Limestone Photovoltaic (PV)1 Facility and associated Infrastructure, near Danielskuil, within the Kgatelopele Local Municipality, Northern Cape Province

Northern Cape Province

Scoping Report

January 2023

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PROJECT DETAILS

Title	:	Limestone Photovoltaic (PV)1 Facility and associated Infrastructure, near Danielskuil, within the Kgatelopele Local Municipality, Northern Cape Province
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Client	:	AGV Projects (Pty) Ltd
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PURPOSE OF THE SCOPING REPORT AND INVITATION TO COMMENT

The Applicant, **AGV Projects (Pty) Ltd**, is proposing the development of a commercial Solar Energy Facility and associated infrastructure on a site located ~16km south-east of the town of Danielskuil and 10km east of Lime Acres in the Northern Cape Province. The site is located within the Kgatelopele Local Municipality and the ZF Mgcawu District Municipality. The facility will have a contracted capacity of up to 150MWp and will be known as the Limestone PV1 Solar Energy Facility. The project is planned as part of a larger cluster of renewable energy projects, which includes another 150MWp PV Solar Energy Facility (Limestone PV2) located on the same property as Limestone PV1 and 360MW Wind Energy Facility (Oryx Wind Energy Facility) also located near Danielskuil. The preferred grid connection for the project is still being determined and will form part of a separate application following confirmation from Eskom.

AGV Projects (Pty) Ltd appointed Savannah Environmental as the independent environmental consultant to undertake the Environmental Impact Assessment (EIA) for the proposed project. The EIA process is being undertaken in accordance with the requirements of the 2014 EIA Regulations, as amended, promulgated in terms of the National Environmental Management Act (NEMA; Act No. 107 of 1998).

This Scoping Report consists of twelve chapters, as follows:

- **Chapter 1** provides background to the Limestone PV1 Solar Energy Facility and the EIA process.
- **Chapter 2** provides a description of the Solar Energy Facility and associated infrastructure.
- **Chapter 3** provides the site selection information and identified project alternatives.
- **Chapter 4** describes solar as a power generation option and provides insight to technologies for solar energy.
- **Chapter 5** outlines the strategic regulatory and legal context for energy planning in South Africa, and specifically for the proposed facility.
- **Chapter 6** describes the need and desirability of the Limestone PV1 Solar Energy Facility within the project site.
- **Chapter 7** outlines the process which was followed during the Scoping Phase of the EIA process.
- **Chapter 8** describes the existing biophysical and socio-economic environment affected by the proposed facility.
- **Chapter 9** provides an identification and evaluation of the potential issues associated with the proposed Limestone PV1 Solar Energy Facility and associated infrastructure.
- **Chapter 10** presents the conclusions of the Scoping Report.
- **Chapter 11** describes the Plan of Study for EIA Phase.
- **Chapter 12** provides references used in the compilation of the Scoping Report.

The Scoping Report is available for review from **06 January 2023 until 06 February 2023** at https://savannahsa.com/public-documents/energy-generation/. All comments received and recorded during the 30-day review and comment period will be included, considered, and addressed within the Final Scoping report for the consideration of the National Department of Forestry, Fisheries and the Environment (DFFE).

EXECUTIVE SUMMARY

AGV Projects (Pty) Ltd is proposing the development of a solar energy facility. PV technology is proposed to be utilised for the generation of electricity, and Limestone PV1 Solar Energy Facility will have a contracted capacity of up to 150MWp. Infrastructure associated with the solar PV facility will include:

- PV modules mounted on either a single axis tracking & fixed structure, dependent on optimisation, technology available and cost.
- Inverters and transformers.
- Low voltage cabling between the PV modules to the inverters.
- Fence around the project development area with security and access control.
- Camera surveillance.
- Internet connection.
- 33kV cabling between the project components and the facility substation.
- 33/132kV onsite facility substation.
- Battery Energy Storage System (BESS) with a footprint of 3-5ha.
- Site offices and maintenance buildings, including workshop areas for maintenance and storage as well as parking for staff and visitors.
- Laydown/staging area on-site in front of mounting structures during installation. Temporary store area close to site entrance (Less than 2ha).
- Access roads (up to 6m wide) and internal distribution roads (up to 5m wide).
- Temporary concrete batching facility.
- Stormwater management infrastructure as required.

The project is planned as part of a larger cluster of renewable energy projects, which includes another 150MWp PV Solar Energy Facility (Limestone PV2) located on the same property as Limestone PV1 and 360MW Wind Energy Facility (Oryx Wind Energy Facility) also located near Danielskuil. Site-specific studies and assessments will delineate areas of potential sensitivity within the identified project site. Once constraining factors have been confirmed, the layout of the solar PV facility can be planned to minimise social and environmental impacts.

From a regional perspective, the Limestone PV1 project site is considered favourable for the development of a commercial solar energy facility by virtue of land suitability, climatic conditions (solar irradiation levels), topography, the location and extent of the study area, availability of grid connection infrastructure and the need and desirability of the project.

Limestone PV1 facility is proposed in response to the identified objectives of the national and provincial government and local and district municipalities to develop renewable energy facilities for power generation purposes. The developer intends to submit a bid in terms of a regulated power purchase procurement process (e.g., REIPPPP) to evacuate the generated power into the national grid or obtain a commercial PPA (Power Purchase Agreement). This will aid in the diversification and stabilisation of the country's electricity supply with the Limestone PV1 facility set to inject up to 120MW (peak AC power) into the national grid

The majority of potential impacts identified to be associated with the construction of the Limestone PV1 Solar Energy Facility and associated infrastructure are anticipated to be localised and restricted to the project site itself, while operation phase impacts/benefits range from local to regional. No environmental fatal flaws were identified to be associated with the project site. Areas of high and very high sensitivity were identified to be avoided by the development footprint. A development envelope is currently being considered to avoid these areas of sensitivity present within the development area and therefore avoidance of sensitive features is considered a necessity for the placement of infrastructure early in the EIA process (**Figure 1**). The development envelope will be fully assessed during the EIA Phase.

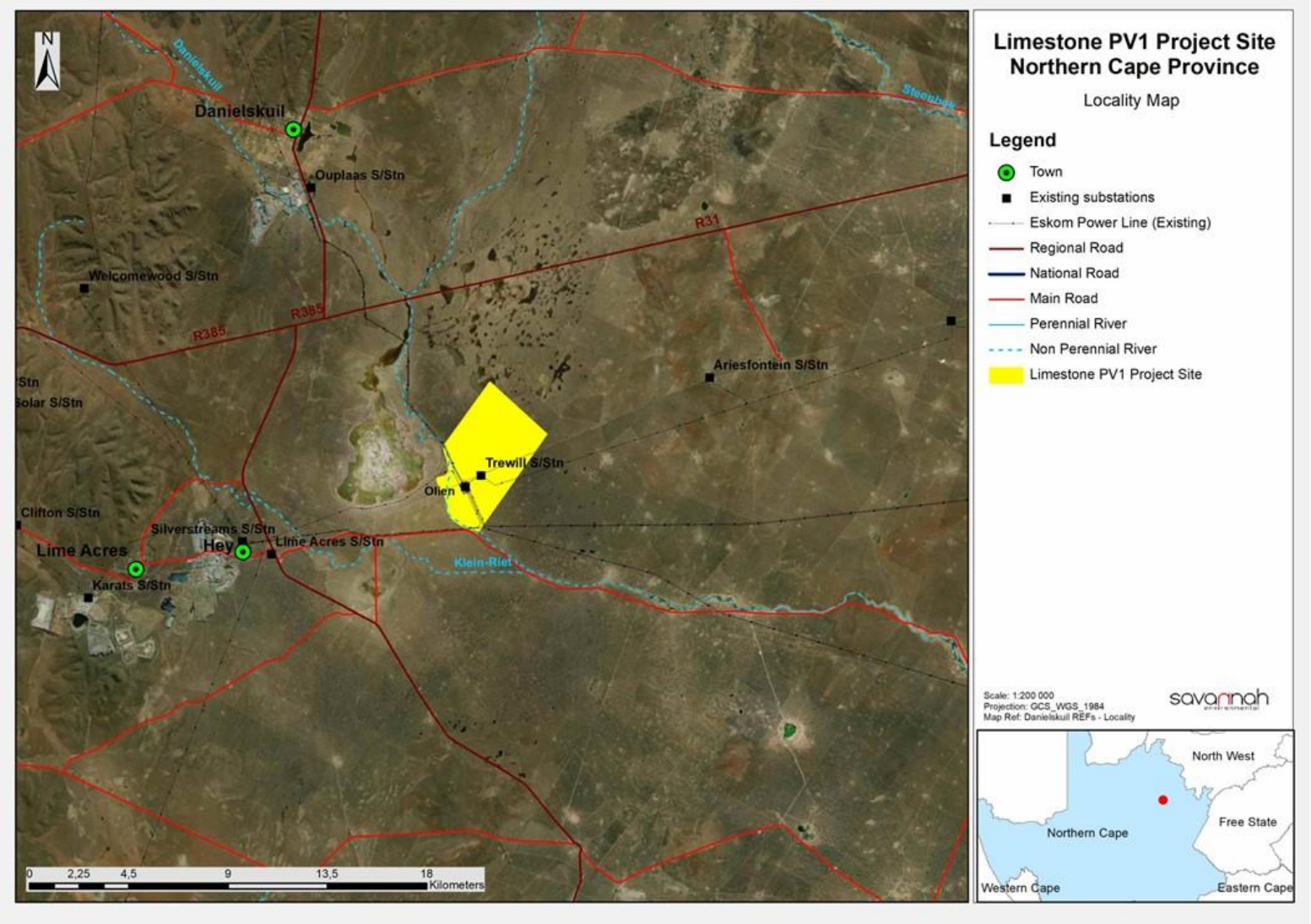

Figure 1: Locality map for the Limestone PV1 Solar Energy Facility

1. Environmental Permitting Requirements

The Limestone PV1 Solar Energy Facility and its associated infrastructure trigger the need for the following environmental permit:

» **An Environmental Authorisation (EA)** from the National Department of Forestry, Fisheries, and the Environment (DFFE), in consultation with the Provincial Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARD&LR), in accordance with the requirements of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations (GNR 326), 2014, as amended.

Savannah Environmental has been appointed as the Independent Environmental Assessment Practitioner (EAP) in accordance with NEMA and Regulations 21 to 24 of the 2014 EIA Regulations (GNR 326) to undertake the required S&EIA in support of the application for Environmental Authorisation (EA) and the public participation process for the project, in order to identify and assess all potential environmental impacts associated with the proposed Solar Energy Facility and recommend appropriate mitigation measures in an Environmental Management Programme (EMPr).

An EIA is an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts. It provides the opportunity for the developer to be fore warned of potential environmental issues and allows for the resolution of issues reported on in the Scoping and EIA Reports as well as a dialogue with Interested and Affected Parties (I&APs). Comprehensive, independent environmental specialist studies are required in accordance with the EIA Regulations to provide the competent authority with sufficient information in order to make an informed decision. The EIA process being undertaken for the proposed general waste disposal site comprises two phases – i.e., Scoping and Impact Assessment - and involves the identification and assessment of environmental impacts through specialist studies, as well as public participation. The process followed in these two phases is as follows:

» The **Scoping Phase** includes the identification and description of potential impacts associated with the proposed project through a desktop study and consultation with interested and affected parties and key stakeholders. This phase considers the broader project area in order to identify and delineate any environmental fatal flaws, no-go or sensitive areas, as well as project alternatives in order to determine which should be assessed in more detail in the EIA Phase. Following the public review period of the Scoping Report, this phase culminates in the submission of a final Scoping Report and Plan of Study for the EIA Phase to the competent authority for acceptance and approval to continue with the EIA Phase of the process.

» The **EIA Phase** involves a detailed assessment of potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This phase considers a proposed development footprint and includes detailed specialist investigations (including field surveys), consideration of feasible alternatives and public consultation. Recommendations of practical and achievable mitigation and management measures are included in an Environmental Management Programme (EMPr) considering all phases of the project. Following the public review period of the EIA Report and EMPr, this phase culminates in the submission of a Final EIA Report and EMPr to the competent authority for review and decision-making.

2. Potential Impacts Identified

The majority of potential impacts identified to be associated with the construction of the Limestone PV1 Solar Energy Facility and associated infrastructure are anticipated to be localised and restricted to the project site itself, while operation phase impacts/benefits range from local to regional. No environmental fatal flaws were identified to be associated with the project site. Areas of high and very high sensitivity were identified to be avoided by the development footprint. These impacts and areas of sensitivity are to be confirmed in the detailed EIA Phase of the process.

» *Terrestrial and freshwater Ecology:* The majority of ecological impacts would be local to regional, with the reduced dispersal and migration of fauna potentially being national. The development of the area could result in the loss or degradation of the habitat and vegetation, most of which is still in a natural condition and is expected to support a number of fauna species. The construction of the solar facility could also lead to the displacement/mortalities of the fauna. The operation of the facility could result in the disruption of ecological life cycles. This could be as a result of a number of things, but mainly due to dust, noise, light pollution and heat radiation. The disturbance of the soil/vegetation layer will allow for the establishment of flora alien invasive species. In turn, the new infrastructure will provide refuge for invasive/feral fauna species. Erosion is another possible impact that could result from the disturbance of the top soil and vegetation cover. A number of machines, vehicles and equipment will be required, aided by chemicals and concrete mixes for the project. Leaks, spillages or breakages from any of these could result in contamination of the receiving water resources. Contaminated water resources are likely to have an effect on the associated biota.

» *Avifauna:* The majority of Avifaunal impacts would be local to regional. The development of the area could result in the loss or degradation of the habitat and vegetation, most of which is still in a natural condition and supports a number of avifauna species. The construction of the solar facility could also lead to the displacement/mortalities of the avifauna and more specifically SCC avifauna species. The operation of the facility could result in the disruption of ecological life cycles. This could be as a result of a number of things, but mainly due to dust, noise, light pollution and heat radiation. Leaks, spillages or breakages from any of these could result in contamination of the receiving water resources. Contaminated water resources are likely to have an effect on the associated biota.

» *Soils and Land Capability:* The land capability sensitivity indicated that the site is characterized with an overall "Low" sensitivity with limited "Moderate" sensitivities following the baseline findings. The DFFE screening tool, shows that there are no crop fields with "High" sensitivity within the assessment area and as a result there will be no segregation of crop production. The proposed Limestone PV1 Solar Energy fhnebrand associated infrastructure will have limited-no impacts on the agricultural production ability of the land.

» *Heritage (including cultural landscape, archaeology and palaeontology*): Impact to significant heritage resources through destruction during the development phase are likely to be local in extent.

» *Visual:* There will be a high significance impact with the viewing of the PV facility infrastructure and activities by primary obervers with a 3km radius of the facility.

» *Socio-Economic:* Social impacts would have a local to international impact and the significance of the impacts varies from low to high. Both positive and negative impacts were also identified to be associated with the construction and operation phases of the project. The positive impacts include the creation of local employment and business opportunities, skill development and training, enhancing of the security of SA's energy supply and decrease coal dependence. The negative

impacts will include the potential risks to livestock and farming infrastructure and the presence of workers on site, potential, traffic, noise, dust and safety impacts associated with construction related activities, Impacts on the rural sense of place

3. Overall Conclusion and Fatal Flaw Analysis

The findings of the Scoping Study indicate that no environmental fatal flaws are associated with the proposed project provided that areas of very high sensitivity are avoided. While some impacts of potential significance do exist, it is anticipated that the implementation of appropriate mitigation measures would assist in reducing the significance of such impacts to acceptable levels. It is however recommended that the project site for the development of the facility be considered outside of the areas identified as no-go areas as far as possible in order to ensure that the development does not have a detrimental impact on the environment. This forms part of the 'funnel-down approach' of the mitigation hierarchy for the identification of an appropriate development footprint within the development area. Even with the appropriate avoidance of sensitive areas, there is an adequate area on the site which can accommodate the planned facility with relatively low impacts on the environment.

Figure 2 provides an environmental sensitivity map of the scoping phase no-go areas. This conclusion must be confirmed through a detailed investigation of the development footprint within the EIA Phase of the process.

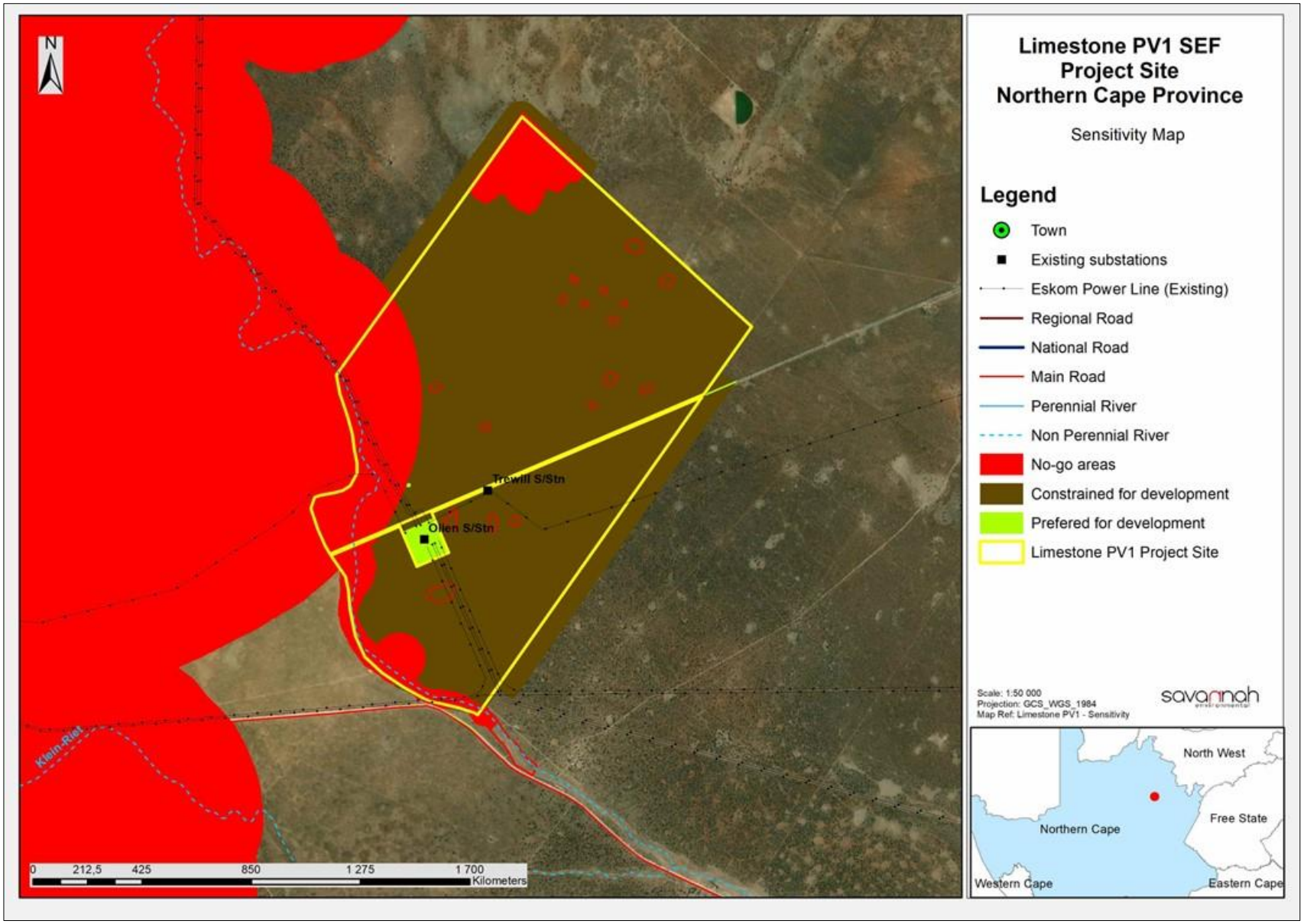

Figure 2: Environmental sensitivity map from the results of the scoping evaluation for the Limestone PV1 Solar Energy Facility

DEFINITIONS AND TERMINOLOGY

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Commercial Operation date: The date after which all testing and commissioning has been completed and is the initiation date to which the seller can start producing electricity for sale (i.e. when the project has been substantially completed).

Commissioning: Commissioning commences once construction is completed.

Construction: Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity. Construction begins with any activity which requires Environmental Authorisation.

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

Decommissioning: To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

Development area: The development area is that identified area (located within the project site) where the project is planned to be located.

Development footprint: The development footprint is the defined area (located within the development area) where the PV array and other associated infrastructure for the project is planned to be constructed. This is the actual footprint of the facility, and the area which would be disturbed.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation, or maintenance of an activity and are generally obvious and quantifiable.

Disturbing noise: A noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dB or more.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Emergency: An undesired/ unplanned event that results in a significant environmental impact and requires the notification of the relevant statutory body, such as a local authority.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that are made up of:
i. The land, water and atmosphere of the earth;
ii. Micro-organisms, plant and animal life;
iii. Any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment, as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management programme: An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800.

Indirect impacts: Indirect or induced changes that may occur because of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place because of the activity.

Interested and affected party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups, and the public.

Method statement: A written submission to the ECO and the site manager (or engineer) by the EPC Contractor in collaboration with his/her EO.

Mitigation hierarchy: The mitigation hierarchy is a framework for managing risks and potential impacts related to biodiversity and ecosystem services. The mitigation hierarchy is used when planning and implementing development projects, to provide a logical and effective approach to protecting and conserving biodiversity and maintaining important ecosystem services. It is a tool to aid in the sustainable management of living, natural resources, which provides a mechanism for making explicit decisions that balance conservation needs with development priorities

No-go areas: Areas of environmental sensitivity that should not be impacted on or utilised during the development of a project as identified in any environmental reports.

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.

Photovoltaic effect: Electricity can be generated using photovoltaic panels (semiconductors) which are comprised of individual photovoltaic cells that absorb solar energy to produce electricity. The absorbed solar radiation excites the electrons inside the cells and produces what is referred to as the Photovoltaic Effect

Pre-construction: The period prior to the commencement of construction, this may include activities which do not require Environmental Authorisation (e.g., geotechnical surveys).

Project site: The project site includes the entirety of all properties within which the development footprint will be located.

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare."

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as

being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Significant impact: An impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.

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CHAPTER 1: INTRODUCTION

AGV Projects (Pty) Ltd is proposing the development of a commercial Solar Energy Facility and associated infrastructure on a site located ~16km south-east of the town of Danielskuil and 10km east of Lime Acres in the Northern Cape Province. The site is located within the Kgatelopele Local Municipality and the ZF Mgcawu District Municipality (refer to **Figure 1.1**). The facility will have a contracted capacity of up to 150MWp and will be known as the Limestone PV1 Solar Energy Facility. The project is planned as part of a larger cluster of renewable energy projects, which includes another 150MWp PV Solar Energy Facility (Limestone PV2) located on the same property as Limestone PV1 and 360MW Wind Energy Facility (Oryx Wind Energy Facility) also located near Danielskuil. The preferred grid connection for the project is still being determined and will form part of a separate application following confirmation from Eskom.

Each renewable energy facility will be constructed as a separate stand-alone project and therefore, separate Scoping and Environmental Impact Assessment (S&EIA) processes will be undertaken for each of the renewable energy facilities.

The Limestone PV1 facility is proposed in response to the identified objectives of the national and provincial government and local and district municipalities to develop renewable energy facilities for power generation purposes. The developer intends to submit a bid in terms of a regulated power purchase procurement process (e.g., REIPPPP) to evacuate the generated power into the national grid or obtain a commercial PPA (Power Purchase Agreement). This will aid in the diversification and stabilisation of the country's electricity supply, in line with the objectives of the Integrated Resource Plan (IRP) with the Limestone PV1 Facility set to inject up to 120MW (peak AC power) into the national grid. The Limestone PV1 Solar Energy Facility will provide valuable jobs and socio-economic benefits that are required in the area.

From a regional perspective, the area within the Northern Cape identified for the project is considered favourable for the development of a commercial PV facility due to the low environmental sensitivity of the identified site, excellent solar resource, and availability of land on which the development can take place. There is also potential for evacuating the power to the national grid via a direct grid connection at the Olien MTS (Main Transmission Substation) which is adjacent to the proposed site.

1.1. Requirement for an Environmental Impact Assessment Process

Section 24 of South Africa's National Environmental Management Act (No. 107 of 1998) (NEMA) pertains to Environmental Authorisations (EA), and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the Competent Authority (CA). The 2014 Environmental Impact Assessment (EIA) Regulations, as amended (GNR 326) published under NEMA prescribe the process to be followed when applying for Environmental Authorisation (EA), while the Listing Notices (Listing Notice 1 (GNR 327), Listing Notice 2 (GNR 325), and Listing Notice 3 (GNR 324)) contain those activities which may not commence without EA from the CA.

As the project has the potential to impact on the environment, an Environmental Authorisation (EA) is required from the National Department of Forestry, Fisheries, and the Environment (DFFE) subject to the completion of a full Scoping and Environmental Impact Assessment (S&EIA) process, as prescribed in Regulations 21 and 24 of the 2014 EIA Regulations (GNR 326), as amended. The requirement for EA subject

to the completion of a full S&EIA process is triggered by the inclusion of, amongst others, Activity 1 of Listing Notice 1 (GNR 327), namely:

"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20MW or more."

In terms of GNR 779 of 01 July 2016, the DFFE has been determined as the Competent Authority for all projects which relate to the IRP for Electricity 2010 – 2030, and any updates thereto. Through the decision-making process, the DFFE will be supported by the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARDLR) as the commenting authority.

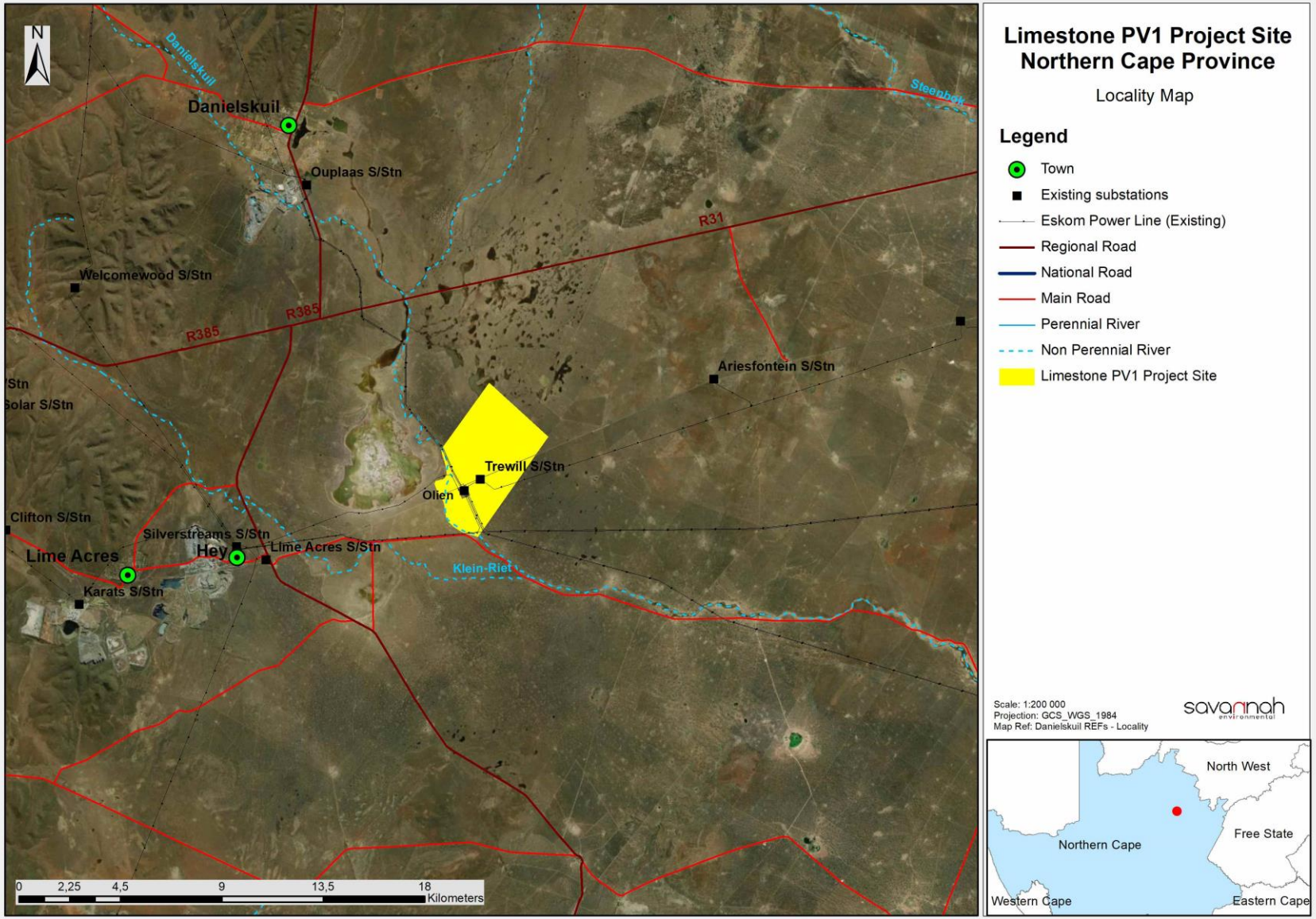

Figure 1.1: Locality map of the project site within which the Limestone PV1 Solar Energy Facility is proposed to be developed (also refer to **Appendix D** for project maps).

1.2. Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of a Scoping Report

This Scoping Report has been prepared in accordance with the requirements of the EIA Regulations published on 08 December 2014 (and amended on 07 April 2017) promulgated in terms of Chapter 5 of the National Environmental Management Act (Act No 107 of 1998). This chapter of the Scoping Report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
2(1)(a)(i) the details of the EAP who prepared the report and (ii) the expertise of the EAP to carry out scoping procedures; including a curriculum vitae	The details of the EAP and the expertise of the EAP have been included in **section 1.5**. The Curriculum vitae of the Savannah Environmental team have been included as **Appendix A**.
2(1)(b) the location of the activity, including (i) the 21-digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties	The location of the project site proposed for the development of the Limestone PV1 Solar Energy Facility is included as **Figure 1.1**. The details of the affected properties, including the property names and numbers, as well as the SG-codes are included in **Table 1.1**.
2(1)(c) a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is (i) a linear activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken	The locality of the project site is illustrated on a locality map included as **Figure 1.1**. The centre point co-ordinates of the project site are included in **Table 1.1**.

This Scoping Report consists of twelve chapters, as follows:

- **Chapter 1** provides background to the Limestone PV1 Solar Energy Facility and the EIA process.
- **Chapter 2** provides a description of the Solar Energy Facility and associated infrastructure.
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1.3. Project Overview

A technically feasible project site[1], with an extent of ~1 842 has been identified by AGV Projects (Pty) Ltd as a technically suitable area for the development of the Limestone PV1 Solar Energy Facility. A development area[2] of ~300-400ha was identified within the project site by the proponent for the development based on the outcome of the specialist assessments and technical considerations. The project site details are as listed in **Table 1.1** below.

Table 1.1: Detailed description of the Limestone PV1 Solar Energy Facility project site

Province	**Northern Cape Province**
District Municipality	ZF Mgcawu District Municipality
Local Municipality	Kgatelopele Local Municipality
Ward Number (s)	Ward 3 and Ward 6 of the Kgatelopele Local Municipality
Nearest town(s)	Danielskuil (~16km north west); Lime Acres (~10km west)
Affected Properties:	**Parent Farm Number** / **Farm Portions** / **SG 21 Digit Code (s)**: Farm Engeland 300 / 4 / C0310000000030000004
Current zoning	Agriculture
Site Coordinates (centre of project site)	23°37'55.69"S; 28°18'58.26"E

The development area is proposed to accommodate the following infrastructure:

- PV modules mounted on either a single axis tracking & fixed structure, dependent on optimisation, technology available and cost.
- Inverters and transformers.
- Low voltage cabling between the PV modules to the inverters.
- Fence around the project development area with security and access control.
- Camera surveillance.
- Internet connection.
- 33kV cabling between the project components and the facility substation.
- 33/132kV onsite facility substation.
- Battery Energy Storage System (BESS) with a footprint of 3-5ha.
- Site offices and maintenance buildings, including workshop areas for maintenance and storage as well as parking for staff and visitors.
- Laydown/staging area on-site in front of mounting structures during installation. Temporary store area close to site entrance (Less than 2ha).
- Access roads (up to 6m wide) and internal distribution roads (up to 5m wide).
- Temporary concrete batching facility.
- Stormwater management infrastructure as required.

[1] The project site is the area with an extent of within which the Limestone PV1 Solar Energy Facility development footprint will be located.

2 The development area is that identified area (located within the project site) where the Limestone PV1 Solar Energy Facility is planned to be located will cover 300-400ha

The key infrastructure components proposed as part of the Limestone PV1 Solar Energy Facility are described in greater detail in Chapter 2 of this Scoping Report.

The overarching objective for the Limestone PV1 Solar Energy Facility is to maximise electricity production through exposure to the available solar resource, while minimising infrastructure, operational and maintenance costs, as well as potential social and environmental impacts in accordance with the principles of sustainable development. The full extent of the development area has been considered within this Scoping Report through site-specific specialist studies with the aim of determining the suitability from an environmental and social perspective and identifying areas that should be avoided in development planning. Within this identified development area, a development footprint[3] or facility layout will be defined for assessment in the EIA Phase. The development area is larger than the area required for the development footprint of a 150MWp Solar Energy Facility and therefore provides the opportunity for the optimal placement of infrastructure, ensuring avoidance of major identified environmental sensitivities or constraints identified through this Scoping and EIA process.

1.4. Overview of the Environmental Impact Assessment (EIA) Process

An EIA is an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts. It provides the opportunity for the developer to be forewarned of potential environmental issues and allows for the resolution of the issues reported on in the Scoping and EIA reports as well as dialogue with interested and affected parties (I&APs).

The EIA process comprises of two (2) phases (i.e., Scoping and Impact Assessment) and involves the identification and assessment of potential environmental impacts through the undertaking of independent specialist studies, as well as public participation. The processes followed in these two phases is as follows:

» The **Scoping Phase** includes the identification of potential issues associated with the project through a desktop study (considering existing information), limited field work and consultation with interested and affected parties and key stakeholders. This phase considers the broader project site in order to identify and delineate any environmental fatal flaws, no-go and / or sensitive areas. Following a public review period of the Scoping report, this phase culminates in the submission of a final Scoping Report and Plan of Study for the EIA to the Competent Authority for consideration and acceptance.

» The **EIA Phase** involves a detailed assessment of the potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This phase considers a proposed development footprint within the project site and includes detailed specialist investigations

3 The development footprint is the defined area (located within the development area) where the solar PV array and other associated infrastructure for the Limestone PV1 Solar Energy Facility is planned to be constructed. This is the actual footprint of the facility, and the area which would be disturbed.

as well as public consultation. Following a public review period of the EIA Report, this phase culminates in the submission of a final EIA Report and an Environmental Management Programme (EMPr), including recommendations of practical and achievable mitigation and management measures, to the Competent Authority for final review and decision-making.

1.5. Details of Environmental Assessment Practitioner and Expertise to conduct the S&EIA Process

In accordance with Regulation 12 of the 2014 EIA Regulations (GNR 326), AGV Projects (Pty) Ltd has appointed Savannah Environmental (Pty) Ltd as the independent Environmental Consultant responsible for managing the Application for EA and supporting Scoping and Environmental Impact Assessment (S&EIA) process; inclusive of comprehensive, independent specialist studies. The application for EA and S&EIA process will be managed in accordance with the requirements of NEMA, the 2014 EIA Regulations (GNR 326), and all other relevant applicable legislation.

Neither Savannah Environmental, the Environmental Assessment Practitioners (EAPs) employed by the company nor any of the specialists responsible for undertaking studies for this project are subsidiaries or are affiliated to the applicant. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed facility.

Savannah Environmental is a specialist environmental consulting company providing a holistic environmental management service, including environmental assessment, and planning to ensure compliance and evaluate the risk of development, and the development and implementation of environmental management tools. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team.

The Savannah Environmental team have considerable experience in environmental impact assessment processes and environmental management, and have been actively involved in undertaking environmental studies for a wide variety of projects throughout South Africa, including those associated with electricity generation from renewable energy sources.

» **Matthew Ellero**, the principal author of this report, is an Environmental Consultant at Savannah Environmental. Matthew holds a Masters in Environmental Science from the University of KwaZulu-Natal in South Africa. His key focus is conducting Basic Assessments, Environmental Impact Assessments and GIS mapping.

» **Nkhensani Masondo**, the senior EAP on this project, is registered with the Environmental Assessment Practitioners Association of South Africa (EAPASA (2020/1385) and holds a BSocSci in Environmental Analysis and Management and is currently completing her MSc in Environmental Management. She has six (6) years of working experience in the environmental field and has gained extensive experience in conducting Environmental Impact Assessments, Stakeholder Engagements, Environmental Auditing and Environmental Management Plans Programmes for a wide range of projects.

» **Jo-Anne Thomas**, the principal EAP on this project, is a registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA - 2019/726) and a Professional Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP). She provides technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, Environmental Impact Assessment studies, environmental auditing and

monitoring, environmental permitting, public participation, Environmental Management Plans and Programmes, environmental policy, strategy and guideline formulation, and integrated environmental management. Her key focus is on integration of the specialist environmental studies and findings into larger engineering-based projects, strategic assessment, and providing practical and achievable environmental management solutions and mitigation measures. Responsibilities for environmental studies include project management (including client and authority liaison and management of specialist teams); review and manipulation of data; identification and assessment of potential negative environmental impacts and benefits; review of specialist studies; and the identification of mitigation measures.

» **Molatela Ledwaba**, the principle public participation consultant for this project has a BA in Environmental Management and is currently working on her BA(Hons) in Environmental Management. Molatela has thirteen (13) years of experience in office administration, project coordination, and public participation in a variety of industries including geohydrological and environmental services projects, but not limited to infrastructure development and mining

In order to adequately identify and assess potential environmental impacts associated with the proposed Limestone PV1 Solar Energy Facility, the following specialist sub-consultants have provided input into this Scoping Report:

Specialist	Area of Expertise
Andrew Husted of The Biodiversity Company	Ecology (flora and fauna); freshwater; avifauna; soils and agricultural potential
Jenna Lavin of Cedar Tower Solutions (CTS)	Heritage (incl. Archaeology and Palaeontology)
Lourens du Plessis of LOGIS	Visual
Molatela Ledwaba of Savannah Environmental	Social

Appendix A includes the curricula vitae for the environmental assessment practitioners from Savannah Environmental

CHAPTER 2: PROJECT DESCRIPTION

This chapter provides a description of the proposed Limestone PV1 Solar Energy Facility and associated infrastructure. It must be noted that the project description presented in this Chapter may change to some extent based on the outcomes and recommendations of detailed engineering and other technical studies, the findings and recommendations of the EIA and supporting specialist studies, and any licencing, permitting, and legislative requirements.

2.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Scoping Report

This chapter of the Scoping Report includes the following information required in terms of the EIA Regulations, 2014, as amended - Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
3(1)(b) the location of the activity including (i) the 21 digit Surveyor General code of each cadastral land parcel, (ii) where available the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	The location of the proposed project, including the 21 digit Surveyor General code is detailed in Section 2.2.1 below.
3(1)(d)(ii) a description of the scope of the proposed activity, including a description of the activities to be undertaken including associated structures and infrastructure	A description of the activities to be undertaken with the development of project is included in **Table 2.1** and **Table 2.2**.

2.2 Nature and Extent of the Limestone PV1 Solar Energy Facility

In responding to the growing electricity demand within South Africa, the need to promote renewable energy and sustainability within the Northern Cape Province, as well as the country's targets for renewable energy, AGV Projects (Pty) Ltd is proposing the development of the Limestone PV1 Solar Energy Facility and associated infrastructure to add up to 120MW Peak AC new capacity to the national electricity grid. The project will make use of photovoltaic modules mounted on either a single axis tracking or fixed structure, dependent on optimisation, technology available and cost. These options are bring considered within this Scoping Report.

2.2.1. Overview of the Project Site

The project is to be developed on a site located approximately ~16km south-east of the town of Danielskuil and 10km east of Lime Acres in the Northern Cape Province. The site is located within the Kgatelopele

Local Municipality in the ZF Mgcawu District Municipality. A broader study area of 1 842ha was initially considered within which a development area[4] of 300-400ha was identified. The Limestone PV1 Solar Energy Facility development footprint will be appropriately located within the development area from a technical and environmental sensitivity perspective. The project site consists of a single property, as detailed in **Table 2.1** below.

Table 2.1: Properties within which the Limestone PV1 Solar Energy Facility project site will be located

Parent Farm Number	Farm Portions	SG 21 Digit Code (s)
Farm Engeland 300	4	C03100000000030000004

Access to the project site is ample with the presence of existing roads mainly consisting of regional roads. The project site is situated close to the R31 and R385 regional roads. An unnamed road provides access to the project site and development area.

The layout will take into consideration any environmentally sensitive areas identified through the EIA process and the PV Panels and associated infrastructure will be appropriately placed. A more accurate understanding of the final development footprint will be determined during the EIA phase with the availability of a facility layout.

2.2.2. Components of the Limestone PV1 Solar Energy Facility

The development area is proposed to accommodate the PV panels and all associated infrastructure which is required for such a facility, and will include:

- PV modules mounted on either a single axis tracking & fixed structure, dependent on optimisation, technology available and cost.
- Inverters and transformers.
- Low voltage cabling between the PV modules to the inverters.
- 33kV cabling between the project components and the facility substation.
- 33/132kV onsite facility substation.
- Battery Energy Storage System (BESS) with a footprint of 3-5ha.
- Site offices and maintenance buildings, including workshop areas for maintenance and storage as well as parking for staff and visitors.
- Laydown/staging area on-site in front of mounting structures during installation. Temporary store area close to site entrance (Less than 2ha).
- Access roads (up to 6m wide) and internal distribution roads (up to 5m wide).
- Temporary concrete batching facility.
- Stormwater management infrastructure as required.
- Fence around the project development area with security and access control.
- Camera surveillance.
- Internet connection.

[4] The development area (~300-400ha in extent) is a smaller focus area within the project site which has been selected as the best practicable option for the facility, considering the technical preferences and environmental constraints identified in the area.

A summary of the details and dimensions of the planned infrastructure associated with the project, as available at this stage in the process, is provided in **Table 2.2.**

Table 2.2: Details or dimensions of typical infrastructure required for the Limestone PV1 Solar Energy Facility

Infrastructure	Footprint and dimensions
Number of Panels	To be determined
Panel Height	+/- 2.2m
Technology	Use of fixed-tilt and single-axis tracking.
Contracted Capacity	Between 75MWp and 150MWp
Area occupied by the solar array	To be determined in the EIA phase
Area occupied by the on-site facility substation	0.5 – 0.75ha
Capacity of on-site facility substation	33kV/132kV
Cabling between the PV array and the onsite substation	The cabling will be in underground trenches and operate at a voltage of up to 33kV.
Extent of areas required for laydown of materials, equipment etc.	Less than 2ha
Access and internal roads	Existing roads will be used as far as possible. Existing gravel roads can be utilized for site access (width of up to 6m). Upgrading of existing roads or new roads will be required. New internal access roads required (width of up 5m), same for construction and operation. Internal access roads will be gravel/hard surfaced.
Grid connection	132kV overhead lines with 100m assessment corridors and +- 35m servitude for overhead lines. Project site adjacent existing MTS (Olien MTS) but exact grid connection details will be determined later.
Temporary infrastructure	Temporary store area close to site entrance (Less than 2ha).

Table 2.2 provides details regarding the requirements and the activities to be undertaken during the Limestone PV1 Solar Energy Facility development phases (i.e., construction phase, operation phase and decommissioning phase). **Table 2.3** provides photographs of the construction phase of a Solar Energy Facility similar to the Limestone PV1 Solar Energy Facility.

