savannah environmental

BACKGROUND INFORMATION DOCUMENT (BID)

JULY
2022

SCOPING AND ENVIRONMENTAL IMPACT ASSESSMENT, BASIC ASSESSMENT AND PUBLIC PARTICIPATION PROCESSES

PROPOSED DEVELOPMENT OF THE MUTSHO SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITIES AND ASSOCIATED ELECTRICAL GRID INFRASTRUCTURE NEAR MUSINA, LIMPOPO PROVINCE

Mutsho Power (Pty) Ltd proposes the construction and operation of four (4) Solar Photovoltaic (PV) Energy Facilities, each with a contracted capacity of up to 100MW, and Electrical Grid Infrastructure comprising a 132kV onsite substation (for the entire 4 x 100MW project), and a 132kV double circuit overhead power line from the onsite substation to the Nzhelele Substation to enable the connection of the four (4) Solar PV Energy Facilities to the national grid for the evacuation of the generated power. It is the developer's intention to develop the projects in a phased approach (i.e., 100MW at a time).

The four (4) Solar PV Energy Facilities and grid connection infrastructure are proposed on a site located approximately 8km south-west of Mopane and 39km south-west of Musina, within the Musina Local Municipality and the Vhembe District Municipality in the Limpopo Province on the following affected properties:

Solar PV Energy Facilities:
» Farm Vrienden 589 MS

Electrical Grid Infrastructure:
» Remaining Extent of Farm Vrienden 589 MS
» Grootpraat 564 MS
» Remaining Extent of Farm Steenbok 565 MS
» Farm 617 MS
» Remaining Extent of Farm Somme 611 MS
» Groot Endaba 581 MS
» Remaining Extent of Farm Antrobus 566 MS
» Portion 2 of Farm Scott 567 MS

Each Solar PV Energy Facility will be constructed as a separate stand-alone project by a separate Special Purpose Vehicle (SPV) and will therefore be assessed through separate Scoping and Environmental Impact Assessment (EIA) processes. Similarly, the grid connection solution will be subjected to a separate Basic Assessment (BA) process in order to facilitate handover of this infrastructure to Eskom once constructed. A combined five (5) applications for Environmental Authorisation (EA) are therefore currently being pursued as follows:

» Four (4) Solar PV Facility EAs
» One (1) EGI EA

Due to the proximity of the Solar PV Energy Facilities and their associated grid connection solution to one another, the public participation processes for the projects will be undertaken concurrently, providing the public with an opportunity to understand and provide comment on all the projects.

The details of the respective projects, including the project names and infrastructure details are provided in the table below:

SOLAR PV FACILITIES:

Project Name	Mutsho Solar PV1	Mutsho Solar PV2	Mutsho Solar PV3	Mutsho Solar PV4
Contracted capacity	100MW	100MW	100MW	100MW
Technology	Solar PV - Horizontal single axis tracking	Solar PV - Horizontal single axis tracking	Solar PV - Horizontal single axis tracking	Solar PV - Horizontal single axis tracking
Onsite substation (IPP Portion) size and capacity	Capacity: 33/132kV Footprint:130mx100m	There will be a single substation location for the entire 4 100MW project. The onsite substation will be completely constructed as part of phase 1 but only equipped for the first 100MW. When such a time comes that the next 100 MW is constructed, the existing substation will be equipped for the additional 100MW generation capacity (i.e., additional transformers, extending the busbars, etc.). This approach will be followed as each 100MW is added.		
Battery Energy Storage System (BESS)	Capacity: 80MWh Footprint: 100mx100m	In a similar manner to the onsite substation, one BESS will be constructed for the entire 400MW project. The BESS will be added in a phased approach as required. Each project phase may or may not require a BESS, depending on the Power Purchase Agreement requirements.		
Access roads (main and internal)	Existing gravel access roads will be utilised to access the project site. If the width of the existing roads is less than 4m, then it will be widened to 4m to ensure the passage of vehicles. The widened part will be covered with mud and gravel. Internal gravel roads of up to 5km in length and 4.5m in width will be required to access the PV panels and the onsite substation.	Existing gravel access roads will be utilised to access the project site. If the width of the existing roads is less than 4m, then it will be widened to 4m to ensure the passage of vehicles. The widened part will be covered with mud and gravel. Internal gravel roads of up to 5km in length and 4.5m in width will be required to access the PV panels and the onsite substation.	Existing gravel access roads will be utilised to access the project site. If the width of the existing roads is less than 4m, then it will be widened to 4m to ensure the passage of vehicles. The widened part will be covered with mud and gravel. Internal gravel roads of up to 5km in length and 4.5m in width will be required to access the PV panels and the onsite substation.	Existing gravel access roads will be utilised to access the project site. If the width of the existing roads is less than 4m, then it will be widened to 4m to ensure the passage of vehicles. The widened part will be covered with mud and gravel. Internal gravel roads of up to 5km in length and 4.5m in width will be required to access the PV panels and the onsite substation.
Other associated infrastructure	Inverters and transformers; cabling between the project components; laydown areas; guardhouses; site offices; warehouses; and water storage tanks at the admin block for human consumption.			

