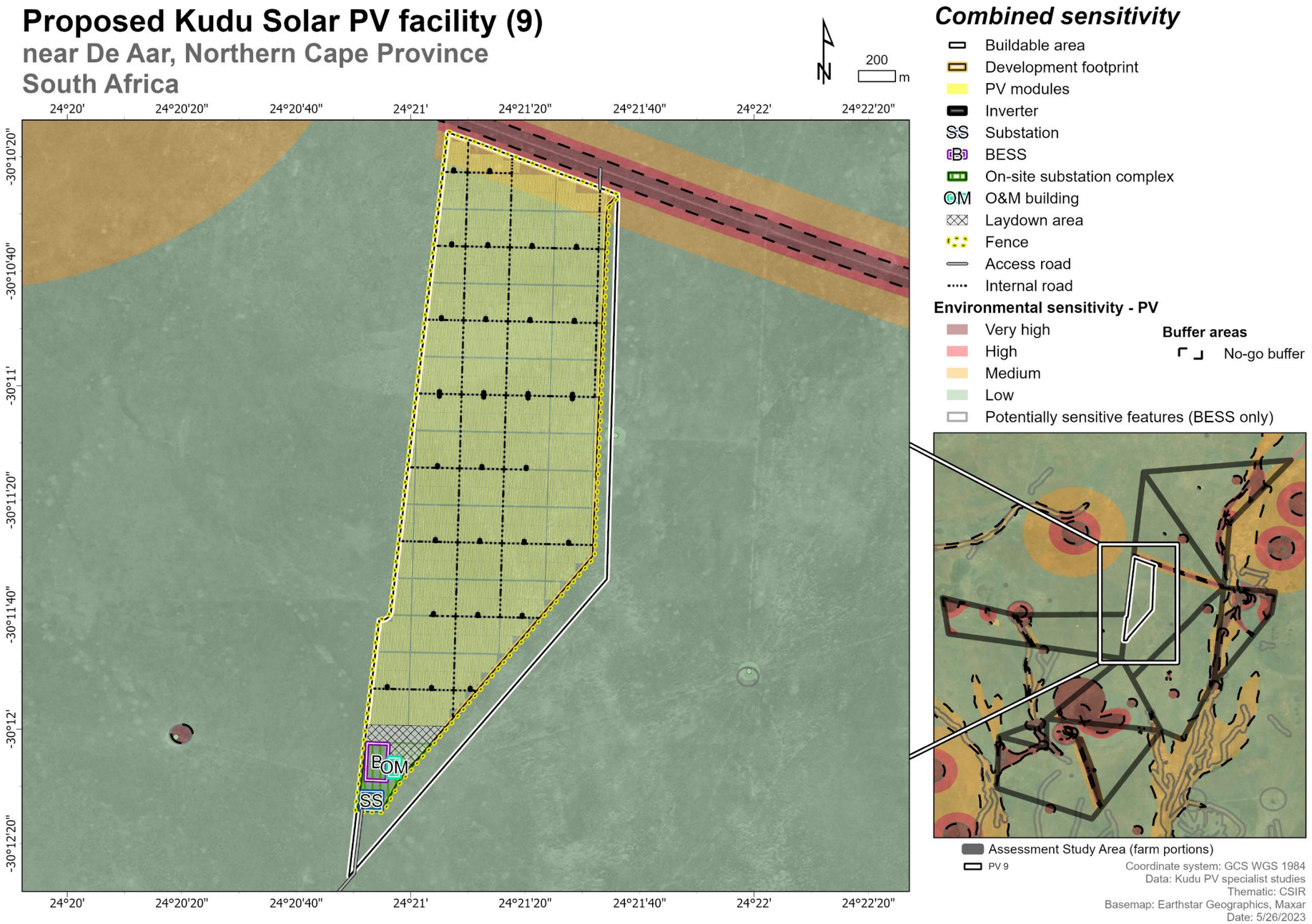
6. ACCESS TO THE GENERIC EMPr

Once completed and signed, to allow the public access to the generic EMPr, the holder of the EA must make the EMPr available to the public in accordance with the requirements of Regulation 26(h) of the EIA Regulations.

APPENDIX E: SENSITIVITY MAP FOR THE STUDY AREA



APPENDIX F:LAYOUT MAP



APPENDIX G: COMBINED LAYOUT AND SENSITIVITY MAP