2.2.3. Project Development Phases Associated with the Limestone PV1 Solar Energy Facility

Table 2.2: Details of the Limestone PV1 Solar Energy Facility project development phases (i.e., design and pre-construction, construction, operation, and decommissioning)

Design and Pre-Construction Phase		
Requirements	»	Conducting final planning and surveys for the Limestone PV1 site before construction
Activities to be undertaken		
Planning	»	Several post-authorisation factors are expected to influence the final design of the solar energy facility and could result in small-scale modifications of the PV array and/or associated infrastructure. An objective of the Engineering, Procurement and Construction (EPC) Contractor, who will be responsible for the overall construction of the project, will be to comply with the approved facility design as far as possible. It should be understood however, that the construction process is dynamic and that unforeseen changes to the project specifications may take place. This Scoping Report therefore describes the project in terms of the best available knowledge at the time. The final facility design is required to be approved by the DFFE prior to commencement of construction. Importantly, should there be any substantive changes or deviations from the original scope or layout of the project following approval thereof, the DFFE will need to be notified and where relevant, environmental approval obtained.
Conduct Surveys	»	Prior to initiating construction, a number of surveys will be required including, but not limited to, confirmation of the micro-siting footprint (i.e. the precise location of the PV panels, on-site facility substation and the associated infrastructure) and a geotechnical survey. Geotechnical surveys acquire information regarding the physical characteristics of soil and rocks underlying a proposed project site and informs the design of earthworks and foundations for structures.
Construction Phase		
Requirements	»	Project receives Environmental Authorisation from the DFFE, preferred bidder allocation granted by DMRE (or other entity), a generating license issued by NERSA, and a Power Purchase Agreement secured with Eskom or a Private PPA. » Expected to be 12 – 18 months for the Limestone PV1 Solar Energy Facility. » Create direct construction employment opportunities. The number of employment opportunities that will be created is still to be determined. The majority of the labour force is expected to be locally sourced but this is to be confirmed. » No on-site labour camps. Employees to be accommodated in the nearby towns such as Danielskuil and Lime Acres and transported to and from site with a mode of transport still to be determined. » Wastewater and sewage management still to be determined. » The amount and types of waste, as well as waste disposal methods are still to be determined. » The electricity requirement and supply for construction activities will be determined at a later stage. » Water to be sourced through either boreholes or the local municipal (still to be determined) and will provide an estimated 80 000 – 100 000 m^3 of water. Method of transportation of the water to site is still to be determined.
Activities to be undertaken		
Establishment of	»	Existing gravel roads (6m wide) to be used for site access and will be utilised, where possible, to minimise impact.

access roads to the Site	» Internal access roads within the site will be established at the commencement of construction. » Access roads will need to be upgraded or added (most likely as gravel/hard surface) as part of the proposed development. New onsite access roads to be up to 5m wide. » Roads to be permanent for operation and maintenance purposes
Undertake site preparation	» Including the clearance of vegetation at the footprint of PV panel supports, establishment of the laydown areas, the establishment of internal access roads and excavations for foundations. » Stripping of topsoil to be stockpiled, backfilled, removed from site and/or spread onsite. » To be undertaken in a systematic manner to reduce the risk of exposed ground being subjected erosion. » Include search and rescue of floral species of concern (where required) and the identification and excavation of any sites of cultural/heritage value (where required).
Transport of components and equipment to and within the site	» The national, regional, secondary and proposed internal access roads will be used to transport all components and equipment required during the construction phase. » Some of the components (i.e., substation transformer) may be defined as abnormal loads in terms of the Road Traffic Act (Act No. 29 of 1989) by virtue of the dimensional limitations. » Typical civil engineering construction equipment will need to be brought to the site (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.) as well as components required for the mounting of the PV support structures, construction of the substation and site preparation.
Establishment of laydown areas on site	» The laydown area will be used for the assembly of the PV panels, and the general placement/storage of construction equipment. » The laydown area will be established close to the site entrance and will cover an area less than 2ha. » Site offices and maintenance buildings, including workshop areas for maintenance and storage will also be established
Erect PV Panels, construct substation, inverters and BESS	» The construction phase involves installation of the PV solar panels, structural and electrical infrastructure required for the operation of Limestone PV1. » In addition, preparation of the soil and improvement of the access roads are likely to continue for most of the construction phase. » For array installations, vertical support posts will be driven into the ground. » Depending on the results of the geotechnical report, a different foundation method, such as screw pile, helical pile, micropile or drilled post/piles could be used. » The posts will hold the support structures (tables) on which the PV modules would be mounted. » Brackets will attach the PV modules to the tables. » Trenches are to be dug for the underground AC and DC cabling, and the foundations of the inverter enclosures and transformers will be prepared. While cables are being laid and combiner boxes are being installed, the PV tables will be erected. » Wire harnesses will connect the PV modules to the electrical collection systems. Underground cables and overhead circuits will connect the Power Conversion Stations (PCS) to the on-site AC electrical infrastructure, and ultimately the onsite facility substation. This process also involves the installation of the BESS facility. » The construction of the on-site facility substation will require a survey of the footprint, site clearing and levelling and construction of access road(s) (where applicable), construction of a level terrace and foundations, assembly, erection, installation and connection of equipment, and

	rehabilitation of any disturbed areas, and protection of erosion sensitive areas.
Construction of the overhead power line	Overhead power lines are constructed in the following simplified sequence: » Step 1: Surveying of the development area, engaging with affected landowners, environmental specialist walkthroughs to inform permitting requirements and micro-siting of the pylon infrastructure. » Step 2: Final design and micro-siting of the infrastructure based on geo-technical, topographical conditions and identified environmental sensitivities. » Step 3: Search-and-rescue activities, vegetation clearance and construction of access roads/tracks (where required) and watercourse crossings (where required). » Step 4: Construction of tower foundations. » Step 5: Assembly and erection of infrastructure onsite. » Step 6: Stringing of conductors. » Step 7: Rehabilitation of disturbed areas. » Step 8: Continued maintenance.
Establishment of ancillary infrastructure	» Site offices and maintenance buildings, including workshop areas for maintenance and storage will be required. » Establishment will require the clearing of vegetation, levelling, and the excavation of foundations prior to construction.
Connect facility to the power grid	» The grid connection will be determined at a later time
Undertake site rehabilitation	» Commence with rehabilitation efforts once construction completed in an area, and all construction equipment is removed. » On commissioning, access points to the site not required during the operation phase will be closed and prepared for rehabilitation.
<u>Operation Phase</u>	
Requirements	» Duration will be 20-25 years. » Requirements for monitoring, reporting, security and maintenance of the project. » Employment opportunities relating mainly to operation activities and maintenance. Full-time employment opportunities will be available during the operation of the Solar Energy Facility and to be determined at a later stage.
Activities to be undertaken	
Operation and Maintenance	» While the solar facility will be largely self-sufficient, monitoring and periodic maintenance activities will be required. » Key elements of the Operation and Maintenance (O&M) plan include monitoring and reporting the performance of the solar energy facility, conducting preventative and corrective maintenance, receiving visitors, and maintaining security. » PV facility will be operational except under circumstances of mechanical breakdown, inclement weather conditions, or maintenance activities. » Disposal of waste products (e.g., oil and other lubricants, etc) in accordance with relevant waste management legislation. » Areas which were disturbed during the construction phase to be utilised should a laydown area be required during operation. » PV panels will be washed during operation utilising clean water or non-hazardous biodegradable cleaning products. Wastewater generated by washing can be allowed to run-off under the panels.

Decommissioning Phase	
Requirements	» Decommissioning of the Limestone PV1 Solar Energy Facility infrastructure at the end of its economic life. » Potential for repowering of the facility, depending on the condition of the facility at the time. » Expected lifespan of approximately 20 – 25 years (with maintenance) before decommissioning is required. » Decommissioning activities to comply with the legislation relevant at the time.
Activities to be undertaken	
Site preparation	» Site preparation activities will include confirming the integrity of the access to the site to accommodate the required decommissioning equipment and lifting cranes. » Preparation of the site (e.g., laydown areas and construction platform). » Mobilisation of construction equipment.
Disassemble and remove PV panels	» When the solar energy facility is ultimately decommissioned, the equipment to be removed will depend on the land use proposed for the project site at the time. » Disconnect the facility from the grid. » Dismantle all panels, mounting structures and foundations in line with all relevant legislation. » Recycle, repurpose and re-use as much of the decommissioned project components as possible in accordance with regulatory requirements. » Concrete foundations will be removed to a depth as defined by an agricultural specialist. » Backfill the mounting structure holes and rehabilitate the area appropriately. » Visible cables will be removed. » A final site walkthrough will be conducted to remove debris and/or waste generated within the site during the decommissioning process. » Rehabilitation may include top soiling, raking, and/or re-seeding (whichever is appropriate).
Future plans for the site and infrastructure after decommissioning	» It is expected that the areas of the project site affected by the Solar Energy Facility infrastructure (development footprint) will revert back to their original land-use (i.e., agriculture) once the Limestone PV1 Solar Energy Facility has reached the end of its economic life and all infrastructure has been decommissioned. » The solar energy facility will potentially have the opportunity to generate power for a Merchant Market operation (i.e. the client would sell power on a bid basis to the market). Another option for the site after decommissioning is for agricultural activities to resume.

It is expected that the areas of the project site affected by the Solar Energy Facility infrastructure (development footprint) will revert back to their original land-use (i.e., agriculture) once the facility has reached the end of its economic life and all infrastructure has been decommissioned.

Table 2.3: Photographs of the construction phase of a Solar Energy Facility similar to the Limestone PV1 Solar Energy Facility(Source:https://medium.com/@solar.dao/how-to-build-pv-solar-plant-6c9f6a01020f; https://www.shutterstock.com/video/clip-1028794-workers-mounting-panels-on-solar-power-plant-construction; https://www.esi-africa.com/renewable-energy/kenya-construction-solar-farm-gets-green-light/)





CHAPTER 3: CONSIDERATION OF ALTERNATIVES

This Chapter provides an overview of the various alternatives considered for the Limestone PV1 Solar Energy Facility as part of the Scoping Process.

3.1 Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of a Scoping Report

This chapter of the Scoping Report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
3(1)(g) a motivation for the preferred site, activity, and technology alternative	The identification and motivation for the preferred project site, the development area within the project site, the proposed activity and the proposed technology is included in **sections 3.3.1, 3.3.3 and 3.3.4**.
3(1)(h)(i) details of the alternative considered	The details of all alternatives considered as part of the Limestone PV1 Solar Energy Facility are included in **sections 3.3.1 – 3.3.5**.
3(1)(h)(ix) the outcome of the site selection matrix	The site selection process followed by the developer in order to identify the preferred project site and development area is described in **section 3.3.1**.
3(1)(h)(x) if no alternatives, including alternative locations for the activity were investigation, the motivation for not considering such	Where no alternatives have been considered, motivation has been included. This is included in **section 3.3**.

3.2 Alternatives Considered during the Scoping Phase

In accordance with the requirements of Appendix 2 of the 2014 Environmental Impact Assessment (EIA) Regulations (GNR 326), reasonable and feasible alternatives including but not limited to site and technology alternatives, as well as the "do-nothing" alternative should be considered.

The DFFE Guideline for determining alternatives states that the key criteria for consideration when identifying alternatives are that they should be "practicable", "feasible", "relevant", "reasonable" and "viable". Essentially there are two types of alternatives:

» Incrementally different (modifications) alternatives to the project.
» Fundamentally (totally) different alternatives to the project.

In this instance, 'the project' refers to Limestone PV1 Solar Energy Facility, a Solar Energy Facility with capacity of up to 150MWp and associated infrastructure proposed to be developed by an Independent Power Producer (IPP) and intended to form part of the DMRE's REIPPP Programme, or other similar programme.

3.2.1. Consideration of Fundamentally Different Alternatives

Fundamentally different alternatives are usually assessed at a strategic level and, as a result, project specific EIAs are therefore limited in scope and ability to address fundamentally different alternatives. At a strategic level, electricity generating alternatives have been addressed as part of the DMRE's current Integrated Resource Plan for Electricity 2010 – 2030 (IRP)[5], and will continue to be addressed as part of future revisions. In this regard, the need for renewable energy power generation from solar energy facilities has been identified as part of the technology mix for power generation in the country for the next 20 years, with provision for 6000MW of large-scale PV. The fundamental energy generation alternatives were assessed and considered within the development of the IRP and the need for the development of renewable energy projects has been defined. Therefore, fundamentally different alternatives to the proposed project are not considered within this EIA process.

3.2.2. Consideration of Incrementally Different Alternatives

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

- The properties on which, or location where the activity is proposed to be undertaken.
- The type of activity to be undertaken.
- The design or layout of the activity.
- The technology to be used in the activity.
- The operational aspects of the activity.

In addition, the option of not implementing the activity (i.e., the "do-nothing" alternative) must also be considered.

The sections below describe the incrementally different alternatives being considered as part of the Limestone PV1 Solar Energy Facility. Where no alternative is being considered, a motivation has been provided as required by the EIA Regulations, 2014.

3.3 Project Alternatives under Consideration for the Limestone PV1 Solar Energy Facility

3.3.1. Property or Location Alternatives

The development site identified for the Limestone PV1 Solar Energy Facility is located ~16km south-east of the town of Danielskuil. The placement of a solar PV facility is dependent on several factors including land suitability, climatic conditions (solar irradiation levels), topography, the location and extent of the study area, availability of grid connection infrastructure and the need and desirability of the project. AGV

[5] The Integrated Resource Plan (IRP) is legislated policy which regulates power generation planning.

Projects (Pty) Ltd considers the preferred development area placed within the study area as being highly favourable and suitable for the establishment of a solar PV facility due to the following site-specific characteristics:

» **Solar resource**: Solar resource is the first main driver of site selection and property viability when considering the development of solar PV facilities. The economic viability of a solar PV facility is directly dependent on the annual direct solar irradiation values of the area within which it will operate. The Global Horizon Irradiation (GHI) for the study area is in the region of approximately 2 240 kWh/m^2/annum (refer to **Figure 3.1**). The Northern Cape Province is considered to have the highest solar irradiation values of the country and therefore enables the development of solar energy projects and the successful operation thereof.

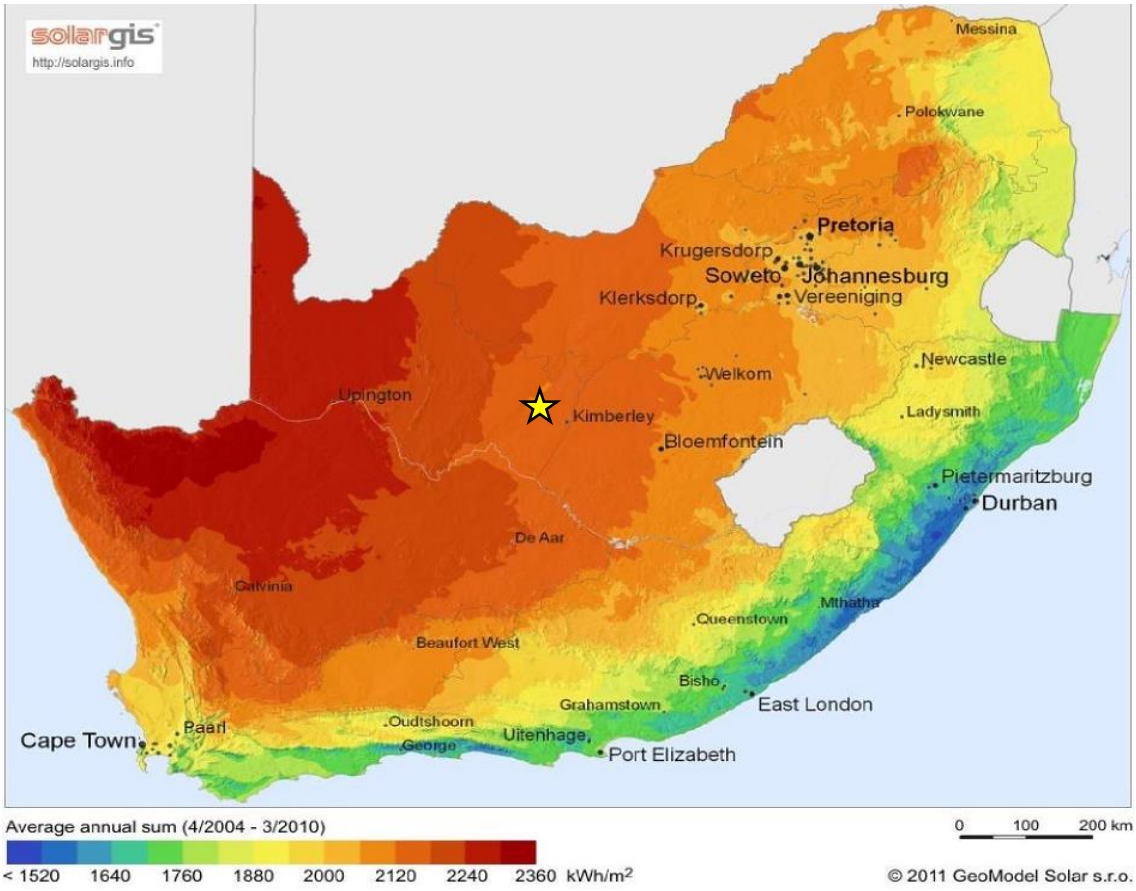


Figure 3.1: Solar irradiation map for South Africa; the proposed Limestone PV1 Solar Energy Facility position is shown by the yellow star on the map. (Source: adapted from GeoModel Solar, 2011).

» **Site extent:** In order to develop the Limestone PV1 Solar Energy Facility with a contracted capacity of up to 150MWp, sufficient space is required. The preferred project site was identified within the Northern Cape Province and in the Danielskuil area following a specialist screening study. The combination of the affected properties has an extent of ~1 841ha, which was considered by the developer as sufficient for the development of the Limestone PV1 Solar Energy Facility. A development footprint within the project site and development area for the placement of infrastructure will be identified and assessed as part of the EIA Phase considering environmental constraints and sensitivities, as well as technical criteria.

- **Landowner support**: The selection of a site where the landowner is supportive of the development of renewable energy is essential for ensuring the success of the project. The landowner does not view the development as a conflict with their current land use practices. The land rights for the properties included in the project site were secured through agreement with the landowners, and are deemed technically feasible by the project developer for such development to take place.

- **Topography**: The region within which the project site is located can be described as flat and homogenous. Elevation across the area ranges from 1 430m above sea level in the west to 1 450m above sea level in the east. There are no prominent hills within the project site with the highest areas of elevation situated to the north east of the project site. The flat topography of the study area under investigation is considered as beneficial in terms of the construction activities that will be required.

- **Geographic location**: The proposed project site is located within an area which has become a node for renewable energy projects, with both PV and CSP solar facilities authorised on and/or in close proximity to the project site. The proposed project site is in close proximity to a planned node for solar development, and therefore compliments planned future land use.

- **Access to the National Electricity Grid:** A key factor in the siting of any generation project is a viable grid connection. The final grid connection solution is still to be determined, but the site is adjacent to the existing Olien MTS which may provide a suitable connection point. The grid connection solution will be subjected to a separate EIA process following confirmation from Eskom.

- **Site access**: Access to the project site is ample with the presence of existing roads mainly consisting of regional roads. The project site is situated close to the R31 and R385 regional roads. An unnamed dirt road provides access to the project site and development area.

- **Environmental sensitivity:** As part of the feasibility assessment for the project, an environmental screening of the site was undertaken by the developer to evaluate the main constraints and opportunities and determine whether or not there were any potential fatal flaws or significant no-go areas within the site. The screening process took place prior to the commencement of the EIA process and included specialist investigations of the broader project site. This included preliminary field investigations by the specialist appointed to undertake the EIA studies, as well as desktop consideration of environmental constraints. The purpose of the screening study was to identify areas constrained for development (i.e., no-go areas). The sensitivity spatial data compiled for the larger site was provided to the applicant prior to lodging the application for environmental authorisation. This is a common approach in the development of renewable energy projects in order to inform the placement of infrastructure for further investigation in the EIA process. Although some environmental sensitivities were identified as a result of the presence of Critical Biodiversity Areas (CBAs) on the site, no conclusive fatal flaws were identified during the screening assessment. It was concluded that a detailed assessment of the site would be required to identify suitable areas for development and recommend mitigation and management measures for the minimisation of impacts.

Based on the above considerations, the Limestone PV1 Solar Energy Facility project site was identified by the developer as being the most technically feasible and viable project site within the broader area for further investigation in support of an Application for Authorisation. No feasible alternative development area was identified for the assessment as part of the EIA process.

3.3.2. Design and Layout Alternatives

The overall aim of the facility layout (i.e., development footprint) is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operation, and maintenance costs, social and environmental impacts. The findings of the specialist scoping assessments will assist the developer in selecting the optimum position for the PV arrays and associated infrastructures including, but not limited to, access roads, and laydown areas.

An overall environmental scoping sensitivity map has been compiled in order to illustrate the sensitive environmental features located within the project site identified at this stage in the process which needs to be considered and, in some instances completely avoided by the development footprint. Once more detailed information is available from an environmental and planning perspective for the broader site following detailed specialist studies, a detailed micro-siting exercise will be undertaken to effectively 'design' the solar facility layout within the project site, which will be known as the development footprint. Through the process of determining constraining factors and environmentally sensitive areas, the layout of the PV facility footprint and infrastructure will be planned and adjusted if necessary to ensure the avoidance of no-go areas and mitigation of sensitive environmental features. A detailed facility layout will be developed and will be made available for assessment and ground-truthing by the independent specialists in the EIA phase. Where further conflicts are predicted, a mitigation strategy will be developed to meet the objectives of the mitigation hierarchy (avoid, minimise, mitigate).

3.3.3. Activity Alternatives

AGV Projects (Pty) Ltd is a renewable energy project developer and as such is only considering renewable energy activities in accordance with the need for such development within the IRP (refer to Chapters 5 and 6 for more detail). Considering the available renewable energy resources within the area and the current significant restrictions placed on other natural resources such as water, it is considered that solar energy is the preferred option for the development of a renewable energy facility within the identified project site. Development of a wind energy facility is also being considered in a separate application process due to the viable wind resource in the area. No other activity alternatives are being considered within this EIA process.

3.3.4. Technology Alternatives

Few technology options are available for solar facilities, and the use of those that are considered are usually differentiated by weather and temperature conditions that prevail in the area, so that optimality is obtained by the final site selection. Solar energy is considered to be the most suitable renewable energy technology for this area, based on the site location, ambient conditions and energy resource availability.

Solar PV was determined as the most suitable option for further assessment. The Integrated Resource Plan (IRP) 2019, excludes the procurement of power from CSP facilities until 2030; whereas new additional capacity of approximately 6 000MW will be required from solar PV facilities. Therefore, PV technology was identified as being the preferred option for the study area. Solar PV consists of a lower visual profile and limited water requirements when compared to the CSP technology option. Therefore, considering the above, no other technology alternatives are being assessed for development on the proposed site.

When considering PV as a technology choice, several types of panels are available, including *inter alia*:

- Bifacial PV panels
- Monofacial PV panels
- Fixed mounted PV systems (static / fixed-tilt panels).
- Single-axis tracking or double-axis tracking systems (with solar panels that rotate around a defined axis to follow the sun's movement).

The primary difference between PV technologies available relate to the extent of the facility, as well as the height of the facility (visual impacts), however the potential for environmental impacts remains similar in magnitude. Fixed mounted PV systems are able to occupy a smaller extent and have a lower height when compared to tracking PV systems, which require both a larger extent of land, and are taller in height. However, both options are considered to be acceptable for implementation from an environmental perspective. Bifacial solar PV panels offer many advantages over monofacial PV panels, as power can be produced on both sides of the module, increasing total energy generation. The preference will therefore be determined on the basis of technical considerations and the site conditions.

The PV panels are designed to operate continuously for more than 20 years, mostly unattended and with low maintenance. The impacts associated with the construction, operation, and decommissioning of the facility are anticipated to be the same irrespective of the PV panel selected for implementation.

Once environmental constraining factors have been determined through the Scoping and EIA process, AGV Projects (Pty) Ltd will consider various solar panel options. The preferred option will be informed by efficiency as well as environmental impact and constraints (such as sensitive biophysical features). The PV panels proposed, will comprise solar panels which once installed, will stand around 2.2m above ground level. The Battery Energy Storage System (BESS) capacity will depend on technology to be used and total installed capacity of solar, and it is expected to be in the order of 75 - 150MWp.

3.3.5. The 'Do-Nothing' Alternative

The 'do-nothing' alternative is the option of not constructing and operating the Limestone PV1 Solar Energy Facility. Should this alternative be selected, there would be no environmental impacts or benefits as a result of construction and operation activities associated with a Solar Energy Facility. The 'do-nothing' alternative will therefore likely result in minimising the cumulative impact on the land, although it is expected that pressure to develop the site for renewable energy purposes will be actively pursued due to the same factors which make the site a viable option for renewable energy development. This alternative will be assessed within the EIA Phase of the process.

CHAPTER 4: SOLAR AS A POWER GENERATION TECHNOLOGY

Environmental pollution and the emission of CO2 from the combustion of fossil fuels through the implementation of conventional power plants constitute a threat to the environment. The use of fossil fuels is reportedly responsible for ~70% of greenhouse gas emissions worldwide. The approach to addressing climate change needs to include a shift in the way that energy is generated and consumed. Worldwide, many solutions and approaches are being developed to reduce emissions. However, it is important to acknowledge that the most cost-effective solution in the short-term is not necessarily the least expensive long-term solution. This holds true not only for direct project costs, but also indirect project costs such as impacts on the environment. Renewable energy is considered a 'clean source of energy' with the potential to contribute greatly to a more ecologically, socially, and economically sustainable future. The challenge however is to ensure that renewable energy projects are able to meet all economic, social and environmental sustainability criteria through the appropriate placement of these facilities.

This chapter explores the use of solar energy as a means of power generation.

4.1. Solar PV Technology

Solar energy facilities, such as those which utilise PV technology, use energy from the sun to generate electricity through a process known as the **Photovoltaic Effect**. Generating electricity using the Photovoltaic Effect is achieved through the use of the following components:

Photovoltaic Modules

PV cells are made of crystalline silicon, the commercially predominant PV technology, that includes materials such as polycrystalline and monocrystalline silicon or thin film modules manufactured from a chemical ink compound. 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)). When sunlight hits the PV panels, free electrons are released and flow through the panels to produce direct electrical (DC) current. DC then needs to be converted to alternating current (AC) using an inverter before it can be directly fed into the electrical grid.

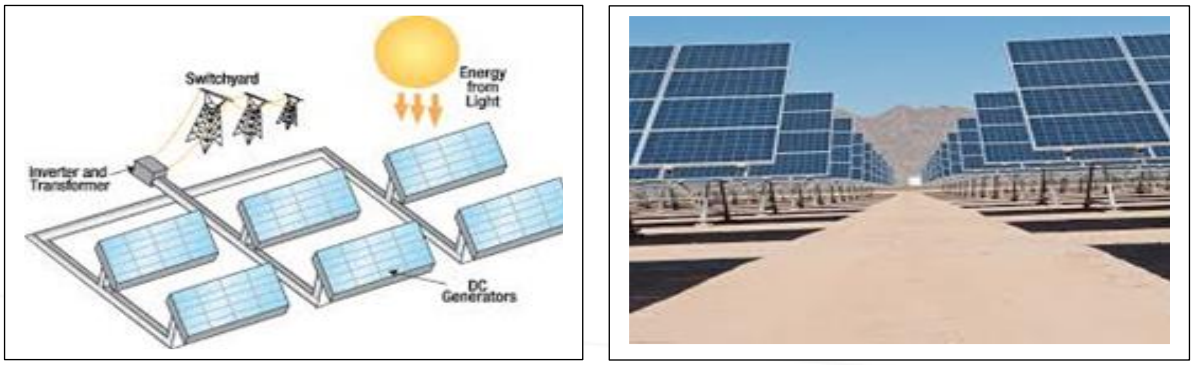


Figure 4.1: Overview of a PV cell, module, and array / panel (Source: pveducation.com)

Inverters

Inverters are used to convert electricity produced by the PV panels from DC into AC, to enable the facility to be connected to a grid connection point. In order to connect a large solar facility such as the one being proposed to a grid connection point, numerous inverters will be arranged in several arrays to collect, and convert power produced by the facility.

Support Structures

PV panels will be fixed to a support structure. PV panels can either utilise fixed / static support structures, or alternatively, they can utilise single or double axis tracking support structures. PV panels which utilise fixed / static support structures are set at an angle (fixed-tilt PV system) so as 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 development and may be adjusted to optimise for summer and winter solar radiation characteristics. PV panels which utilise tracking support structures track the movement of the sun throughout the day so as to receive the maximum amount of solar irradiation.

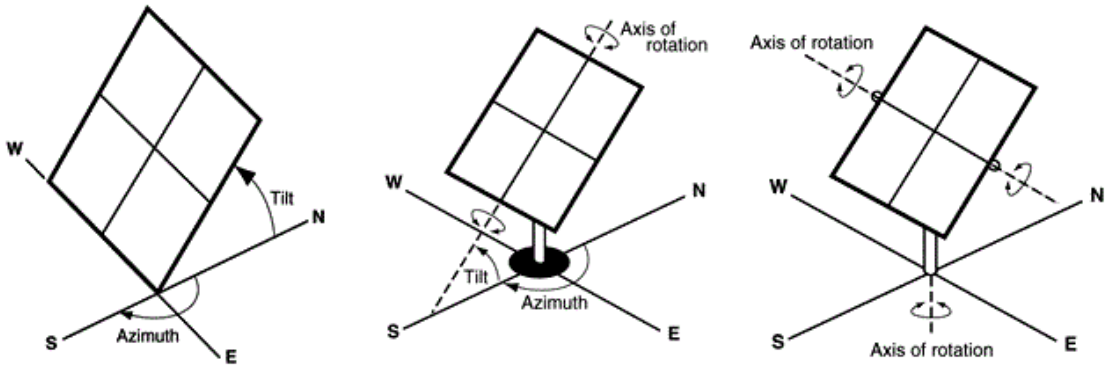


Figure 4.2: Overview of different PV tracking systems (from left to right: fixed-tilt, single-axis tracking, and double-axis tracking (Source: pveducation.com))

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

Bifacial Solar Panel Technology

Bifacial ("two-faced") modules produce solar power from both sides of the panel. Traditional solar panels capture sunlight on one light-absorbing side. The light energy that cannot be captured is simply reflected away. 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 4.3). Practically speaking, this means that a bifacial solar panel can absorb light reflected off the ground or another material. 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. Use of trackers is recommended so the modules can track the sun's movement across the sky, enabling them to stay directed to receive the maximum possible sunlight to generate power.

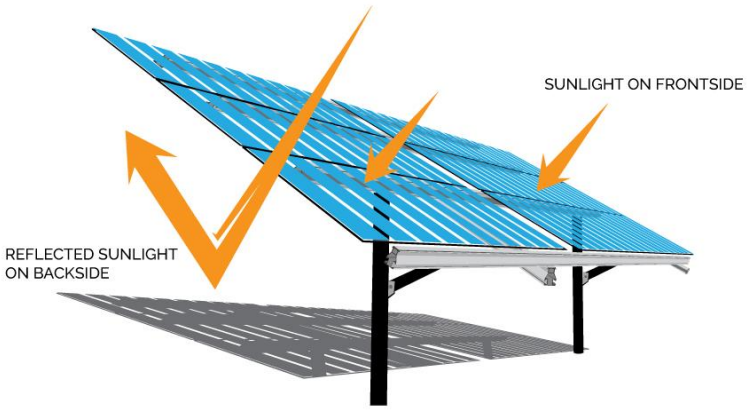


Figure 4.3: Diagram showing how bifacial Solar PV panels work (Source: https://sinovoltaics.com/learning-center/solar-cells/bifacial-solar-modules/)

4.2. Battery Energy Storage System (BESS)

The need for a BESS stems from the fact that electricity is only produced by the Solar Energy Facility 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 Energy Facility into the electricity grid.
- This will assist with the objective to generate electricity by means of renewable energy to feed into the National Grid which will be procured under either the REIPPPP other government run procurement programmes or for sale to private entities if required.
- Proposed footprint of battery storage area: 3 – 5ha.
- Proposed capacity of battery storage: 50 - 150MWac.
- Proposed technology to be used: Lithium-ion batteries (LFP/NMC or others) (Li-Ion), Lithium capacitors/Electrochemical capacitors (LiC), and/or Redox-flow batteries (RFB)

CHAPTER 5: POLICY AND LEGISLATIVE CONTEXT

This Chapter provides an overview of the policy and legislative context within which the development of a Solar Energy Facility, such as the Limestone PV1 Solar Energy Facility, is proposed. It identifies environmental legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process which may be applicable to or have bearing on the proposed project.

5.1 Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of a Scoping Report

This chapter of the Scoping Report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
3(1)(e) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	Chapter 5 as a whole provides an overview of the policy and legislative context which is considered to be associated with the development of the Limestone PV1 Solar Energy Facility. The regulatory and planning context has been considered at national, provincial and local levels.

5.2. Strategic Electricity Planning in South Africa

The need to expand electricity generation capacity in South Africa is based on national policy and informed by on-going strategic planning undertaken by the Department of Mineral Resources and Energy (DMRE). The hierarchy of policy and planning documentation that support the development of renewable energy projects such as the Limestone PV1 Solar Energy Facility is illustrated in **Figure 5.1**. These policies are discussed in more detail in the following sections, along with the provincial and local policies or plans that have relevance to the development of the proposed project.

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

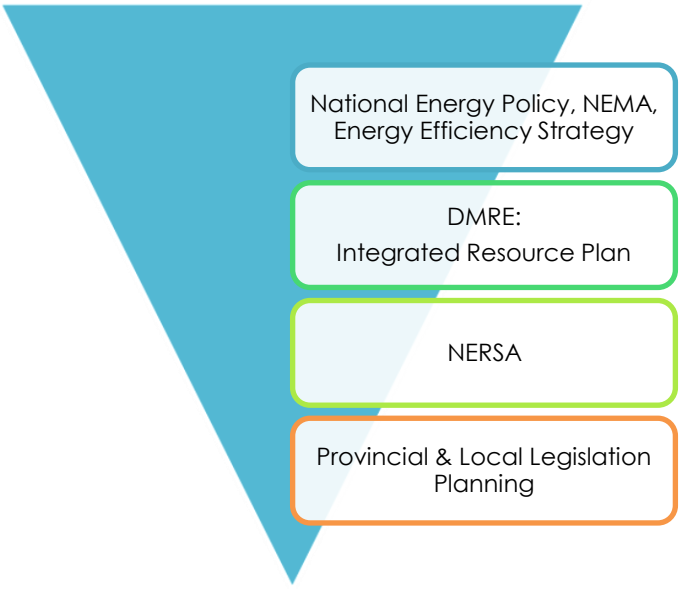


Figure 5.1: Hierarchy of electricity and planning documents

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

- **Department of Mineral Resources and Energy (DMRE):** This Department is responsible for policy relating to all energy forms and for compiling and approving the Integrated Resource Plan (IRP) for electricity. Furthermore, the Department is also responsible for granting approvals for the use of land which is contrary to the objects of the Mineral and Petroleum Resource Development Act (Act No. 28 of 2002) (MPRDA) in terms of Section 53 of the Act. Therefore, in terms of the Act, approval from the Minister is required to ensure that the proposed activities do not sterilise mineral resources that may occur within the project site and development area.
- **National Energy Regulator of South Africa (NERSA):** NERSA is responsible for regulating all aspects of the electricity sector and will ultimately issue licenses for IPP projects to generate electricity.
- **Department of Forestry, Fisheries and the Environment (DFFE):** This Department is responsible for environmental policy and is the controlling authority in terms of NEMA and the EIA Regulations, 2014 (GN R326) as amended. DFFE is the Competent Authority for this project (as per GN R779 of 01 July 2016), and is charged with granting the EA for the project under consideration. The Department is also responsible for issuing permits for the disturbance or destruction of protected tree species listed under Section 15 (1) of the National Forest Act (No. 84 of 1998) (NFA).
- **The South African Heritage Resources Agency (SAHRA):** SAHRA is a statutory organisation established under the National Heritage Resources Act (No. 25 of 1999) (NHRA), as the national administrative body responsible for the protection of South Africa's cultural heritage.
- **South African National Roads Agency Limited (SANRAL):** This Agency is responsible for the regulation and maintenance of all national road routes.
- **Department of Water and Sanitation (DWS):** This Department is responsible for effective and efficient water resource management to ensure sustainable economic and social development. This Department is also responsible for evaluating and issuing licenses pertaining to water use (i.e., Water Use License (WUL) and General Authorisation).
- **The Department of Agriculture, Land Reform and Rural Development (DALRRD):** This Department is the custodian of South Africa's agricultural resources and is primarily responsible for the formulation and implementation of policies governing the agriculture sector.

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

» **Provincial Government of Northern Cape – Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARDLR):** This Department is the commenting authority for the EIA process for the project and is responsible for issuing of biodiversity and conservation-related permits.
» **Northern Cape Department of Roads and Public Works:** This Department provides effective co-ordination of crime prevention initiatives, provincial police oversight, traffic management and road safety towards a more secure environment.
» **Ngwao-Boswa Ya Kapa Bokone (NBKB):** This Department identifies, conserves and manages heritage resources throughout the Northern Cape Province.

At the **Local Level,** the local and district municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the Northern Cape Province, both the local and district municipalities play a role. The project site is located across the **Kgatelopele Local Municipality** within the **ZF Mgcawu District Municipality**. In terms of the Municipal Systems Act (No. 32 of 2000), it is compulsory for all municipalities to go through an Integrated Development Planning (IDP) process to prepare a five-year strategic development plan for the area under their control.

5.3. International Policy and Planning Context

A brief review of the most relevant international policies relevant to the establishment of the Limestone PV1 Solar Energy Facility are provided below in **Table 5.1**. The Limestone PV1 Solar Energy Facility is considered to be aligned with the aims of these policies, even if contributions to achieving the goals therein are only minor.

Table 5.1: International policies relevant to the Limestone PV1 Solar Energy Facility

Relevant policy	Relevance to the Limestone PV1 Solar Energy Facility
United Nations Framework Convention on Climate Change (UNFCCC) and Conference of the Party (COP)	The Conference of the Parties (COP), established by Article 7 of the UNFCCC, is the supreme body and highest decision-making organ of the Convention. It reviews the implementation of the Convention and any related legal instruments and takes decisions to promote the effective implementation of the Convention. The Conference of the Parties (COP) 21 was held in Paris from 30 November to 12 December 2015. From this conference, an agreement to tackle global warming was reached between 195 countries. South Africa signed the Agreement in April 2016 and ratified the agreement on 01 November 2016. The Agreement was assented to by the National Council of Provinces on 27 October 2016, and the National Assembly on 1 November 2016. The Paris Agreement set out that every 5 years countries must set out increasingly ambitious climate action. This meant that, by 2020, countries needed to submit or update their plans for reducing emissions, known as nationally determined contributions (NDCs). The

Relevant policy	Relevance to the Limestone PV1 Solar Energy Facility
	COP26 summit held on 2021 brought parties together to accelerate action towards the goals of the Paris Agreement and the UN Framework Convention on Climate Change. On 13 November 2021, COP26 concluded in Glasgow with all countries agreeing the Glasgow Climate Pact to keep 1.5˚C alive and finalise the outstanding elements of the Paris Agreement. South Africa's National Climate Change Response Policy (NCCRP) establishes South Africa's approach to addressing climate change, including adaptation and mitigation responses. The NCCRP formalises Government's vision for a transition to a low carbon economy, through the adoption of the 'Peak, Plateau and Decline' (PPD) GHG emissions trajectory whereby South Africa's emissions should peak between 2020 and 2025, plateau for approximately a decade, and then decline in absolute terms thereafter, and based on this the country has pledged to reduce emissions by 34% and 42% below Business As Usual (BAU) emissions in 2020 and 2025, respectively. The policy provides support for the Limestone PV1 Solar Energy Facility which will contribute to managing climate change impacts, supporting the emergency response capacity, as well as assist in reducing GHG emissions in a sustainable manner.
The Equator Principles IV (October 2020)	The Equator Principles (EPs) IV constitute a financial industry benchmark used for determining, assessing, and managing project's environmental and social risks when financing projects. The EPs are primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. The EPs are applicable to large infrastructure projects (such as the Limestone PV1 Solar Energy Facility) and apply globally to all industry sectors. Such an assessment should propose measures to minimise, mitigate, and offset adverse impacts in a manner relevant and appropriate to the nature and scale of the Limestone PV1 Solar Energy Facility. In terms of the EPs, South Africa is a non-designated country, and as such the assessment process for projects located in South Africa evaluates compliance with the applicable IFC Performance Standards on Environmental and Social Sustainability, and Environmental Health and Safety (EHS) Guidelines. The Limestone PV1 Solar Energy Facility is currently being assessed in accordance with the requirements of the 2014 EIA Regulations, as amended (GN R326), published in terms of Section 24(5) of the National Environmental Management Act (No. 107 of 1998) (NEMA), which is South Africa's national legislation providing for the authorisation of certain controlled activities. Through this assessment, all potential social and environmental risks are identified and assessed, and appropriate mitigation measures proposed.
International Finance Corporation (IFC) Performance Standards and Environmental and Social Sustainability (January 2012)	The International Finance Corporation's (IFC) Performance Standards (PSs) on Environmental and Social Sustainability were developed by the IFC and were last updated on 1 January 2012.

Relevant policy	Relevance to the Limestone PV1 Solar Energy Facility
	Performance Standard 1 requires that a process of environmental and social assessment be conducted, and an Environmental and Social Management System (ESMS) appropriate to the nature and scale of the project, and commensurate with the level of its environmental and social risks and impacts, be established and maintained. The above-mentioned standard is the overarching standard to which all the other standards relate. Performance Standards 2 through to 8 establish specific requirements to avoid, reduce, mitigate, or compensate for impacts on people and the environment, and to improve conditions where appropriate. While all relevant social and environmental risks and potential impacts should be considered as part of the assessment, the standards 2 and 8 describe potential social and environmental impacts that require particular attention specifically within emerging markets. Where social or environmental impacts are anticipated, the developer is required to manage them through its ESMS consistent with Performance Standard 1. Given the nature of the Limestone PV1 Solar Energy Facility, it is anticipated (at this stage of the process) that Performance Standards 1, 2, 3, 4, 6, and 8 may be applicable to the project.

5.4. National Policy and Planning Context

National policies have to be considered for the construction and operation of the solar PV facility to ensure that the development is in line with the planning of the country. A brief review of the most relevant national policies is provided below in **Table 5.2**. The development of Limestone PV1 Solar Energy Facility is considered to align with the aims of these policies, even where contributions to achieving the goals therein are only minor.

Table 5.2: Relevant national legislation and policies for Limestone PV1 Solar Energy Facility

Relevant legislation or policy	Relevance to Limestone PV1 Solar Energy Facility
Constitution of the Republic of South Africa, 1996	Section 24 of the Constitution pertains specifically to the environment. It states that everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development, and use of natural resources while promoting justifiable economic and social development. The Constitution outlines the need to promote social and economic development. Section 24 of the Constitution therefore requires that development be conducted in such a manner that it does not infringe on an individual's environmental rights, health, or well-being. This is especially significant for previously disadvantaged individuals who are most at risk to environmental impacts. The undertaking of an EIA process for the proposed project in terms of the requirements of the EIA Regulations, 2014 (as amended) aims to minimise any impacts on the natural and social environment.
National Environmental Management Act (No. 107 of 1998) (NEMA)	The NEMA is South Africa's key piece of environmental legislation and sets the framework for environmental management in South Africa. The NEMA is founded on the principle that everyone has the right to an environment that is not harmful to their health or well-being as contained within the Bill of Rights.

Relevant legislation or policy	Relevance to Limestone PV1 Solar Energy Facility
	The national environmental management principles state that the social, economic, and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed, and evaluated, and decisions must be appropriate in the light of such consideration and assessment. The need for responsible and informed decision-making by government on the acceptability of environmental impacts is therefore enshrined within the NEMA.
National Energy Act (No. 34 of 2008)	The purpose of the National Energy Act (No. 34 of 2008) is to ensure that diverse energy resources are available, in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, while taking environmental management requirements into account. In addition, the Act also provides for energy planning, and increased generation and consumption of Renewable Energies (REs). The Act provides the legal framework which supports the development of RE facilities for the greater environmental and social good and provides the backdrop against which South Africa's strategic planning regarding future electricity provision and supply takes place.
White Paper on the Energy Policy of the Republic of South Africa (1998)	The White Paper on Energy Policy places emphasis on the expansion of energy supply options to enhance South Africa's energy security. This can be achieved through increased use of renewable energy and encouraging new entries into the generation market. The policy states that the advantages of renewable energy include, minimal environmental impacts during operation in comparison with traditional supply technologies, generally lower running costs, and high labour intensities. Disadvantages include higher capital costs in some cases, lower energy densities, and lower levels of availability, depending on specific conditions, especially with sun and wind-based systems. Nonetheless, renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future.
White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)	The White Paper on Renewable Energy Policy supplements Government's predominant policy on energy as set out in the White Paper on the Energy Policy of the Republic of South Africa (DME, 1998). The policy recognises the potential of renewable energy and aims to create the necessary conditions for the development and commercial implementation of renewable energy technologies. The White Paper on Renewable Energy sets out Government's vision, policy principles, strategic goals, and objectives for promoting and implementing renewable energy in South Africa. The country relies heavily on coal to meet its energy needs due to its abundant, and fairly accessible and affordable coal resources. However, massive renewable energy resources that can be sustainable alternatives to fossil fuels, have so far remained largely untapped. The development of additional renewable energy projects will promote the use of the abundant South African renewable energy resources and contribute to long-term energy security and diversification of the energy mix.
The Electricity Regulation Act (No. of 2006)	The Electricity Regulation Act of 2006 replaced the Electricity Act (No. 41 of 1987), as amended, with the exception of Section 5B, which provides funds for the energy regulator for the purpose of regulating the electricity industry. The Act establishes a

Relevant legislation or policy	Relevance to Limestone PV1 Solar Energy Facility
	national regulatory framework for the electricity supply industry and introduces the National Energy Regulator (NERSA) as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licences and registration as the manner in which the generation, transmission, distribution, trading, and import and export of electricity are regulated.
National Development Plan 2030	The National Development Plan (NDP) 2030 is a plan prepared by the National Planning Commission in consultation with the South African public which is aimed at eliminating poverty and reducing inequality by 2030. In terms of the Energy Sector's role in empowering South Africa, the NDP envisages that, by 2030, South Africa will have an energy sector that promotes: » Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation. » Social equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households. » Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change. In formulating its vision for the energy sector, the NDP took the IRP 2010 as its point of departure. Therefore, although electricity generation from coal is still seen as part of the energy mix within the NDP, the plan sets out steps that aim to ensure that, by 2030, South Africa's energy system will look very different to the current situation: coal will contribute proportionately less to primary-energy needs, while gas and renewable energy resources – especially wind, solar, and imported hydroelectricity – will play a much larger role. The NDP aims to provide a supportive environment for growth and development, while promoting a more labour-absorbing economy. The development of Limestone PV1 Solar Energy Facility supports the NDP through the development of energy-generating infrastructure which will not lead to the generation of GHGs and will result in economic development and growth of the area surrounding the development area.
Integrated Energy Plan (IEP), November 2016	The purpose and objectives of the Integrated Energy Plan (IEP) are derived from the National Energy Act (No. 34 of 2008). The IEP takes into consideration the crucial role that energy plays in the entire economy of the country and is informed by the output of analyses founded on a solid fact base. It is a multi-faceted, long-term energy framework which has multiple aims, some of which include: » To guide the development of energy policies and, where relevant, set the framework for regulations in the energy sector. » To guide the selection of appropriate technologies to meet energy demand (i.e., the types and sizes of new power plants and refineries to be built and the prices that should be charged for fuels). » To guide investment in and the development of energy infrastructure in South Africa. » To propose alternative energy strategies which are informed by testing the potential impacts of various factors such as proposed policies, introduction of new technologies, and effects of exogenous macro-economic factors.