GRID CONNECTION INFRASTRUCTURE

Details of the proposed grid connection solution for the Mutsho Solar PV Facilities are provided in the table below. Two connection points, i.e., the existing Nzhelele Substation and the Louis Trichardt Substation, are required to evacuate the 400MW into the national grid.

Corridor width (for assessment purposes)	A grid corridor has been identified for the assessment and placement of the 132kV double circuit overhead power line from onsite substation to the Nzhelele Substation. The grid connection corridor comprises a 300m wide corridor to allow for avoidance of environmental sensitivities and suitable placement within the corridor. Therefore, the entire corridor is being proposed for the development provided the infrastructure remains within the identified corridor and environmental sensitivities are avoided.
Power line capacity	132kV double circuit power line to the Nzhelele Substation
Tower height	Above 8m
Power line servitude width	Up to 32m
Length of power lines	The 132kV double circuit power line from the onsite substation to the Nzhelele Substation will be ~ 12km in length.
Development footprint of the onsite substation (Eskom Portion)	130mx100m – will also include associated equipment, infrastructure, buildings, and laydown areas.
Capacity of the onsite substation	33/132kV

The projects are intended to assist in addressing South Africa's energy challenge and to align with the Department of Mineral Resources and Energy (DMRE's) Integrated Resource Plan (IRP) 2019, to pursue a diversified energy mix that reduces reliance on a single or a few primary energy resources. It is the Developer's intention to bid each renewable energy facility under the Renewable Energy Independent Power Producer Procurement (REIPPP) Programme (or similar programme). The power generated from each Solar PV Energy Facility will be sold to Eskom and fed into the national electricity grid through the proposed grid connection solution.

AIM OF THIS BACKGROUND INFORMATION DOCUMENT

This document aims to provide you, as an Interested and/or Affected Party (I&AP), with:

- An overview of the Mutsho Solar PV Energy Facilities and the associated grid connection solution.
- An overview of the Scoping and Environmental Impact Assessment (EIA) processes, Basic Assessment (BA) process, and specialist studies being undertaken to assess the Solar PV Facilities and their associated grid connection solution.
- Details of how you can become involved in the S&EIA and BA processes, receive information, or raise comments that may concern and/or interest you.

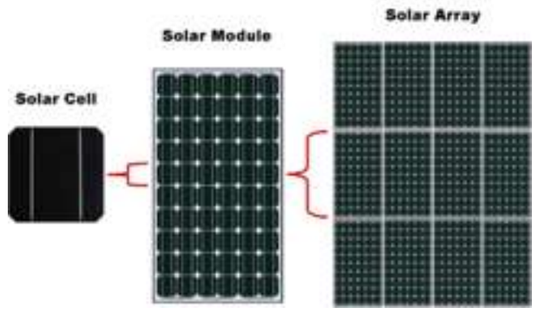
OVERVIEW OF SOLAR PV TECHNOLOGY

Solar energy facilities use energy from the sun to generate electricity through a process known as the **Photovoltaic Effect.** This effect refers to photons of light colliding with electrons, therefore placing the electrons into a higher state of energy to create electricity. The solar fields of the PV facilities will comprise the following components:

PV Cells, Modules and Panels:
A PV cell is made of silicone that acts as a semiconductor used to produce the photovoltaic effect. PV cells are arranged in multiples / arrays and placed behind a protective glass sheet to form a PV module (Solar Panel). Each PV cell is positively charged on one side and negatively charged on the opposite side, with electrical conductors attached to either side to form a circuit. This circuit captures the released electrons in the form of an electric current (i.e., Direct Current (DC)).

A solar PV module is made up of individual solar PV cells connected together, whereas a solar PV array is a system made up of a group of individual solar PV modules electrically wired together to form a much larger PV installation.

PV panels are designed to operate continuously for more than 20 years, mostly unattended and with low maintenance.



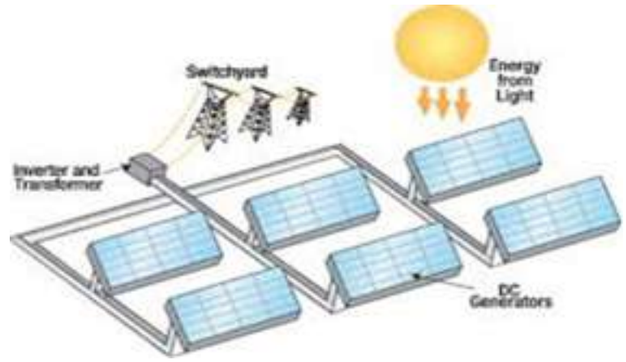


Figure 2: Overview of a PV cell, module, and array / panel (Source: pveducation.com).

Inverters

Inverters are used to convert the electricity produced by the PV cells from DC into Alternating Current (AC) to enable the distribution of the electricity generated to the private offtaker's electricity point of interconnection. Numerous inverters will be arranged in several arrays to collect and convert power produced by the Solar PV Energy Facility.

Support Structures

The PV panels will be fixed to support structures to maximise exposure to the sun. They can either utilise fixed / static support structures or alternatively single or double axis tracking support structures. PV panels that utilise fixed / static support structures are set at an angle (fixed-tilt PV system), to optimise the amount of solar irradiation. With fixed / static support structures, the angle of the PV panel is dependent on the latitude of the proposed Project and may be adjusted to optimise for summer and winter solar radiation characteristics. PV panels that utilise tracking support structures track the movement of the sun throughout the day, to receive the maximum amount of solar irradiation.

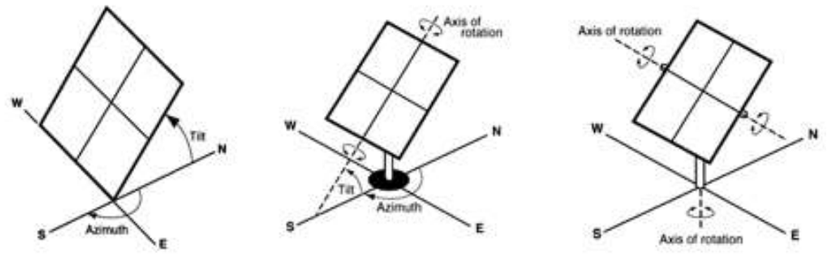


Figure 3: Overview of different PV tracking systems (from left to right: fixed-tilt, single-axis tracking, and double-axis tracking (Source: pveducation.com)).

Bifacial and Monofacial Solar Panel Technology

Bifacial ("two-faced") modules produce solar power from both sides of the panel. Bifacial solar panels have solar cells on both sides, which enables the panels to absorb light from the back and the front (refer to Figure 4). Practically speaking, this means that a bifacial solar panel can absorb light reflected off the ground or another material. The ability of surfaces to reflect sunlight (heat from the sun) is known as the albedo effect. Light coloured surfaces return a large part of the sunrays back to the atmosphere (high albedo) and dark surfaces absorb the rays from the sun (low albedo) . In general, more power can be generated from bifacial modules for the same area, without having to increase the development footprint.

The optimum tilt for a bifacial module has to be designed so as to capture a big fraction of the reflected irradiation. Monofacial solar panels capture sunlight on one light-absorbing side. The light energy that cannot be captured is simply reflected away (refer to Figure 4).