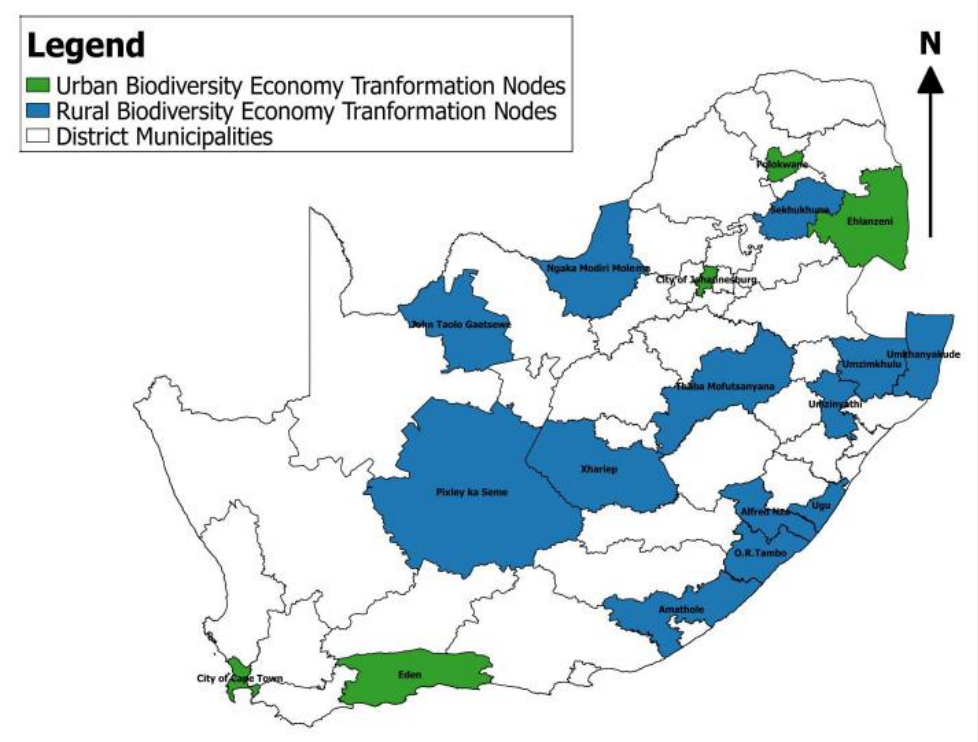
Relevant legislation or policy	Relevance to Limestone PV1 Solar Energy Facility
	A draft version of the IEP was released for comment on 25 November 2016. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development. The development of the IEP is an ongoing continuous process. It is reviewed periodically to take into account changes in the macroeconomic environment, developments in new technologies and changes in national priorities and imperatives, amongst others. The 8 key objectives of the integrated energy planning process are as follows: » Objective 1: Ensure security of supply. » Objective 2: Minimise the cost of energy. » Objective 3: Promote the creation of jobs and localisation. » Objective 4: Minimise negative environmental impacts from the energy sector. » Objective 5: Promote the conservation of water. » Objective 6: Diversify supply sources and primary sources of energy. » Objective 7: Promote energy efficiency in the economy. » Objective 8: Increase access to modern energy.
Integrated Resource Plan for Electricity (IRP) 2010-2030	The Integrated Resource Plan (IRP) for Electricity 2010 – 2030 is a subset of the IEP and constitutes South Africa's National electricity plan. The primary objective of the IRP is to determine the long-term electricity demand and detail how this demand should be met in terms of generating capacity, type, timing, and cost. The IRP also serves as input to other planning functions, including amongst others, economic development and funding, and environmental and social policy formulation. The promulgated IRP 2010–2030 identified the preferred generation technology required to meet expected demand growth up to 2030. It incorporated government objectives such as affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources, localisation and regional development. The need for a Just Transition to a sustainable, low carbon and equitable energy system is also recognised. Following the promulgation of the IRP 2010–2030, implementation followed in line with Ministerial Determinations issued under Section 34 of the Electricity Regulation (Act No. 4) of 2006. The Ministerial Determinations give effect to planned infrastructure by facilitating the procurement of the required electricity capacity. According to the IPP Procurement Programme overview report (2021), as at 31 March 2021, a total of 6 422MW has been procured under the REIPPP Programme from 112 IPPs in seven bid rounds, with 5 078MW being currently operational and made available to the grid. IPPs have commissioned 1005MW from two (2) Open Cycle Gas Turbines (OCGT) peaking plants. Under the Eskom Build Programme, 1 332MW has been procured from the Ingula Pumped Storage Project, 1 588MW and 800MW from the Medupi and Kusile power stations and 100MW from the Sere Wind Farm. Provision has been made for the following new capacity by 2030: » 1 500MW of coal » 2 500MW of hydro » 6 000MW of solar PV

Relevant legislation or policy	Relevance to Limestone PV1 Solar Energy Facility
	» 14 400MW of wind » 1 860MW of nuclear » 2 088MW of storage » 3 000MW of gas/diesel » 4 000MW from other distributed generation, co-generation, biomass and landfill technologies Based on the IRP 2019, 6 000MW has been allocated for solar PV facilities from 2022 to 2030. Therefore, the development of the Limestone PV1 Solar Energy Facility is supported by the IRP 2019.
New Growth Path (NGP) Framework, 23 November 2010	The purpose of the New Growth Path (NGP) Framework is to provide effective strategies towards accelerated job-creation through the development of an equitable economy and sustained growth. The target of the NGP is to create 5 million jobs by 2020; with economic growth and employment creation as the key indicators identified in the NGP. The framework seeks to identify key structural changes in the economy that can improve performance in terms of labour absorption and the composition and rate of growth. To achieve this, government will seek to, amongst other things, identify key areas for large-scale employment creation, as a result of changes in conditions in South Africa and globally, and to develop a policy package to facilitate employment creation in these areas.
National Climate Change Bill, 2018	On 08 June 2018, the Minister of Environmental Affairs published the National Climate Change Bill ("the Bill") for public comment. The Bill provides a framework for climate change regulation in South Africa aimed at governing South Africa's sustainable transition to a climate resilient, low carbon economy and society. The Bill provides a procedural outline that will be developed through the creation of frameworks and plans. Limestone PV1 Solar Energy Facility is a renewable energy generation facility and would not result in the generation or release of emissions during its operation.
National Climate Change Response Policy, 2011	South Africa's National Climate Change Response Policy (NCCRP) establishes South Africa's approach to addressing climate change, including adaptation and mitigation responses. The NCCRP formalises Government's vision for a transition to a low carbon economy, through the adoption of the 'Peak, Plateau and Decline' (PPD) GHG emissions trajectory whereby South Africa's emissions should peak between 2020 and 2025, plateau for approximately a decade, and then decline in absolute terms thereafter, and based on this, the country has pledged to reduce emissions by 34% and 42% below Business As Usual (BAU) emissions in 2020 and 2025, respectively. As an integral part of the policy, a set of near-term priority flagship programmes will be implemented to address the challenges of climate change, one of which includes the Renewable Energy Flagship Programme. This flagship programme includes a scaled-up renewable energy programme, based on the current programme specified in the IRP 2010, and using the evolving South African Renewables Initiative led by the Department of Public Enterprise and Department of Trade and Industry (DTI), as a driver for the deployment of renewable energy technologies. The programme will be informed by enhanced domestic manufacturing potential and the implementation of energy efficiency and renewable energy plans by local government. The development of the Limestone PV1 Solar Energy Facility is aligned with the

Relevant legislation or policy	Relevance to Limestone PV1 Solar Energy Facility
	Renewable Energy Flagship Programme identified under South Africa's NCCRP and could therefore be argued to be aligned with the country's approach to addressing climate change.
National Climate Change Response Strategy for South Africa, 2004	The need for a national climate change policy for South Africa was identified as an urgent requirement during the preparations for the ratification of the UNFCCC in 1997. A process to develop such a policy was thus instituted under the auspices of the National Committee for Climate Change (NCCC), a non-statutory stakeholder body set up in 1994 to advise the Minister on climate change issues and chaired by the then Department of Environmental Affairs and Tourism (DEAT). It was determined that a national climate change response strategy will promote integration between the programmes of the various government departments involved to maximise the benefits to the country as a whole, while minimising negative impacts. Further, as climate change response actions can potentially act as a significant factor in boosting sustainable economic and social development, a national strategy specifically designed to bring this about is clearly in the national interest, supporting the major objectives of the government, including poverty alleviation and the creation of jobs. A number of principles and factors guided the conception of the strategy and are required to be implemented. These are: » Ensuring that the strategy is consistent with national priorities, including poverty alleviation, access to basic amenities including infrastructure development, job creation, rural development, foreign investment, human resource development and improved health, leading to sustainable economic growth. » Ensuring alignment with the need to consistently use locally available resources. » Ensuring compliance with international obligations. » Recognizing that climate change is a cross cutting issue that demands integration across the work programmes of other departments and stakeholders, and across many sectors of industry, business, and the community. » Focussing on those areas that promote sustainable development. » Promoting programmes that will build capacity, raise awareness, and improve education in climate change issues. » Encouraging programmes that will harness existing national technological competencies. » Reviewing the strategy constantly in the light of national priorities and international trends. » Recognizing that South Africa's emissions will continue to increase as development is realised. The strategy was devised through an integrated approach and considers policies and programmes of other government departments and the fact that South Africa is a developing country. This will ensure that the principles of sustainable development are adequately served and do not conflict with existing development policies.
Strategic Integrated Projects (SIPs)	The Presidential Infrastructure Coordinating Committee (PICC) is integrating and phasing investment plans across 18 Strategic Infrastructure Projects (SIPs) which have five core functions: to unlock opportunity, transform the economic landscape, create new jobs, strengthen the delivery of basic services, and support the integration of African economies. A balanced approach is being fostered through greening of the economy, boosting energy security, promoting integrated municipal infrastructure investment, facilitating integrated urban development, accelerating skills

Relevant legislation or policy	Relevance to Limestone PV1 Solar Energy Facility
	development, investing in rural development, and enabling regional integration. SIP 8 and 9 of the energy SIPs supports the development of the solar energy facility: » SIP 8: Green energy in support of the South African economy: Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010 – 2030) and supports bio-fuel production facilities. » SIP 9: Electricity generation to support socio-economic development: The proposed Limestone PV1 Solar Energy Facility is a potential SIP 9 Project as electricity will be generated and social and economic upliftment, development and growth will take place within the surrounding communities. It would become a SIP 9 project if selected as a Preferred Bidder project by the Department Mineral Resources and Energy. SIP 9 supports the acceleration of the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances. The Limestone PV1 Solar Energy Facility could be registered as a SIP project once it is selected as a Preferred Bidder project and is under development. The project would then contribute to the above-mentioned SIPs.
National Biodiversity Economy Strategy (NBES) (March 2016)	The biodiversity economy of South Africa encompasses the businesses and economic activities that either directly depend on biodiversity for their core business or that contribute to conservation of biodiversity through their activities. The commercial wildlife and the bioprospecting industries of South Africa provide cornerstones for the biodiversity economy and are the focus of this strategy. Both the wildlife and bioprospecting sub-sectors of the biodiversity economy have already demonstrated the potential for significant future development and growth. In the study commissioned on the situational analysis of the biodiversity economy, the contribution of the biodiversity economy to the national economy can be measured in terms of Gross Domestic Product (GDP), with the wildlife and bioprospecting industries contributing approximately R3 billion to GDP in 2013. Growth in the wildlife and bioprospecting industries can make a significant impact on the national economy, while contributing to national imperatives such as job creation, rural development and conservation of our natural resources. The Wildlife Industry value chain is centred on game and wildlife farming/ranching activities that relate to the stocking, trading, breeding, and hunting of game, and all the services and goods required to support this value chain. The key drivers of this value chain include domestic hunters, international hunters and a growing retail market demand for wildlife products such as game meat and taxidermy products. This sector is therefore characterised by an interesting combination of agriculture, eco-tourism and conservation characteristics. Over the period 2008-2013, the total Wildlife Industry market grew by more than 14% per year. This growth comprised an average annual growth exceeding 6% in domestic hunting, a decrease in international hunting, and an exponential growth in live auction sales. It is considered likely that the consolidated Wildlife Industry has the potential to experience a weighted average annual growth rate of between 4 %-14 % per year up to 2030. In order for the wildlife and bioprospecting sub-sectors of the biodiversity economy to

Relevant legislation or policy	Relevance to Limestone PV1 Solar Energy Facility
	achieve its full potential, a strategic partnership between the state, private sector and communities is required. To this end, a National Biodiversity Economy Strategy (NBES) is required to guide the sustainable growth of the wildlife and bioprospecting industries and to provide a basis for addressing constraints to growth, ensuring sustainability, identifying clear stakeholder's responsibilities and monitoring progress of the Enabling Actions. The Vision of NBES is to optimise the total economic benefits of the wildlife and bioprospecting industries through its sustainable use, in line with the Vision of the Department of Environmental Affairs. The purpose of NBES is to provide a 14-year national coordination, leadership and guidance to the development and growth of the biodiversity economy. NBES has set an industry growth goal stating that by 2030, the South African biodiversity economy will achieve an average annualised GDP growth rate of 10% per annum. This envisioned growth curve extends into the year 2030 and is aligned to the efforts of the country's National Development Plan, Vision 2030. The NBES seeks to contribute to the transformation of the biodiversity economy in South Africa through inclusive economic opportunities, reflected by a sector which is equitable - equitable access to resources, equitable and fair processes and procedures and equitable in distribution of resources (i.e. business, human, financial, indigenous species, land, water) in the market. To address these transformation NBES imperatives, NBES has the principles of: » Conservation of biodiversity and ecological infrastructure » Sustainable use of indigenous resources » Fair and equitable beneficiation » Socio-economic sustainability » Incentive driven compliance to regulation » Ethical practices » Improving quality and standards of products. The NBES provides the opportunity to redistribute South Africa's indigenous biological/ genetic resources in an equitable manner, across various income categories and settlement areas of the country. The NBES has prioritised nodes in the country for biodiversity economy transformation, referred to as BET nodes. NBES prioritises 18 BET nodes, 13 rural and 5 urban districts across the nine provinces of the country, with communities having been prioritised for development of small and medium size enterprises and community-based initiatives which sustainably use of indigenous biological and/or genetic resources. The ZF Mgcawu District municipality within which the Limestone PV1 Solar Energy Facility is proposed is not identified as a priority area.

Relevant legislation or policy	Relevance to Limestone PV1 Solar Energy Facility
	

5.5. Provincial Policy and Planning Context

A brief review of the most relevant provincial policies is provided below in **Table 5.3**. The proposed development is considered to align with the aims of these policies, even if contributions to achieving the goals therein are only minor.

Table 5.3: Relevant provincial legislation and policies for Limestone PV1 Solar Energy Facility

Relevant legislation or policy	Relevance to the Limestone PV1 Solar Energy Facility
Northern Cape Provincial Spatial Development Framework (PSDF) 2012	The Northern Cape Provincial Spatial Development Framework (PSDF) 2012 states that the overarching goal for the province is to enable sustainability through sustainable development. The province considers social and economic development as imperative in order to address the most significant challenge facing the Northern Cape, which is poverty. The PSDF identifies key sectoral strategies and plans which are considered to be the key components of the PSDF. Sectoral Strategy 19 refers to a provincial renewable energy strategy. Within the PSDF a policy has been included which states that renewable energy sources (including the utilisation of solar energy) are to comprise 25% of the province's energy generation capacity by 2020. The overall energy objective for the province also includes promoting the development of renewable energy supply schemes which are considered to be strategically important for increasing the diversity of domestic energy supply and avoiding energy imports, while also minimising the detrimental environmental impacts. The implementation of sustainable renewable energy is also to be promoted within the province through appropriate financial and fiscal instruments.

Relevant legislation or policy	Relevance to the Limestone PV1 Solar Energy Facility
	The development of Limestone PV1 Solar Energy Facility supports the overall energy objective of the province to have 25% of its electricity from renewable energy sources.
Northern Cape Provincial Spatial Development Framework (PSDF) 2018 Review - Executive Summary	The review of the Northern Cape PSDF (2018) refers to infrastructure investment and that a balance must be maintained between investments aimed at meeting the social needs of communities and investment aimed at promoting economic development and job creation. The Spatial Development Strategy identified in the PSDF for basic infrastructure includes the achieving the provision of green infrastructure which includes renewable energy. As part of the Vision 2040 of the PSDF key opportunities are identified for the Province. The strengthening of the development triangle that is formed by the linking of Kimberley, Vryburg, Upington and De Aar. The development triangle sustains a diverse economy with strong mining, agricultural and renewable energy sectors. It is stated in the PSDF that a sustainable and viable economic network must be driven within the development triangle to improve the return of public investment in the Province. The development of Limestone PV1 Solar Energy Facility will contribute to the economic network of the province specifically in terms of the renewable sector, albeit it does not fall within the development triangle.
The Northern Cape Climate Change Response Strategy	The key aspects of the Northern Cape Climate Change Response Strategy (NCCCRS) Report are summarised in the MEC's (NCPG: Environment and Nature Conservation) 2011 budget speech: "*The Provincial Climate Change Response Strategy will be underpinned by specific critical sector climate change adaptation and mitigation strategies that include the Water, Agriculture and Human Health sectors as the 3 key Adaptation Sectors, the Industry and Transport alongside the Energy sector as the 3 key Mitigation Sectors with the Disaster Management, Natural Resources and Human Society, livelihoods and Services sectors as 3 remaining key. Sectors to ensure proactive long-term responses to the frequency and intensity of extreme weather events such as flooding and wildfire, with heightened requirements for effective disaster management*". Key points from the MEC address include the NCPG's commitment to develop and implement policy in accordance with the National Green Paper for the National Climate Change Response Strategy (2010), and an acknowledgement of the Northern Cape Province's extreme vulnerability to climate-change driven desertification. The development and promotion of a provincial green economy, including green jobs, and environmental learnership is regarded as an important provincial intervention in addressing climate change. The renewable energy sector, including solar and wind energy (but also biofuels and energy from waste), is explicitly indicated as an important element of the Provincial Climate Change Response Strategy. The development of Limestone PV1 Solar Energy Facility will assist in achieving (although only to a limited extent) the promotion of the provincial green economy of the Northern Cape.

5.6. Local Policy and Planning Context

The local tiers of government relevant to the Limestone PV1 Solar Energy Facility is the Kgatelopele Local Municipality which falls within the ZF Mgcawu District Municipality. Instruments and/or policies at both the district and local level contain objectives which align with the development of Limestone PV1 Solar Energy Facility. These include, economic growth, job creation, community upliftment and poverty alleviation.

Table 5.4: Relevant local legislation and policies for Limestone PV1 Solar Energy Facility

<table>
<tr><th>Relevant policy</th><th>Relevance to Limestone PV1 Solar Energy Facility</th></tr>
<tr><td>ZF Mgcawu District Municipality IDP 2021</td><td>The vision for the ZF Mgcawu District Municipality as contained within its IDP 2017 – 2022 (2020 / 2021) is as follows:

“Quality support to deliver quality services.”

The mission of the ZF Mgcawu DM is:

“Centre of excellence in providing quality basic services through support to local municipalities.”

The following strategic objectives and development objectives have been identified for the ZF Mgcawu DM:

<table>
<tr><th>Strategic Objective</th><th>Development Objective</th></tr>
<tr><td rowspan="2">(i) To monitor and determine the housing backlogs in the district as well as to eradicate sanitation & infrastructure backlogs</td><td>01. Maintain and report on the housing requirements</td></tr>
<tr><td>02. Provide project management support to B-Municipalities</td></tr>
<tr><td rowspan="3">(ii) To assess and provide targeted support improving institutional capacity and service delivery capabilities of category B-municipalities</td><td>03. Assess and report on the institutional capacity of B-municipalities to fulfill their statutory mandates</td></tr>
<tr><td>04. Assess and report on the service delivery capabilities of B-municipalities to fulfill their statutory mandates</td></tr>
<tr><td>05. Provide targeted support to B-municipalities (e.g. including legal support to B-municipalities regarding land use matters)</td></tr>
<tr><td rowspan="2">(iii) To promote environmental health and safety of communities in the ZF Mgcawu District through the proactive prevention, mitigation, identification and management of environmental health services, fire and disaster risks</td><td>06. Providing environmental health services to B-municipalities</td></tr>
<tr><td>07. Implement special programmes (e.g. HIV /Aids)</td></tr>
<tr><td>(iv) To promote safety of communities in the ZF Mgcawu District through the proactive prevention, mitigation,</td><td>08. Establish disaster management mechanisms and programmes in the ZF Mgcawu District</td></tr>
</table>
</td></tr>
</table>

	identification and management of fire and disaster risks	
	(v) To Facilitate the Development of Sustainable regional land use, economic, spatial and environmental planning frameworks that will support and guide the development of a diversified, resilient and sustainable district economy	09. Establish a vehicle to ensure all businesses are co-operating (i.e. District LED Forum)
		10. Create investment opportunities in sectoral development (i.e. investment activities; Entrepreneurial business support programme)
		11. Enable an environment for business establishment and support initiatives (i.e. Increase the number of businesses; entrepreneurial support)
	(v) To market, develop and co-ordinate tourism in the ZF Mgcawu District	12. Promote the Green Kalahari tourism brand in the ZF Mgcawu district
	(vi) To assess and monitor the status of infrastructure needs and requirements of B Municipalities	13. Establish and provide selected infrastructure needs to targeted B Municipalities
	(vii) To ensure efficient business operations and to fulfils the assurance statutory requirements of the ZF Mgcawu District Municipality	14. Enable and improve financial viability and management through well structured budget processes, financial systems, and MFMA compliance (i.e. promote good budget and fiscal management; Unqualified audits)
		15. Enable efficient and effective administrative support and Planning processes (i.e. Maintaining sound labour relations, practices and overall administrative support, IDP planning etc.
	The implementation of Limestone PV1 Solar Energy Facility would contribute positively towards the strategic objective of supporting and guiding the development of a diversified, resilient and sustainable district economy, and the development objectives of creating investment opportunities in sectoral development (i.e. investment activities; Entrepreneurial business support programme), and enabling an environment for business establishment and support initiatives (i.e. Increase the number of businesses; entrepreneurial support) through its local content and local economic development requirements as prescribed under the REIPPP Programme.	
Kgatelopele Local Municipality Integrated Development Plan Review for 2018 – 2019.	The Kgatelopele Local Municipality Integrated Development Plan for 2018 – 2019 (further referred to as the Plan) is a strategic document that outlines the community's development objectives. It also includes a policy framework which guides management in the decision-making process of the financial planning for the municipal area. This Local Municipality according to the Plan is committed to strengthening and extending the public participation in its work. The Plan identifies six performance areas, which have to be aligned to the strategic objectives of the municipal area. The first key performance area identified below, is the area, which relates to the proposed Life SPP. The six (6) key performance areas (KPA) are:	

	» KPA 1: Basic Services This KPA refers to the physical infrastructure and energy efficiency to ensure efficient infrastructure and energy supply that will contribute to the improvement of quality of life for all citizens of the Kgatelopele local municipality. » KPA 2: Spatial consideration/ Environment KPA 2 refers to Special planning and land use management and has been proposed as a tool to effect spatial transformation » KPA 3: Economic Growth and development KPA 3 refers to Economic Growth and Development to facilitate sustainable economic empowerments for all communities within the Kgatelopele local municipality and enabling a viable and conducive economic environment through the development of related initiatives including job creation and skills development. » KPA 4: Financial Sustainability This KPA refers to financial sustainability to ensure the financial sustainability of the municipality to adhere to statutory requirements. » KPA 5: Institutional transformation. This KPA refers to institutional transformation to provide an effective and efficient workforce by aligning our institutional arrangements to our overall strategy in order to deliver quality services. » KPA 6: Good Governance and Public Participation KPA 5 refers to governance and stakeholder participation to promote proper governance and public participation. » KPA 6: Spatial Development This KPA gives direction for the municipality in terms of its land use and its potential and direction for growth.

CHAPTER 6: NEED AND DESIRABILITY

Appendix 2 of the 2014 EIA Regulations (GNR 326) requires that a Scoping Report includes a motivation for the need and desirability of the proposed development, including the need and desirability of the activity in the context of the preferred location. The need and desirability of the development needs to consider whether it is the right time and the right place for locating the type of land-use/activity being proposed. The need and desirability of a proposed development is, therefore, associated with the Informed use of land, and should be able to respond to questions such as, but not limited to, what the most sustainable use of the land may be.

This Chapter provides an overview of the need and desirability, and perceived benefits of the project specifically.

6.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Scoping Report

This chapter includes the following information required in terms of Appendix 2: Content of a Scoping Report:

Requirement	Relevant Section
3(1)(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	The need and desirability for the development of the Limestone PV1 Solar Energy Facility is included and discussed as a whole within this chapter. The need and desirability for the development of the solar energy facility has been considered from an international, national, regional, and site-specific perspective.

6.2. Need and Desirability from an International Perspective

The need and desirability of the Limestone PV1 Solar Energy Facility, from an international perspective, can be described through the project's alignment with internationally recognised and adopted agreements, protocols, and conventions. South Africa is a signatory to a number of international treaties and initiatives, including the United Nation's Development Programme's (UNDP's) Sustainable Development Goals (SDGs). The SDGs address global socio-economic challenges such as poverty, hunger, health, education, climate change, gender equality, water, sanitation, energy, urbanisation, environment, and social justice. The SDGs consist of 17 global goals set by the United Nations. The 17 SDGs are characterised by 169 targets, and 304 indicators.

Goal 7 of the SDGs relates to "Affordable and Clean Energy", with the aim of the goal being to ensure access to affordable, reliable, sustainable, and modern energy for all. The following targets and indicators have been set for Goal 7:

Targets	Indicators
7.1 By 2030, ensure universal access to affordable, reliable and modern energy services.	7.1.1 Proportion of population with access to electricity. 7.1.2 Proportion of population with primary reliance on clean fuels and technology.

Targets		Indicators	
7.2	By 2030, increase substantially the share of renewable energy in the global energy mix.	7.2.1	Renewable energy share in the total final energy consumption.
7.3	By 2030, double the global rate of improvement in energy efficiency.	7.3.1	Energy intensity measured in terms of primary energy and GDP.
7.A	By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology.	7.A.1	Mobilised amount of United States dollars per year starting in 2020 accountable towards the $100 billion commitment.
7.B	By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support.	7.B.1	Investments in energy efficiency as a percentage of GDP and the amount of foreign direct investment in financial transfer for infrastructure and technology to sustainable development services.

The development of the Limestone PV1 Solar Energy Facility would contribute positively towards Goal 7 (and specifically 7.2.1) of the SDGs through the following means:

- By generating up to 150MWp (contracted capacity) of affordable and clean energy.
  - A study published by the CSIR on 14 October 2016 ("Cost of new power generators in South Africa Comparative analysis based on recent Independent Power Producer (IPP) announcements", Dr Tobias Bischof-Niemz and Ruan Fourie) which took into consideration the results of the cost prices bid successfully under the Department of Mineral Resources and Energy's Renewable Energy (RE) IPP and Coal Baseload IPP Procurement Programmes, found that solar PV and wind were 40% cheaper than new baseload coal (i.e. R0.62/kWh for PV and wind vs R1.03 for coal).
  - Solar power technology is one of the cleanest electricity generation technologies, as it does not result in the release of emissions during its operation.
- By contributing towards South Africa's total generation capacity, specifically through the utilisation of renewable energy resources.

The Kyoto Protocol (1997) is also relevant to the need for the development of the Limestone PV1 Solar Energy Facility from an international perspective. The protocol calls for the reduction of South Africa's greenhouse gas emissions through actively cutting down on using fossil fuels, or by utilising more renewable resources. The development of the Limestone PV1 Solar Energy Facility will add capacity to the renewable energy sector of the country and strengthen the commitment and action plan to achieve the requirements, as set out in the protocol, through the generation of energy without the emission of greenhouse gasses.

6.3. Need and Desirability from a National Perspective

The National Development Plan (NDP) envisages that, by 2030, South Africa will have an energy sector that provides reliable and efficient energy service at competitive rates; that is socially equitable through expanded access to energy at affordable tariffs; and that is environmentally sustainable through reduced emissions and pollution. Historically, coal has provided the primary fuel resource for baseload electricity

generation in South Africa. Consequently, Eskom, who is the main electricity generating company in the country, generates approximately 85% of the country's electricity from coal resources (Stats SA, 2016), resulting in a large carbon footprint. Taking into consideration the need to ensure adequate supply of electricity and meet international obligations in terms of addressing climate change, Government has identified the need to diversify the energy mix within the country.

The Limestone PV1 Solar Energy Facility is proposed in specific response to a National Government initiative, the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), or a similar programme. This programme was initiated in order to give effect to the requirements of the IRP with regards to renewable energy targets. As a result, the need and desirability of the Limestone PV1 Solar Energy Facility from a national perspective can largely be linked from the project's alignment with national government policies, plans, and programmes which have relevance to energy planning and production (as discussed in detail in **Chapter 5**). The following key plans have been developed by National Government to consider South Africa's current energy production, projected future demands, and provides the necessary framework within which energy generation projects can be developed:

» Integrated Energy Plan (IEP)
» Integrated Resource Plan (IRP)

The above-mentioned energy plans have been extensively researched and are updated on an on-going basis to take into consideration changing scenarios, new information, developments in new technologies, and to reflect updated demands and requirements for energy production within the South African context. These plans form the basis of South Africa's energy generation sector and dictate national priorities for energy production.

The IEP is intended to provide a roadmap of South Africa's future energy landscape and guide future energy infrastructure investments and policy development. The Plan considered the three pillars of sustainable development, and list the following as the eight key energy planning objectives:

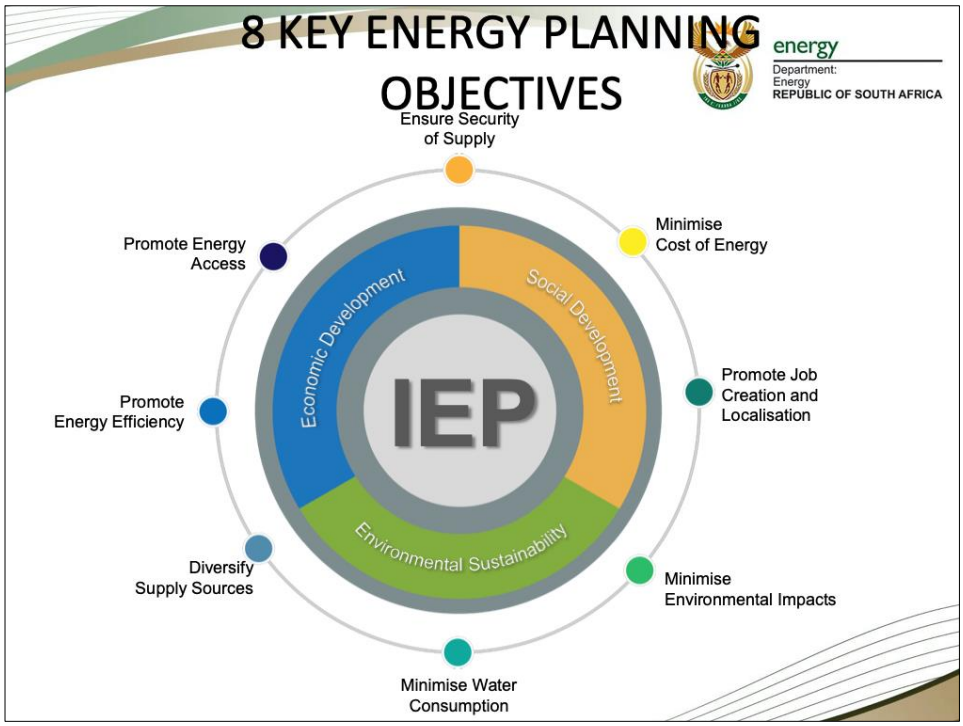


Figure 6.1: Eight key energy objectives as listed in the IEP, 2016 (extract from DOE presentation, December 2016)

In terms of electricity generation, the IEP states that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources, and includes the following statement regarding solar energy's contribution to the diversified energy mix:

- *Solar should play a much more significant role in the electricity generation mix than it has done historically and constitutes the greatest share of primary energy (in terms of total installed capacity) by 2050. The contribution of solar in the energy mix comprises both CSP and solar PV. Solar PV includes large scale installations for power generation which supply to the grid and individual, off-grid solar home systems and rooftop panels.*
- *Several interventions which could enhance the future solar energy landscape are recommended as follows: – Large scale CSP projects with proven thermal storage technologies and hybridisation / industrial steam application projects should be incentivised in the short to medium term. In the long term, the existing incentives could be extended to promote locally developed CSP technology storage solutions and large-scale solar fuel projects.*
- *A thorough solar resource assessment for South Africa should continue to be undertaken in the Northern Cape Province and extended to other provinces deemed to have high solar radiation levels.*
- *Investments should be made to upgrade the grid in order to accommodate increasing solar and other renewable energy contributions.*

The IRP for Electricity 2010 – 2030 (gazetted in 2019) is a subset of the IEP and constitutes South Africa's current gazetted energy plan. The purpose of the plan is to ensure sustainable electricity development which takes into consideration technical, economic, and social constraints, and identifies investments in the electricity sector which are required to meet the country's forecasted electricity demands at minimum costs. This plan provides for the development of 8288MW of capacity from Solar Photovoltaic energy facilities by 2030, with an annual contribution of 1000MW from 2022.

A number of IPP Procurement Programmes have been initiated to secure electricity generated from a range of resources from the private sector (i.e., from Independent Power Producers, or IPPs). Under these Programmes, IPPs are invited to submit proposals for the finance, construction, operation, and maintenance of electricity generation facilities for the purpose of entering into an Implementation Agreement with the DMRE and a Power Purchase Agreement (PPA) with Eskom as the buyer. Provision has been made for new additional capacities in the IRP 2019 (refer to **Figure 6.2**).

	Coal	Cost (Decommissioning)	Nuclear	Hydro	Storage	PV	Wind	CSP	GAS/ Diesel	Other (Distributed Generation, Cogeri, Biomass, Landfill
Current	31715		1860	2100	2912	1474	1980	300	3830	499
2019	2155	-2372	-	-	-	-	244	300	-	Allocation to the intent of the short term capacity and energy gap
2020	1433	-557	-	-	-	114	300	-	-	
2021	1433	-1403	-	-	-	300	818	-	-	
2022	755	-344	-	-	513	400 1000	1600	-	-	
2023	750	-555	-	-	-	1000	1600	-	-	500
2024	1 000	-	1660	-	-	-	1600	-	1000	500
2025	7 000	-	-	-	-	1000	1600	-	-	500
2026	-	-1734	-	-	-	-	1600	-	-	500
2027	750	-547	-	-	-	-	1600	-	2000	500
2028	-	-475	-	-	-	1000	1600	-	-	500
2029	-	-1654	-	-	1575	1000	1600	-	-	500
2030	-	-1656	-	1500	-	1000	1600	-	-	500
Total Installed Capacity by 2030 (MW)	33164		1660	4600	5000	8288	17742	600	6380	-
% Total Installed Capacity (% of MW)	43		2.36	5.84	6.35	10.52	22.53	0.76	8.1	-
% Annual Energy Contribution (% of MWh)	58.3		4.5	0.3	1.2	6.3	17.8	0.6	1.3	-

Figure 6.2: A snapshot of the updated Energy Mix as per the IRP 2019

Renewable resources are valuable in contributing towards electricity generation and diversifying South Africa's electricity mix, while contributing towards South Africa's response to Climate Change. Under the REIPPPP, the DMRE intends to secure 14 725MW of electricity from renewable energy generation facilities utilising either onshore wind, concentrated solar thermal, solar photovoltaic (PV), biomass, biogas, landfill gas, or hydro across a number of bidding windows, while simultaneously contributing towards socio-economic development. A total of 1 980MW[6] of wind generated electricity has been awarded to

[6]https://www.cliffedekkerhofmeyr.com/en/news/publications/2019/Corporate/energy-alert-22-october-The-Integrated-Resource-Plan-2019-A-promising-future-roadmap-for-generation-capacity-in-South-Africa.html

preferred bidders across six (6) rounds of bidding to date, with 1 362MW still remaining to be allocated in subsequent bidding rounds. Preferred bidders identified under any IPP Procurement Programme, including the REIPPPP, are required to satisfy a number of economic development requirements, including amongst others, job creation, local content, skills development, enterprise and supplier development, and socio-economic development. In addition to electricity generation and supply, IPP Procurement Programmes also contribute positively towards socio-economic development of a region, over and above job creation.

In addition to the policy considerations detailed above, Government has prioritised post COVID-19 turnaround plans in terms of renewable energies within the Just Energy Transition (JET), coupled with key development objectives of the various spheres of government. Eskom's JET Office was established in 2020 with a vision of achieving "Net Zero" carbon emissions by 2050, with an increase in sustainable jobs. Some of the additional benefits of moving towards lower carbon technologies, is the positive impact on air quality and water usage, the potential to create new exciting jobs, and a greater preservation of biodiversity in South Africa.

These policies share the same ideals, such as:

» The utilisation, application and investment in renewable energy resources in South Africa is considered to be an essential means of reducing the carbon footprint of the country,
» Diversifying the national economy,
» Reducing poverty, and
» Providing critical additional energy to that of Eskom.

Eskom's Transmission Development Plan (TDP) is a development plan produced annually by Eskom Transmission detailing how the network will develop in the next 10 years. The 2022-2031 TDP projects that renewable generation will reach 32 098MW by 2031, with wind generation expected to contribute 19 348 MW.

Government has compiled an Economic Reconstruction and Recovery Plan which was presented to Parliament in October 2020. According to this plan, the economic survey will rely on a massive investment in infrastructure, including energy, telecommunications, ports and rail. The core elements of the Economic Reconstruction and Recovery Plan are as follows:

1. Priority interventions for economic recovery: the plan sets out eight priority interventions that will ignite South Africa's recovery and reconstruction effort. These are the flagship initiatives that all of society will rally around to build a new economy (**Figure 6.3**).
2. Enabling conditions for growth: these are growth-enhancing reforms and other preconditions for an inclusive, competitive and growing economy.
3. Macroeconomic framework: economic reconstruction and recovery requires careful mobilisation of resources to ensure fiscal sustainability.
4. Institutional arrangements: the plan focuses on execution and is supported by enhanced institutional arrangements to ensure implementation and accountability.

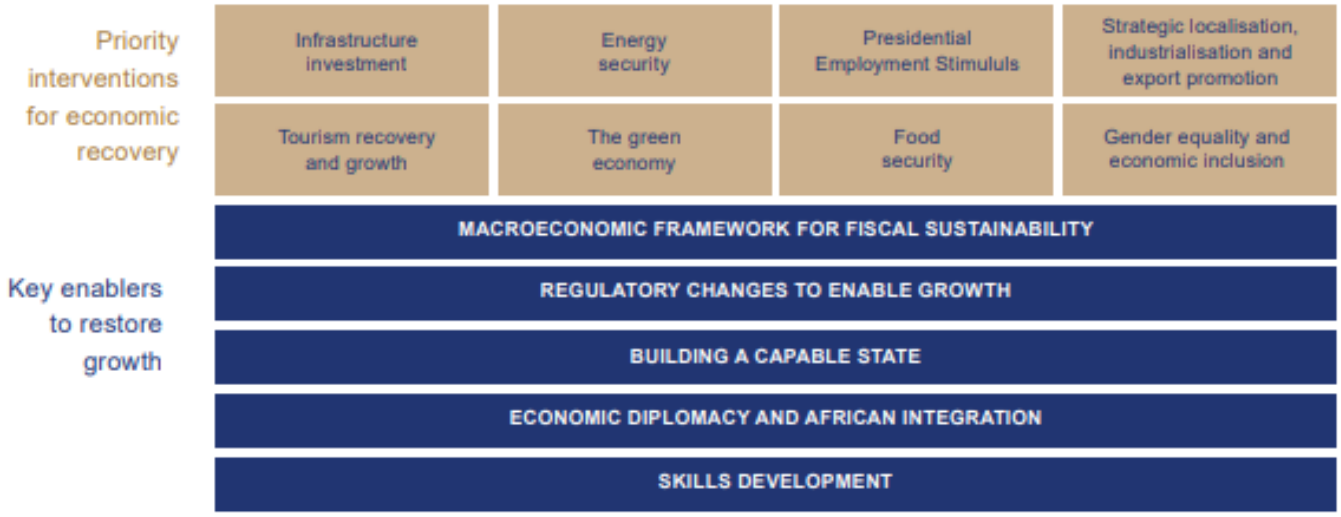


Figure 6.3: Core elements of the Economic Reconstruction and Recovery Plan (source: Building a new economy - Highlights of the Reconstruction and Recovery Plan, Presidency of the Republic of South Africa)

The plan recognises energy security as the most important prerequisite for the recovery agenda and states that renewed investment in a diversified energy mix can be achieved within a short time horizon, while alleviating a crippling energy crisis and facilitating a necessary transition to a less carbon-intensive economy. One of the key commitments of the plan is therefore to implement the IRP 2019 without delay to provide a substantial increase in the contribution of renewable energy sources by 2030, alongside other sources including battery storage, gas and clean coal. The transition to green energy is recognised as contributing towards the realisation of the low-carbon, climate-resilient and inclusive economy envisaged by the National Development Plan. The development of the Limestone PV1 Solar Energy Facility is identified as a mechanism for securing additional power generation capacity for input to the national grid, reducing the reliance for electricity on Eskom.

The South African government has identified the green economy as one of 12 job drivers that could help contribute to creating 460 000 additional jobs by 2025. The New Growth Path, in which the sectoral jobs targets are disaggregated, envisages that as many as 300 000 new direct jobs could be created in the areas of natural resource management and renewable energy construction (Department of Energy, 2019). Whilst the project is currently being considered as forming part of the REIPPP programme, the Applicant will implement similar social and economic development strategies, including amongst others, job creation, local content, skills development, enterprise and supplier development, and socio-economic development. In addition to electricity generation and supply the project will therefore also contribute positively towards socio-economic development of a region, over and above job creation.

The need for new power generation from solar energy facilities has been identified and assessed by government at a national scale considering the national energy requirements as well as international commitments under the Paris Agreement; therefore, provision has been made for the inclusion of new solar power generation capacity in South Africa's energy mix. The implementation of the Limestone PV1 Solar Energy Facility has the potential to contribute positively towards the identified need, while simultaneously contributing to job creation and socio-economic development, identified as a need for the country within the National Development Plan (NDP).

Limestone PV1 Solar Energy Facility will make use of renewable energy technology and would contribute positively towards reducing South Africa's GHG emissions and ensure compliance with all applicable legislation and permitting requirements. In addition, by making use of PV technology, Limestone PV1 Solar Energy Facility would have reduced water requirements when compared with some other generation technologies in alignment with one of the vision 2030 themes of the Department of Water and Sanitation's National Water Resource Strategy 2 (2013) (i.e., transitioning to a low carbon economy through stimulating renewable energy and retrofitting buildings).

6.3.1. Benefits of Renewable Energy and the Need and Desirability in the South African Environment

The generation of electricity from renewable energy resources offers a range of potential socio-economic and environmental benefits for South Africa. These benefits include:

Socio-economic upliftment of local communities: The Limestone PV1 Solar Energy Facility has the potential to create much needed employment for unskilled locals during the construction phase. Training opportunities will also be afforded to qualified local people who can be upskilled to undertake certain roles during the construction and operation phases. Some of the challenges facing the Local and District municipalities, as detailed in the IDPs include High rates of unemployment, high levels of poverty, and low levels of development despite the strategic local in terms of the national transport corridors. The Local and District municipalities are therefore in need to economic development, sustainable employment opportunities and growth in personal income levels. A study undertaken by the DMRE, National Treasury and the Development Bank of Southern Africa (DBSA) in June 2017 found that employment opportunities created during the construction phase of renewable energy projects implemented to date had created 40% more jobs for South African citizens than anticipated. The study also found that significantly more people from local communities were employed during construction than was initially planned, confirming the potential benefits for local communities associated with the implementation of renewable energy projects.

Since inception of the REIPPPP in 2011, approximately 63 291 job years for South African citizens to date have been created.

Limestone PV1 Solar Energy Facility also has the potential to make a positive contribution towards the identified community needs. In terms of the economic development requirements of the REIPPPP, the project will commit benefits to the local community in the form of job creation, localisation, and community ownership. In accordance with the DMRE's bidding requirements of the REIPPPP, a percentage of the revenue generated per annum during operation will be made available to local communities through a social beneficiation scheme. Therefore, the potential for creation of employment and business opportunities, and the opportunity for skills development for local communities is significant. Secondary social benefits can be expected in terms of additional spend in nearby towns due to the increased demand for goods and services. These socio-economic benefits would include an increase in the standard of living for local residents within the area as well as overall financial and economic upliftment.