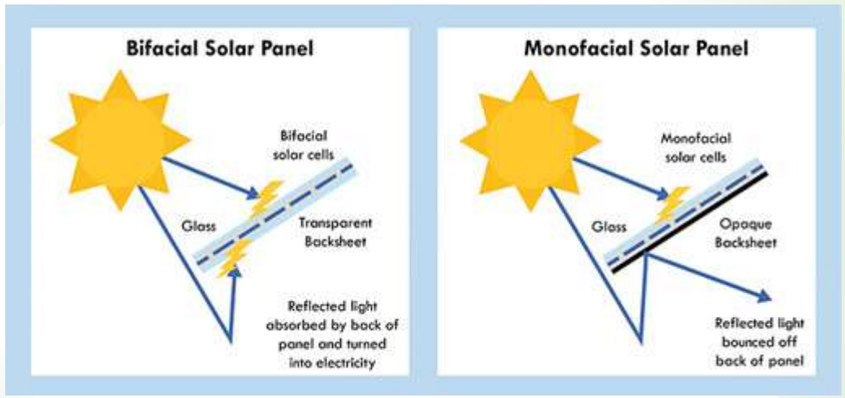


Figure 4: Diagram showing how bifacial and monofacial Solar PV panels work (Source: https://www.solarkobo.com/post/bifacial-solar-panels)

The need for a Battery Energy Storage System (BESS) stems from the fact that electricity is only produced by the Solar PV Energy Facilities while the solar resource is available, while the peak demand may not necessarily occur during the daytime or as the resource is available. Therefore, the storage of electricity and supply thereof during peak-demand will mean that the facility is more efficient, reliable and electricity supply more constant.

The BESS will:

» Store and integrate a greater amount of renewable energy from the Solar PV Energy Facilities into the national grid.
» This will assist with the objective to generate electricity by means of renewable energy to feed into the national grid.
» Proposed footprint of battery storage area: 100mx100m.
» Proposed capacity of battery storage: 80MWh.
» Proposed technology to be used: Lithium - Ion Battery or Lithium-iron-phosphate Battery or Redox vanadium.
» Battery types to be considered: Solid State Batteries and Redox Flow Batteries.

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

In accordance with the EIA Regulations, 2014 (as amended) published in terms of Section 24(5) of the National Environmental Management Act (No. 107 of 1998) (NEMA), the applicant requires Environmental Authorisation (EA) from the National Department of Forestry, Fisheries and the Environment (DFFE), in consultation with the Limpopo Department of Economic Development, Environment and Tourism (LDEDET), for the development of the proposed projects. In terms of Section 24(5) of NEMA, the EIA Regulations 2014 (as amended) and Listing Notices (GNR 327, GNR 325, and GNR 324), the four (4) applications for EA for the Solar Energy Facilities are required to be supported by Scoping & EIA processes. The one (1) application for EA for the grid connection solution is required to be supported by a BA process. Each application is required to be supported by comprehensive, independent specialist studies undertaken in accordance with Appendix 6 of the EIA Regulations, 2014 (as amended), and where relevant the gazetted protocols.

An EIA is an effective planning and decision-making tool. It allows for potential environmental consequences resulting from a proposed activity to be identified and appropriately managed during the construction, operation, and decommissioning phases of a development. It also provides an opportunity for the project applicant to be forewarned of potential environmental issues and allows for the resolution of issue(s) identified and reported on as part of the EIA process, as well as provides opportunity for dialogue with key stakeholders and Interested and Affected Parties (I&APs).

Savannah Environmental has been appointed as the independent environmental consultant responsible for managing the separate applications for EA and undertaking the supporting EIA processes required to identify and assess potential environmental impacts associated with the projects detailed above, as well as propose appropriate mitigation and management measures to be contained within the Environmental Management Programmes (EMPrs) for the projects.

WHAT ARE THE POTENTIAL ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE PROPOSED PROJECTS?

The development areas for the Solar PV Energy Facilities and the grid connection corridor will be assessed by independent environmental specialists to delineate areas of sensitivity within the PV development areas and grid connection corridor, assess impacts associated with the projects and make recommendations regarding avoidance, management and mitigation of impacts. Studies will be informed by available information and detailed field investigations undertaken in accordance with the relevant guidelines and protocols. Once the constraining environmental factors have been determined, the layouts for the proposed facilities can be determined and presented in the EIA reporting. Specialist studies that are proposed as part of the EIA processes include the following:

» Biodiversity Impact Assessment – includes ecology, fauna and flora and assesses the potential impact and the associated disturbance of vegetation on the biodiversity of the area (including critical biodiversity areas and broad-scale processes).
» Wetland and freshwater Impact Assessment – includes an assessment of impacts and associated disturbance to drainage lines, rivers, and wetlands at a broad and fine scale.
» Avifauna Impact Assessment – includes an assessment of the impact on avifaunal habitats and sensitive species.
» Soils and Agricultural Potential Assessment – includes land types and assesses the significance of loss of agricultural land and soil degradation and/or erosion.
» Heritage Impact Assessment (including archaeology, palaeontology, and cultural landscape) – which includes archaeology, palaeontology and a description of the cultural landscape elements and assesses the potential of disturbance to or destruction of heritage sites and fossils during the construction phase through excavation activities as well as the impact on the cultural landscape of the area.
» Visual Impact Assessment – which includes the visual quality of the area and assesses the impact of the Solar PV Facilities and the grid connection solution on the aesthetics within the area.
» Social Impact Assessment – which assesses the positive and negative social impacts.

PUBLIC PARTICIPATION PROCESS

The sharing of information forms the basis of the public participation process and offers I&APs the opportunity to become actively involved in the EIA process. Comments and inputs from I&APs are encouraged in order to ensure that potential impacts are considered throughout the EIA process. The public participation process aims to ensure that:

- Information containing all relevant facts in respect of the applications are made available to I&APs for review.
- I&AP participation is facilitated in such a manner that they are provided with reasonable opportunity to comment on the proposed projects.
- Adequate review periods are provided for I&APs to comment on the findings of the Scoping, EIA and Basic Assessment Reports.

In order to ensure effective participation, the public participation process includes the following:

- Identifying I&APs, including affected and adjacent landowners and occupiers of land, and relevant Organs of State, and recording details within a database.
- Notifying registered I&APs of the commencement of the EIA processes and distributing the Background Information Document (BID).
- Providing access to registered parties to an online stakeholder engagement platform, which centralises project information and stakeholder input in a single digital platform.
- Providing an opportunity for I&APs to engage with the project team.
- Placing site notices at the affected properties and in the study area.
- Placing an advertisement in a local newspaper.
- Notifying I&APs of the release of the Reports for review and comment, meetings to be held and the closing dates by which comments must be received.
- Providing an opportunity to engage with the project team via an appropriate virtual platform (to reduce the risks associated with COVID-19) or telephone.

YOUR RESPONSIBILITIES AS AN I&AP

In terms of the EIA Regulations, 2014 (as amended) and the Public Participation Guidelines, 2014, your attention is drawn to your responsibilities as an I&AP:

- To participate in the EIA processes, you must register yourself on the I&AP database.
- You are required to disclose any direct business, financial, personal, or other interest that you may have in the approval or refusal of the applications.
- You must ensure that any comments regarding the proposed projects are submitted within the stipulated timeframes.