Increased energy security: Given that renewables can often be deployed in a short timeframe and in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality in the short-term, while reducing expensive distribution losses. According to CSIR's power sector statistics, South Africa experienced loadshedding for 1 900 hours in the first 3 quarters of 2022, making it the most intensive loadshedding year. More loadshedding was recorded in September 2022

than for the entirety of 2020. The contribution of renewable energy technologies (wind, solar PV and CSP) increased in 2022 to a total of 6.2 GW installed capacity and provided 6.5% of the total energy mix.

Resource saving: It is estimated that the achievement of the targets in the Renewable Energy White Paper will result in water savings of approximately 16.5 million kilolitres per annum. As an already water-stressed nation, it is critical that South Africa engages in a variety of water conservation measures, particularly due to the detrimental effects of climate change on water availability. Renewable energy also translates into revenue savings, as fuel for renewable energy facilities is free, while compared to the continual purchase of fuel for conventional power stations.

According to the IPP Procurement Programme overview report dated 31 December 2021, water savings of 85.3 million kilolitres has been realised by the programme from inception to the date of this publication, of which 5.2 million kilolitres were from reporting quarter 3 of 2021.

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

According to the IPP Procurement Programme overview report, as of 31 December 2021, the REIPPPP had made the following significant impacts in terms of energy supply:

- 6 323 MW of electricity had been procured from 92 Renewable Energy Independent Power Producers (IPPs) in bid windows 1-4
- 5 661 MW of electricity generation capacity from 85 IPP projects has been connected to the national grid.
- 71 073 GWh of energy has been generated by renewable energy sources procured under the REIPPPP since the first project became operational in November 2013. Renewable energy IPPs have proved to be very reliable. Of the 85 projects that have started operations, 77 projects have been operational for longer than a year. The electrical energy generated over the past 12-month period for the 77 projects is 14 117 GWh, which is 95% of their annual energy contribution projections of 14 924 GWh over a 12-month delivery period. Thirty one (31) of the 77 projects (40%) have individually exceeded their projections.

In August 2021, Bid Window 5, which had aimed to sign up 2 600MW of power, including 1 600MW of wind and 1 000MW of solar was open. It attracted 102 bids, offering capacity of 9 644MW. 25 Preferred Bidders were selected to provide a total of 2 583MW from wind and solar developments. Bid window 6, which concluded on 03 October 2022, attracted 56 projects amounting to 9.6 GW. Of the total, 33 projects represent 5.5 GW solar PV capacity within the range of 50 MW to 240 MW. Onshore wind energy facilities make up the remaining 23 projects offered with 4.1 GW capacity.

Economics: As a result of the excellent resource and competitive procurement processes, both wind power and solar PV power are now proven in South Africa as cheaper forms of energy generation than coal power. They offer excellent value for money to the economy and citizens of South Africa while benefitting society as a whole through the development of clean energy.

The following has been achieved by the IPP programme (December 2021) in terms of investment and economics:

- Investment (equity and debt) to the value of R209.7 billion was attracted in bid rounds 1 - 4.
- Socio-economic development contributions of R1.8 billion to date, of which R109.6 million was spent in this 2021 reporting quarter.
- Enterprise development contributions of R537.9 million to date, of which R27.2 million was spent in this 2021 reporting quarter.

The JET aims to maximise the social and economic opportunities of climate action, while minimizing and carefully managing any challenges.

Pollution reduction: The release of by-products through the burning of fossil fuels for electricity generation has a particularly hazardous impact on human health and contributes to ecosystem degradation. The use of solar irradiation or wind for power generation is a non-consumptive use of a natural resource which produces zero emissions during its operation.

The overview of the Independent Power Producers Procurement Report (December 2021) indicates that a carbon emission reduction of 72.1 Mton CO_2 has been realised by the IPP programme from inception to date, of which 4.4 Mton is in the 2021 reporting quarter 3.

The JET is expected to contribute to better and cleaner energy for all by reducing air pollution and reduce carbon emissions.

Climate friendly development: The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through the reduction of GHG emissions. South Africa is estimated to currently be responsible for approximately 1% of global GHG emissions (and circa half of those for which Africa is responsible) and is ranked 12th worldwide in terms of per capita carbon dioxide emissions as of 2021. Since its inception, the REIPPPP has achieved carbon emission reductions[7] of 72.1 Mton of CO_2. The development of Limestone PV1 Solar Energy Facility, and the associated electricity generated as a result of the facility, will result in considerable savings on tons of CO_2 emissions.

Support for international agreements: The effective deployment of renewable energy provides a tangible means for South Africa to demonstrate its commitment to its international agreements under the Kyoto Protocol and the Paris Agreement, and for cementing its status as a leading player within the international community. France, Germany, UK, US, the EU and World Bank are some of the international partners involved with the Just Energy Transition.

Employment creation: The development, procurement, installation, maintenance and management of renewable energy facilities have significant potential for job creation and skills development in South

[7] Carbon emission reduction is calculated based on a displacement of power, from largely coal-based to more environmentally friendly electrical energy generation, using a gross Eskom equivalent emissions factor of 1.015 tons CO_2/MWh.

Africa. The construction phase will create temporary employment opportunities and the operation phase will create limited full-time employment opportunities.

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

Support to a new industry sector: The development of renewable energy offers the opportunity to establish a new industry within the South African economy, which will create jobs and skill local communities which have potential for further renewable energy projects.

Protecting the natural foundations of life for future generations: Actions to reduce our disproportionate carbon footprint can play an important part in ensuring our role in preventing dangerous anthropogenic climate change, thereby securing the natural foundations of life for generations to come; this is the basis of sustainable development.

6.4. Need and Desirability of the project from a Regional Perspective

The Northern Cape Province has been identified as an area where electricity generation from renewable resources (including solar energy) is highly feasible and a viable option. Provincial policies and plans include renewable energy development and economic upliftment from such developments as part of the strategic planning. The location of the study area and project site within the Northern Cape Province is therefore considered to support the Province/Region's generation targets.

The overarching objective for the Solar Energy Facility is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operational and maintenance costs, as well as social and environmental impacts. From a regional site selection perspective, this region is considered to be technically viable for solar energy development by virtue of its measured solar resource. The Global Horizon Irradiation (GHI) in the province is around 2 556 kWh/m^2/annum. The Northern Cape Province is ranked 1st on the list of South Africa's provinces considered to have high solar generation potential and therefore enables the development of solar energy projects and the successful operation thereof. Local municipality policies and plans include energy development and upliftment of the area as a result of such development as part of their priorities. The development of the proposed project is therefore supported at a planning level.

6.5. Receptiveness of and desirability of the project site to develop the Limestone PV1 Solar Energy Facility

As detailed in Chapter 3, the placement of a Solar Energy Facility is strongly dependent on several factors including climatic conditions (solar irradiation), topography, the location of the site, availability of grid connection, the extent of the site and the need and desirability for the project. From a local level perspective, the project site and development area have specifically been identified by the proponent as being highly desirable from a technical perspective for the development of a PV facility.

The development area within which the facility footprint is proposed is sufficient in extent for the installation of a solar PV facility with a development footprint of ~300-400ha, while allowing for the avoidance of environmental site sensitivities. This consideration is in line with the mitigation strategy and enables the achievement of the objectives of the mitigation hierarchy (i.e., avoid, minimise, mitigate).

CHAPTER 7: APPROACH TO UNDERTAKING THE EIA PROCESS

In terms of the EIA Regulations of December 2014 (as amended) published in terms of the NEMA (Act No. 107 of 1998) as amended, the construction and operation of the Limestone PV1 Solar Energy Facility is a listed activity requiring Environmental Authorisation (EA). The application for EA is required to be supported by an Environmental Impact Assessment (EIA) process based on the contracted capacity of the facility being up to 150MWp and Activity 1 of Listing Notice 2 (GNR 325) being triggered.

An EIA process refers to the process undertaken in accordance with the requirements of the 2014 EIA Regulations (GNR 326), as amended, which involves the identification and assessment of direct, indirect, and cumulative environmental impacts associated with a proposed project or activity. The EIA process comprises two main phases: i.e., **Scoping** and **EIA Phase**, and is illustrated in **Figure 7.1**. Public participation forms an important component of the process and is undertaken throughout both phases.

Figure 7.1: The Phases of an Environmental Impact Assessment (EIA) Process

7.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Scoping Report

This chapter includes the following information required in terms of Appendix 2: Content of a Scoping report:

Requirement	Relevant Section
3(1)(d)(i) a description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for and (ii) a description of the activities to be undertaken, including associated structures and infrastructure.	All listed activities triggered and applied for are included in **Section 7.2**.
3(1)(g)(ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs.	The public participation process followed throughout the EIA process for the Limestone PV1 Solar Energy Facility is included in **Section 7.5.2** and copies of the supporting documents and inputs are included in **Appendix C**.

Requirement	Relevant Section
3(1)(g)(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	The main issues raised through the undertaking of the public participation process, including consultation with I&APs are included in the Comments and Responses Report in **Appendix C8**.
3(1)(g)(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives are included in **Section 7.5.3**.
3(1)(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed.	The assumptions and limitations of the EIA process being undertaken for the Limestone PV1 Solar Energy Facility is included in **Section 7.6**.

7.2 Relevant legislative permitting requirements

The legislative permitting requirements applicable to the Limestone PV1 Solar Energy Facility, as identified at this stage in the process and considered within this EIA process, are described in more detail under the respective sub-headings.

7.2.1 National Environmental Management Act (No. 107 of 1998) (NEMA)

NEMA is South Africa's key piece of national environmental legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of the NEMA, the potential impact on the environment associated with listed activities must be considered, investigated, assessed, and reported on to the Competent Authority (the decision-maker) charged by NEMA with granting of the relevant Environmental Authorisation (EA). Since the Limestone PV1 Solar Energy Facility is a power generation project and therefore relates to the IRP for Electricity 2010 – 2030, the National Department of Forestry, Fisheries, and the Environment (DFFE) has been determined as the Competent Authority (CA) in terms of GNR 779 of 01 July 2016. The Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARDLR) is the Commenting Authority on the project.

The need to comply with the requirements of the EIA Regulations published under NEMA ensures that developers are provided the opportunity to consider the potential environmental impacts of their activities early in the project development process, and also allows for an assessment to be made as to whether environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the Competent Authority with sufficient information in order for an informed decision to be taken regarding the application for EA.

The EIA process being conducted for the Limestone PV1 Solar Energy Facility is undertaken in accordance with Section 24(5) of the NEMA, which defines the procedure to be followed in applying for EA, and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the competent authority. Listed Activities are activities identified in terms of Section 24 of the NEMA which are likely to have a detrimental effect on the environment, and which may not commence without an EA from the competent authority subject to the completion of an environmental assessment process (either a Basic Assessment (BA) or full Scoping and EIA).

Table 7.1 details the listed activities in terms of the EIA Regulations, 2014 (as amended) that apply to the Limestone PV1 Solar Energy Facility, and for which an application for Environmental Authorisation has been submitted to the DFFE. The table also includes a description of the specific project activities that relate to the applicable listed activities.

Table 7.1: Listed activities as per the EIA Regulations that are triggered by the Limestone PV1 Solar Energy Facility

Notice Number	Activity Number	Description of listed activity
Listing Notice 1 (GNR 327) 08 December 2014 (as amended on 07 April 2017)	11(i)	The development of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275kV. ***Internal electrical infrastructure required to connect the Limestone PV1 Solar Energy Facility to the grid connection infrastructure will consist of 33kV cabling (buried or overhead) and a 33/132kV onsite substation. The site is located outside an urban area.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended on 07 April 2017)	12(ii)(a)(c)	The development of – (ii) Infrastructure or structures with a physical footprint of 100 square metres or more Where such development occurs- (a) within a watercourse; or (c) within 32 metres of a watercourse. ***The construction and operation of the Limestone PV1 Solar Energy Facility and associated infrastructure will occur within freshwater/drainage features, as well as within 32m of these features. The infrastructure will have a physical footprint of more than 100 square metres.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended on 07 April 2017)	14	The development and related operation of facilities and infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres. ***The development of the Limestone PV1 Solar Energy Facility will require the construction and operation of facilities and infrastructure for the storage and handling of dangerous goods (combustible and flammable liquids, such as oils, lubricants, solvents) associated with the onsite substation, where such storage will occur inside containers with a combined capacity exceeding 80 cubic meters but not exceeding 500 cubic meters.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended on 07 April 2017)	19(i)	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a (i) Watercourse. ***The site for the Limestone PV1 Solar Energy Facility is associated with the presence of freshwater/drainage features. Therefore, during the construction phase, 10 cubic metres of rock will be removed from the***

Notice Number	Activity Number	Description of listed activity
		watercourses for the development of the Limestone PV1 Solar Energy Facility and associated infrastructure where this encroaches on such features.
Listing Notice 1 (GNR 327) 08 December 2014 (as amended on 07 April 2017)	24(ii)	The development of a road – (ii) with a reserve wider than 13.5m, or where no reserve exists where the road is wider than 8m. ***The construction of the Limestone PV1 Solar Energy Facility will require the construction of new access roads. These will exceed 8m in width.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended on 07 April 2017)	28(ii)	Residential, mixed, retail, commercial, industrial, or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1ha. ***The total area to be developed (i.e., the development footprint) for the Limestone PV1 Solar Energy Facility is greater than 1ha and occurs outside an urban area in an area currently zoned for agriculture.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended on 07 April 2017)	56(ii)	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres. ***Existing farm roads within the project site may require widening or lengthening. Access roads will be widened by more than 6 metres.***
Listing Notice 2 (GNR 325) 08 December 2014 (as amended on 07 April 2017)	1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20MW or more. ***The project comprises a renewable energy generation facility, which will utilise solar power technology and will have a generation capacity of up to 150MWp.***
Listing Notice 2 (GNR 325) 08 December 2014 (as amended on 07 April 2017)	15	The clearance of an area of 20ha or more of indigenous vegetation. ***The facility is located on agricultural land where the predominant land use is agriculture. The project will require the clearance of indigenous vegetation within an area in excess of 20ha for the development of infrastructure.***
Listing Notice 3 (GNR 324) 08 December 2014 (as amended on 07 April 2017)	4(ii)(g)(ee)	The development of a road wider than 4 metres with a reserve less than 13.5 metres. **g. Northern Cape** (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans The development of the Limestone PV1 Solar Energy Facility and associated infrastructures will require the development of roads wider than 4m within CBA areas.

Notice Number	Activity Number	Description of listed activity
Listing Notice 3 (GNR 324) 08 December 2014 (as amended on 07 April 2017)	10(ii)(iii)(g)(ee)	The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres **g. Northern Cape** (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. ***The development of the Limestone PV1 Solar Energy Facility and associated infrastructures will require the storage and handling of a dangerous good with a capacity of more than 30 cubic meters within Critical biodiversity areas.***
Listing Notice 3 (GNR 324) 08 December 2014 (as amended on 07 April 2017)	14(x)(ii)(a)(g)(ii)(ff)	The development of: (ii)Infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse **g. Northern Cape** (ii) Outside urban areas (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; ***The construction and operation of the Limestone PV1 Solar Energy Facility and associated infrastructure will occur within freshwater/drainage features, as well as within 32m of these features. The infrastructure will have a physical footprint of more than 10 square metres. The site is located outside an urban area and within Critical biodiversity areas.***
Listing Notice 3 (GNR 324) 08 December 2014 (as amended on 07 April 2017)	18(ii)(a)(g)(ee)	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. **g. Northern Cape** (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. ***Existing roads may require widening by more than 4 m and/or lengthening by more than 1km, to accommodate the movement of heavy vehicles and cable trenching activities.***

7.2.2 National Water Act (No. 36 of 1998) (NWA)

In accordance with the provisions of the National Water Act (No. 36 of 1998) (NWA), all water uses must be licensed with the Competent Authority (i.e., the Regional Department of Water and Sanitation (DWS) or the relevant Catchment Management Agency (CMA)). Water use is defined broadly, and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation.

Table 7.2 contains Water Uses associated with the proposed project and identified in terms of the NWA which require licensing either in the form of a General Authorisation (GA), or in the form of a Water Use License (WUL). The table also includes a description of those project activities which relate to the applicable Water Uses.

Table 7.2: List of Water Uses published under Section 21 of NWA, as amended.

Notice No.	Activity No.	Description of Water Use
NWA (No. 36 of 1998)	Section 21 (c)	Impeding or diverting the flow of water in a watercourse ***The site considered for the establishment of the Limestone PV1 Solar Energy Facility is associated with the presence of freshwater/drainage features. Activities pertaining to the establishment of the Solar Energy Facility might encroach on freshwater/drainage features which may lead to an impediment and diversion of the flow in the watercourses. .***
NWA (No. 36 of 1998)	Section 21 (i)	Altering the bed, banks, course or characteristics of a watercourse. ***The site considered for the establishment of the Limestone PV1 Solar Energy Facility is associated with the presence of freshwater/drainage features. Activities pertaining to the establishment of the Solar Energy Facility might encroach on freshwater/drainage features which may lead to the altering of the characteristics of the watercourses.***

In the event that the flow of water in the freshwater/drainage features is affected and the bed, banks or course characteristics are altered, then a water use authorisation would be required. This will need to be in accordance with the requirements of the Regulations Regarding the Procedural Requirements for Water Use License Applications and Appeals (GNR 267), or a GA registered in accordance with the requirements of the Revision of General Authorisation. The process of applying for a WUL or GA registration will only be completed once a positive EA has been received and the project selected as Preferred Bidder under the REIPPPP or similar programme. This is in line with the requirements of the Department of Water and Sanitation (DWS).

7.2.3 National Heritage Resources Act (No. 25 of 1999) (NHRA)

The National Heritage Resources Act (No. 25 of 1999) (NHRA) provides an integrated system which allows for the management of national heritage resources, and to empower civil society to conserve heritage resources for future generations. Section 38 of NHRA provides a list of activities which potentially require the undertaking of a Heritage Impact Assessment.

Section 38: Heritage Resources Management

1). Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as –

a. the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

b. the construction of a bridge or similar structure exceeding 50m in length;

c. any development or other activity which will change the character of a site –

i). exceeding 5 000m² in extent; or

ii). involving three or more existing erven or subdivisions thereof; or

iii). involving three or more erven or divisions thereof which have been consolidated within the past five years; or

iv). the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority.

Must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of such development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38(3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the proposed development, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the South African Heritage Resources Agency (SAHRA) Permit Regulations (GNR 668).

7.3 Overview of the EIA Process being undertaken for the Limestone PV1 Solar Energy Facility

The development of the Limestone PV1 Solar Energy Facility requires Environmental Authorisation (EA) from the DFFE subject to the completion of a full Scoping and Environmental Impact Assessment (S&EIA), as prescribed in Regulations 21 to 24 of the 2014 EIA Regulations (GNR 326), as amended. The need for a full S&EIA process to be conducted in support of the application for EA is based on listed activities triggered which are contained within Listing Notice 2 (GNR 325), as detailed in Section 7.2.1 above.

The S&EIA process is to be undertaken in two phases as follows (refer to **Figure 7.2**):

» The **Scoping Phase** includes the identification and description of potential impacts associated with the project through a desktop study and consultation with I&APs and key stakeholders through a Public Participation Process. The entire project site is evaluated within this process. Through this study, areas of sensitivity within the project site are identified and delineated in order to identify any environmental fatal flaws, and environmentally sensitive, or no-go areas which need to be considered. In accordance with Regulation 21(1) of the 2014 EIA Regulations (GNR 326), as amended, this Scoping Report prepared for the project will be subjected to a 30-day review and comment period during which any Interested and Affected Party (I&AP) or Authority are invited to review and provide comment on the findings. Following completion of this review period, a Final Scoping Report, which incorporates all comments received during the 30-day public review and comment period, will be prepared and submitted to DFFE for consideration. Following receipt of the Final Scoping Report, the

DFFE has 43 days within which to either accept the Scoping Report, and advise the applicant to proceed or continue with the tasks contemplated in the Plan of Study for EIA; or refuse the application for EA in the event that the proposed activity is in conflict with a prohibition contained in the legislation; or the Scoping Report does not substantially comply with Appendix 2 of the 2014 EIA Regulations (GNR 326), as amended.

» The **EIA Phase** involves a detailed assessment of potentially significant positive and negative direct, indirect, and cumulative impacts identified during the Scoping Phase. This phase includes detailed specialist investigations and a Public Participation Process, and results in the compilation of an EIA Report and Environmental Management Programme (EMPr). In accordance with Regulation 23(1)(a) of the 2014 EIA Regulations (GNR 326), as amended, the EIA Report and EMPr prepared for the project will also be subjected to a 30-day public review and comment period during which members of the public, I&APs, and authorities will be invited to review and provide comment on the EIA Report and EMPr. Following conclusion of this review period, a Final EIA Report and EMPr which incorporates all comments received during the 30-day review and comment period, will be prepared and submitted to the DFFE for consideration. Following receipt of the Final EIA Report and EMPr, the DFFE has 107 days within which to either grant or refuse the EA.

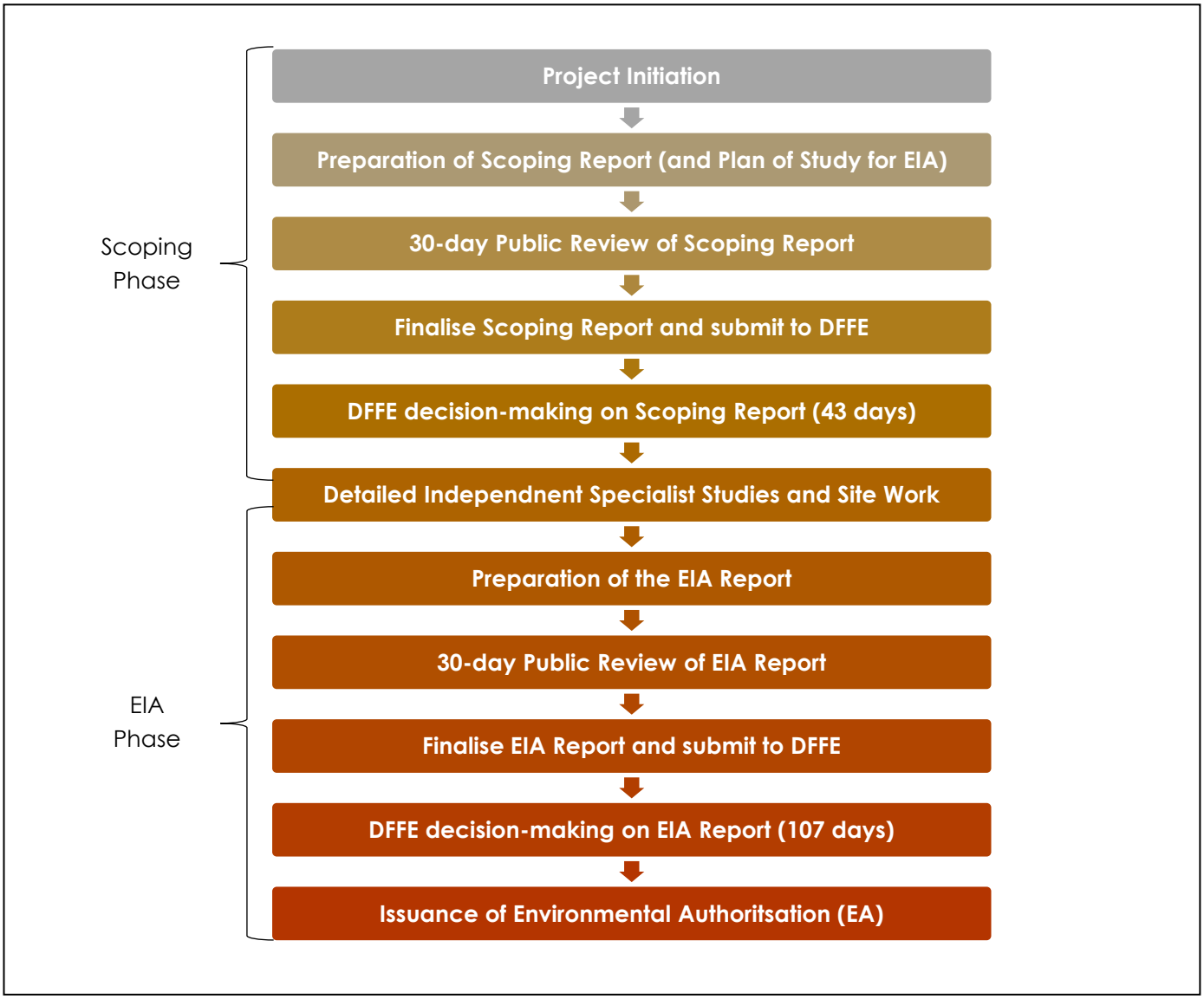


Figure 7.2: Regulated timeframe of an Environmental Impact Assessment (EIA) Process

7.4 Objectives of the Scoping Phase

This Scoping Report documents the evaluation of potential environmental impacts of the Limestone PV1 Solar Energy Facility and forms part of the EIA process being conducted in support of an application for EA for the project. The Scoping Phase has been conducted in accordance with the requirements of the 2014 EIA Regulations (GNR 326), as amended, and therefore aims to:

- Identify and evaluate potential environmental (biophysical and social) impacts and benefits of all phases of the proposed development (including design, construction, operation, and decommissioning) within the broader project site through a review of existing baseline data, including specialist studies which were undertaken within the project area.
- Identify potentially sensitive environmental features and areas within the broader project site in order to inform the preliminary design process of the facility.
- Define the scope of studies to be undertaken during the EIA process.
- Provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the EIA Phase, as well as regarding the scope and extent of specialist studies that will be required to be undertaken.

The following objectives of the Scoping Phase (in accordance with Appendix 2 of the 2014 EIA Regulations (GNR 326)), as amended, have been met, through the undertaking of a consultative process.

- The policies and legislation relevant to the project have been identified and considered within this Scoping Report.
- The need and desirability of the proposed project, including the need and desirability of the activity in the context of the preferred project site have been motivated.
- Feasible alternatives for the project have been considered and confirmed.
- Potential impacts associated with the undertaking of the identified activities and proposed technology have been identified and described.
- Areas of high sensitivity to be avoided by the development footprint within the broader project site have been identified. The development footprint and proposed facility layout will be assessed within the EIA Phase.
- Key issues associated with the project to be addressed during the EIA Phase through further detailed study and ground-truthing have been identified and listed within this Scoping Report.
- The level of assessment, including the methodology to be applied, the expertise required, and the extent of further consultation to be undertaken in the EIA Phase of the process, with the aim of determining the extent of impacts associated with the activities through the life cycle of the project (i.e., construction, operation, and decommissioning), have been identified and included within this Scoping Report as part of a Plan of Study for the EIA Phase.
- Suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored have been identified where possible at this stage in the process.

7.5 Overview of the Scoping Phase

Key tasks undertaken within the Scoping Phase include:

- Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
- Submission of the completed application for EA to the competent authority (i.e., the DFFE) in terms of Regulations 5 and 16 of the 2014 EIA Regulations (GNR 326), as amended.
- Undertaking a public participation process in accordance with Chapter 6 of GNR 326 and the Department of Environmental Affairs (2017) Public Participation guidelines in terms of the NEMA EIA Regulations (hereinafter referred to as "the Guidelines") in order to obtain comments on and identify issues and concerns associated with the proposed project.
- Undertaking of independent specialist studies in accordance with Appendix 6 of the EIA Regulations, 2014 (GNR 326), as amended, and the requirements of the Specialist Protocols published in Regulation GNR 320, issued 20 March 2020 and GNR 1150 of 30 October 2020, where relevant, as well as other relevant guidelines.
- Preparation of a Scoping Report and Plan of Study for the EIA in accordance with the requirements of Appendix 2 of the 2014 EIA Regulations (GNR 326).
- Provision of a 30-day public and authority review period for the Scoping Report.
- Preparation of a Comments and Response (C&R) Report detailing all comments raised by I&APs and responses provided as part of the Scoping Phase.
- Submission of a Final Scoping Report, including a Plan of Study for the EIA, to the DFFE for review and approval.

7.5.1 Authority Consultation and Application for Authorisation in terms of the 2014 EIA Regulations (as amended)

In terms of GNR 779 of 1 July 2016, the National DFFE is the competent authority for all projects which relate to the IRP and any updates thereto. As the project is proposed within the Northern Cape Province, the Northern Cape DAEARDLR is the provincial commenting authority for the project. Consultation with these authorities, as well as other relevant Organs of State will continue throughout the Scoping Phase. To date, this consultation has included the following:

- Submission of a pre-application form to the DFFE providing details of the project and the process to be undertaken was completed on 12 October 2022. It was confirmed by the case officer via email on 17 October 2022 that no pre-application meeting would be required for the project.
- Submission of the application for Environmental Authorisation to the DFFE via the DFFE Novell File System.
- Submission of the Scoping Report for review and comment by:
  - The competent and commenting authorities.
  - State departments that administer laws relating to a matter affecting the environment relevant to an application for EA.
  - Organs of State which have jurisdiction in respect of the activity to which the application relates.

The submissions, as listed above, were undertaken electronically, as required by the DFFE. A record of all authority correspondence undertaken during the Scoping Phase is included in **Appendix B**.

7.5.2 Public Participation Process

Public participation is an essential and regulatory requirement for an Environmental Authorisation process and is guided by Regulations 41 to 44 of the EIA Regulations 2014 (GNR 326), as amended. The purpose of

public participation is clearly outlined in Regulation 40 of the EIA Regulations 2014 (GNR 326, as amended, and is being followed for this proposed project.

The sharing of information forms the basis of the public participation process and offers the opportunity for I&APs to become actively involved in the EIA Process from the outset. The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner. The public participation process affords I&APs opportunities to provide input into and receive information regarding the EIA process in the following ways:

During the **Scoping Phase**:
» Provide an opportunity to submit comments regarding the project.
» Assist in identifying reasonable and feasible alternatives, where required.
» Contribute relevant local information and knowledge to the environmental assessment.
» Allow registered I&APs to verify that their comments have been recorded, considered, and addressed, where applicable, in the environmental investigations.
» Foster trust and co-operation.
» Generate a sense of joint responsibility and ownership of the environment.
» Comment on the findings of the Scoping Phase results.
» Identify issues of concern and suggestions for enhanced benefits.

During the **EIA Phase**:
» Contribute relevant local information and knowledge to the environmental assessment.
» Verify that issues have been considered in the environmental investigations as far as possible as identified within the Scoping Phase.
» Comment on the findings of the environmental assessments.
» Attend a Focus Group Meeting to be conducted for the project.

During the **decision-making phase**:
» To advise I&APs of the outcome of the competent authority's decision, and how and by when the decision can be appealed.

The Public Participation process therefore aims to ensure that:
» Information containing all relevant facts in respect of the application is made available to potential stakeholders and I&APs for their review.
» The information presented during the public participation process is presented in such a manner, i.e., local language and technical issues, that it avoids the possible alienation of the public and prevents them from participating.
» Public participation is facilitated in such a manner that I&APs are provided with a reasonable opportunity to comment on the project.
» A variety of mechanisms are provided to I&APs to correspond and submit their comments i.e., fax, post, email, telephone, text message (SMS and WhatsApp).
» An adequate review period is provided for I&APs to comment on the findings of the Scoping and EIA Reports.

In terms of the requirement of Chapter 6 of the EIA Regulations of December 2014, as amended, the following key public participation tasks are required to be undertaken:
» Fix a notice board at a place conspicuous to the public at the boundary or on the fence of—

(i) the site where the activity to which the application relates is or is to be undertaken; and
(ii) any alternative site mentioned in the application.

» Give written notice to:
(i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
(ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
(iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
(iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
(v) the municipality which has jurisdiction in the area;
(vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
(vii) any other party as required by the competent authority.

» Place an advertisement in one local newspaper.
» Open and maintain a register of I&APs and Organs of State.
» Release of a Scoping Report for a 30-day review and comment period.
» Prepare a Comments and Responses (C&R) report which documents the comments received on the EIA process and during the 30-day review and comment period of the Scoping Report and the responses provided by the project team.

i. Stakeholder identification and Register of Interested and Affected Parties

42. A proponent or applicant must ensure the opening and maintenance of a register of I&APs and submit such a register to the competent authority, which register must contain the names, contact details and addresses of –
(a) All persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP;
(b) All persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and
(c) All organs of state which have jurisdiction in respect of the activity to which the application relates.

I&APs have been identified through a process of networking and referral, obtaining information from Savannah Environmental's existing stakeholder database, liaison with potentially affected parties in the greater surrounding area and a registration process involving the completion of a reply form. Key stakeholders and affected and surrounding landowners have been identified and registered on the project database. Other stakeholders are required to formally register their interest in the project through either directly contacting the Savannah Environmental Public Participation team via phone, text message (SMS and WhatsApp), email or fax, or registering their interest via the online stakeholder engagement platform. An initial list of key stakeholders identified and registered is included in **Table 7.3**.

Table 7.3: Initial list of Stakeholders identified for the inclusion in the project database during the public participation process for the Limestone PV1 Solar Energy Facility

Organs of State
National Government Departments
Department of Forestry, Fisheries and the Environment (DFFE)
Department of Mineral Resources and Energy (DMRE)
Department of Agriculture, Land Reform and Rural Development (DALRRD)

Department of Water and Sanitation (DWS)
Government Bodies and State-Owned Companies
Eskom Holdings SOC Limited
National Energy Regulator of South Africa (NERSA)
South African Civil Aviation Authority (CAA)
Air Traffic Navigation Services (ATNS)
South African Heritage Resources Agency (SAHRA)
South African National Roads Agency Limited (SANRAL)
South African Defence Force Northern Cape
South African Radio Astronomy Observatory (SARAO)
Telkom SA SOC Limited
Transnet SA SOC Limited
Provincial Government Departments
Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (NC DAEARDLR)
Northern Cape Department: Transport, Safety and Liaison
Ngwao Boswa Kapa Bokone (NBKB) – provincial Heritage Authority
Local Government Departments
ZF Mgcawu District Municipality
Kgatelopele Local Municipality – including the Ward Councillor, ward committee members, community representative or local community forum members
Commenting Stakeholders
BirdLife South Africa
Endangered Wildlife Trust (EWT)
SENTECH
Landowners
Affected landowners, tenants and occupiers
Neighbouring landowners, tenants and occupiers

As per Regulation 42 of the EIA Regulations, 2014, as amended, all relevant stakeholder and I&AP information has been recorded within a register of I&APs (refer to **Appendix C1** for a listing of the recorded parties). In addition to the above-mentioned EIA Regulations, point 4.1 of the Public Participation Guidelines has also been followed. The register of I&APs contains the names[8] of:

- All persons who requested to be registered on the database through the use of the online stakeholder engagement platform or in writing and disclosed their interest in the project.
- All Organs of State which hold jurisdiction in respect of the activity to which the application relates.

[8] Contact details and addresses have not been included in the I&AP database as this information is protected by the Protection of Personal Information Act (No 4 of 2013).

» All persons who submitted written comments or attended virtual meetings (or in-person consultation) and viewed the narrated presentations on the Savannah Environmental online platform during the public participation process.

I&APs have been encouraged to register their interest in the EIA process from the onset of the project, and the identification and registration of I&APs will be on-going for the duration of the EIA process. The database of I&APs will be updated throughout the EIA process and will act as a record of all I&APs involved in the public participation process.

ii. Advertisements and Notifications

40.(2)(a)	Fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of – (i) The site where the activity to which the application or proposed application relates is or is to be undertaken; and (ii) Any alternative site.
40.(2)(b)	Giving written notice, in any of the manners provided for in section 47Dof the Act, to – (i) The occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken; (ii) Owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken; (iii) The municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area; (iv) The municipality which has jurisdiction in the area; (v) Any organ of state having jurisdiction in respect of any aspect of the activity; and (vi) Any other party as required by the competent authority.
40.(2)(c)	Placing an advertisement in – (i) One local newspaper; or (ii) Any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
40.(2)(d)	Placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii); and
40.(2)(e)	Using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to – (i) Illiteracy; (ii) Disability; or (iii) Any other disadvantage.

The EIA process was announced with an invitation to the Organs of State, potentially affected and adjacent landowners, tenants and occupiers, and general public to register as I&APs and to actively participate in the process. This was achieved via the following:

» Compilation of a background information document (BID) (refer to **Appendix C3**) providing technical and environmental details on the project and how to become involved in the EIA process. This was provided in English and Afrikaans. The BID and the process notification letter announcing the EIA process, notifying Organs of State, potentially affected and neighbouring landowners, as well as

registered stakeholders and I&APs of the proposed Limestone PV1 Solar Energy Facility, and providing background information of the project and inviting I&APs to register on the project's database were distributed via email on **06 January 2023**. Evidence of distribution is contained in **Appendix C** of the Scoping Report. The BID is also available electronically on the Savannah Environmental website (https://savannahsa.com/public-documents/energy-generation/).

- Placement of site notices announcing the EIA process at visible points along the boundary of the project site (i.e., the boundaries of the affected properties), in accordance with the requirements of the EIA Regulations on **9 November 2022**. Photographs of the site notices and the GPS co-ordinates of the locations where the site notices were placed are contained within **Appendix C2** of the Scoping Report.
- Placement of an advertisement in the NoordkaapBulletin (in Afrikaans and English) on **15 December 2022.** This advert:
  - Announced the project and the associated EIA process.
  - Provided details of how I&APs can become involved in the EIA process, including details of the public participation consultant.

  A copy of the newspaper advert as sent to the newspaper and the advert tear sheet are included in **Appendix C2** of the Scoping Report.
- Placement of an advertisement in the NoordkaapBulletin (in Afrikaans and English) on **15 December 2022.** This advert:
  - Announced the availability of the Scoping report, the review period, and where it is accessible for review.
  - Invited comment on the Scoping Report.
  - Provided all relevant details to access the Savannah Environmental online stakeholder engagement platform.
- The Scoping Report has been made available for review by I&APs for a 30-day review and comment period from **Friday, 06 January 2023** to **Monday**, **06 February 2023**. The Scoping Report has been made available on the Savannah Environmental website and all registered I&APs have been notified of the availability on **06 January 2023** via email which included the link to access the report on the Savannah Environmental website. The evidence of distribution of the Scoping Report will be included in the Final Scoping Report, which will be submitted to the DFFE.

iii. Public Involvement and Consultation

In order to accommodate the varying needs of stakeholders and I&APs within the surrounding area, as well as capture their views, comments, issues and concerns regarding the project, various opportunities have been and will continue to be provided to I&APs to note their comments and issues. I&APs are being consulted through the following means:

Table 7.4: Public involvement for the Limestone PV1 Solar Energy Facility

Activity	Date
Announcement of the EIA process and the availability of the Scoping Report for a 30-day review and comment period, including details on how to access the Scoping Report via the online stakeholder engagement platform	06 January 2023
Distribution of the BID, process notification letters and stakeholder reply form announcing the EIA process and inviting I&APs to register on the project database. The BID and electronic reply form was also made available on the online	06 January 2023

stakeholder engagement platform.	
Placement of site notices at the project site, and surrounding areas.	9 November 2022
Distribution of notification letters announcing the availability of the Scoping Report for a 30-day review and comment period. These letters were distributed to Organs of State, Government Departments, Ward Councillors, landowners within the surrounding area (including neighbouring landowners), registered I&APs and key stakeholder groups.	06 January 2023
30-day review and comment period of the Scoping Report.	Friday, 06 January 2023 to Monday, 06 February 2023
Virtual meetings through the use of virtual platforms as determined through discussions with the relevant stakeholder group: » Landowners » Authorities and key stakeholders (including Organs of State, local municipality and official representatives of community-based organisations). » Where an I&AP does not have access to a computer and/or internet to participate in a virtual meeting telephonic discussions (including WhatsApp video call) will be set-up and minuted for inclusion. The preferred language of the I&AP has been considered when setting up these discussions. Direct in-person consultation will only take place in limited numbers and where sanitary conditions can be maintained at all times.	Focus group meetings (virtual meetings or in-person consultations) will be held during the 30-day review and comment period of the Scoping Report.
On-going consultation (i.e., telephone liaison; e-mail communication) with all I&APs.	Throughout the EIA process

iv. Registered I&APs entitled to Comment on the Scoping Report

43.(1) A registered I&AP is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.

(2) In order to give effect to section 24O of the Act, any State department that administers a law relating to a matter affecting the environment must be requested, subject to regulation 7(2), to comment within 30 days.

44.(1) The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.

(2) Where a person desires but is unable to access written comments as contemplated in subregulation (1) due to –

(a) A lack of skills to read or write;
(b) Disability; or
(c) Any other disadvantage;

Reasonable alternative methods of recording comments must be provided for.

I&APs registered on the database have been notified by means of a notification letter of the release of the Scoping Report for a 30-day review and comment period, invited to provide comment on the Scoping Report, and informed of the manner in which, and timeframe within which such comment must be made. The report has been made available in English in soft copies to I&APs. Hard copies can be made available on request.

The Scoping Report has been made available on the Savannah Environmental website (https://savannahsa.com/public-documents/energy-generation/). A notification letter to all registered parties was distributed at the commencement of the 30-day review and comment period, on **06 January 2023**. Where I&APs are not able to provide written comments (including SMS and WhatsApp), other means of consultation, such as telephonic discussions will be used to provide the I&APs with a platform to verbally raise their concerns and comments on the proposed development.

All comments raised as part of the discussions and written comments submitted during the 30-day review and comment period will be recorded and included in **Appendix C6** and **Appendix C7** of the Scoping Report.

v. Identification and Recording of Comments

Comments raised by I&APs to date have been included into a Comments and Responses (C&R) Report, which is included in **Appendix C8** of this Scoping Report. The C&R Report includes detailed responses from members of the EIA project team and/or the project proponent to the issues and comments raised. The C&R Report will be updated with all comments received during the 30-day review and comment period and will be included as **Appendix C8** in the Final Scoping Report that will be submitted to the DEFF for approval.

Meeting notes of all the telephonic discussions and meetings conducted during the 30-day review and comment period of the Scoping Report will be included in **Appendix C7**.

7.6. Outcomes of the DFFE Web-Based Screening Tool

In terms of GNR 960 (promulgated on 5 July 2019) and Regulation 16(1)(b)(v) of the 2014 EIA Regulations (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of applications in terms of Regulations 19 and 21 of the EIA Regulations.

The requirement for the submission of a Screening Report (included as **Appendix P** of the Scoping Report) for the Limestone PV1 Solar Energy Facility is applicable as it triggers Regulation 19 of the EIA Regulations, 2014, as amended. **Table 7.5** provides a summary of the specialist assessments identified in terms of the screening tool and responses to each assessment from the project team considering the project site under consideration.

Table 7.5: Sensitivity ratings from the DFFE's web-based online Screening Tool associated with the development of the Limestone PV1 Solar Energy Facility

Environmental Theme/Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
Agriculture	Medium	A Soils, Land Use and Agricultural Potential compliance statement is included in this Scoping Report as **Appendix I**. The study found that the site was mostly low-medium sensitivity. A compliance statement was required as per the protocol.

Environmental Theme/Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
Animal Species	High	A Terrestrial Ecology Scoping Assessment (including fauna) has been undertaken for the solar energy facility and is included as **Appendix G** of the Scoping Report. The specialists found the site to be mostly comprised of high sensitivity with large areas of very high sensitivity and some areas of very low sensitivity. A detailed assessment will be undertaken in the EIA Phase of the process.
Landscape (Solar))	Very High	A Visual Scoping Assessment has been undertaken for the solar energy facility and is included in this Scoping Report as **Appendix K.** A detailed assessment will be undertaken in the EIA Phase of the process.
Archaeological and Cultural Heritage	Very high	A Heritage Screener has been undertaken for the solar energy facility and is included in this Scoping Report as **Appendix J**. The specialists found that It is likely that the proposed development will impact significant cultural landscape and archaeological. A full Heritage Impact Assessment (including an assessment of archaeological heritage resources and the cultural landscape) will be undertaken during the EIA Phase.
Palaeontology	Very High	A Heritage Screener has been undertaken for the solar energy facility and is included in this Scoping Report as **Appendix J**. The specialists found that It is likely that the proposed development will impact significant palaeontological heritage. A full Heritage Impact Assessment (including an assessment of palaeontological heritage resources) will be undertaken during the EIA Phase.
Terrestrial Biodiversity	Very High	A Terrestrial Ecology Scoping Assessment has been undertaken for the solar energy facility and is included as **Appendix G** of the Scoping Report. The specialists found the site to be mostly comprised of high sensitivity with large areas of very high sensitivity and some areas of very low sensitivity. A detailed assessment will be undertaken in the EIA Phase of the process.
Aquatic Biodiversity	Very High	A Terrestrial Ecology Assessment (which includes a freshwater component) has been undertaken for the solar energy facility and is included as **Appendix G** of the Scoping Report. The specialists found the site to be mostly comprised of high sensitivity with large areas of very high sensitivity and some areas of very low sensitivity. A detailed assessment will be undertaken in the EIA Phase of the process.
Avian	Low	An Avifauna Scoping Assessment Report has been undertaken for the solar energy facility and included as **Appendix H** of the Scoping Report. The specialists have found the site to have high to very high avian sensitivity. A Regime 2 monitoring survey - Two surveys over a 6-months period to cover the wet and dry periods is underway and

Environmental Theme/Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
		will inform the assessment of impacts in the EIA Phase of the process.
Civil Aviation (Solar PV)	Low	The Civil Aviation Authority (CAA) and Air Traffic Navigation Services (ATNS) will be consulted throughout the EIA process to obtain input and details of any requirements for further studies.
Defence	Low	The project site is not located within close proximity of any military base. The South African Defence Force Northern Cape will be consulted throughout the EIA process to obtain input and details of any requirements for further studies.
RFI	Low	The project site is located not located close to any RFI sensitive areas. Telkom will be consulted throughout the EIA process to obtain input and details of any requirements for further studies.
Plant Species	Medium	A Terrestrial Ecology Scoping Assessment (including flora) has been undertaken for the Limestone PV1 Solar Energy Facility and is included as **Appendix G** of the Scoping Report. The specialists found the site to be mostly comprised of high sensitivity with large areas of very high sensitivity and some areas of very low sensitivity. A detailed assessment will be undertaken in the EIA Phase of the process.
Socio-Economic Assessment	The screening report does not indicate a rating for this theme.	A Socio-Economic Scoping Assessment has been undertaken and is included in the Scoping Report as **Appendix L**. A detailed assessment will be undertaken in the EIA Phase of the process.

7.7. Evaluation of Issues Identified through the Scoping Process

Direct, indirect, and cumulative environmental impacts associated with the project identified during the Scoping Phase have been identified and evaluated through consideration of existing information available for the Limestone PV1 Solar Energy Facility project site.

In order to evaluate issues and assign an order of priority, the following methodology was used to identify the characteristics of each potential issue/impact:

- The ***nature***, which includes a description of what causes the impact, what will be affected and how it will be affected.
- The ***extent***, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional or national.
- Identify ***sensitive receptors*** that may be impacted on by the proposed development and the types of impacts that are most likely to occur.

» The ***significance*** of potential impacts in terms of the requirements of the 2014 EIA Regulations (including (nature, significance, consequence, extent, duration and probability of the impacts, the degree to which these impacts:
  (a) Can be reversed;
  (b) May cause irreplaceable loss of resources; and
  (c) Can be avoided, managed or mitigated.
» Identify the potential impacts that will be considered further in the EIA Phase through detailed investigations.

The evaluation of the proposed project resulted in a description of the nature, significance, consequence, extent, duration, and probability of the identified issues, as well as recommendations regarding further studies required within the EIA Phase.

7.8. Finalisation of the Scoping Report

The final stage of the Scoping Phase entails the recording and capturing of comments received from stakeholders and I&APs on the Scoping Report in order to finalise the Scoping Report for submission to the DFFE for decision-making. All written comments received will be addressed within the C&R Report (refer to **Appendix C8**).

7.9. Assumptions and Limitations of the EIA Process

The following assumptions and limitations are applicable to the EIA process for the Limestone PV1 Solar Energy Facility:

» All information provided by the developer and I&APs to the environmental team was correct and valid at the time it was provided.
» The project site identified by the developer represents a technically suitable site for the establishment of a solar energy facility, which is based on the design undertaken by technical consultants for the project.
» The development footprint (the area that will be affected during the operation phase) will include the footprint for the solar energy facility and associated infrastructure (i.e., internal access roads).
» The Scoping Phase evaluation of impacts has been largely based on desktop studies. This information has been used to inform this Scoping Report and will be verified by specialists in the EIA Phase to assess the project development footprint for the Limestone PV1 Solar Energy Facility.

7.10. Legislation and Guidelines that have informed the preparation of this Scoping Report

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

» National Environmental Management Act (Act No. 107 of 1998).
» EIA Regulations of December 2014, published under Chapter 5 of NEMA (as amended).
» Department of Forestry, Fisheries and the Environment (2017), Public Participation guidelines in terms of NEMA EIA Regulations.
» Department of Forestry, Fisheries and the Environment (2017), Integrated Environmental Management Guideline: Guideline on Need and Desirability.

- Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation; and
- International guidelines – the Equator Principles, the IFC Performance Standards, the Sustainable Development Goals, World Bank Environmental and Social Framework, and the and World Bank Group Environmental, Health, and Safety Guidelines (EHS Guidelines).

Several other Acts, standards or guidelines have also informed the project process and the scope of issues addressed and assessed in this Scoping Report. A review of legislative requirements applicable to the proposed project as identified at this stage in the process is provided in **Table 7.5**.

Table 7.5: Relevant legislative permitting requirements applicable to the Limestone PV1 Solar Energy Facility

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Legislation			
Constitution of the Republic of South Africa (No. 108 of 1996)	In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that: "*Everyone has the right –* » *To an environment that is not harmful to their health or well-being, and* » *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:* ∗ *Prevent pollution and ecological degradation,* ∗ *Promote conservation, and* ∗ *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development*."	Applicable to all authorities	There are no permitting requirements associated with this Act. The application of the Environmental Right however implies that environmental impacts associated with proposed developments are considered separately and cumulatively. It is also important to note that the "right to an environment clause" includes the notion that justifiable economic and social development should be promoted, through the use of natural resources and ecologically sustainable development.
National Environmental Management Act (No. 107 of 1998) (NEMA)	The 2014 EIA Regulations have been promulgated in terms of Chapter 5 of NEMA. Listed activities which may not commence without EA are identified within the Listing Notices (GNR 327, GNR 325 and GNR 324) which form part of these Regulations (GNR 326). In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation. Considering the capacity of the proposed Limestone PV1 Solar Energy Facility (i.e., contracted capacity of up to	DFFE – Competent Authority Northern Cape DAEARDLR – Commenting Authority	The listed activities triggered by the proposed project have been identified and are being assessed as part of the EIA process currently underway for the project. The EIA process will culminate in the submission of a EIA Report to the DFFE for review and decision-making.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	150MWp) and the triggering of Activity 1 of Listing Notice 2 (GNR 325), a full Scoping and EIA process is required in support of the Application for EA.		
National Environmental Management Act (No 107 of 1998) (NEMA)	In terms of the "Duty of Care and Remediation of Environmental Damage" provision in Section 28(1) of NEMA every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment. In terms of NEMA, it is the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.	DFFE Northern Cape DAEARDLR	While no permitting or licensing requirements arise directly by virtue of the proposed project, this section finds application through the consideration of potential cumulative, direct, and indirect impacts. It will continue to apply throughout the life cycle of the project.
Environment Conservation Act (No. 73 of 1989) (ECA)	The Noise Control Regulations in terms of Section 25 of the ECA contain regulations applicable for the control of noise in the Provinces of Limpopo, North-West, Mpumalanga, Northern Cape, Eastern Cape, and KwaZulu-Natal Provinces. The Noise Control Regulations cover the powers of a local authority, general prohibitions, prohibitions of disturbing noise, prohibitions of noise nuisance, use of measuring instruments, exemptions, attachments, and penalties. In terms of the Noise Control Regulations, no person shall make, produce, or cause a disturbing noise, or allow it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof (Regulation 04).	DFFE Northern Cape DAEARDLR Kgatelopele Local Municipality	Noise impacts are expected to be associated with the construction phase of the project. Considering the location of the development area in relation to residential areas and provided that appropriate mitigation measures are implemented, construction noise is unlikely to present a significant intrusion to the local community. There is therefore no requirement for a noise permit in terms of the legislation.
National Water Act (No. 36 of 1998) (NWA)	A water use listed under Section 21 of the NWA must be licensed with the Regional DWS, unless it is listed in Schedule 1	Regional Department of Water and Sanitation	The Limestone PV1 development area is located within the regulated area of a river.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	of the NWA (i.e. is an existing lawful use), is permissible under a GA, or if a responsible authority waives the need for a licence. Water use is defined broadly, and includes consumptive and non-consumptive water uses, taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation. Consumptive water uses may include taking water from a water resource (Section 21(a)) and storing water (Section 21(b)). Non-consumptive water uses may include impeding or diverting of flow in a water course (Section 21(c)), and altering of bed, banks or characteristics of a watercourse (Section 21(i)).		As a result, a water use authorisation for the project will be required from DWS. The process will be completed once a positive EA has been received and the project selected as Preferred Bidder by the DMRE. This is in line with the requirements from DWS.
Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA)	In accordance with the provisions of the MPRDA a mining permit is required in accordance with Section 27(6) of the Act where a mineral in question is to be mined, including the mining of materials from a borrow pit.	Department of Mineral Resources and Energy (DMRE)	Any person who wishes to apply for a mining permit in accordance with Section 27(6) must simultaneously apply for an Environmental Authorisation in terms of NEMA. No borrow pits are expected to be required for the construction of the project, and as a result a mining permit or EA in this regard is not required to be obtained.
	Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary to any object of the Act, or which is likely to impede any such object must apply to the Minister for approval in the		In terms of Section 53 of the MPRDA, approval is required from the Minister of Mineral Resources and Energy to ensure that the proposed development does not sterilise a

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	prescribed manner.		mineral resource that might occur on site.
National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA)	The National Dust Control Regulations (GNR 827) published under Section 32 of NEM:AQA prescribe the general measures for the control of dust in all areas, and provide a standard for acceptable dustfall rates for residential and non-residential areas. In accordance with the Regulations (GNR 827) any person who conducts any activity in such a way as to give rise to dust in quantities and concentrations that may exceed the dustfall standard set out in Regulation 03 must, upon receipt of a notice from the air quality officer, implement a dustfall monitoring programme. Any person who has exceeded the dustfall standard set out in Regulation 03 must, within three months after submission of the dustfall monitoring report, develop and submit a dust management plan to the air quality officer for approval.	Northern Cape DAEARDLR / ZF Mgcawu District Municipality	In the event that the project results in the generation of excessive levels of dust the possibility could exist that a dustfall monitoring programme would be required for the project, in which case dustfall monitoring results from the dustfall monitoring programme would need to be included in a dust monitoring report, and a dust management plan would need to be developed.
National Heritage Resources Act (No. 25 of 1999) (NHRA)	Section 07 of the NHRA stipulates assessment criteria and categories of heritage resources according to their significance. Section 35 of the NHRA provides for the protection of all archaeological and palaeontological sites, and meteorites. Section 36 of the NHRA provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority. Section 38 of the NHRA lists activities which require developers or any person who intends to undertake a listed activity to notify the responsible heritage resources authority	South African Heritage Resources Agency (SAHRA) Ngwao Boswa Kapa Bokone – provincial heritage authority	A Heritage Impact Assessment will be undertaken for the project as per the requirements of Section 38 of the NHRA. The Heritage Impact Assessment will be made available in the EIA Phase. Should a heritage resource be impacted upon, a permit may be required from SAHRA or Ngwao Boswa Kapa Bokone (NBKB) in accordance with of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668).

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	and furnish it with details regarding the location, nature, and extent of the proposed development. Section 44 of the NHRA requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction.		
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Section 53 of NEM:BA provides for the MEC / Minister to identify any process or activity in such a listed ecosystem as a threatening process. Three government notices have been published in terms of Section 56(1) of NEM:BA as follows: » Commencement of TOPS Regulations, 2007 (GNR 150). » Lists of critically endangered, vulnerable and protected species (GNR 151). » TOPS Regulations (GNR 152). It provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (NEM:BA: National list of ecosystems that are threatened and in need of protection, (Government Gazette 37596, GNR 324), 29 April 2014).	DFFE Northern Cape DAEARDLR	Under NEM:BA, a permit would be required for any activity that is of a nature that may negatively impact on the survival of a listed protected species. An Ecological Impact Assessment will be undertaken as part of the EIA Phase to identify the presence of any listed protected species present on site which will require a permit.
National Environmental Management: Biodiversity Act (No.	Chapter 5 of NEM:BA pertains to alien and invasive species, and states that a person may not carry out a restricted	DFFE	An Ecological Impact Assessment will be undertaken as part of the EIA Phase to identify

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
10 of 2004) (NEM:BA)	activity involving a specimen of an alien species without a permit issued in terms of Chapter 7 of NEM:BA, and that a permit may only be issued after a prescribed assessment of risks and potential impacts on biodiversity is carried out. Applicable, and exempted alien and invasive species are contained within the Alien and Invasive Species List (GNR 864).	Northern Cape DAEARDLR	the presence of any alien and invasive species present on site.
Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA)	Section 05 of CARA provides for the prohibition of the spreading of weeds. Regulation 15 of GN R1048 published under CARA provides for the classification of categories of weeds and invader plants, and restrictions in terms of where these species may occur. Regulation 15E of GN R1048 published under CARA provides requirement and methods to implement control measures for different categories of alien and invasive plant species.	DALRRD	CARA will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies need to be developed and implemented. In addition, a weed control and management plan must be implemented. In terms of Regulation 15E (GN R1048) where Category 1, 2 or 3 plants occur a land user is required to control such plants by means of one or more of the following methods: » Uprooting, felling, cutting or burning. » Treatment with a weed killer that is registered for use in connection with such plants in accordance with the directions for the use of such a weed killer. » Biological control carried out in accordance with the stipulations of the Agricultural Pests Act (No. 36 of 1983), the ECA and any other applicable legislation. » Any other method of treatment recognised by the executive officer that has as its object the control of plants

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			concerned, subject to the provisions of sub-regulation 4. » A combination of one or more of the methods prescribed, save that biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods to the extent that the agents are destroyed or become ineffective.
National Forests Act (No. 84 of 1998) (NFA)	According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. Notice of the List of Protected Tree Species under the National Forests Act (No. 84 of 1998) was published in GNR 734. The prohibitions provide that "no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister".	DFFE	A licence is required for the removal of protected trees. It is therefore necessary to conduct a survey that will determine the number and relevant details pertaining to protected tree species present in the development footprint for the submission of relevant permits to authorities prior to the disturbance of these individuals. An Ecological Impact Assessment will be undertaken as part of the EIA Phase to identify the presence of any protected trees present on site which will require a permit.
National Veld and Forest Fire Act (No. 101 of 1998) (NVFFA)	Chapter 4 of the NVFFA places a duty on owners to prepare and maintain firebreaks, the procedure in this regard, and the role of adjoining owners and the fire protection association. Provision is also made for the making of firebreaks on the international boundary of the Republic of South Africa. The applicant must ensure that firebreaks are wide and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land, it does not cause soil erosion, and it is reasonably free of inflammable material capable of carrying a veldfire across it.	DFFE	While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of the Limestone PV1 Solar Energy Facility, in terms of the preparation and maintenance of firebreaks, and the need to provide appropriate equipment and trained personnel for firefighting purposes.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	Chapter 5 of the Act places a duty on all owners to acquire equipment and have available personnel to fight fires. Every owner on whose land a veldfire may start or burn or from whose land it may spread must have such equipment, protective clothing and trained personnel for extinguishing fires, and ensure that in his or her absence responsible persons are present on or near his or her land who, in the event of fire, will extinguish the fire or assist in doing so, and take all reasonable steps to alert the owners of adjoining land and the relevant fire protection association, if any.		
Hazardous Substances Act (No. 15 of 1973) (HAS)	This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger, to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance » Group IV: any electronic product, and » Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate	Department of Health (DoH)	It is necessary to identify and list all Group I, II, III, and IV hazardous substances that may be on site and in what operational context they are used, stored or handled. If applicable, a license would be required to be obtained from the DoH.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	license being in force.		
National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA)	The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by – » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. In terms of the Regulations published in terms of NEM:WA (GNR 912), a BA or EIA is required to be undertaken for identified listed activities. Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that: » The containers in which any waste is stored, are intact and not corroded or in » Any other way rendered unlit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise, and » Pollution of the environment and harm to health are prevented.	DFFE – Hazardous Waste Northern Cape DAEARDLR – General Waste	No waste listed activities are triggered by the project, and therefore, no Waste Management License is required to be obtained. General and hazardous waste handling, storage and disposal will be required during construction and operation. The National Norms and Standards for the Storage of Waste (GNR 926) published under Section 7(1)(c) of NEM:WA will need to be considered in this regard.
National Road Traffic Act (No. 93 of 1996) (NRTA)	The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on	South African National Roads Agency (SANRAL) – national roads	An abnormal load / vehicle permit may be required to transport the various components to site for construction. These include route

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.	Northern Cape Department: Transport, Safety and Liaison	clearances and permits required for vehicles carrying abnormally heavy or abnormally dimensioned loads and transport vehicles exceeding the dimensional limitations (length) of 22m. Depending on the trailer configuration and height when loaded, some of the onsite substation and BESS components may not meet specified dimensional limitations (height and width) which will require a permit.
Astronomy Geographic Advantage Act (Act 21 of 2007)	» Preservation and protection of areas within South Africa that are uniquely suited for optical and radio astronomy. » In terms of section 7(1) and 7(2) of this Act, the Minister declared core astronomy advantage areas on 20 August 2010 under Regulation No. 723 of Government Notice No. 33462. In this regard, all land within a 3 kilometres radius of the centre of the Southern African large Telescope dome falls under the Sutherland Core Astronomy Advantage Area. The declaration also applies to the core astronomy advantage area containing the MeerKAT radio telescope and the core of the planned Square Kilometre Array (SKA) radio telescope. The study area does not fall within the 3 km radius of SALT or within an area which could affect the	Department of Science and Technology	The study area falls within the Northern Cape. SARAO should be consulted as a key stakeholder to confirm that the project will not impact on the SKA and to determine any specific requirements.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	MeerKAT and SKA developments. » Under Section 22(1) of the Act the Minister has the authority to protect the radio frequency spectrum for astronomy observations within a core or central astronomy advantage area. As such, the Minister may still under section 23(1) of the Act, declare that no person may undertake certain activities within a core or central astronomy advantage area. These activities include the construction, expansion or operation of any fixed radio frequency interference source, facilities for the generation, transmission or distribution of electricity, or any activity capable of causing radio frequency interference or which may detrimentally influence the astronomy and scientific endeavour.		
	Provincial Policies / Legislation		
Northern Cape Nature Conservation Act (Act No. 9 of 2009)	This Act provides for the sustainable utilisation of wild animals, aquatic biota and plants; provides for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; provides for offences and penalties for contravention of the Act; provides for the appointment of nature conservators to implement the provisions of the Act; and provides for the issuing of permits and other authorisations. Amongst other regulations, the following may apply to the current project: » Boundary fences may not be altered in such a way as to prevent wild animals from freely moving onto or off of a property; » Aquatic habitats may not be destroyed or damaged; » The owner of land upon which an invasive species is found (plant or animal) must take the necessary steps to	Northern Cape DAEARDLR	A collection/destruction permit must be obtained from Northern Cape DAEARDLR for the removal of any protected plant or animal species found on site. Should these species be confirmed within the development footprint during any phase of the project, permits will be required. An Ecological Impact Assessment will be undertaken as part of the EIA Phase to identify the presence of any listed species present on site which will require a permit.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	eradicate or destroy such species; » The Act provides lists of protected species for the Province.		

7.10.1 Best Practice Guidelines Birds & Solar Energy (2017)

The Best Practice Guidelines Birds & Solar Energy (2017) proposed by the Birds and Renewable Energy Specialist Group (BARESG) (convened by BirdLife South Africa and the Endangered Wildlife Trust) contain guidelines for assessing and monitoring the impact of solar generation facilities on birds in Southern Africa. The guidelines recognise the impact that solar energy may have on birds, through for example the alteration of habitat, the displacement of populations from preferred habitat, and collision and burn mortality associated with elements of solar hardware and ancillary infrastructure; and the fact that the nature and implications of these effects are poorly understood.

The guidelines are aimed at Environmental Assessment Practitioners (EAPs), avifaunal specialists, developers and regulators and propose a tiered assessment process, including:

(i) Preliminary avifaunal assessment – an initial assessment of the likely avifauna in the area and possible impacts, preferably informed by a brief site visit and by collation of available data; also including the design of a site-specific survey and monitoring project should this be deemed necessary.
(ii) Data collection – further accumulation and consolidation of the relevant avian data, possibly including the execution of baseline data collection work (as specified by the preliminary assessment), intended to inform the avian impact study.
(iii) Impact assessment – a full assessment of the likely impacts and available mitigation options, based on the results of systematic and quantified monitoring if this was deemed a requisite at preliminary assessment.
(iv) Monitoring – repetition of baseline data collection, plus the collection of mortality data. This helps to develop a complete before and after picture of impacts, and to determine if proposed mitigation measures are implemented and are effective, or require further refinement. Monitoring may only be necessary for projects with the potential for significant negative impacts on birds (i.e. large area affected and / or vulnerable species present).

In terms of the guidelines the quantity and quality of baseline data required to inform the assessment process at each site should be set in terms of the size of the site and the predicted impacts of the solar technology in question, the anticipated sensitivity of the local avifauna (for example, the diversity and relative abundance of priority species present, proximity to important flyways, wetlands or other focal sites) and the amount of existing data available for the area.

Data collection could vary from a single, short field visit (Regime 1, for e.g. at a small or medium sized site with low avifaunal sensitivity), to a series of multi-day survey periods, including the collection of various forms of data describing avian abundance, distribution and movement and spread over 12 months (Regime 3, for e.g. at a large developments located in a sensitive habitat, or which otherwise may have significant impacts on avifauna). **Table 7.6** is taken from the best practise guidelines and provides a summary of the recommended assessment regimes in relation to proposed solar energy technology, project size, and likely risk).

Table 7.2: Recommended avian assessment regimes in relation to proposed solar energy technology, project size, and known impact risks.

Type of technology*	Size**	Avifaunal Sensitivity***		
		Low	Medium	High
All except CSP power tower	Small (< 30ha)	Regime 1	Regime 1	Regime 2
	Medium (30 – 150ha)	Regime 1	Regime 2	Regime 2
	Large (> 150ha)	Regime 2****	Regime 2	Regime 3
CSP power tower	All	Regime 3		

Regime 1: One site visit (peak season); minimum 1 – 5 days.
Regime 2: Pre- and post-construction; minimum 2 – 3 x 3 – 5 days over 6 months (including peak season); carcass searches.
Regime 3: Pre- and post-construction; minimum 4 – 5 x 4 – 8 days over 12 months, carcass searches.

* Different technologies may carry different intrinsic levels of risk, which should be taken into account in impact significance ratings

** For multi-phased projects, the aggregate footprint of all the phases should be used. At 3ha per MW, Small = < 10MW, Medium = 10 – 50MW, Large = > 50MW.

*** The avifaunal sensitivity is based on the number of priority species present, or potentially present, the regional, national or global importance of the affected area for these species (both individually and collectively), and the perceived susceptibility of these species (both individually and collectively) to the anticipated impacts of development. For example, an area would be considered to be of high avifaunal sensitivity if one or more of the following is found (or suspected to occur) within the broader impact zone:

1) Avifaunal habitat (e.g. a wetlands, nesting or roost sites) of regional or national significance.
2) A population of a priority species that is of regional or national significance.
3) A bird movement corridor that is of regional or national significance.
4) A protected area and / or Important Bird and Biodiversity Area.

An area would be considered to be of medium avifaunal sensitivity if it does not qualify as high avifaunal sensitivity, but one or more of the following is found (or suspected to occur) within the broader impact zone

1) Avifaunal habitat (e.g. a wetland, nesting or roost sites) of local significance.
2) A locally significant population of a priority species.
3) A locally significant bird movement corridor.

An area would be considered to be of low avifaunal sensitivity if it is does not meet any of the above criteria.

**** Regime 1 may be applied to some large sites, but only in instances where there is abundant existing data to support the assessment of low sensitivity.

Bird distribution patterns fluctuate widely in response to environmental conditions (e.g., local rainfall patterns, nomadism, migration patterns, seasonality), meaning that a composition noted at a particular moment in time will differ during another time period at the same locality. For this reason a regime 2 survey - i.e. 2 surveys over 6 months, will be used to inform both the development footprint as well as Avifauna Impact Assessment report to be completed for the EIA phase.

7.10.2 The IFC Environmental Health and Safety (EHS) Guidelines

The IFC EHS Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). The following IFC EHS Guidelines have relevance to the proposed project:

» IFC EHS General Guidelines
» IFC Project Developer's Guide to Utility-Scale Solar Photovoltaic Power Plants

The General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines, however no Industry Sector EHS Guidelines have been developed for PV solar power to date. The application of the General EHS Guidelines should be tailored to the hazards and risks associated with a project, and should take into consideration site-specific variables which may be applicable, such as host country context, assimilative capacity of the environment, and other project factors. In instances where host country regulations differ from the standards presented in the EHS Guidelines, whichever is the more stringent of the two in this regard should be applied.

The General EHS Guidelines include consideration of the following:

- Environmental:
  - Air Emissions and Ambient Air Quality
  - Energy Conservation
  - Wastewater and Ambient Water Quality
  - Water Conservation
  - Hazardous Materials Management
  - Waste Management
  - Noise
  - Contaminated Land
- Occupational Health and Safety:
  - General Facility Design and Operation
  - Communication and Training
  - Physical Hazards
  - Chemical Hazards
  - Biological Hazards
  - Radiological Hazards
  - Personal Protective Equipment (PPE)
  - Special Hazard Environments
  - Monitoring
- Community Health and Safety:
  - Water Quality and Availability
  - Structural Safety of Project Infrastructure
  - Life and Fire Safety (L&FS)
  - Traffic Safety
  - Transport of Hazardous Materials
  - Disease Prevention
  - Emergency Preparedness and Response
- Construction and Decommissioning:
  - Environment
  - Occupational Health & Safety
  - Community Health & Safety

7.10.3 IFC's Project Developer's Guide to Utility-Scale Solar Photovoltaic Power Plants (2015)

While no Industry Sector EHS Guidelines have been developed for PV Solar Power, the IFC has published a Project Developer's Guide to Utility-Scale Solar Photovoltaic Power Plants (IFC, 2015). Chapter 8 of the Project Developer's Guide pertains to Permits, Licensing and Environmental Considerations, and states

that in order to deliver a project which will be acceptable to international lending institutions, environmental and social assessments should be carried out in accordance with the requirements of the key international standards and principles, namely the Equator Principles and IFC's Performance Standards (IFC PS).

Some of the key environmental considerations for solar PV power plants contained within the Project Developer's Guide include:

- Construction phase impacts (i.e. OHS, temporary air emissions from dust and vehicle emissions, noise related to excavation, construction and vehicle transit, solid waste generation and wastewater generation from temporary building sites and worker accommodation).
- Water usage (i.e. the cumulative water use requirements).
- Land matters (i.e. land acquisition procedures and the avoidance or proper mitigation of involuntary land acquisition / resettlement).
- Landscape and visual impacts (i.e. the visibility of the solar panels within the wider landscape and associated impacts on landscape designations, character types and surrounding communities).
- Ecology and natural resources (i.e. habitat loss / fragmentation, impacts on designated areas and disturbance or displacement of protected or vulnerable species).
- Cultural heritage (i.e. impacts on the setting of designated sites or direct impacts on below-ground archaeological deposits as a result of ground disturbance during construction).
- Transport and access (i.e. impacts of transportation of materials and personnel).
- Drainage / flooding (i.e. flood risk associated with the site).
- Consultation and disclosure (i.e. consulting with key authorities, statutory bodies, affected communities and other relevant stakeholders as early as possible).
- Environmental and Social Management Plan (ESMP) (i.e. compile an ESMP to ensure that mitigation measures for relevant impacts are identified and incorporated into project construction procedures and contracts).

CHAPTER 8: DESCRIPTION OF THE AFFECTED ENVIRONMENT

This section of the Scoping Report provides a description of the local environment. This information is provided in order to assist the reader in understanding the pre-construction conditions of the environment within which the proposed project is proposed. Aspects of the biophysical, social, and economic environment that could be directly or indirectly affected by, or could affect, the proposed development have been described. This information has been sourced from both existing information available for the area as well as collected field data undertaken by specialist consultants and aims to provide the context within which this EIA process is being conducted.

8.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Scoping Report

This chapter includes the following information required in terms of the EIA Regulations, 2014 - Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
3(1)(g)(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The environmental attributes associated with the development of the Limestone PV1 Solar Energy Facility are included as a whole within this chapter. The environmental attributes that are assessed within this chapter include the following: » The regional setting of the broader study area and the project site indicates the geographical aspects associated with the Limestone PV1 Solar Energy Facility. This is included in **Section 8.2**. » The climatic conditions present within the broader study area have been included in **Section 8.3**. » The biophysical characteristics of the project site and the surrounding areas are included in **Section 8.4**. The characteristics considered are topography and terrain, geology, soils and agricultural potential and the ecological profile which includes the vegetation patterns, listed plant species, critical biodiversity areas and broad-scale processes, freshwater resources, terrestrial fauna, and avifauna. » The heritage and cultural aspects (including archaeology and palaeontology) have been included in **Section 8.5**. » The visual quality of the surrounding area and the project site has been considered in **Section 8.6**. » The socio-economic characteristics associated with the broader study area and the project site have been included in **Section 8.7**

A more detailed description of each aspect of the affected environment is included within the specialist Scoping Reports contained within **Appendices G – L**.

8.2. Regional Setting

The Limestone PV1 Solar Energy Facility is located ~16km south-east of the town of Danielskuil and 10km east of Lime Acres in the Northern Cape Province. The site is located within the Kgatelopele Local Municipality and the ZF Mgcawu District Municipality. The Northern Cape Province, within which the project site is located, is situated in the north-western corner of South Africa and has a land area of 372,889 km^2, therefore occupying approximately 30% of South Africa's land area and making it the largest province in South Africa with the smallest population. The Northern Cape Province is known for its mining and agricultural sectors. The Northern Cape Province comprises of five district municipalities, namely, Frances Baard, John Taolo Gaetsewe, Namakwa, Pixley Ka Seme and ZF Mgcawu (refer **to Figure 8.1**) – which contain twenty six (26) local municipalities collectively, with the project site being located within the ZF Mgcawu District Municipality and Kgatelopele Local Municipality.

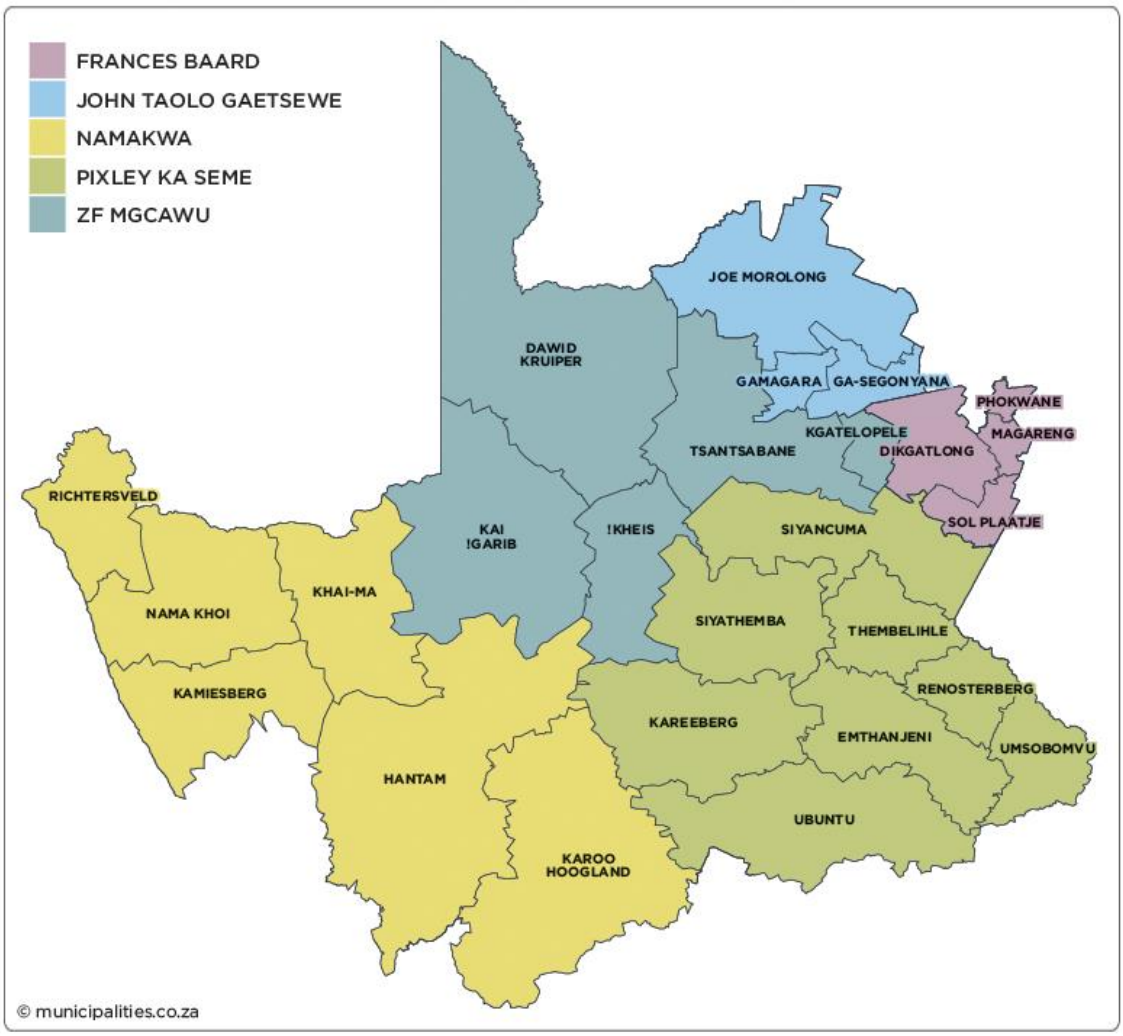


Figure 8.1: District municipalities of the Northern Cape Province (Source: Municipalities of South Africa)

The ZF Mgcawu District Municipality is a Category C municipality bordered by Botswana in the north and Namibia in the west, John Taolo Gaesewe, Frances Baard to the east and Pixley Ka Seme and Namakwa to the south. The district makes up just under a third of the province's geographical area, which mainly comprise of the vast Kalahari Desert, Kgalagadi Transfrontier Park and the former Bushmanland.

The ZF Mgcawu District Municipality comprises five local municipalities, namely, !Kheis, Dawid Kruiper, Kai !Garib, Tsantsabane and Kgatelopele (refer to **Figure 8.2**). According to Stats SA (2016 Community

Survey), ZF Mgcawu's population increased from 236 783 in 2011 to 252 692 people in 2016. The economy of the ZF Mgcawu District Municipality is driven by agriculture, mining, tourism and manufacturing.

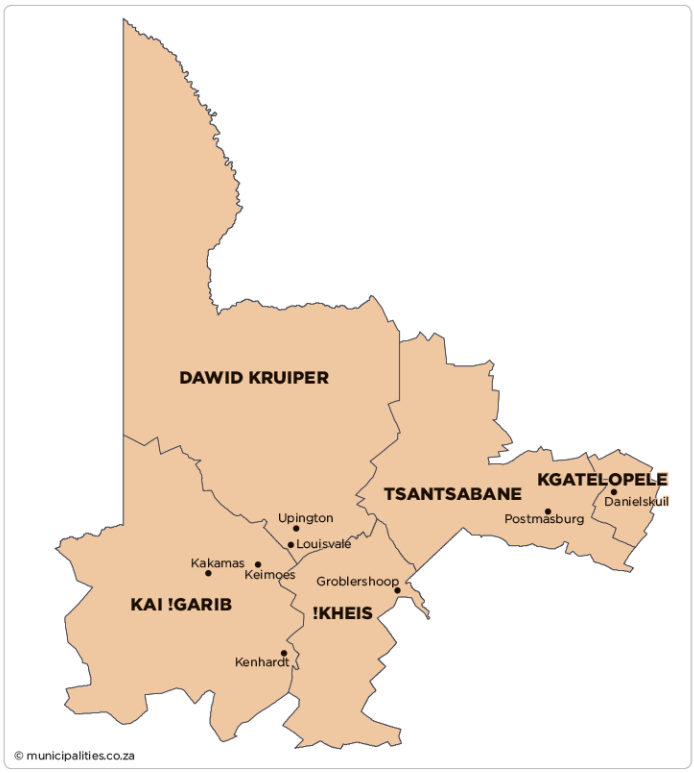


Figure 8.2: Local municipalities of the ZF Mgcawu District Municipality (Source: Municipalities of South Africa

The Kgatelopele Local Municipality covers an area of 2 478km² and is named for the Setswana name for "progress". The municipality has a population of 18 687 people according to Stats SA with the largest towns in the area being those of Danielskuil and Lime Acres. Kgatelopele Local Municipality is bordered by the John Taolo Gaetsewe District in the north, the Pixley ka Seme District in the south, the Frances Baard District in the east, and Tsantsabane in the west. It is the smallest of the five municipalities that make up the district, accounting for only 2% of its geographical area. Primary economic sectors in the municipality include mining, agriculture, manufacturing, business services

8.3. Climatic Conditions

The region within which the project site is located is characterised as having a semi-arid climate. The area has a mean annual precipitation of 246mm with the majority of rainfall occurring during summer. The region is also characterised by high and low extreme temperatures during the summer and winter (refer to **Figure 8.3**).

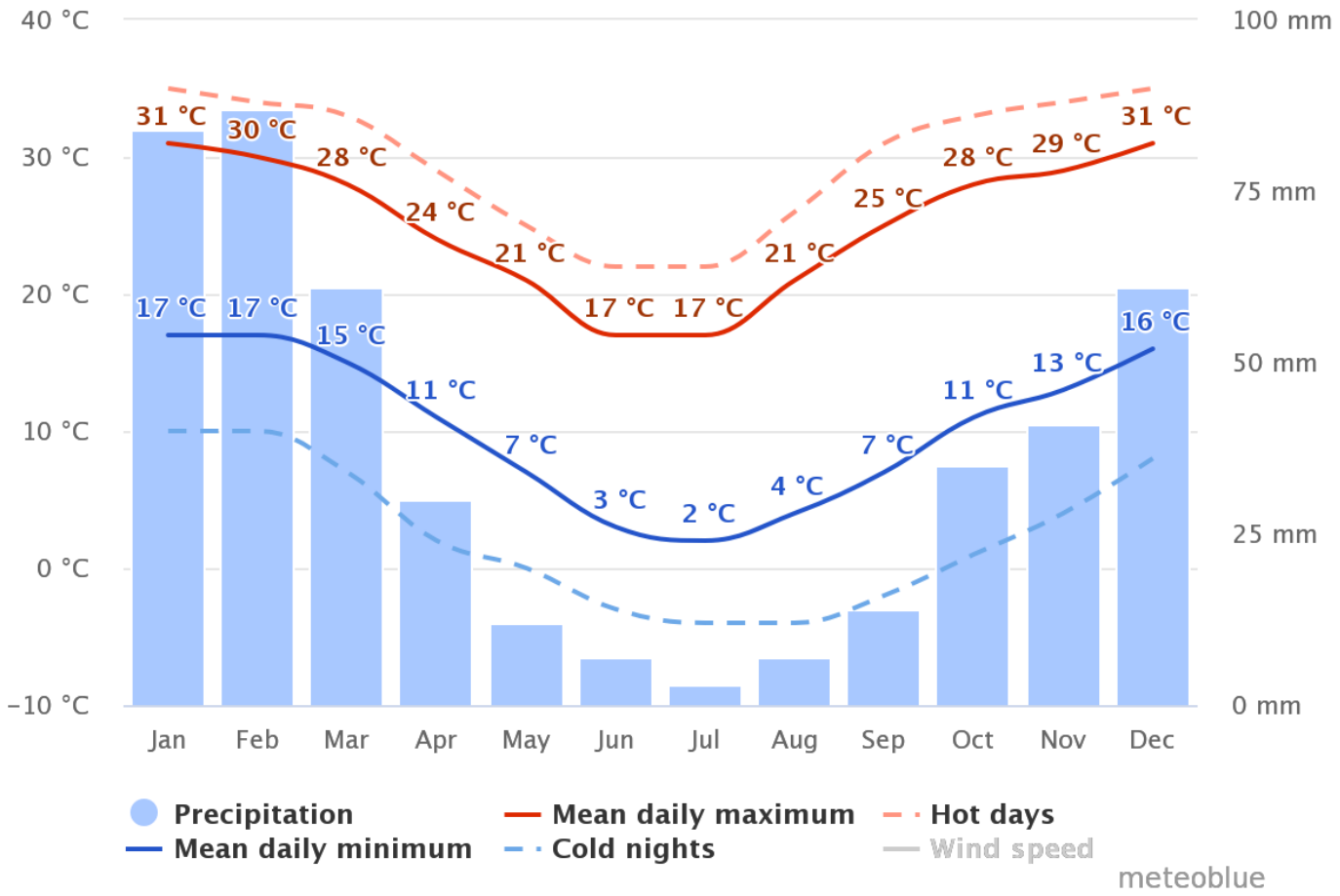


Figure 8.3: Climatic graph for the broader region within which the proposed project site is located (Source: https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/dani%C3%ABlskuil_south-africa_1011918)

8.4. Biophysical Characteristics of the Project Site

The following section provides an overview and description of the biophysical characteristics of the study area and has been informed by specialist studies (**Appendices G – L**) undertaken for this Scoping Report.

8.4.1 Topographical profile

The study area occurs on land that ranges in elevation from approximately 1424m above sea level in the Great Pan and Rooipan in the west to 1454 metres above sea level (MASL) on the site itself and areas to the north and south west. The terrain surrounding the proposed property is generally flat. Most of the regulated area is characterised by a gentle slope percentage between 0 to 10% with some few irregularities in areas with slopes reaching 20%. This illustration indicates a more uniform topography with occurrence of some few steep sloping areas being present. The Digital Elevation Model (DEM) of the project area indicates an elevation of 1 435 to 1 500 MASL (Refer to **Figure 8.4**).

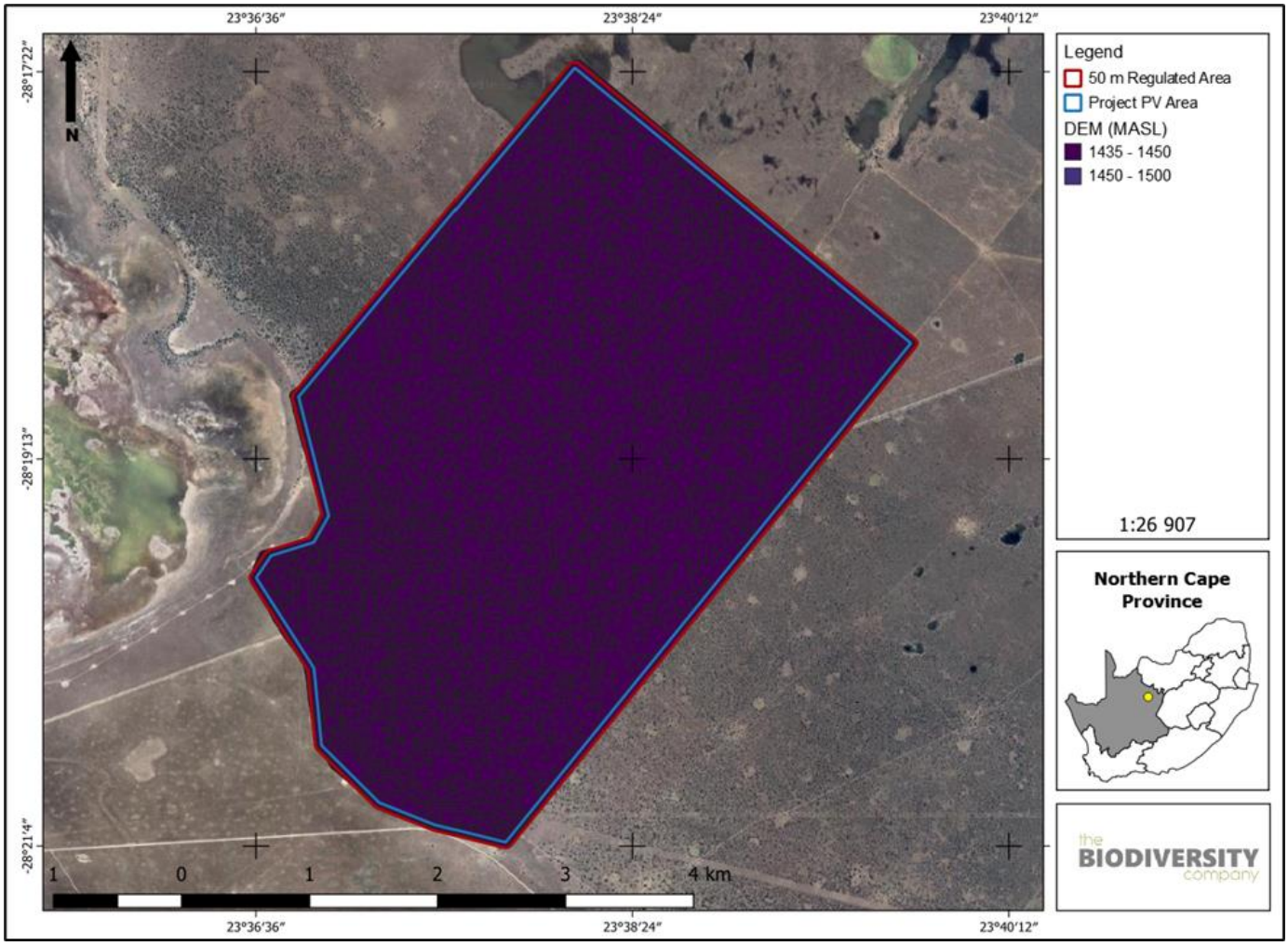


Figure 8.4: Digital Elevation Model map of the project within which the Limestone PV1 Solar Energy Facility is proposed.

8.4.2 Geology, Soils and Agricultural Potential

Geological Setting

The proposed Limestone PV1 project site is mostly underlain by sediments of the Ongeluk Formation, Danielskuil Member, Kuruman Member of the Asbesberge Formation, Lime Acres Member of the Ghaap Plateau and Surface Limestone Quaternary Sands. The geology of the project site is indicated in **Figure 8.5**.