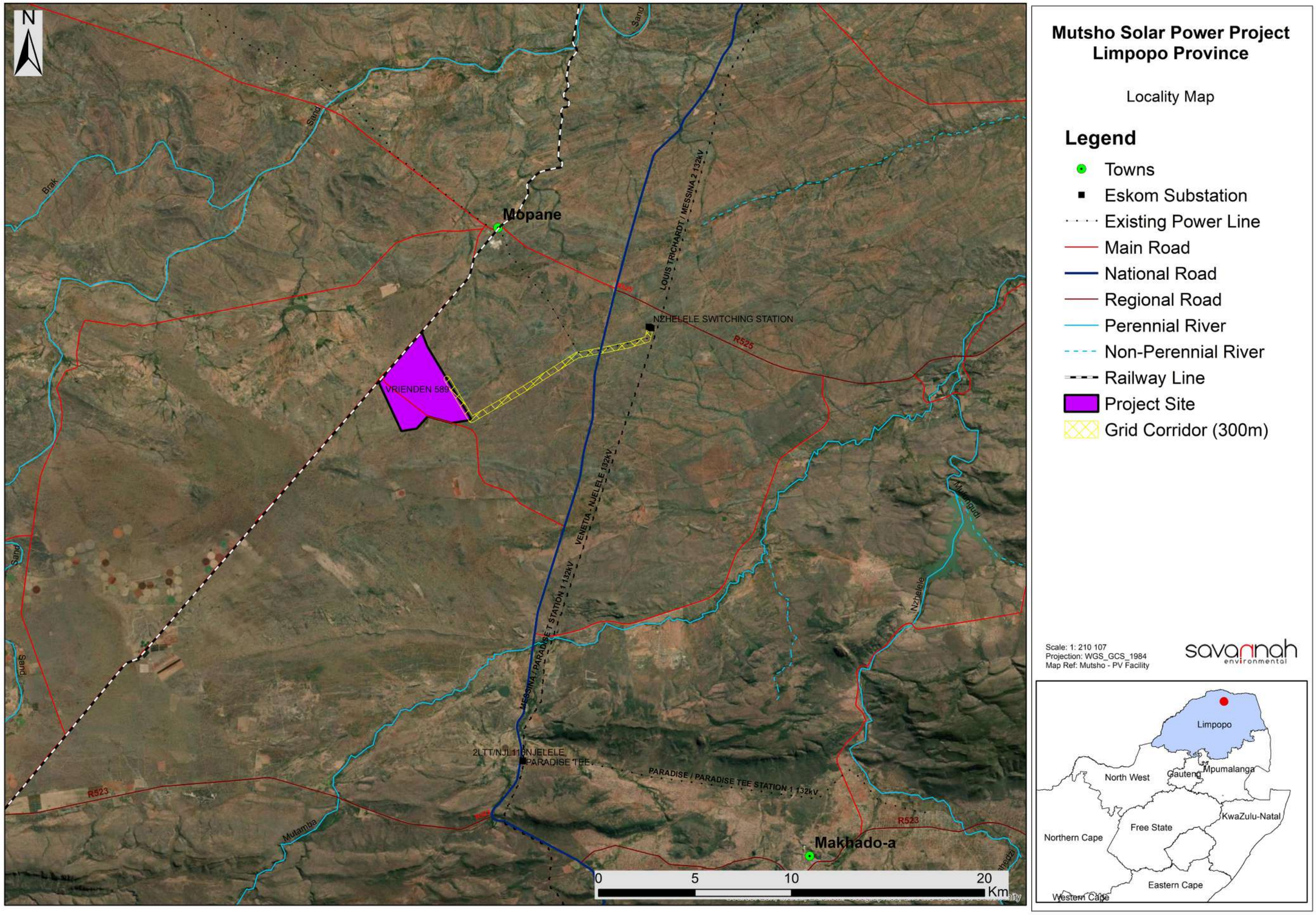
HOW TO BECOME INVOLVED

- By responding by phone, fax, or e-mail to the invitation for your involvement.
- By returning the reply form to the relevant contact person.
- By engaging with the project team during the EIA processes.
- By contacting the environmental consultant with queries or comments.
- By reviewing and commenting on the Reports within the stipulated review and comment periods.

If you consider yourself an I&AP for the proposed projects, we urge you to make use of the opportunities created by the public participation process to provide comment, raise issues and concerns which affect and / or interest you, or request further information. Your input forms a key element of the EIA processes.

By completing and submitting the accompanying reply form, you automatically register yourself as an I&AP for the proposed projects, and are ensured that your comments, concerns, or queries raised regarding the projects will be noted. Please note that all comments received will be included in the project documentation. This may include personal information.

Figure 1: Locality Map and Layout



COMMENTS AND QUERIES

Direct all comments, queries or responses to:

Savannah Environmental
Nondumiso Bulunga
P.O. Box 148, Sunninghill, 2157
Tel: 011 656 3237
Mobile: 060 978 8396
Fax: 086 684 0547
E-mail: publicprocess@savannahsa.com

To visit the online stakeholder engagement platform and view project documentation, visit
www.savannahSA.com