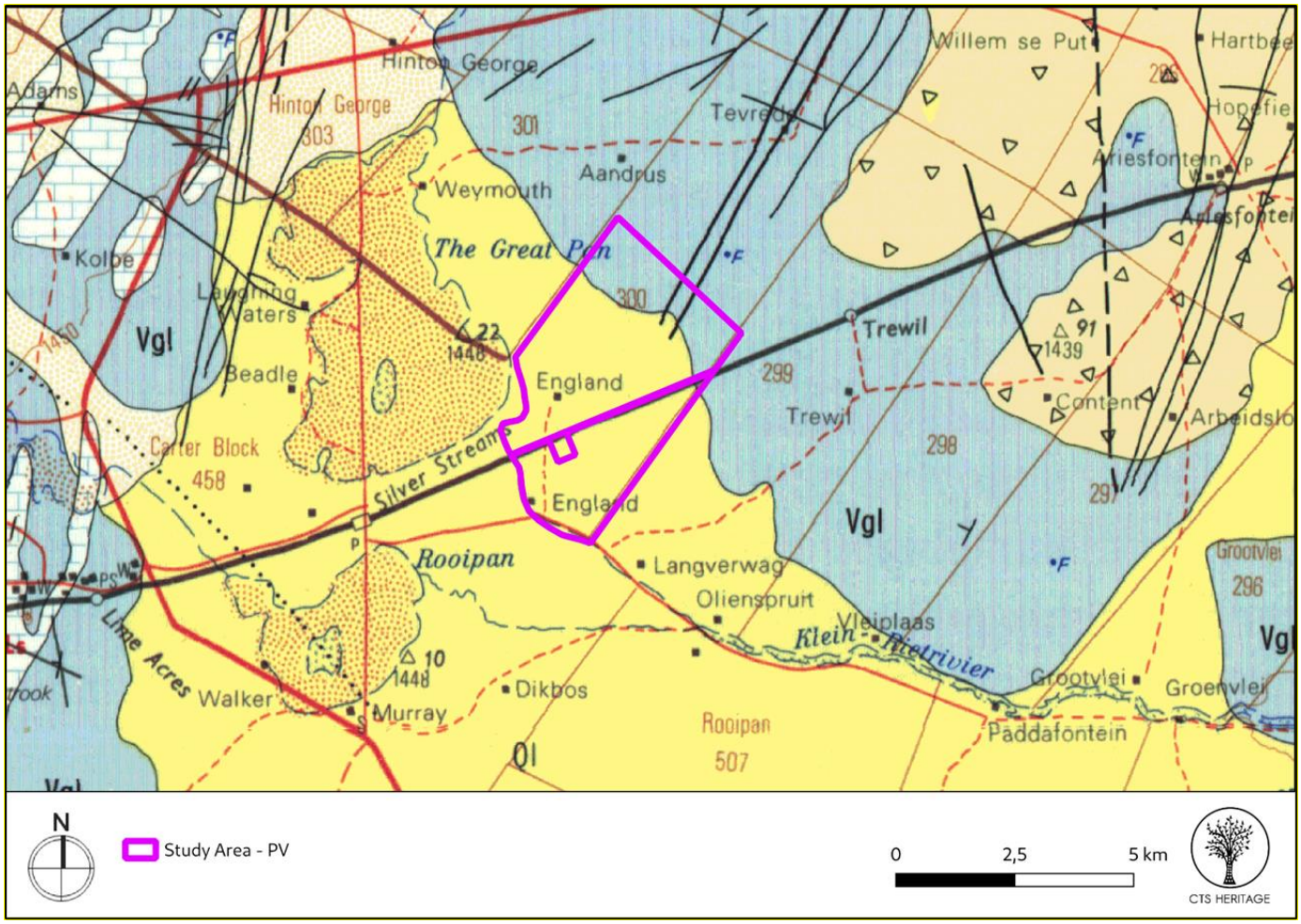


Figure 8.5: Extract from the CGS 2822 Postmasburg Map indicating the geological setting of the project site

Land Type, Soil Forms and Land Capability

According to the land type database (Land Type Survey Staff, 1972 - 2006) the proposed project site falls within the Fc 04 land type. The Fc 04 land type mostly consists of bare rocks and Mispah soil forms following the South African soil classification working group (1990) with the possibility of other soils occurring throughout the landscapes. The area is also characterised with the Glenrosa soil form and shallow soils. Lime is absent in the entire terrain landscape.

The most sensitive soil forms identified within the assessment area are the Etosha and Vaalbos soil forms, with other associated soils also occurring. The Etosha soil form has an orthic topsoil with a neocutanic subsurface horizon underlain by a soft carbonate horizon. The Vaalbos soil form consists of an orthic topsoil horizon on top of a red apedal horizon merging into a hard rock substratum below

The land capability of the above-mentioned soils has been determined to have land capability classes of "III" and "IV" with a climate capability level 8 given the low Mean Annual Precipitation (MAP) and the high Mean Annual Potential Evapotranspiration (MAPE) rates. The combination between the determined land capability and climate capability results in land potential "L6". The "L6" land potential level is characterised by a very restricted potential. Regular and/or severe limitations occur due to soil, slope, temperatures or rainfall. These areas are non-arable. The "L6" land potential of the assessment area is characterized with an overall "Low" sensitivity following the baseline findings (refer to **Figure 8.6**).

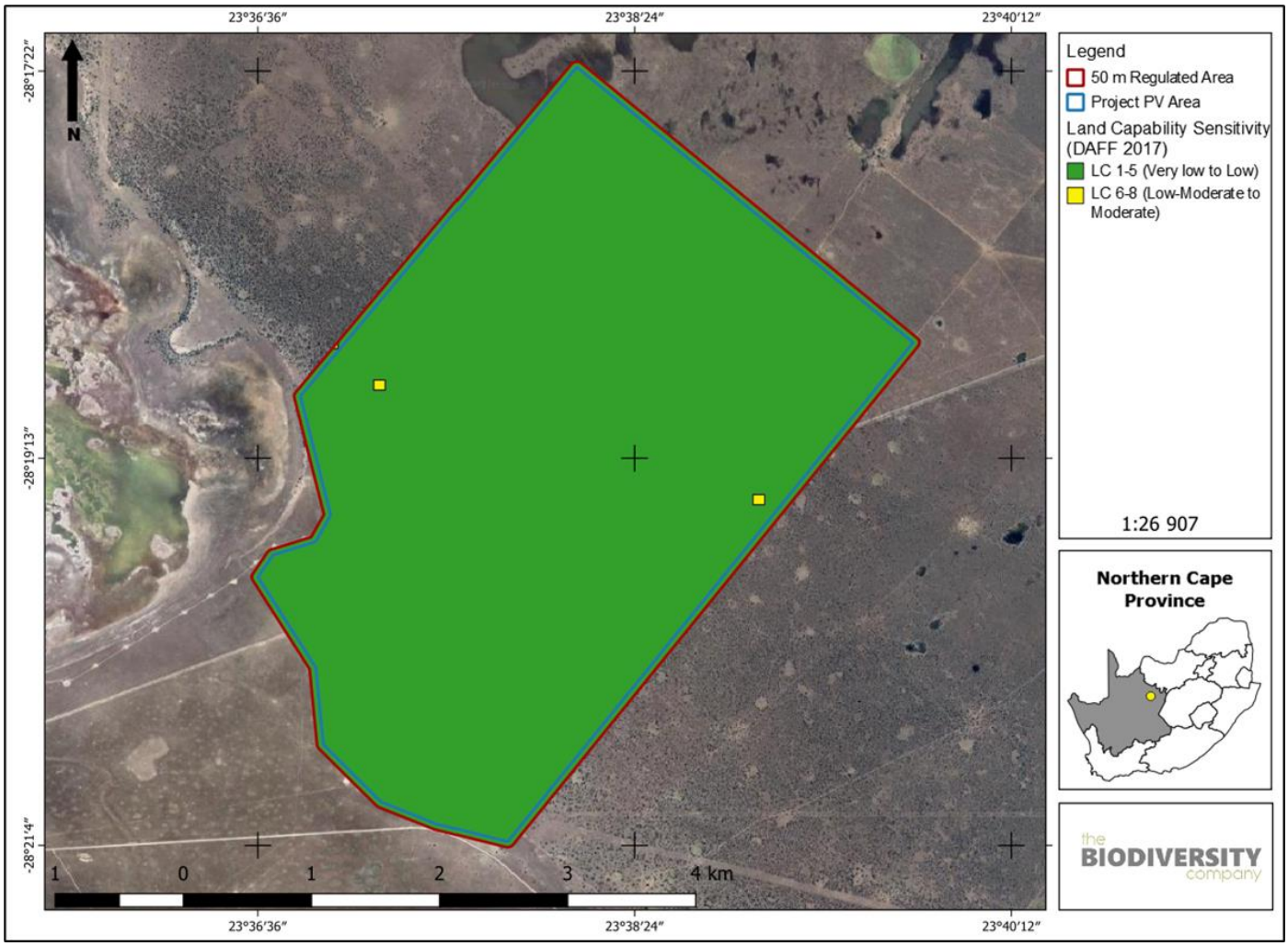


Figure 8.6: Land capacity present within the Limestone PV1 project site

8.4.3 Land Use

Land uses within the surrounding areas includes limestone mining, watercourses, livestock, and game farming activities. Historically, grazing from livestock and mismanagement has led to (limited) deterioration of the area.

The project site consists of natural grassland, low shrubland and open woodland. There are two Eskom substations (Olien and Trewill) and a homestead located within the project site. Power lines and a road traverse the site.

8.4.4 Ecological Profile of the Broader Study Area and the Project Site

i. Broad-Scale Vegetation Patterns

The study area is situated within the savanna biome. The savanna vegetation of South Africa represents the southern-most extension of the most widespread biome in Africa (Mucina & Rutherford, 2006). The savanna biome is the largest biome in South Africa, extending throughout the east and north-eastern areas of the country. Most savanna vegetation communities are characterised by a herbaceous layer dominated by grasses and a discontinuous to sometimes very open tree layer (Mucina & Rutherford, 2006).

Savannas are characterised by a dominant grass layer, over-topped by a discontinuous, but distinct woody plant layer. At a structural level, Africa's savannas can be broadly categorised as either fine-leaved (microphyllous) savannas or broad-leaved savannas. Fine-leaved savannas typically occur on nutrient rich soils and are dominated by microphyllous woody plants of the Mimosaceae family and a generally dense herbaceous layer (Scholes & Walker, 1993).

On a fine-scale vegetation type, the study area overlaps with two vegetation types: the Ghaap Plateau Vaalbosveld and the Southern Kalahari Mekgacha (Refer to **Figure 8.7**).

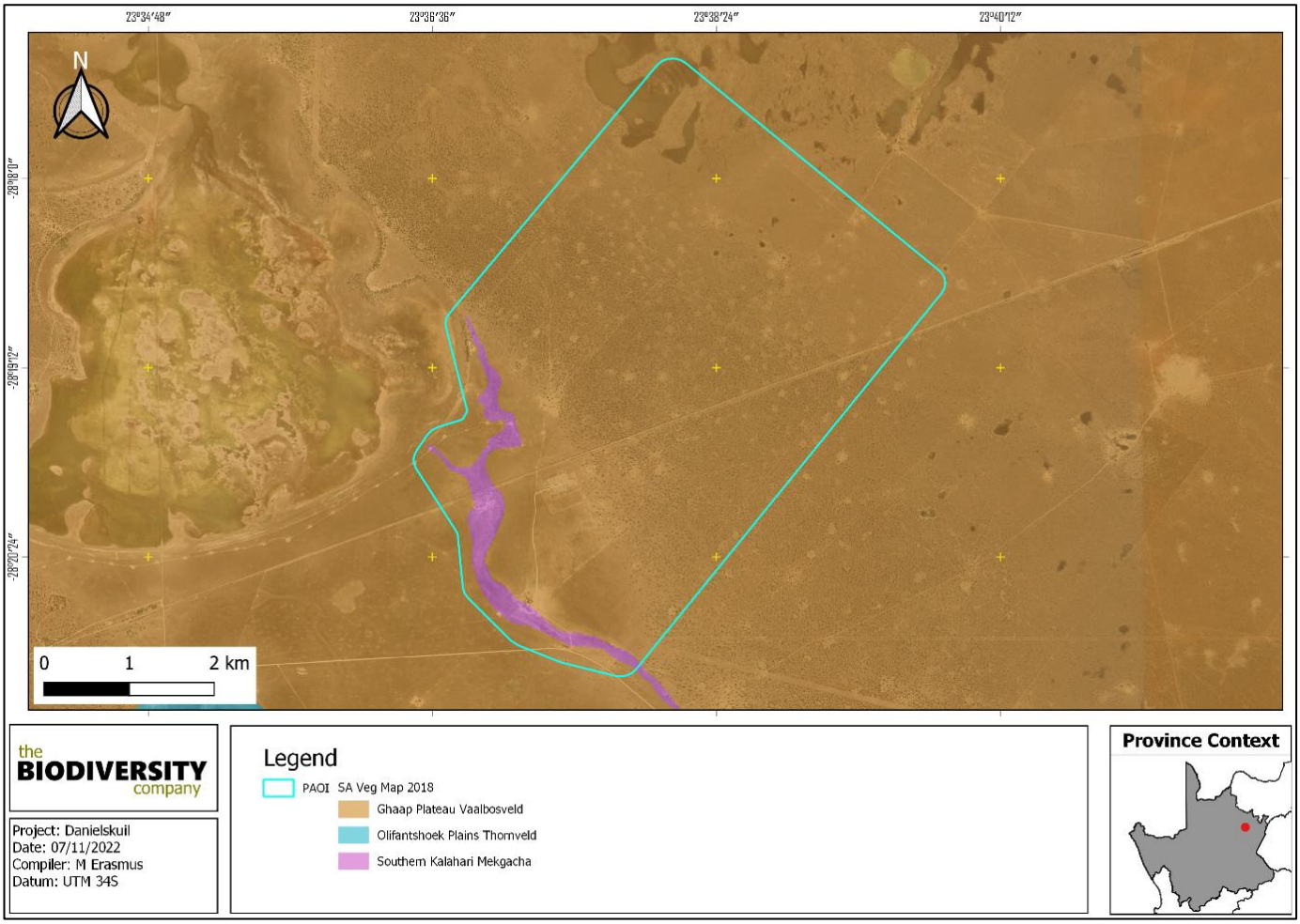


Figure 8.7: National vegetation map of the project site showing the vegetation types that comprise the Limestone PV1 project site.

Ghaap Plateau Vaalbosveld

The vegetation type is known for flat plateau areas with a well-developed shrub layer with *Tarchonanthus camphoratus* and *Vachellia karroo*. Areas may exhibit an open tree layer with *Olea europaea subsp. africana*, V. *tortilis, Ziziphus mucronata* and *Searsia lancea*. The presence of Olea is more important in the southern parts of the unit, while V. *tortilis, V. hebeclada* as well as *Senegalia mellifera* are more important in the north and part of the west of the unit. The south-central part of this unit has remarkably low cover of Thorn tree species for an arid savanna and is dominated by the non-thorny T. *camphoratus, s. lancea* and *O. europaea subsp. africana* (Mucina and Rutherford,2006).

Based on Mucina and Rutherford's (2006) vegetation classification, important plant taxa are those species that have a high abundance, a frequent occurrence (not being particularly abundant); or are prominent in the landscape within a particular vegetation type. They note the following species are important taxa in the Ghaap Plateau Vaalbosveld vegetation type:

Table 8.1: Important Plant Taxa found within the Ghaap Plateau Vaalbosveld vegetation type

IMPORTANT SPECIES	
Growth Form	**Key Species**
Trees	*Vachellia erioloba.*
Small Trees	*Senegalia mellifera subsp. detinens, Searsia lancea, Vachellia karroo, V. tortilis subsp. heteracantha, Boscia albitrunca.*
Tall Shrubs	*Olea europaea subsp. cuspidata, Rhigozum trichotomum, Tarchonanthus camphoratus, Ziziphus mucronata, Diospyros austro-africana, D. pallens, Ehretia rigida subsp. rigida, Euclea crispa subsp. ovata, Grewia flava, Gymnosporia buxifolia, Lessertia frutescens, Searsia tridactyla.*
Low Shrubs	*Vachellia hebeclada subsp. hebeclada, Aptosimum procumbens, Chrysocoma ciliata, Helichrysum zeyheri, Hermannia comosa, Lantana rugosa, Leucas capensis, Melolobium microphyllum, Peliostomum leucorrhizum, Pentzia globosa, P. viridis, Zygophyllum pubescens*
Succulent Shrubs	*Hertia pallens, Lycium cinereum.*
Semi parasitic Shrub	*Thesium hystrix*
Woody Climber	*Asparagus africanus*
Graminoids	*Anthephora pubescens, Cenchrus ciliaris, Digitaria eriantha subsp. eriantha, Enneapogon scoparius, Eragrostis lehmanniana, Schmidtia pappophoroides, Themeda triandra, Aristida adscensionis, A. congesta, A. diffusa, Cymbopogon pospischilii, Enneapogon cenchroides, E. desvauxii, Eragrostis echinochloidea, E. obtusa, E. rigidior, E. superba, Fingerhuthia africana, Heteropogon contortus, Sporobolus fimbriatus, Stipagrostis uniplumis, Tragus racemosus.*
Herbs	*Barleria macrostegia, Geigeria filifolia, G. ornativa, Gisekia africana, Helichrysum cerastioides, Heliotropium ciliatum, Hermbstaedtia odorata, Hibiscus marlothianus, H. pusillus, Jamesbrittenia aurantiaca, Limeum fenestratum, Lippia scaberrima, Selago densiflora, Vahlia capensis subsp. vulgaris.*
Succulent Herb	*Aloe grandidentata.*

Southern Kalahari Mekgacha

Sparse, patchy grasslands, sedgelands and low herblands dominated by C4 grasses on the bottom of (mostly) dry riverbeds. Low shrublands in places with patches of taller shrubland on the banks of the rivers.

Based on Mucina and Rutherford's (2006) vegetation classification, important plant taxa are those species that have a high abundance, a frequent occurrence (not being particularly abundant); or are prominent in the landscape within a particular vegetation type. They note the following species are important taxa in the Southern Kalahari Mekgacha vegetation type:

Table 8.2: Important Plant Taxa found within the dry river-bottoms that make up the Southern Kalahari Mekgacha vegetation type

IMPORTANT SPECIES	
Growth Form	**Key Species**
Tall Shrubs	*Lebeckia linearifolia, Sisyndite spartea, Deverra denudata subsp. aphylla.*

Herbs	*Amaranthus dinteri subsp. dinteri, A. praetermissus, A. schinzianus, Boerhavia repens, Chamaesyce inaequilatera, Cucumis africanus, Geigeria ornativa, G. pectidea, Heliotropium lineare, Indigofera alternans, I. argyroides, Kohautia cynanchica, Lotononis platycarpa, Osteospermum muricatum, Platycarpha carlinoides, Radyera urens, Stachys spathulata, Tribulus terrestris.*
Succulent Herb	*Zygophyllum simplex. Graminoids: Cenchrus ciliaris, Chloris virgata, Enneapogon desvauxii, Eragrostis annulata, E. bicolor, Odyssea paucinervis, Panicum coloratum, Eragrostis porosa, Panicum impeditum, Sporobolus nervosus.*

Table 8.3: Important Plant Taxa found within the rocky slopes of river canals that make up the Southern Kalahari Mekgacha vegetation type

IMPORTANT SPECIES	
Growth Form	**Key Species**
Tall Trees	*Vachellia erioloba.*
Low Shrubs	*Aptosimum lineare, Pechuel-Loeschea leubnitziae*.
Graminoids	*Setaria verticillata, Enneapogon scaber, Oropetium capense, Stipagrostis uniplumis, Tragus racemosus.*
Herbs	*Dicoma capensis.*

ii. Ecosystem Threat Status of the Broad-Scale Vegetation Types

On the basis of a scientific approach used at national level by the South African National Biodiversity Institute (SANBI), vegetation types can be categorised according to their conservation status which is, in turn, assessed according to the degree of transformation relative to the expected extent of each vegetation type. The status of a habitat or vegetation type is based on how much of its original area still remains intact relative to various thresholds. The Ecosystem Threat Status is therefore an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. According to the spatial dataset the proposed project site overlaps with a LC ecosystem (Refer to **Figure 8.8**)

The Ghaap Plateau Vaalbosveld vegetation type is considered to be Least Threatened. The vegetation type has a conservation target of 16%. None of the vegetation type is conserved in statutory conservation areas. Only about 1% has already been transformed with very low erosion. (Mucina & Rutherford, 2006).

The Southern Kalahari Mekgacha is considered to be Least Threatened. This vegetation type is 18% statutorily conserved in the Kgalagadi Transfrontier Park and Molopo Nature Reserve. About 2% has been transformed by road building. The Southern Kalahari Mekgacha vegetation type are under strong utilisation pressure by domestic animals (grazing, browsing and animal penning. Invasive *Prosopis* species have encroached in certain areas. (Mucina & Rutherford, 2006).

Figure 8.8: Ecosystem threat status map of the Limestone PV1 project site.

iii. Listed Plant Species and Plants Protected in terms of the National Environmental Management: Biodiversity Act and the Northern Cape Nature Conservation Act

A list was obtained from the SANBI database (POSA — Plants of Southern Africa) indicates that 470 species of indigenous plants are expected to occur within the study area. No SCC, based on their conservation status, are expected to occur within the study area, not including potential protected tree species.

iv. Terrestrial Fauna Communities within the Study Area

Mammals

The International Union for Conservation of Nature (IUCN) Red List Spatial Data lists 64 mammal species that could be expected to occur within the area. This list excludes large mammal species that are limited to protected areas. Six (6) of these expected species are regarded as threatened. All but one of these have a low likelihood of occurrence based on the lack of suitable habitat (refer to **Table 8.8**).

Smutsia temminckii (Temminck's Pangolin) inhabits mainly savannas and woodlands in low-lying regions with moderate to dense scrub where average annual rainfall is between 250 mm and 1 400 mm. It also occurs in floodplain grassland, rocky slopes and sandveld up to 1 700 m above sea level. The population in South Africa is estimated to be between 16 329–24 102 mature individuals (Pietersen *et al*, 2019). In the

Northern Cape Province, densities have been calculated at 0.16 reproductively active individuals/km² and overall densities at 0.23 individuals/km². The species' is over-exploited for medicinal use and is increasingly focused on core conservation areas. There has been a sharp increase in the number of individuals that have been seized from illegal trade since 2010. Changes in farming practices are directly impacting the species through habitat loss and alteration, while the increased human presence in these previously undisturbed areas is resulting in increased levels of poaching. Nomadic grazing is also having a negative impact across their range due to increased levels of poaching. Additional threats include fences (electrified and not), mining and roadkills.

Table 8.7: List of mammal species of conservation concern that may occur in the project area as well as their global and regional conservation statuses

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI)	IUCN	
Felis nigripes	Black-footed Cat	VU	VU	Low
Panthera pardus pardus	African Leopard	VU	VU	Low
Parahyaena brunnea	Brown Hyaena	NT	NT	Low
Smutsia temminckii	Temminck's Pangolin	VU	VU	Moderate
Aonyx capensis	Cape Clawless Otter	NT	NT	Low
Eidolon helvum	Straw-coloured Fruit Bat	NT	NT	Low

Amphibians

Based on the IUCN Red List Spatial Data and Amphibian Map, 11 amphibian species are expected to occur within the area. One of these species is threatened

Table 8.8: List of Amphibian species of conservation concern that may occur in the project area as well as their global and regional conservation statuses

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI)	IUCN	
Pyxicephalus adspersus	Giant Bullfrog	NT	LC	Moderate

The Giant Bull Frog (*Pyxicephalus adspersus*) is listed as LC on a global scale (IUCN SSC Amphibian Specialist Group, 2013), but NT on a regional scale (Minter *et al*, 2004). The species is widely distributed in arid sub-saharan Africa, mainly at higher elevations. Within South Africa, it occurs in the north-eastern part of the Western Cape, central and southern Eastern Cape, northern, central and eastern parts of Northern Cape, northern KwaZulu-Natal (except the low-lying parts), Free State, North West, Gauteng and Limpopo provinces, and at only a few localities in Mpumalanga Province. It typically breeds in seasonal, shallow, grassy pans in flat, open areas but also utilises non-permanent vleis and shallow water on the margins of

waterholes and dams. Although they sometimes inhabit clay soils, they prefer sandy substrates. Habitat loss due to crop agriculture and urbanisation is a major threat to this species. Due to the presence of suitable habitat, the likelihood of occurrence of this species on the site is rated a moderate.

Reptiles

Based on the IUCN Red List Spatial Data and the Reptile Map database, 35 reptile species are expected to occur within the area. None of these species are of conservation concern.

v. Ecosystem protection level

The ecosystem protection level is an indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems. The project site overlaps mainly with a MP ecosystem, with a small portion being NP (Refer to **Figure 8.9**).

Figure 8.9: Map illustrating the ecosystem protection level associated with the Limestone PV1 project site

vi. Critical Biodiversity Areas (CBA)

According to the CBA map in **Figure 8.10**, the majority of the project site overlaps with areas classified as CBA; most of the area being CBA2. CBAs are areas that must be maintained in a good ecological condition (natural or near-natural state) in order to meet biodiversity targets. CBAs collectively meet biodiversity targets for all ecosystem types as well as for species and ecological processes that depend on natural or near-natural habitat, that have not already been met in the protected area network (SANBI, 2016).

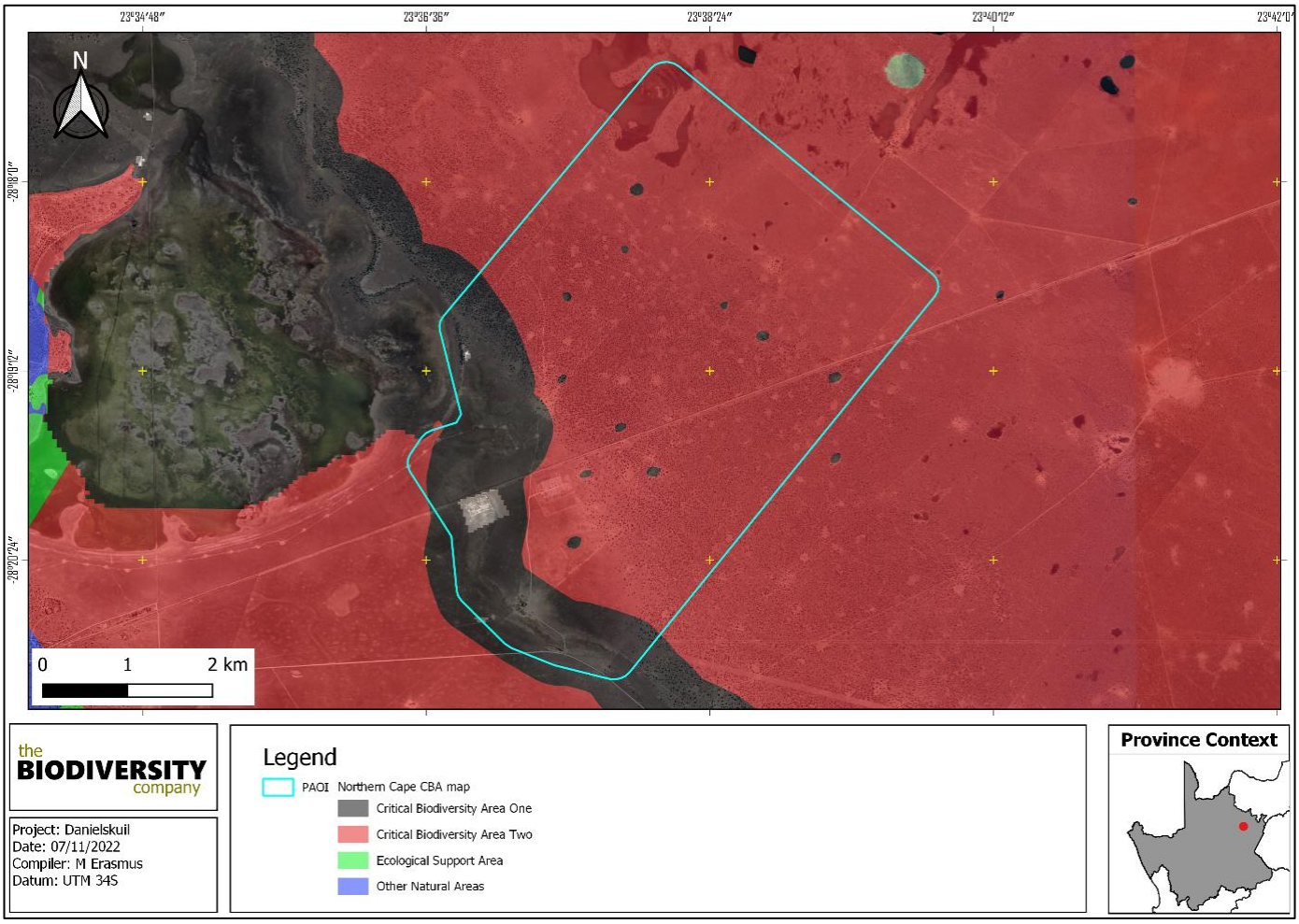


Figure 8.10: Provincially identified terrestrial conservation priority areas found within the project site

vii. National Protected Areas Expansion Strategy, Protected Areas, and Conservation Areas

Land-based protected area expansion targets include large, intact, and unfragmented areas of high importance for biodiversity representation and ecological persistence, which are suitable for the creation or expansion of large, protected areas. Such areas were identified through a systematic biodiversity planning process undertaken as part of the development of the National Protected Area Expansion Strategy 2008 (NPAES). They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with a strong emphasis on climate change resilience and requirements for protecting terrestrial and freshwater ecosystems (FEPA: Freshwater Ecosystem Priority Areas). These areas should not be seen as future boundaries of protected areas, since in many cases only a portion of a particular focus area would be required to meet the protected area targets set in NPAES. They are also not a replacement for fine-scale planning, which may identify a range of different priority sites based on local requirements, constraints, and opportunities.

The site is not located within any NPAES focus areas or any Formal-/Informal Protected Areas. The nearest NPAES focus area is located approximately 2.2 km north-west from the project site (Eastern Kalahari Bushveld), while the nearest Formal Protected Area is located approximately 29km south of the site (Rockwood Nature Reserve).

viii. Strategic Water Source Areas and National Freshwater Ecosystem Priority Areas

Strategic Water Source Areas (SWSAs) are defined as areas of land that supply a quantity of mean annual surface water runoff in relation to their size and therefore, contribute considerably to the overall water supply of the country. These are key ecological infrastructure assets and the effective protection of surface water SWSAs areas is vital for national security because a lack of water security will compromise national security and human wellbeing. The project site is more than 100 km from the closest surface water SWSA but does fall within the Southern Ghaap Plateau groundwater SWSA.

The National Freshwater Ecosystem Priority Area (NFEPA) database provides strategic spatial priorities for conserving the country's freshwater ecosystems and associated biodiversity as well as supporting sustainable use of water resources. A NFEPA coverage for the project site (refer to **Figure 8.11**) revealed that the project site overlaps with several true NFEPA wetlands, as well as a FEPA River (NBA CR River), classed as Freshwater Ecosystem Priority Area.

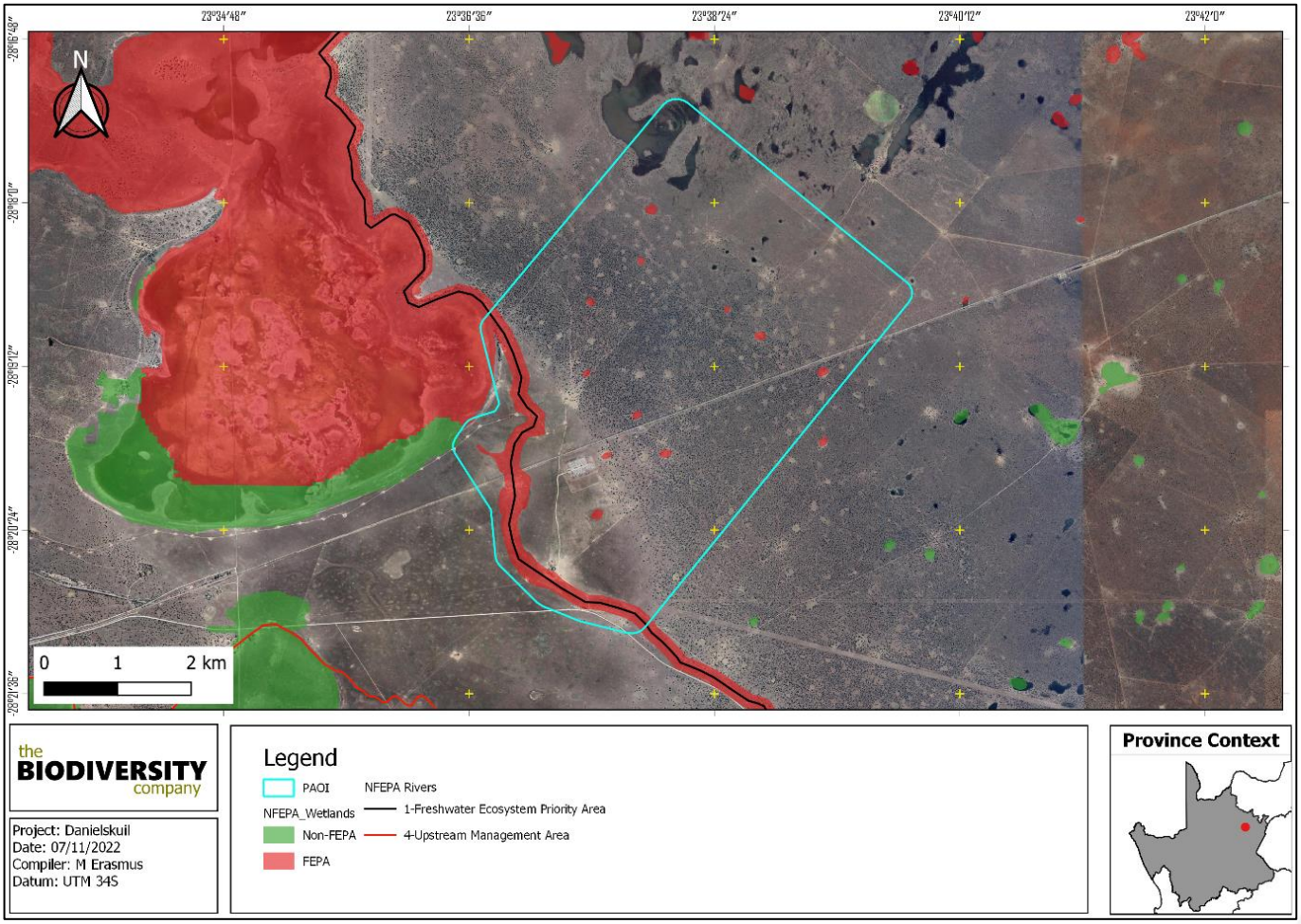


Figure 8.11: The project site in relation to the National Freshwater Ecosystem Priority Areas

ix. Avifauna

Important Bird and Biodiversity Areas (IBA)

The proposed development is not located within an IBA. The Spitskop Dam IBA is located approximately 83 km to the north-east of the project area (Spitskop Dam).

Avifauna Habitats

The proposed study site is comprised entirely of CBA 1 and CBA 2 areas. These form important areas needed to meet biodiversity targets for ecosystem types, species and ecological processes. The project site also overlaps with Freshwater Ecosystem Priority Areas (FEPA) that are classified as a critically endangered ecosystem. There are numerous FEPA wetlands that are also located within the project site. The FEPA and CBA sites form important areas for avifauna Species of Conservation Concern (SCCs). A short distance from the site is the Klein Riet River and adjacent is a pan which provides highly suitable habitat for Lesser and Greater Flamingo's. Habitat types located within the project area include grassland, vaalbos veld, transformed, water resources and shrubland. Water resources were considered areas of very high ecological importance. Grassland, Vaalbosveld and shrubland were considered to be of high ecological importance. Transformed areas were considered to be of very low ecological importance.

Expected Species

A list of possible species that could occur within the proposed project site was compiled using the expected avifauna list from the South African Bird Atlas Project (SABAP2) website. Threatened, Near-Threatened, Least Concern, and Vulnerable species were identified as potential impact receptors of the proposed development that could occur in the area. Based on the SABAP 2 data, 202 species are expected in the project area of which 12 species are threatened species (refer to **Table 8.10**).

Table 8.10: Consolidated list of Threatened, Near-Threatened, Endemic/ Near- endemic and Priority Species potentially occurring on the proposed development site as identified during the desktop study

Species	Common name	RegionalStatus (SANBI,2016)	IUCN (2021)	Likelihood of occurrence
Aquila rapax	Eagle, Tawny	EN	VU	Moderate
Aquila verreauxii	Eagle, Verreaux's	VU	LC	Moderate
Ciconia nigra	Stork, Black	VU	LC	Moderate
Cursorius rufus	Courser, Burchell's	VU	LC	High
Falco biarmicus	Falcon, Lanner	VU	LC	High
Neotis ludwigii	Bustard, Ludwig's	EN	EN	High
Oxyura maccoa	Duck, Maccoa	NT	VU	Moderate
Phoeniconaias minor	Flamingo, Lesser	NT	NT	High
Phoenicopterus roseus	Flamingo, Greater	NT	LC	High
Polemaetus bellicosus	Eagle, Martial	EN	EN	Moderate
Rostratula benghalensis	Painted-snipe, Greater	NT	LC	Moderate
Sagittarius serpentarius	Secretary bird	VU	EN	High

The Animal demographic unit launched the Coordinated Waterbird Counts (CWAC) project in 1992 as part South Africa's commitment to international waterbird conservation. Regular mid-summer and mid-winter censuses are done to determine the various features of water birds including population size, how waterbirds utilise water sources and determining the heath of wetlands. The project area is 13 km from the Danielskuil CWAC and 11 km from the Soutpan CWAC.

Table 8.11: Number of water bird species recorded at the two CWAC sites and their average reporting rates

Species	Common name	Soutpan	Danielskuil
Recurvirostra avosetta	Avocet, Pied	28.00	
Fulica cristata	Coot, Red-knobbed	3.80	7.00
Sarkidiornis melanotos	Duck, Knob-billed		1.00
Dendrocygna viduata	Duck, White-faced Whistling		15.00
Anas undulata	Duck, Yellow-billed	1.00	3.50
Ardea intermedia	Egret, Intermediate	1.00	
Bubulcus ibis	Egret, Western Cattle		10.50
Phoenicopterus roseus	Flamingo, Greater	13.00	
Alopochen aegyptiaca	Goose, Egyptian	1.60	2.00
Tachybaptus ruficollis	Grebe, Little		4.50
Tringa nebularia	Greenshank, Common	183.00	
Ardea melanocephala	Heron, Black-headed	1.00	
Ardea cinerea	Heron, Grey	3.00	
Ardea cinerea	Heron, Grey		2.50
Plegadis falcinellus	Ibis, Glossy		2.00
Bostrychia hagedash	Ibis, Hadada	1.00	1.00
Vanellus armatus	Lapwing, Blacksmith	8.00	18.20
Rostratula benghalensis	Painted-snipe, Greater	1.00	
Charadrius hiaticula	Plover, Common Ringed		2.00
Charadrius pecuarius	Plover, Kittlitz's	20.50	2.00
Charadrius tricollaris	Plover, Three-banded	4.25	
Charadrius tricollaris	Plover, Three-banded		3.25
Actitis hypoleucos	Sandpiper, Common		1.50
Calidris ferruginea	Sandpiper, Curlew	20.00	39.00
Tringa stagnatilis	Sandpiper, Marsh	7.00	6.00
Tringa glareola	Sandpiper, Wood	1.00	1.00
Tadorna cana	Shelduck, South African	3.75	1.50
Himantopus himantopus	Stilt, Black-winged	38.50	1.00
Calidris minuta	Stint, Little	48.00	22.50
Anas capensis	Teal, Cape	2.00	1.00
Anas erythrorhyncha	Teal, Red-billed	2.00	
Motacilla capensis	Wagtail, Cape	4.60	4.50
Calidris pugnax	Ruff	8.50	

Species recorded through on-site surveys

A field assessment was conducted 12-16 September 2022, during this survey the 88 bird species were recorded of which three were SCCs, namely the Lanner Falcon, Burchell's Courser and Greater Flamingo. Of the 88 species 15 species were identified that would be at risk for collisions, electrocutions or habitat loss due to the development (refer to **Table 8.12)**

Table 8.12: Species at risk for collisions, electrocutions and habitat loss

Species	Common name	(Regional, Global)	Collisions	Electrocution	Habitat Loss
Cursorius rufus	Burchell's Courser	VU, LC			x
Alopochen aegyptiaca	Egyptian Goose		x	x	
Plegadis falcinellus	Glossy Ibis		x	x	
Phoenicopterus roseus	Greater Flamingo	NT, LC		x	
Bostrychia hagedash	Hadeda (Hadada) Ibis		x	x	
Numida meleagris	Helmeted Guineafowl			x	
Falco biarmicus	Lanner Falcon	VU, LC	x		x
Afrotis afraoides	Northern Black Korhaan		x	x	x
Melierax canorus	Pale Chanting Goshawk			x	
Lophotis ruficrista	Red-crested Korhaan		x	x	x
Tadorna cana	South African Shelduck		x		
Bubo africanus	Spotted Eagle-Owl		x	x	
Bubulcus ibis	Western Cattle Egret		x	x	
Dendrocygna viduata	White-faced Whistling Duck		x	x	
Anas undulata	Yellow-billed Duck		x	x	

8.5. Integrated Heritage including Archaeology, Palaeontology, and the Cultural Landscape

8.5.1 Cultural Landscape

In 1801, the London Missionary Society also established a station among the Griqua at Leeuwenkuil. The site proved too arid for cultivation and in about 1805 they moved the station to another spring further up the valley and called it Klaarwater. Their second choice was little better than their first, and for many years a lack of water prevented any further development. The name of the settlement was changed later to Griquatown or Griekwastad in Afrikaans. They lived among a mixed nomadic community of the

Chaguriqua tribe and "bastaards" (people of mixed origin) from Piketberg. Their two leaders were Andries Waterboer and Adam Kok II. From 1813 to 17 July 1871, the town and its surrounding area functioned as Andries Waterboer's Land. Griekwastad was later the capital of British Colony Griqualand West from 1873 to 1880, with its own flag and currency, before it was annexed into the Cape Colony. The proposed development is located on one of the main routes between Griekwastad and Kuruman and as such, evidence of this heritage may be impacted by the proposed development.

Danielskuil derives its name from a cone-shaped depression deep in the dolomitic limestone; with a domed covering, reminiscent of the biblical 'Daniel in the lions' den'. The Griqua leader Adam Kok is said to have used this depression as a prison, and to also have kept snakes in it. The area was famous because of the Griqua Chief who ruled there by the name of Barend Barends. Barend Barends was the son of a "half-Hottentot Dutchman" and one of the most important leaders along the turbulent northern frontier of the Cape Colony from 1790 to 1834. He was one of the first chiefs of the Griqua tribe, an indigenous Khoi group. A book, Barend Barends - Die Vergete Kaptein van Danielskuil, has been recently published about his story. During the Anglo Boer war (1899-1902) the British army built and used a blockhouse fort, which overlooks the town from the north.

8.5.2. Archaeology

An archaeological assessment of the Finsch Mine was completed by Henderson in 2005 (SAHRIS ID 6780). Henderson drafted a brief history of the Finsch Mine and this is not repeated here. Suffice to note that "Recent human activity at the Finsch Mine, which would have left traces of mining and structures, therefore only dates back to 1959 on Brits. It would appear that there may be an earlier date for farming activities on Bonza". Elements of the cultural landscape that may be impacted by the proposed development include the sense of place of the historic core of Postmasburg as well as the mining and farming heritage of the area.

Due to mining activities in the area, a number of heritage impact assessments have been completed in close proximity to the development area and these are relevant here (Figure 2 and Appendix 2). The well-known Taung site that preserved early hominid remains is located only some 50 kilometres to the west of the site under investigation. Wonderwerk cave near Kuruman also retain evidence of early peoples in its 6 meter midden deposit, especially in the rear portions of the cave. Towards the front rock-art from later Stone Age peoples are also preserved. Furthermore the engraving sites Wildebeestkuil, Driekopseiland and Nooitgedacht near Kimberly confirm a continued presence of Later Stone Age peoples in the general region. It is very likely that significant archaeological heritage may be impacted by the proposed development.

A recent HIA completed by CTS Heritage located south of this proposed development area (CTS 2022) revealed a great many heritage resources evident within the broader context. The vast majority of these resources, consisting of individual artefacts and low density artefact scatters ascribed to the Middle and Later Stone Age as well as rural infrastructure such as wind mills, have been determined to be not conservation-worthy. A number of heritage resources of significance were, however, also identified. These resources range from significant archaeological sites and scatters to burial grounds and graves as well as historic farm werfs and infrastructure such as the irrigation furrows ascribed to the work of the London Missionary Society and the local Griekwa population. The relationship between the furrows, the farm werfs and the burials form a unique and layered cultural landscape that speaks to the unique past of this area

and its Griekwa inhabitants. It is likely that similar heritage resources are located within this development footprint. **Figure 8.15** shows the heritage resources previously identified within the broader study area.

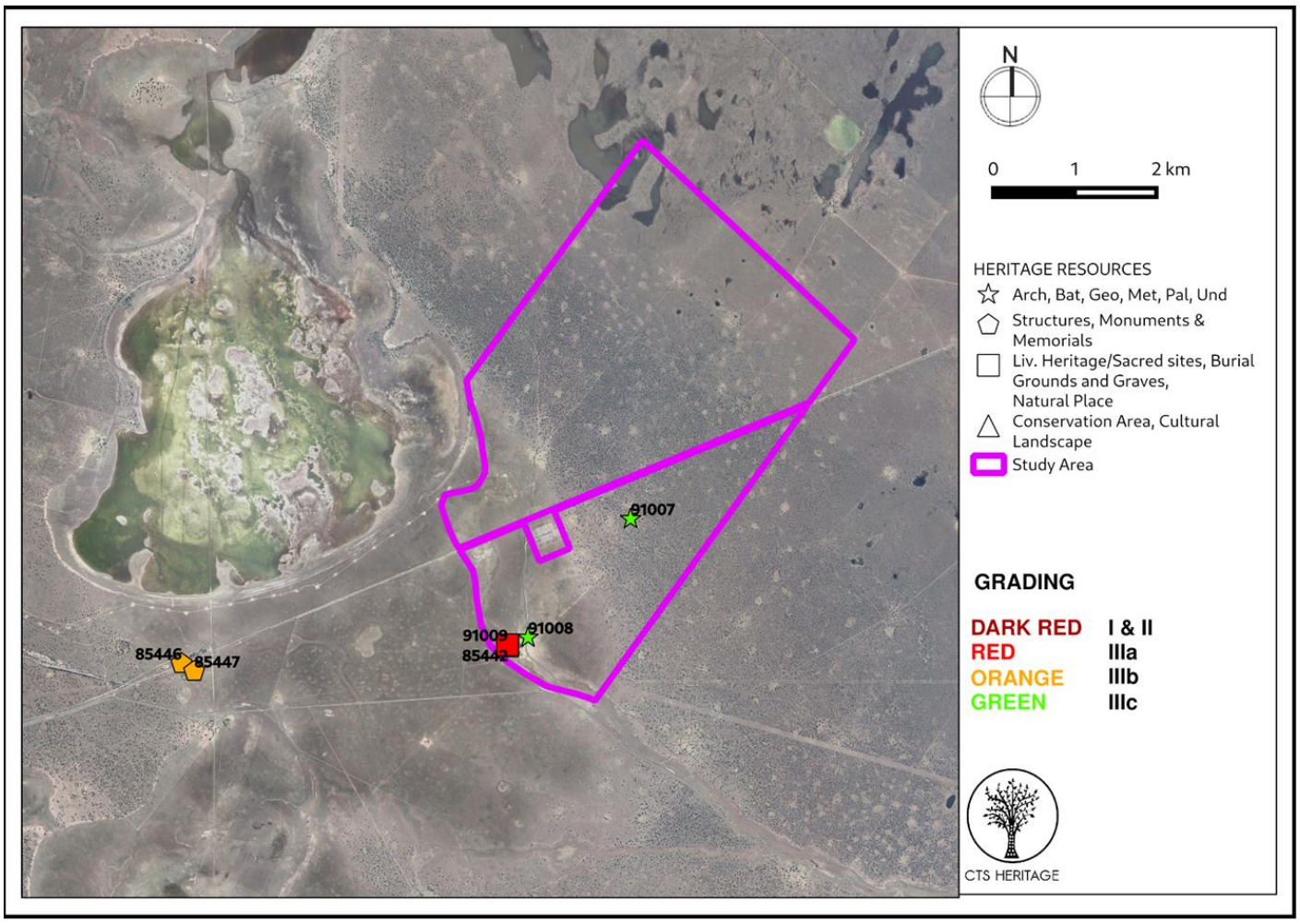


Figure 8.15: Heritage resources identified within the study area.

8.5.3. Palaeontology

The proposed Limestone PV1 solar development is mostly underlain by quaternary surface limestone while the Lime Acres Member (Ghaap Group, Campbell Rand Subgroup, Kogelbeen Formation) crops out in the north-eastern portion of the development. The site is underlain by the Kalahari Group, the Klippan formation and Kogelbeen formation(Campbell Rand Subgroup, Transvaal Supergroup).

The Campbell Rand Subgroup consists of a thick (1,6 to 2,5 km) carbonate platform succession of cherts with minor tuffs and siliciclastic rocks as well as dolomitic limestones and dolostones. These sediments were deposited about 2,6 to 2,5 Ga (billion years ago) on the shallow submerged shelf of the Kaapvaal Craton Young (1932); Beukes (1980, 1983); Eriksson & Truswell (1974); Eriksson & Altermann (1998); Eriksson et al. (2006); Altermann and Herbig (1991); Altermann and Wotherspoon (1995). Frequent changes in sea level were caused by changing depositional cycles in shallow water facies. Stromatolitic limestones and dolostones, oolites, laminated calcilutites, cherts, with subordinate siliclastics (shales, siltstones) and minor tuffs (Beukes 1980, Beukes 1986, Sumner 2002, Eriksson et al. 2006, Sumner & Beukes 2006) are present in the Campbell Rand Subgroup. Schopf (2006) reviewed the older Archaean stromatolite occurrences from the

Ghaap Group. Stromatolites are layered mounds, columns and sheet-like sedimentary rocks. Originally, they were formed by the growth of layer upon layer of cyanobacteria, a single-celled photosynthesizing microbe. Cyanobacteria are prokaryotic cells (simplest form of modern carbon-bases life). Stromatolites are first found in Precambrian rocks and are known as the earliest known fossils. The oxygen atmosphere that we depend on was generated by numerous cyanobacteria photosynthesizing during the Archaean and Proterozoic Era. Several authors have described the spectacular stromatolites of the Ghaap Group in the Northern Cape Province [Almond & Pether (2008); Boetsap locality figured by McCarthy & Rubidge (2005); Eriksson et al. (2006)

The late Archaean Kogelbeen Formation is about 450m thick and comprise of limestone and chert with stromatolites and microbial horizons as well as dolomite. Within the stromatolitic horizons secondary chert replacement occurs. Columnar and domal stromatolites as well as microbial laminites and oolitic facies are also found in this Formation. Altermann & Wotherspoon (1995) found that the Lime Acres Member is present at the top of the Kogelbeen Formation. The Lime Acres Member is extensively mined in this region. Lime Acres is known for its significant fossil stromatolite site (Altermann & Wotherspoon 1995).

The fossil assemblages of the Kalahari are represented by terrestrial plants and animals with a close resemblance to living forms. Fossil assemblages include bivalves, diatoms, gastropod shells, ostracods, and trace fossils. Late Cenozoic calcrete may comprise of bones, horn corns as well as mammalian teeth. Tortoise remains have also been uncovered as well as trace fossils which includes termite and insect's burrows and mammalian trackways. Amphibian and crocodile remains have been uncovered where the depositional settings in the past were wetter. Fossils are mostly associated with ancient lakes, pans, and river systems.

The PalaeoMap of the South African Heritage Resources Information System indicates that the Palaeontological Sensitivity of the Quaternary surface limestones are High and that of the Lime Acres Member are Very High (refer to **Figure 8.16**) (Almond and Pether, 2009; Almond et al., 2013). The nature of the excavations associated with Renewable Energy facilities tends to be deep and as such, given the high and very high palaeontological sensitivity of the sediments that underlay the project site, the likelihood of impacting intact sediments is high.

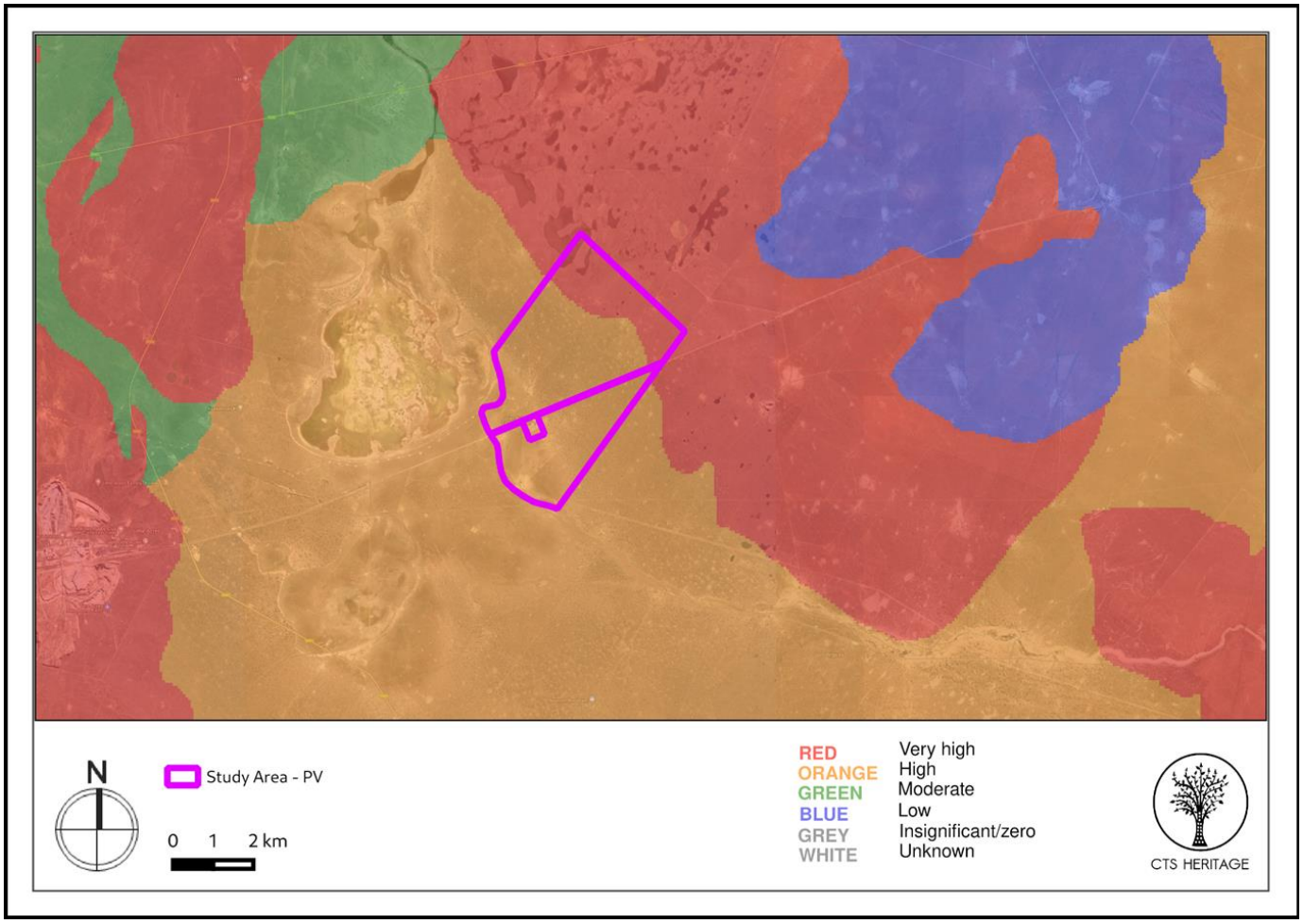


Figure 8.16: Palaeosensitivity map indicating fossil sensitivity underlying the project site

8.6. Visual Quality

The greater landscape of the study area is characterised by wide-open spaces and very limited development. The study area is sparsely populated with 7.5 people per km^2 within the local municipality. In addition to Lime Acres, a number of isolated homesteads occur throughout the study area. Some of these in the study area include[9]:

- England
- Langverwag
- Oliënspruit
- Dikkbos
- Murray
- Aandrus
- Tevrede

[9] The names listed below are of the homestead or farm dwelling as indicated on the SA 1: 50 000 topographical maps and do not refer to the registered farm name.

The terrain surrounding the proposed project site is generally flat with numerous non-perennial pans present in the broader area. the Great Pan and Rooipan, which are located to the west of the proposed site. The climate within the region is semi-arid, with the study area receiving approximately 200 mm of rainfall per annum. Land cover is primarily low *shrubland* concentrated more to the west and south west, and grassland found to the east with scattered areas of open woodland.

Access to the site is from a secondary road via the R385. Rail infrastructure is prominent in the area, with the Transnet Cape Corridor Freight railway line running from north east to south bisects the proposed site. This railway line is along heavy-haul railway line that connects mines between Warrenton in the North-East to Cape Town in the South. It is used primarily to transport commodities such as iron ore, manganese and lime and does not carry passengers. Other industrial infrastructure within the study area includes numerous existing high voltage lines that traverse the site:

» Olien/Ferrum 1 and 2 275 kV
» Olien/Ouplaas 1 132 kV
» Plateau/Trewill 1 132 kV
» Karats/Olien 1 and 2 132 kV
» Noko/Olien 1 132 kV
» Olien/Ulco 1 132 kV
» Silverstreams/Ulco 1 132 kV
» Boundary/Olien 1 and 2 275 kV

All of these power lines congregate at the Olien Substation which is located within the proposed Limestone PV1 project site. The Trewill Substation is located just east of the Olien Substation.

It should be noted that there are a few of authorised (and current)/ proposed renewable energy applications within the study area and the greater region, that may change the landscape to some degree in the future.

8.6.1 Identified Visual Receptors

This section is intended to highlight possible receptors within the landscape up to 6km from the site which due to use could be sensitive to landscape change.

0 – 1km
» There are a two residences/farmsteads known as England located within this zone. However, the one England farmstead is located within the proposed development footprint,
» Additionally, a small section of a secondary road is located within this zone in the south, south west. It is anticipated that the proposed PV facility will be highly visible from this portion of road.

1 – 3km
» Residents of Langverwag and users of the secondary road.
» The rest of the visually exposed areas fall within vacant land and open space.

3 - 6km
» Most of this zone falls within vacant open space

» Residents of Aandrus, Olienspruit, Witput, Dikbos, Murray, Silverstreams, Outpost and Beadle homesteads.
» A secondary road is also located within this zone, however only small portions may be visually exposed and the intrusion will be fleeting.

8.7. Socio-Economic Profile

8.7.1. Profile of the Broader Area

The project site is located within Ward 3 and Ward 6 of the Kgatelopele Local Municipality, which form part of the ZF Mgcawu District Municipality.

Population, Income and Employment Profile

The ZF Mgcawu District Municipality forms the mid-northern region of the province, which borders Botswana. This district is 102 524km^2 in extent and covers around 27% of the Northern Cape Province area, making it the largest district in South Africa, after Pixley ka Seme and Namakwa. This district is bordered by four (4) District municipalities, namely John Taolo Gaetswe, Francis Baard, Pixley ka Seme and Namakwa District Municipality. It also shares borders with the Republic on Namibia and Botswana. The district municipality comprises of five (5) Local Municipalities namely, the Dawid Kruiper, Kai! Garb, Kheis and Kgatelopele Local Municipality. .

The ZF Mgcawu District Municipality has a total population of 266 001, having experienced an increase of 37 555 from 2008 to 2018. The population growth in the local municipalities varied significantly. The population of the ZF Mgcawu District Municipality in 2018 was made up of 29.64% Africans (78 800), 8.35% Whites (22 200), 61.06% Colored (162 000), and 0.96% Asians (2 540). In 2019, there were 51% males and 49% females living in ZF Mgcawu District Municipality.

Table 8.14: Population figures of the ZF Mgcawu District Municipality

Municipality	2008	2013	2018	Average annual growth
Kai!Garib	64,600	67,400	70,500	0.87%
Dawid Kruiper	97,600	107,000	115,000	1.69%
!Kheis	17,800	17,300	17,600	-0.10%
Tsantsabane	31,600	36,600	40,900	2.61%
Kgatelopele	16,800	19,400	21,600	2.53%
Total	**228,446**	**247,820**	**266,001**	**1.53%**

Source: IHS Markit Regional eXplorer version 1750

The young working age (25–44 years) age group makes up the biggest percentage of the population, accounting for 86 700 people or 32.6% of the total. The age group of infants and children (0–14 years) has the second-highest population with a total share of 25.2%, followed by the age group of teenagers and young adults (15–24 years) with 49 300 persons.

The Kgatelopele Local Municipality, within which the Limestone PV1 site is located, is situated in the ZF Mgcawu District Municipality of the Northern Cape Province. The main towns include Lime Acres and Danielskuil, which both fall into a medium category for development potential on an individual basis.

Danielskuil serves as the major town of significance for the entire Kgatelopele Local Municipality area, the basis for economic activity, social and Institutional services and development opportunities within the municipality, whereas Lime Acres is very prominent as the mining town.

According to the Information Handling Services (IHS) Markit Regional eXplorer version 1750 the population of this Kgatelopele municipality was 21 600 in 2018. The population growth between 2008 (16 800) and 2018 (21 600) has increased by 2.53%, with male population at 52.5% and female at 47.5%. The 2011 census indicates that the majority of the population is relatively young. According the 2011 Census the majority of the population within the municipality speaks Afrikaans (58%) and Setswana (33%).

Economic Profile

The Northern Cape is primarily dependent on two industries, namely mining and agriculture. These two industries employ approximately 57% of all workers in the province.

The ZF Mgcawu District Municipality Final Integrated Development Plan - framework 2021-2022 (IDP) identifies agriculture, agriculture enterprises, livestock farming, irrigation farming, tourism and heritage, and minerals and mining as the key economic activities. The municipal accounts for 30% of the provincial economy in terms of the minerals and mining in the district. Aside from mining, tourism is regarded as the most important sector in the district, and it is the fastest growing industry that contributes to the district economy. The mining and agricultural sectors thus largely dominates the economy of the ZF Mgcawu District Municipality.

The Kgatelopele Local Municipality IDP of 2018/2019 indicates that most people within the municipality have at least some secondary educations and have finished secondary school. Some have only completed elementary school, while others have no formal education. This indicates that their prospects of finding a good job or other employment options are reduced because they did not obtain their senior certificate. Due to a high percentage of people who completed secondary school and obtained a higher education, the municipality has large, capacitated workforce to contribute to the economy of the municipality.

The number of economically active people is slightly higher than the number of non-economically active people, resulting in a very high dependency ration of 50.6%. According to Stats 2011, the unemployment rate is 22.3% and 29.1% of all unemployment people are young adults. There is a need to address the difficulties faced by those who are unemployed, especially young people.

CHAPTER 9: SCOPING OF POTENTIAL ISSUES

This chapter serves to describe environmental issues and potential positive and negative impacts that have been identified to be associated with the development of the Limestone PV1 Solar Energy Facility and associated infrastructure through the scoping study, and to make recommendations for further studies required to be undertaken in the EIA Phase of the process. The scoping process has involved the review of existing information (including previous detailed studies undertaken), field work by specialist consultants and input from the project proponent.

The project site considered for the proposed Limestone PV1 Solar Energy Facility is 1 842ha in extent and includes the affected properties listed in **Table 9.1** below. The entire project site was investigated during the Scoping Phase to determine the environmental suitability of the site. This will provide an indication of the areas of sensitivity that the developer would need to take into consideration in the planning of the location of the proposed solar energy facility within the development footprint.

Table 9.1: Property affected by the proposed development

Parent Farm Number	Farm Portions
Farm Engeland 300	4

Section 9.2 provides a summary of the findings of the scoping study undertaken for the construction, operation, and decommissioning phases of the Limestone PV1 Solar Energy Facility. Impacts associated with construction can also be expected to be associated with the decommissioning phase (however, to a lesser extent as the development footprint would have previously undergone transformation and disturbance during construction). More detail regarding potential impacts is included in the specialist scoping reports included in **Appendix G - L**.

A summary of the potential cumulative impacts that may be associated with the project is provided in **Section 9.3**. These impacts are associated with the scale of the project when considered together with other similar developments within the region and will be confirmed and assessed within the EIA Phase of the project.

9.1. Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of a Scoping Report

This chapter includes the following information required in terms of the EIA Regulations, 2014 - Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
3(1)(g)(v) the impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts (aa) can be reversed (bb) may cause irreplaceable loss of resources and (cc) can be avoided, managed or mitigated.	The impacts and risks identified to be associated with the construction and operation phases of the Limestone PV1 Solar Energy Facility have been included in **sections 9.2 and 9.3**. Impact tables have been included for each field of study which considers the nature, significance, consequence, extent duration and probability of the impacts, as well the reversibility of the impacts, the loss of resources and avoidance or mitigation.

3(1)(g)(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The positive and negative impacts associated with the Limestone PV1 Solar Energy Facility have been included in **sections 9.2 and 9.3.**
3(1)(g)(viii) the possible mitigation measures that could be applied and level of residual risk	Possible mitigation (i.e., avoidance of sensitive areas) has been included in **sections 9.2 and 9.3.**

9.2. Evaluation of potential impacts associated with the Construction, Operation and Decommissioning Phases

9.2.1. Impacts on Ecology (including flora and fauna)

The project site is situated within the savanna biome, mapped as falling within the Ghaap Plateau Vaalbosveld and Southern Kalahari Mekgacha vegetation types. Ghaap Plateau Vaalbosveld and Southern Kalahari Mekgacha are listed as Least Threatened in terms of the National Vegetation Map (SANBI, 2018).

A list was obtained from the SANBI database (POSA — Plants of Southern Africa) indicates that 470 species of indigenous plants are expected to occur within the study area. No SCC, based on their conservation status, are expected to occur within the study area, not including potential protected tree species.

The project site overlaps with areas classified as both CBA1 and CBA2. The site is not located within any NPAES focus areas or any Formal-/Informal Protected Areas.

The International Union for Conservation of Nature (IUCN) Red List Spatial Data lists 64 mammal species that could be expected to occur within the area. This list excludes large mammal species that are limited to protected areas. Six (6) of these expected species are regarded as threatened. All but one of these have a low likelihood of occurrence based on the lack of suitable habitat.

Based on the IUCN Red List Spatial Data and Amphibian Map, 11 amphibian species are expected to occur within the area. One of these species, *Pyxicephalus adspersus*, is threatened.

Based on the IUCN Red List Spatial Data and the Reptile Map database, 35 reptile species are expected to occur within the area. None of these species are threatened.

A NFEPA coverage map for the project site revealed that the project site overlaps with several true NFEPA wetlands, as well as a FEPA River (NBA CR River).

Sensitivity Analysis of the Site
Sensitivities that occur specifically within the project site for the Limestone PV1 Solar Energy Facility are as follows (refer to **Figure 9.1**):

- Wooded Vaalbosveld – High Site Ecological Importance
- Open Shrubveld – High Site Ecological Importance
- Open Grassland – High Site Ecological Importance
- Transformed – Very Low Site Ecological Importance
- Watercourse Wet-Depression (Pan) – Very High Site Ecological Importance
- Water Resources (Depressions) – High Site Ecological Importance

The interpretation of the Site Ecological Importance classifications in relation to the proposed development activities as outlines in the guidelines is presented in **Table 9.2** below.

Table 9.2: Interpretation of Site Ecological Importance Classifications

Site Ecological importance	Interpretation in relation to proposed development activities
Very High	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e., last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very Low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

No destructive development activities should be considered for Very High SEI habitat units. Avoidance is recommended for the delineated water resources and accompanying buffers and for the Wooded Vaalbosveld habitat. Any development in the high SEI areas will lead to the direct destruction and loss of portions of functional habitat. Guidelines for development in high sensitivity areas require avoidance mitigation as much as possible. This must include concerted efforts to avoid these sensitive areas where feasible, and disturbances must be kept to an absolute minimum. Changes must be made to project infrastructure design to limit the amount of area/habitat impacted in relation to the title deed area (for example 10%). Avoiding most of the Wooded Vaalbosveld habitat will be considered as avoidance, thus allowing development in the remaining High SEI areas. The minimisation of the disturbance footprint is also considered to be avoidance, this will include brush cutting beneath panels as opposed to the complete clearance of vegetation (applicable to the Wooded Vaalbosveld habitat as well). Limited development activities of low-medium impact are acceptable, followed by appropriate restoration activities. The infrastructure layout should consider habitat connectivity to avoid fragmentation, and technology alternatives should opt to retain vegetation under the PV panels.

It is recommended that the central core of the Wooded Vaalbosveld habitat be preserved. Some minor development creep into the edges of the habitat may be allowed – provided that the provincial authority issues a permit for the destruction of the protected Wild Olive (*Olea europaea* subsp. *africana*) trees that dominate these areas.

Figure 9.1: Preliminary ecological Site Ecological Importance sensitivity map of the project site

Issue	Nature of Impact during the Construction and Decommissioning Phases	Extent of Impact	No-Go Areas
Destruction, fragmentation and degradation of habitats and ecosystems	Direct impacts: » Disturbance / degradation / loss to vegetation and habitats » Ecological corridors are disrupted » Habitat fragmentation » Loss of protected plant species Indirect impacts: » Erosion risk increases » Fire risk increases » Increase in invasive alien species	Regional	Watercourse and Wet-Depression (Pan) Habitats
Spread and/or establishment of alien and/or invasive species	Direct impacts: » Loss of vegetation and habitat due to increase in alien species Indirect impacts: » Creation of infrastructure suitable for breeding activities of alien and/or invasive species » Spreading of potentially dangerous diseases due to invasive and pest species	Local	Watercourse and Wet-Depression (Pan) Habitats
Direct mortality of fauna	Direct impacts: » Loss of SCC species » Loss of fauna diversity Indirect impacts: » Loss of diversity and species composition in the area. » Possible impact on the food chain	Regional	Watercourse and Wet-Depression (Pan) Habitats
Reduced dispersal/migration of fauna	Direct impacts: » Loss of genetic diversity » Isolation of species and groups leading to inbreeding Indirect impacts: » Reduced seed dispersal » Loss of ecosystem services	Regional/National	Watercourse and Wet-Depression (Pan) Habitats
Environmental pollution due to water runoff, spills from vehicles and erosion	Direct impacts: » Pollution in waterbodies and the surrounding environment » Faunal mortality (direct and indirectly) Indirect impacts: » Ground water pollution » Loss of ecosystem services	Regional	Watercourse and Wet-Depression (Pan) Habitats
Disruption/alteration of ecological life cycles	Direct impacts: » Disruption/alteration of ecological life cycles due to noise	Local	Watercourse and Wet-Depression (Pan) Habitats

Issue	Nature of Impact during the Construction and Decommissioning Phases	Extent of Impact	No-Go Areas
(breeding, migration, feeding) due to noise, dust, heat radiation and light pollution.	» Reduced pollination and growth of vegetation due to dust » Faunal mortality due to light pollution (nocturnal species becoming more visible to predators) » Heat radiation could lead to the displacement of species <u>Indirect impacts:</u> » Loss of ecosystem services		
Staff and others interacting directly with fauna (potentially dangerous) or poaching of animals	<u>Direct impacts:</u> » Loss of SCCs or TOPS species <u>Indirect impacts:</u> » Loss of ecosystem service » Loss of genetic diversity	Local	Watercourse and Wet-Depression (Pan) Habitats
Description of expected significance of impact The development of the area could result in the loss or degradation of the habitat and vegetation, most of which is still in a natural condition and is expected to support a number of fauna species. The construction of the solar facility could also lead to the displacement/mortalities of the fauna. The operation of the facility could result in the disruption of ecological life cycles. This could be as a result of a number of things, but mainly due to dust, noise, light pollution and heat radiation. The disturbance of the soil/vegetation layer will allow for the establishment of flora alien invasive species. In turn, the new infrastructure will provide refuge for invasive/feral fauna species. Erosion is another possible impact that could result from the disturbance of the top soil and vegetation cover. A number of machines, vehicles and equipment will be required, aided by chemicals and concrete mixes for the project. Leaks, spillages or breakages from any of these could result in contamination of the receiving water resources. Contaminated water resources are likely to have an effect on the associated biota.			
Gaps in knowledge & recommendations for further study. » The site sensitivity concurs with that reflected in the DFFE Screening Tool Report. A Biodiversity Impact Assessment is required to be undertaken in accordance with the requirements of the Specialist Protocols. » Determine a suitable buffer width for the identified features. » Possibility of offset areas for the loss of CBA as well as Wooded Vaalbosveld in situ, if necessary. **Recommendations with regards to general field surveys** » A search and rescue plan needs to be implemented for the proposed project for the provincially protected species, especially the old Olive Trees.			

9.3.2. Impacts on Avifauna

The proposed study site is comprised entirely of CBA 1 and CBA 2 areas. These form important areas needed to meet biodiversity targets for ecosystem types, species and ecological processes. The project site also overlaps with Freshwater Ecosystem Priority Areas (FEPA) that are classified as a critically endangered ecosystem. There are numerous FEPA wetlands that are also located within the project site. The FEPA and CBA sites form important areas for avifauna Species of Conservation Concern (SCC's). A short distance from the site is the Klein Riet River and adjacent is a pan which provides highly suitable habitat for Lesser and Greater Flamingos. Habitat types located within

the project area include grassland, vaalbos veld, transformed, water resources and shrubland. Water resources were considered areas of very high ecological importance. Grassland, Vaalbosveld and shrubland were considered to be of high ecological importance. Transformed areas were considered to be of very low ecological importance.

A list of possible species that could occur within the proposed project site was compiled using the expected avifauna list from the South African Bird Atlas Project (SABAP2) website. Threatened, Near- Threatened, Least Concern, and Vulnerable species were identified as potential impact receptors of the proposed development that could occur in the area. Based on the SABAP 2 data, 202 species are expected in the project area of which 12 species are threatened species.

A field assessment was conducted 12-16 September 2022. During this survey the 88 bird species were recorded of which three were SCCs, namely the Lanner Falcon, Burchell's Courser and Greater Flamingo. Of the 88 species 15 species were identified that would be at risk for collisions, electrocutions or habitat loss due to the development.

Sensitivity Analysis for the Site

Additional avifaunal sensitivities may become apparent following the analysis of flight paths and occurrence data from all four seasons of avifaunal surveys (still to be completed). It is nevertheless possible to map areas of elevated avifaunal site ecological importance at this stage. The following sensitivities were identified from an avifaunal perspective (Refer to **Figure 9.2**):

- Water Resources - Very High Avifaunal Site Ecological Importance
- Grassland – High Avifaunal Site Ecological Importance
- Transformed - Very Low Avifaunal Site Ecological Importance
- Vaalbos veld - High Avifaunal Site Ecological Importance
- Shrubland - High Avifaunal Site Ecological Importance

The interpretation of the Site Ecological Importance classifications in relation to the proposed development activities as outlines in the guidelines is presented in **Table 9.3** below.

Table 9.3: Interpretation of Site Ecological Importance Classifications

Site Ecological importance	Interpretation in relation to proposed development activities
Very High	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e., last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by

	appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very Low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

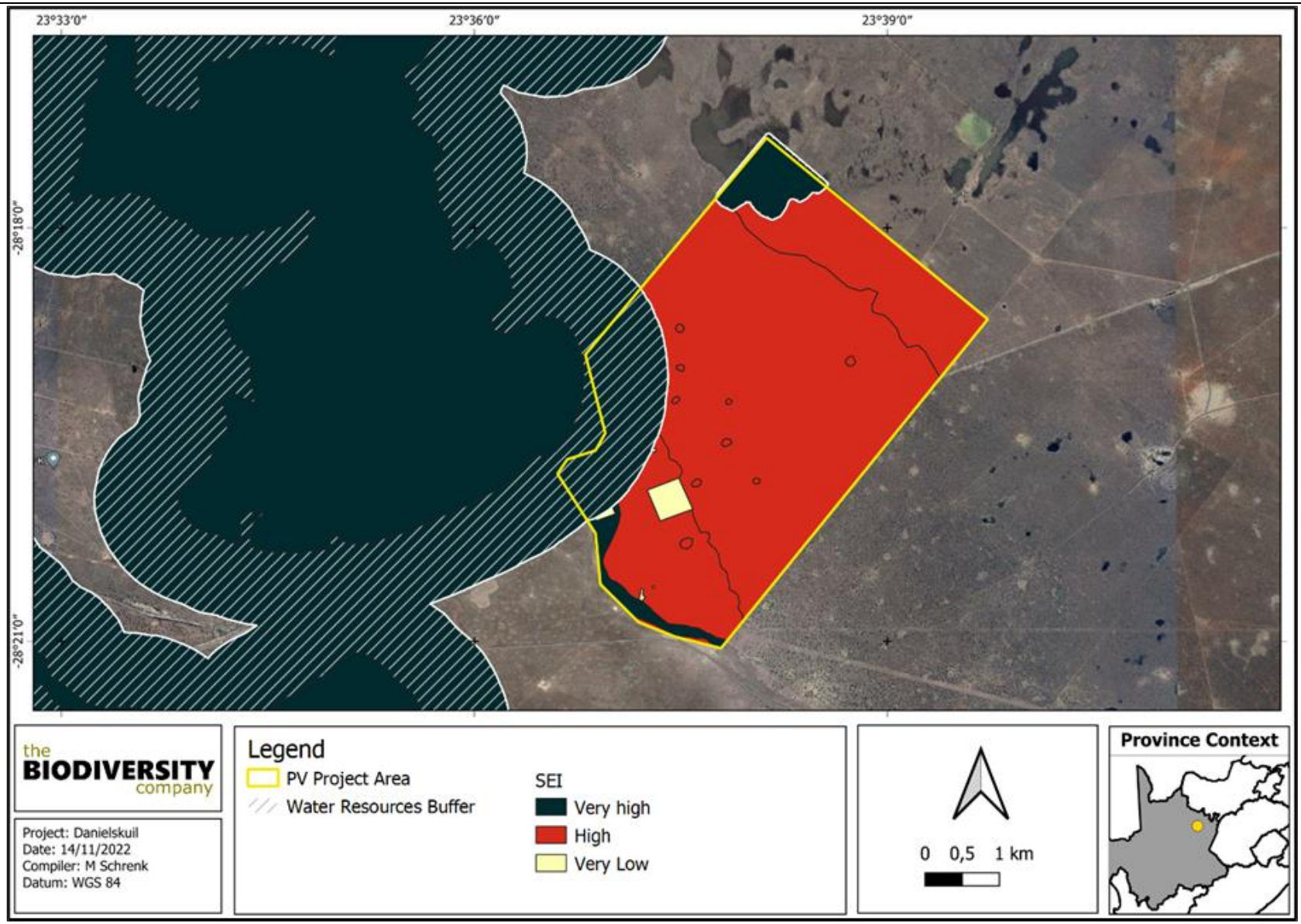


Figure 9.2: Avifaunal sensitivities identified as the project site

Issue	Nature of Impact	Extent	No-Go Areas
Destruction, fragmentation and degradation of habitats and ecosystems	Direct impacts: » Disturbance / degradation / loss to vegetation and habitats » Ecological corridors are disrupted » Habitat fragmentation Indirect impacts: » Erosion risk increases » Fire risk increases » Increase in invasive alien species	Local	Water resources and buffer area
Spread and/or establishment of alien and/or invasive species	Direct impacts: » Loss of vegetation and habitat due to increase in alien species Indirect impacts: » Creation of infrastructure suitable for breeding activities of alien and/or invasive species » Spreading of potentially dangerous diseases due to invasive and pest species	Local	None identified at this stage
Direct mortality of avifauna	Direct impacts: » Loss of SCC species » Loss of avifauna diversity Indirect impacts: » Loss of diversity and species composition in the area. » Possible impact on the food chain	Regional	The whole of the project area footprint because of the large amount of Greater flamingos found at the wetland adjacent to the project area, combined with the presence of Lanner Falcon, Burchell's Courser, Kori Bustard and Southern Black Korhaan.
Reduced dispersal/migration of fauna	Direct impacts: » Loss of genetic diversity » Isolation of species and groups leading to inbreeding Indirect impacts: » Reduced seed dispersal » Loss of ecosystem services	Regional	None identified at this stage
Environmental pollution due to water runoff, spills from vehicles and erosion	Direct impacts: » Pollution in watercourses and the surrounding environment » Avifaunal mortality (direct and indirectly) Indirect impacts:	Local	None identified at this stage

Issue	Nature of Impact	Extent	No-Go Areas
	» Ground water pollution » Loss of ecosystem services		
Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, dust, heat radiation and light pollution.	Direct impacts: » Disruption/alteration of ecological life cycles due to noise » Reduced pollination and growth of vegetation due to dust leading to reduced habitat » Avifaunal mortality due to light pollution (nocturnal species becoming more visible to predators) » Heat radiation could lead to the displacement of species Indirect impacts: » Loss of ecosystem service	Local	None identified at this stage
Staff and others interacting directly with fauna (potentially dangerous) or poaching of animals	Direct impacts: » Loss of SCCs or TOPS species Indirect impacts: » Loss of ecosystem service » Loss of genetic diversity	Local	None identified at this stage

Description of expected significance of impact

The development of the area could result in the loss or degradation of the habitat and vegetation, most of which is still in a natural condition and supports a number of avifauna species. The construction of the solar facility could also lead to the displacement/mortalities of the avifauna and more specifically SCC avifauna species. The operation of the facility could result in the disruption of ecological life cycles. This could be as a result of a number of things, but mainly due to dust, noise, light pollution and heat radiation. Leaks, spillages or breakages from any of these could result in contamination of the receiving water resources. Contaminated water resources are likely to have an effect on the associated biota.

Gaps in knowledge & recommendations for further study

» The site sensitivity does not concur with that reflected in the DFFE Screening Tool Report. An Avifauna Impact Assessment is required to be undertaken in accordance with the requirements of the Specialist Protocols.
» This study is completed at a desktop level only.
» Identification and descriptions of habitats.
» Identification of the Site Ecological Importance after dual season surveys.
» Location and identification of SCCs as well as in the case of avifauna their location of the nests.
» Determine a suitable buffer width for the identified features.

Recommendations with regards to general field surveys

» Field surveys to prioritise the development areas, but also consider the project site.
» Avifauna assessment field work to be conducted over two seasons to ensure migratory species are considered. Fieldwork for second survey to be undertaken during the wet season period.

9.3.3. Impacts on Soils and Land Capability

According to the land type database (Land Type Survey Staff, 1972 - 2006) the proposed project site falls within the Fc 04 land type. The Fc 04 land type mostly consists of bare rocks and Mispah soil forms following the South African soil classification working group (1990) with the possibility of other soils occurring throughout the landscapes. The area is also characterised with the Glenrosa soil form and shallow soils. Lime is absent in the entire terrain landscape.

The land capability of the above-mentioned soils has been determined to have land capability classes of "III" and "IV" with a climate capability level 8 given the low Mean Annual Precipitation (MAP) and the high Mean Annual Potential Evapotranspiration (MAPE) rates. The combination between the determined land capability and climate capability results in land potential "L6". The "L6" land potential level is characterised by a very restricted potential. Regular and/or severe limitations occur due to soil, slope, temperatures or rainfall. These areas are non-arable.

Sensitivity Analysis for the Site

The land capability sensitivity (refer to **Figure 9.3**) indicated that the site is characterized with an overall "Low" sensitivity with limited "Moderate" sensitivities following the baseline findings. The DFFE screening tool, (2022) shows that there are no crop fields with "High" sensitivity within the assessment area and as a result there will be no segregation of crop production.

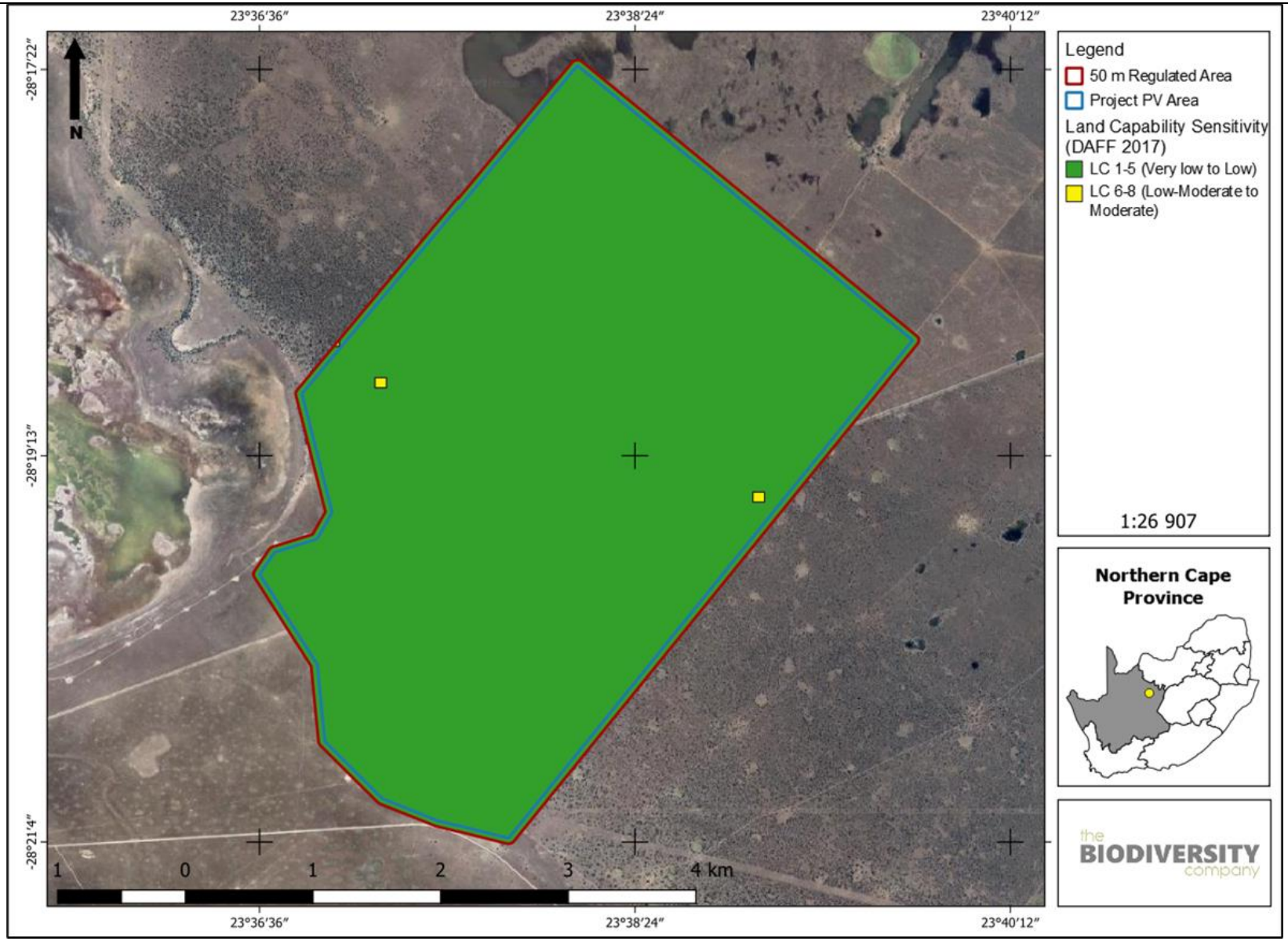


Figure 9.3: Land capacity present within the Limestone PV1 project site

Description of expected significance of impact

It is the specialist's opinion that the proposed Limestone PV1 Solar Energy facility and associated infrastructure will have limited to no impacts on the agricultural production ability of the land.

Gaps in knowledge & recommendations for further study

» The site sensitivity concurs with that reflected in the DFFE Screening Tool Report. A Soils and Agricultural Compliance Statement is required in accordance with the requirements of the Specialist Protocols.

Recommendations with regards to general field surveys

» No further field surveys required.

9.3.4. Impacts on Heritage (Archaeology and Palaeontology)

Cultural Landscape

Due to the nature of the development and its context, cumulative impact and negative impact to the cultural landscape is possible.

Archaeology

A number of heritage resources of significance were identified within the Limestone PV1 site (this information is detailed below and **Figure 9.4**). These resources include a structure (graded IIIC), an informal burial ground graded IIIA and historic kraal graded IIIC. These are all heritage resources associated with the England historic farm werf. Part of the significance of this historic werf lies in its context and as such, it is recommended that a buffer of 300m is implemented around the farm werf for PV infrastructure. Impact to significant archaeological resources such as Stone Age artefact scatters, burial grounds and graves, historical artefacts, historical structures and rock art engravings through destruction during the development phase is likely.

Site ID	Site Name	Description	Grading	Recommended Mitigation	Report
85442	HR06: Redstone Solar Thermal Power Project to Olien MTS Heritage Report 004	An informal cemetery with 5 graves was identified at this location. The graves were placed in a single line next to each other and were orientated from west to east. The graves have informal mounds of soil and packed rocks as dressings. The graves are situated approximately 120m to the west of the farmstead. The graves are most probably associated with farm labourers who were previously working on the farm Engeland. There was nobody on the farm to question about these graves. Site size: Approximately 5m x 15m.	IIIA	Adjust the development layout and demarcate site with at least a 10 metre buffer.	ACWA Power SolarReserve Redstone Solar Thermal Power Plant to Olien Substation, in the ZF Ngcawu District Municipality – Heritage Impact Assessment. PGS Heritage (2014)
91007	Olien SEF002	Later Stone Age flakes on chert from a dispersed scatter in the northern part of the area	IIIC	None	Archaeological & Cultural Heritage Impact Assessment

					Phase 1: Proposed Olien Solar Project development on Portion 4 of Farm 300, Barkly West, near Limeacres, Northern Cape. Morris (2012)
91008	Olien SEF003	Remains of kraals made from calcrete cobbles.	IIIC	None	Archaeological & Cultural Heritage Impact Assessment Phase 1: Proposed Olien Solar Project development on Portion 4 of Farm 300, Barkly West, near Limeacres, Northern Cape. Morris (2012)
91009	Olien SEF004	A row of unmarked graves was documented	IIIA	The graves should be fenced and development must be restricted to no closer than 100 m.	Archaeological & Cultural Heritage Impact Assessment Phase 1: Proposed Olien Solar Project development on Portion 4 of Farm 300, Barkly West, near Limeacres, Northern Cape. Morris (2012)

Palaeontology

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on 15 October 2022. No fossils were found during the site visit. It is proposed that the development will not lead to detrimental impacts on the palaeontological reserves of the area. The construction of the development may be authorised in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources. However, just east of the development, well-preserved stromatolite outcrops in the Lime Acers Member (Altermann & Wotherspoon 1995) were identified, while Almond (2015) found well-preserved stromatolites south of the R385, north of Lime Acres. These well-preserved outcrops are located just south-west of the present study area. The possibility of well-preserved stromatolite finds is thus possible.

The PalaeoMap of the South African Heritage Resources Information System indicates that the Palaeontological Sensitivity of the Quaternary surface limestones are High and that of the Lime Acres Member are Very High (refer to **Figure 9.5**) (Almond and Pether, 2009; Almond et al., 2013). The nature of the excavations associated with Renewable Energy facilities tends to be deep and as such, given the high and very high palaeontological sensitivity of the sediments that underlay the project site, the likelihood of impacting intact Kalahari Group, Klippan formation and Kogelbeen formation sediments is high and therefore Impacts to palaeontological resources is likely.

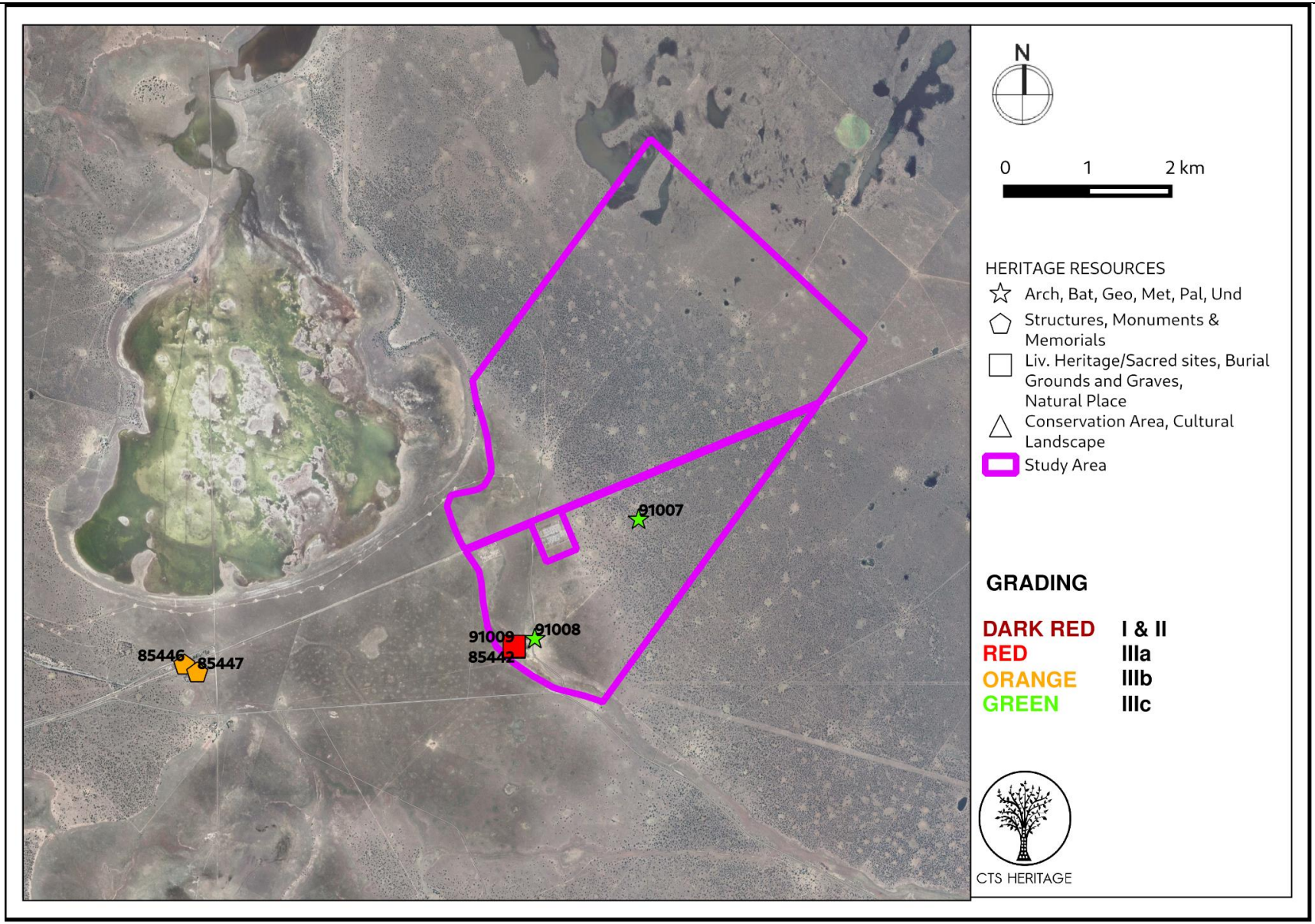


Figure 9.4: Heritage resources map of the Limestone PV1 study area

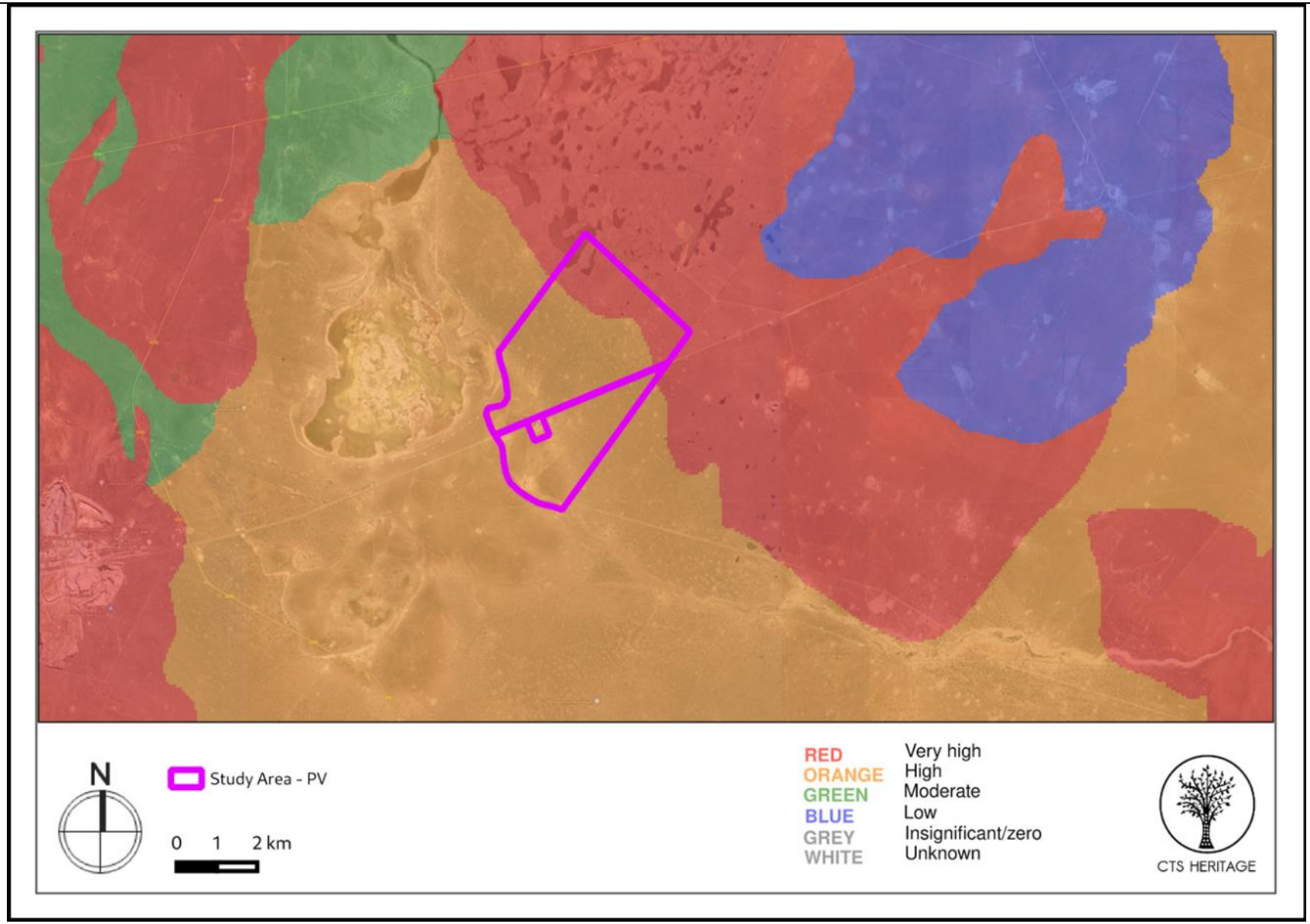


Figure 9.5: Palaeosensitivity map indicating fossil sensitivity underlying the project site

Issue	Nature of Impact	Extent	No-Go Areas
Impact to significant heritage resources through destruction during the development phase.	» Destruction of significant heritage resources	Local scale with broader impacts to scientific knowledge	300m buffer around farmhouse werf
Description of expected significance of impact Field assessment will determine the significance of the resources likely to be impacted. Impacts can be minimised through the implementation of appropriate mitigation measures.			
Gaps in knowledge & recommendations for further study » The site sensitivity concurs with that reflected in the DFFE Screening Tool Report. A Heritage Impact Assessment must be undertaken in accordance with the requirements of the Specialist Protocols. As no specific protocol exists for visual impacts, this assessment must be undertaken in accordance with the requirements of the National Heritage Resources Act (NHRA). » It is likely that the proposed development will impact significant cultural landscape, archaeological and palaeontological heritage and as such, it is recommended that a heritage impact assessment be completed that assesses these impacts as per section 38(3) of the NHRA. » Based on the available information, it is likely that the proposed development will negatively impact on significant archaeological, palaeontological and cultural landscape heritage resources. As such, it is recommended that an HIA is required that assesses these impacts and proposes mitigation measures. **Recommendations with regards to general field surveys** » Detailed field surveys are required.			

9.3.5. Impacts on the Visual Quality of the Area

The greater landscape of the study area is characterised by wide-open spaces and very limited development. The study area is sparsely populated with 7.5 people per km^2 within the local municipality. In addition to Lime Acres, a number of isolated homesteads occur throughout the study area.

Potential sensitive visual receptors include:

» Residents of homesteads and farm dwellings (in closer proximity to the facility)
» Observers travelling along the secondary roads traversing near the proposed developments

The possible receptors within the landscape which due to use could be sensitive to landscape change.

0 – 1km

- There are a two residences/farmsteads known as England located within this zone. However, the one England farmstead is located within the proposed development footprint,
- Additionally, a small section of a secondary road is located within this zone in the south, south west. It is anticipated that the proposed PV facility will be highly visible from this portion of road.

1 – 3km

- Residents of Langverwag and users of the secondary road.
- The rest of the visually exposed areas fall within vacant land and open space.

3 - 6km

- Most of this zone falls within vacant open space
- Residents of Aandrus, Olienspruit, Witput, Dikbos, Murray, Silverstreams, Outpost and Beadle homesteads.
- A secondary road is also located within this zone, however only small portions may be visually exposed and the intrusion will be fleeting.

> 6km

- At distances exceeding 6km the intensity of visual exposure is expected to be very low and highly unlikely due to the distance between the object (development) and the observer.

Sensitivity Analysis for the Site

The visual exposure of the proposed PV facility is mapped in **Figure 9.6.** In general terms it is envisaged that the structures, where visible from shorter distances (e.g. less than 1km and potentially up to 3km), and where sensitive visual receptors may find themselves within this zone, may constitute a high visual prominence, potentially resulting in a visual impact. This may include residents of the farm dwellings mentioned above, as well as observers travelling along the road in closer proximity to the facility

Issue	Nature of Impact	Extent	No-Go Areas
» The viewing of the PV facility infrastructure and activities	» The potential negative experience of viewing the infrastructure and activities within a predominantly undeveloped setting	Primarily observers situated within a 3km radius of the facility	» None identified at this stage.

Description of expected significance of impact

Depending on the proximity of the receptor, there is likely to be a moderate to high impact significance of the facility on receptors in the local area.

Gaps in knowledge & recommendations for further study

The site sensitivity concurs with that reflected in the DFFE Screening Tool Report for sensitive receptors in close proximity to the facility. A Visual Impact Assessment is required to be undertaken in accordance with the requirements of the Specialist Protocols. As no specific protocol exists for visual impacts, this assessment must be undertaken in accordance with the requirements of the EIA Regulations.

A finalised layout of the PV facility and ancillary infrastructure are required for further analysis. This includes the provision of the dimensions of the proposed structures and ancillary equipment.

Additional spatial analyses are required in order to create a visual impact index that will include the following criteria:

» Visual exposure

- Visual distance/observer proximity to the structures/activities
- Viewer incidence/viewer perception (sensitive visual receptors)
- Visual absorption capacity of the environment surrounding the infrastructure and activities

Additional activities:

- Identify potential cumulative visual impacts
- Undertake a site visit
- Recommend mitigation measures and/or infrastructure placement alternatives
- Additional spatial analyses be undertaken in order to create a visual impact index that will further aid in determining potential areas of visual impact. This exercise should be undertaken for the core PV facility as well as for the ancillary infrastructure, as these structures (e.g. the BESS structures) are envisaged to have varying levels of visual impact at a more localised scale.
- The site-specific issues (as mentioned earlier in the report) and potential sensitive visual receptors should be measured against this visual impact index and be addressed individually in terms of nature, extent, duration, probability, severity and significance of visual impact.
- Additionally, due to the location of the proposed PV site whereby the railway line bisects the proposed site, the need for a glint and glare assessment should be investigated.
- This recommended work must be undertaken during the Environmental Impact Assessment (EIA) Phase of reporting for this proposed project.

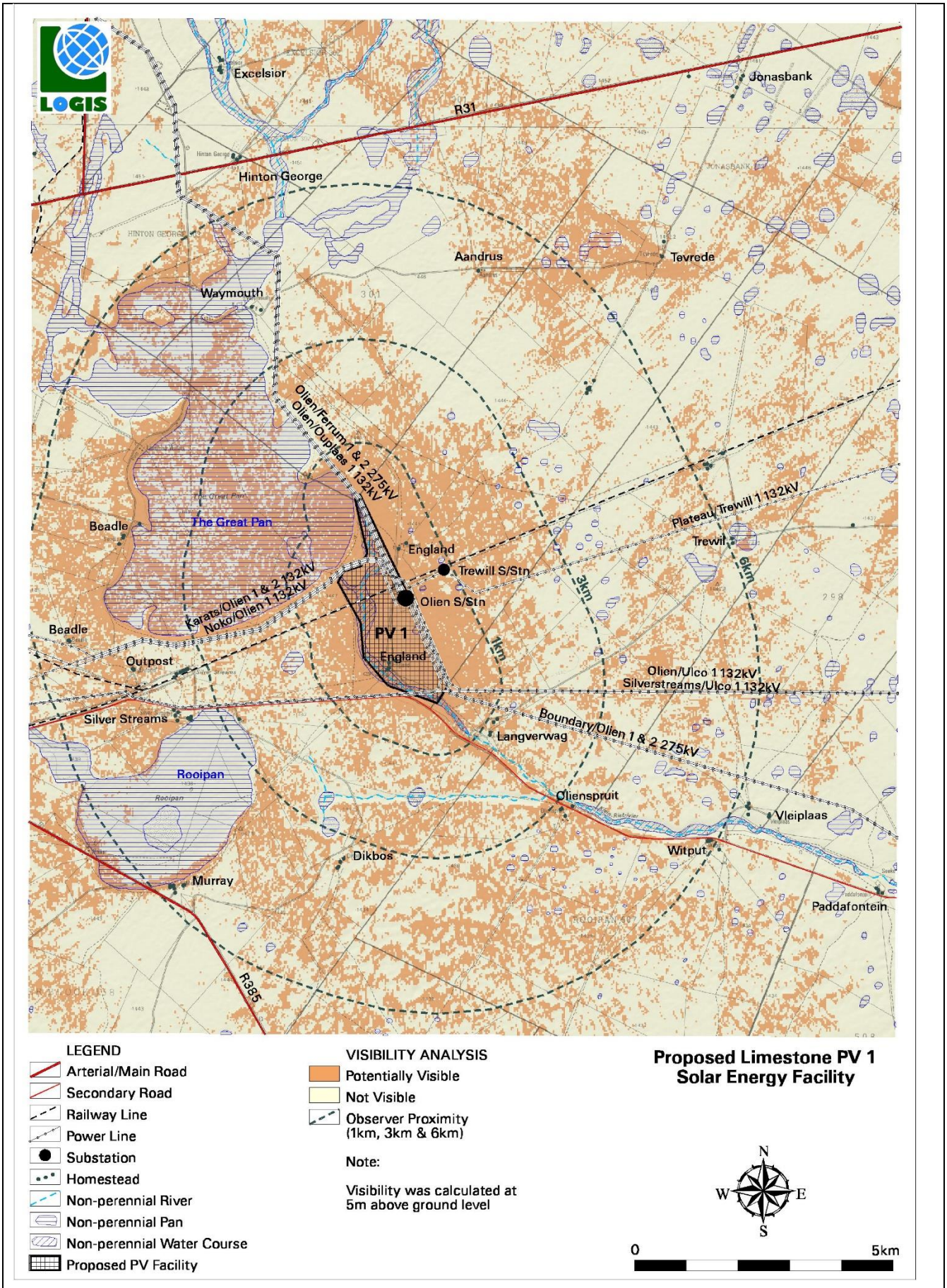


Figure 9.6: The potential (preliminary) visual exposure of the proposed Limestone PV1 facility.

9.3.6. Impacts on Socio-Economic Environment

Social Impacts during the Construction Phase

Impact Creation of local employment and business opportunities, skill development and training			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Creation of local employment and business opportunities, skill development and training associated with construction phase	Direct impacts: » Creation of temporary employment opportunities » Creation of business procurement opportunities Indirect impacts: » Creation of skill and development opportunities » Support the local economy	Local - Regional	N/A
Description of expected significance of impact The Limestone PV1 Solar Energy Facility construction phase will extend over a period of 12 months. A total of 6,754 people are expected to be employed during construction phase. This will include 34% (2,296) skilled labour, of which 3% is highly skilled (70) and 22% semi-skilled (505) and non-skilled 66% (4,457) people. 67-72% of labour will be sourced from the local communities, but this is dependent to a skill survey conducted by the Economic Development Consultant that will be appointed closer to the construction or bidding process. Danielskuil and surrounding areas, would be in a position to qualify for most of the low skilled and semi-skilled opportunities. The business-related opportunities will be linked to hospitality (accommodation) and services sector (catering, security, transport etc.). This will result in a benefit to the local communities, the significance of which is expected to be medium in the short-term.			
Gaps in knowledge & recommendations for further study » Collection of information on local skills, educational levels and service sectors **Recommendations with regards to general field surveys** » Site visit and further interviews with Landowners and other relevant stakeholders			

Impact The potential risks to livestock and farming infrastructure and the presence of workers on site			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
The potential risks to safety of local communities associated with the presence of construction workers on site	Direct impacts: » Break -ins and theft of livestock » Harm to local community or potential attacks Indirect impacts: » Resentment of outsiders and tension with local communities	Local	N/A

	» Increase in risk of theft		
Description of expected significance of impact According to data from the previous energy projects, movements and activities of construction workers can have an impact on the host communities. This is typically related to projects in rural areas and the risks are to the local farmers. Impacts are potentially of moderate significance but could be effectively reduced to low with the implementation of mitigation measures.			
Gaps in knowledge & recommendations for further study » Collection of data on the existing farming operations and activities **Recommendations with regards to general field surveys** » Site visit and further interviews with the local farmers			

Impact Potential impacts on family structures, social networks and community services associated with the influx of job seekers			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
The potential risks to livestock and farming infrastructure and the presence of workers on site	Direct impacts: » Anti -Social behaviour of construction workers » Disruption of social networks Indirect impacts: » Resentment of outsiders and tension with local communities	Local	N/A
Description of expected significance of impact Evidence from other renewable energy projects indicates that the construction phase can result in the influx of jobseekers to the area and that this has the potential to impact negatively on local communities. Impacts can be of Moderate significance but can be reduced with the implementation of mitigation measures.			
Gaps in knowledge & recommendations for further study » Gathering of data on the existing community and needs **Recommendations with regards to general field surveys** » Site visit and interviews with representatives from the local municipality, community representatives and landowners.			

Impact: heavy vehicles associated with construction activities			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Potential, traffic, noise, dust and safety impacts associated with construction related activities	Direct impacts: » Dust impacts, and impact on the local communities living closer to the construction site » Noise impacts caused by moving construction	Local	N/A

	vehicles » Damage on the gravel road that is leading to the project site Indirect impacts: » Limited indirect impacts		
Description of expected significance of impact Evidence from other renewable energy projects suggests that the construction-related activities do have an impact on the local communities in terms of dust, noise, and safety. Impacts could be of moderate significance in the short-term but can be effectively reduced through the implementation of appropriate management measures. Traffic impacts are expected during the construction phase. This can result in impacts on local roads and daily movement patterns. Impacts could be of moderate significance in the short term but could be effectively reduced through appropriate management measures.			
Gaps in knowledge & recommendations for further study » Gathering of information on existing farming activities and operations **Recommendations with regards to general field surveys** » Site visit and interviews with community representatives and farmers			

Social Impacts during the Operation Phase

Impact: Creation of local employment and business opportunities, skill development and training			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Creation of local employment and business opportunities, skill development and training associated with construction phase	Direct impacts: » Creation of employment opportunities. » Creation of business and procurement opportunities. Indirect impacts: » Creation of training and skills development opportunities. » Support for local economy.	Local- Regional	N/A
Description of expected significance of impact The operational phase of renewable energy projects offers a comparatively small number of direct employment possibilities. Reviewing the REIPPPP, however, reveals that there are other advantages to operating renewable energy plants that go beyond just creating employment opportunities. Although limited in number, the job opportunities provided will have a high positive impact for those individuals affected.			
Gaps in knowledge & recommendations for further study » Collection of information on local skills, educational levels and service sectors **Recommendations with regards to general field surveys**			

- Site visit and interviews with community representatives and other relevant stakeholders

Impact: Development of infrastructure for the generation of renewable energy			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Enhance the security of SA's energy supply and decrease coal dependence	Direct impacts: » Improve energy security » Support renewable energy » Reduce reliance on coal Indirect impacts: » Limited indirect impacts	Local - International	N/A
Description of expected significance of impact Due to supply shortages, South Africa's prolonged energy crisis, which began in 2007, has led to widespread rolling blackouts (also known as load shedding). The load shedding has significantly affected investor confidence as well as other economic sectors. In addition to addressing environmental problems related to climate change and the consumption of finite water resources, renewable energy facilities also create significant socio-economic opportunities and benefits, particularly for historically underprivileged rural communities. Although the project will only contribute up to 150MWp to the electricity grid, this will aid in achieving government's planned shift in the energy mix to include renewable energy.			
Gaps in knowledge & recommendations for further study » collection and reviewing of information from previous similar projects **Recommendations with regards to general field surveys** » Desktop review on previous similar projects			

Impact: Rural sense of place			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Impact on rural sense of place	Direct impacts: » Change in rural sense of place Indirect impacts: » Limited indirect impacts	Local	N/A
Description of expected significance of impact Renewable energy projects do have the potential to impact on an area's sense of place in some instances, this can impact on the landscape of the surroundings. The findings of Visual Impact Assessment scoping report indicates that the impacts will be on primarily observers situated within a 3km radius of the facility and are expected to be moderate to high significance and can be mitigated.			
Gaps in knowledge & recommendations for further study » Collection of data on potential sensitive land uses and activities.			

- Review of Visual Impact Assessment

Recommendations with regards to general field surveys

- Site visit and interviews with local farmers, officials from the municipality and landowners in the area.

Social Impacts during the Decommissioning Phase

Impact: Decommissioning may result in the layoff of the people who worked during the operational phase.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Impact of loss of employment and income	Direct impacts: » Loss of employment and income Indirect impacts: » impact on the local economy and other business	Local - Regional	N/A
Description of expected significance of impact Given the relatively small number of people expected to be employed during the operation phase, the social impacts associated with decommissioning are likely to be limited/minimal. Impacts on individuals are however expected to be of high significance but can be managed through the implementation of downscaling programs and retrenchment packages.			
Gaps in knowledge & recommendations for further study » N/A **Recommendations** » N/A			

9.4 Evaluation of Potential Cumulative Impacts Associated with the Limestone PV1 Solar Energy Facility and Other Approved Renewable Energy Developments

Impacts of a cumulative nature place the direct and indirect impacts of the proposed project into a regional and national context, particularly in view of similar or resultant developments and activities in the region. Potential cumulative impacts associated with the Limestone PV1 Solar Energy Facility are described below and will be assessed in detail as part of the subsequent EIA Phase to be conducted for the project.

Cumulative impacts, in relation to an activity, refer to the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area. For cumulative effects analysis to help the decision-maker and inform interested parties, it must be limited to effects that can be evaluated meaningfully (DEAT, 2004). It is important to explore the potential for cumulative impacts as this will lead to a better understanding of these impacts and the potential for mitigation that may be required. The scale at which the cumulative impacts are assessed is important. For example, the significance of the cumulative impact on the regional or national economy will be influenced by solar PV developments throughout South Africa, while the significance of the cumulative impact on the visual amenity may only be influenced by solar PV developments that are in closer proximity to each other. For practical purposes a sub-regional scale of 30km is considered for the evaluation of cumulative impact of solar PV developments.

The cumulative impacts associated with the Limestone PV1 Solar Energy Facility have been viewed from two perspectives within this Scoping Report:

- Cumulative impacts associated with the scale of the project (one up to150MWp Solar Energy Facility on the project site); and
- Cumulative impacts associated with other relevant planned, approved, or existing similar developments within a 30km radius of the project site (multiple renewable facilities and the associated grid connection infrastructure in the proximity of the site).

Cumulative effects are commonly understood as the impacts which combine from different projects, and which result in significant change, which is larger than the sum of all the impacts (DEAT, 2004). The complicating factor is that the projects that need to be considered are from past, present, and reasonably foreseeable future development. Cumulative effects can be characterised according to the pathway they follow. One pathway could be the persistent additions from one process. Another pathway could be the compounding effect from one or more processes. Cumulative effects can therefore occur when impacts are:

- Additive (incremental).
- Interactive.
- Sequential.
- Synergistic.

Canter and Sadler (1997) describe the following process for addressing cumulative effects in an EIA:

- Delineating potential sources of cumulative change (i.e., GIS to map the relevant renewable energy facilities in close proximity to one another).

» Identifying the pathways of possible change (direct impacts).
» Indirect, non-linear or synergistic processes.
» Classification of resultant cumulative changes.

The site for the proposed development is located within 30km from several other authorised renewable energy facilities. These projects include the following (refer to **Figure 9.7**):

Project Name	Project Status
Humansrus Photovoltaic (PV) 1 Solar Facility (12/12/20/1903)	Authorised
Photovoltaic Power Station At Ovaal Substation (12/12/20/1944)	Authorised
Ample Solar Groenwater (Concentrated Solar Power) Facility (12/12/20/2252/1)	Authorised
Humanrus 100MW concentrated solar power plant(12/12/20/2316/AM8)	Authorised
Welcome Wood PV Power Station 3 (12/12/20/2613)	Authorised
Arriesfontein 100MW concentrated solar power (CSP) (12/12/20/2646)	Authorised
Arriesfontein 3x Photovoltaic Solar Power Plants (12/12/20/2647/AM3)	Authorised
Arriesfontein Solar PV Power Plants: Phase 3 (12/12/20/2648)	Authorised
Welcome Wood substation PV power plant cluster 2 (12/12/20/2675)	Authorised
Danielskuil solar photovoltaic facility (14/12/16/3/3/1/1751)	Authorised
Acwa Power SolarReserve Redstone PV SEF (14/12/16/3/3/1/1916)	Authorised
PV solar power facility within Kgatelopele Local Municipality (14/12/16/3/3/2/453)	Authorised
Alpha PV Solar Energy Facility (14/12/16/3/3/2/671)	In Progress
120MW Manlenox Renewable Energy Generation Project (14/12/16/3/3/2/929)	Authorised
Manlenox 2 Renewable Energy Generation Project (14/12/16/3/3/2/930)	Authorised

In addition to the renewable energy facilities listed above, one new renewable energy facility (i.e., one Solar Energy Facility) is proposed on the same property as the Limestone PV1 Solar Energy Facility, namely:

Project Name	Contracted Capacity
Limestone PV2 Energy Facility	Up to 150MWp

The cumulative impacts that have the potential to be compounded through the development of the Limestone PV1 Solar Energy Facility and its associated infrastructure in proximity to other similar developments include impacts such as those listed below. The role of the cumulative assessment is to test if such impacts are relevant to the Limestone PV1 Solar Energy Facility within the project site being considered for the development:

» Loss of threatened or protected vegetation types, habitat, or species through clearing, resulting in an impact on the conservation status of such flora,

fauna, or ecological functioning.

- Risk to freshwater features through disturbance associated with construction activities and increased runoff and erosion during the operation phase.
- Risk to avifauna through habitat loss, displacement, and collision with solar panels.
- Loss of high agricultural potential areas presenting a risk to food security and increased soil erosion.
- Loss of heritage resources (including palaeontological and archaeological resources).
- Complete or whole-scale change in the sense of place and character of an area and unacceptable visual intrusion.
- Unacceptable impact to socio-economic factors and components. .

Summary of the nature, significance, consequence, extent, duration, and probability of the impacts

- The above-mentioned impacts are considered probable, although it is anticipated that the extent, duration, and magnitude of these impacts can be minimised to levels where this impact can be regarded as having low significance through the implementation of appropriate mitigation measures.
- The operational lifespan of the project and other renewable energy facilities within the surrounding areas is expected to be long-term (i.e., a minimum of 20 years) and subsequently the impact is also expected to be long-term.
- The impact associated with the proposed development is expected to be local, affecting mainly the immediate environment and surrounding areas, as well as other renewable energy facilities within the vicinity.

Gaps in knowledge & recommendations for further study:

- Each specialist study will consider and assess the cumulative impacts of proposed, approved and authorised renewable projects in the area.
- Cumulative impacts will be fully assessed and considered in the EIA phase.

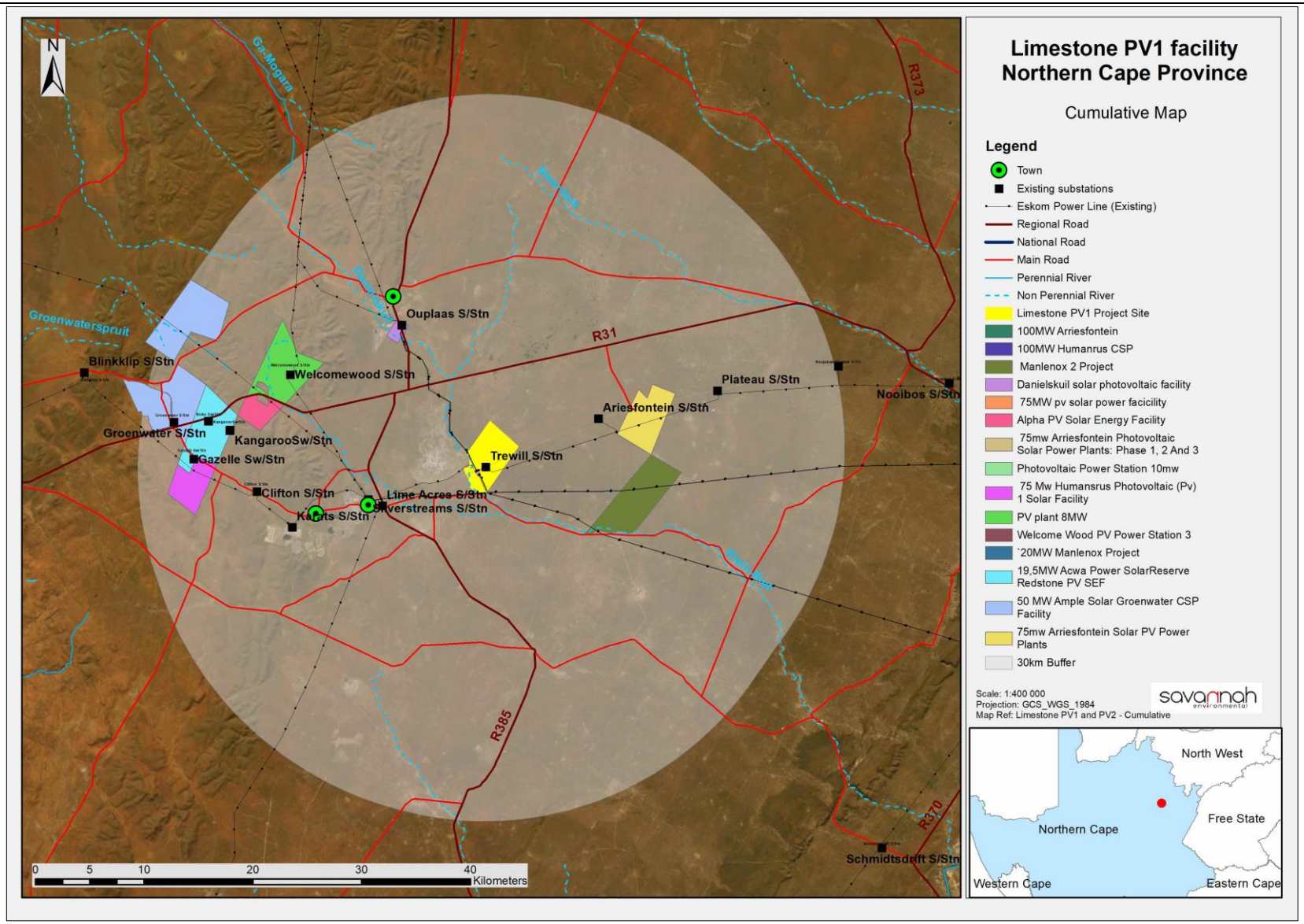


Figure 9.7: Cumulative map illustrating other approved and/or constructed renewable energy facilities located within a 30km radius of the Limestone PV1 Solar Energy Facility

CHAPTER 10: CONCLUSIONS

This Scoping Report is aimed at detailing the nature and extent of the proposed Limestone PV1 Solar Energy Facility and associated infrastructure, identifying and describing potential issues, potential environmental fatal flaws and/or areas of sensitivity associated with developing the project on the identified site, and defining the extent of studies required to be undertaken as part of the detailed EIA phase of the S&EIA process. This was achieved through an evaluation of the proposed project, involving the project proponent, and specialist consultants. This Scoping Report has been compiled in terms of the 2014 EIA Regulations (GNR 326) published in terms of Section 24(5) of NEMA.

A summary of the conclusions of the evaluation of the potential impacts identified to be associated with the project is provided in **Section 10.2**. Recommendations regarding investigations required to be undertaken within the detailed EIA phase are provided within the Plan of Study for EIA (**Chapter 11**).

10.1 Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of a Scoping Report

This chapter of the Scoping Report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(h)(xi) a concluding statement indicating the preferred alternatives, including the preferred location of the activity.	An overall conclusion and fatal flaw analysis regarding the Limestone PV1 Solar Energy Facility is included within this chapter as a whole.

10.2. Overview of the Scoping Study

This Scoping Report documents the procedure for determining the extent of, and approach to, the Environmental Impact Assessment (EIA) Phase. The Scoping Phase included the following key tasks:

- Involvement of relevant authorities and Interested and Affected Parties (I&APs) through the Public Involvement Process.
- Specialist studies including review of desk-top information and field work.
- Site sensitivity verification.
- Identification of potential impacts (positive and negative) associated with feasible project alternatives to be assessed during the EIA Phase.
- Defining Terms of Reference for any specialist studies required to inform the EIA Phase (Plan of Study (PoS)) for the Environmental Impact Assessment.

10.2. Overview of the Limestone PV1 Solar Energy Facility

The Limestone PV1 Solar Energy Facility is proposed on a site located site located ~16km south-east of the town of Danielskuil and 10km east of Lime Acres in the Northern Cape Province. The site is located within the Kgatelopele Local Municipality and the ZF Mgcawu District Municipality on Potion 4 of Farm 300 – Engeland.

The Limestone PV1 Solar Energy Facility project site is proposed to accommodate the following infrastructure which will enable the facility to supply a contracted capacity of up to 150MWp:

- PV modules mounted on either a single axis tracking & fixed structure, dependent on optimisation, technology available and cost.
- Inverters and transformers.
- Low voltage cabling between the PV modules to the inverters
- Fence around the project development area with security and access control
- Camera surveillance
- Internet connection
- 33kV cabling between the project components and the facility substation
- 33/132kV onsite facility substation
- Battery Energy Storage System (BESS) with a footprint of 3-5ha.
- Site offices and maintenance buildings, including workshop areas for maintenance and storage as well as parking for staff and visitors.
- Laydown/staging area on-site in front of mounting structures during installation. Temporary store area close to site entrance (Less than 2ha).
- Access roads (up to 6m wide) and internal distribution roads (up to 6m wide).
- Temporary concrete batching facility
- Stormwater management infrastructure as required

The extent of the project site is ~1 842MW and has been considered in this Scoping Report. A development area of up to 400ha will be considered for the development of the project based on the outcome of the specialist assessments and technical considerations. This scoping study has identified sensitive areas within the project site to assist in focussing the location of the development footprint for the Limestone PV1 Solar Energy Facility to minimise the potential for environmental impact. The size of the development footprint within the development area will be confirmed in the EIA Phase once the facility layout has been defined.

10.2. Evaluation of the Proposed Project

The potentially significant issues related to the construction and operation of the Limestone PV1 Solar Energy Facility include:

- Destruction, fragmentation and degradation of habitats and ecosystems.
- Impacts on flora and fauna Species of Conservation Concern.
- Alien plant invasion.
- Disturbance of fauna and avifauna as a result of the presence of people and machinery on site.
- Direct mortality of fauna as a result of collisions with construction vehicles.
- Direct mortality of avifauna as a result of collisions with project infrastructure.
- Reduced dispersal/migration of fauna.
- Environmental pollution due to water runoff, spills from vehicles and erosion.
- Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, dust, heat radiation and light pollution.
- Impact to significant heritage resources through destruction during the development phase.
- Visual impacts associated with the PV facility infrastructure and activities on site.
- The potential risks to livestock and farming infrastructure and the presence of workers on site.

» Impact on rural sense of place.

The majority of potential impacts identified to be associated with the construction of the Limestone PV1 Solar Energy Facility and associated infrastructure are anticipated to be localised and restricted to the project site itself, while operation phase impacts/benefits range from local to regional. No environmental fatal flaws were identified to be associated with the project site. Areas of high and very high sensitivity were identified to be avoided by the development footprint as detailed below and reflected in **Figure 10.1**. These impacts and areas of sensitivity are to be confirmed in the detailed EIA Phase of the process.

10.3. Site Sensitivity Analysis for the Limestone PV1 Solar Energy Facility

This section considers the sensitive features located within the project site, as identified by the independent specialists within each respective field, and also indicates the locations of the sensitive features within the project site.

The potentially sensitive areas which have been identified through the scoping study are illustrated in **Figure 10.1**. The detail is based on the desktop review of available baseline information for the project site, as well as sensitivity data from specialist studies undertaken during the scoping phase, which included field surveys. During the site and desktop surveys, the affected area was investigated in sufficient detail in order to provide definitive insight into the potential for constraining factors on the site. The sensitivity map must be used as a tool by the developer to avoid any areas flagged to be of higher risk or sensitivity and inform the location/layout of the development footprint for the facility and associated infrastructure. The development footprint is the area which will be assessed further in detail in the EIA Phase in order to provide an assessment of environmental acceptability and suitability of the facility layout of the Limestone PV1 Solar Energy Facility.

10.3.1 Ecology Sensitive Features

The project site overlaps with areas classified as both CBA1 and CBA2. The site is not located within any NPAES focus areas or any Formal/Informal Protected Areas. Ecological sensitivities that occur specifically within the project site for the Limestone PV1 Solar Energy Facility are as follows:

» Wooded Vaalbosveld – High Site Ecological Importance (SEI)
» Open Shrubveld – High Site Ecological Importance
» Open Grassland – High Site Ecological Importance
» Transformed – Very Low Site Ecological Importance
» Watercourse Wet-Depression (Pan) – Very High Site Ecological Importance
» Water Resources (Depressions) – High Site Ecological Importance

No destructive development activities should be considered for Very High SEI habitat units. Avoidance is recommended for the delineated water resources and accompanying buffers and for the Wooded Vaalbosveld habitat.

Any development in the high SEI areas will lead to the direct destruction and loss of portions of functional habitat. Guidelines for development in high sensitivity areas require avoidance mitigation as much as possible. This must include concerted efforts to avoid these sensitive areas where feasible, and disturbances must be kept to an absolute minimum. Changes must be made to project infrastructure

design to limit the amount of area/habitat impacted in relation to the title deed area (for example 10%). Avoiding most of the Wooded Vaalbosveld habitat will be considered as avoidance, thus allowing development in the remaining High SEI areas. The minimisation of the disturbance footprint is also considered to be avoidance, this will include brush cutting beneath panels as opposed to the complete clearance of vegetation (applicable to the Wooded Vaalbosveld habitat as well).

Limited development activities of low-medium impact are acceptable, followed by appropriate restoration activities. The infrastructure layout should consider habitat connectivity to avoid fragmentation, and technology alternatives should opt to retain vegetation under the PV panels.

It is recommended that the central core of the Wooded Vaalbosveld habitat be preserved. Some minor development creep into the edges of the habitat may be allowed – provided that the provincial authority issues a permit for the destruction of the protected Wild Olive (*Olea europaea*).

The site sensitivity defined through the scoping study concurs with that reflected in the DFFE Screening Tool Report. A Biodiversity Impact Assessment is required to be undertaken in accordance with the requirements of the Specialist Protocols to assess potential impacts and recommend appropriate mitigation measures.

10.3.2 Avifaunal Sensitive Features

The following sensitivities were identified from an avifaunal perspective following the first monitoring survey:

- Water Resources - Very High Avifaunal Site Ecological Importance
- Grassland – High Avifaunal Site Ecological Importance
- Transformed - Very Low Avifaunal Site Ecological Importance
- Vaalbos veld - High Avifaunal Site Ecological Importance
- Shrubland - High Avifaunal Site Ecological Importance

Additional avifaunal sensitivities may become apparent following the analysis of flight path and occurrence data from all four seasons of avifaunal surveys (the final survey still to be conducted). Most of the project site is considered to be of high and very high sensitivity because of the number of Greater flamingos found at the wetland adjacent to the project area, combined with the presence of Lanner Falcon, Burchell's Courser, Kori Bustard and Southern Black Korhaan.

The site sensitivity defined through the scoping study does not concur with that reflected in the DFFE Screening Tool Report (which is indicated as low sensitivity). An Avifauna Impact Assessment is required to be undertaken in accordance with the requirements of the Specialist Protocols to assess potential impacts and recommend appropriate mitigation measures. This assessment will be informed by 2 monitoring surveys undertaken in accordance with the Best Practice Guidelines for Birds and Solar Facilities.

10.3.3 Soils and Land Capability Sensitive Features

The land capability sensitivity indicated that the site is characterized with an overall "Low" sensitivity with limited "Moderate" sensitivities following the baseline findings. The DFFE screening tool, (2022) shows that

there are no crop fields with "High" sensitivity within the assessment area and as a result there will be no segregation of crop production. It is the specialist's opinion that the proposed Limestone PV1 Solar Energy facility and associated infrastructure will have limited-no impacts on the agricultural production ability of the land.

There are no areas identified which are required to be excluded from the proposed development footprint. The site sensitivity concurs with that reflected in the DFFE Screening Tool Report. A Soils and Agricultural Compliance Statement is required in accordance with the requirements of the Specialist Protocols.

10.3.4 Heritage Sensitive Features (incl. Archaeology and Palaeontology)

The PalaeoMap of the South African Heritage Resources Information System indicates that the Palaeontological Sensitivity of the area proposed for development is underlaid by sediments of high and very high sensitivity. The nature of the excavations associated with Renewable Energy facilities tends to be deep and as such, given the high and very high palaeontological sensitivity of the sediments that underlay the project site, the likelihood of impacting intact Kalahari Group, Klippan formation and Kogelbeen formation sediments is high

Due to the nature of the development and its context, cumulative impact and negative impact to the cultural landscape is possible. There are no sites of palaeontological significance identified at this stage which are required to be excluded from the proposed development footprint at this stage. A number of heritage resources of significance were identified within the Limestone PV1 site. These resources include a structure (graded IIIC), an informal burial ground graded IIIA and historic kraal graded IIIC. These are all heritage resources associated with the England historic farm werf. Part of the significance of this historic werf lies in its context and as such, it is recommended that a buffer of 300m is implemented around the farm werf for PV infrastructure. Based on the available information, it is likely that the proposed development will negatively impact on significant archaeological, palaeontological and cultural landscape heritage resources. The site sensitivity concurs with that reflected in the DFFE Screening Tool Report. A Heritage Impact Assessment must be undertaken in accordance with the requirements of the Specialist Protocols to assess potential impacts and recommend appropriate mitigation measures. As no specific protocol exists for heritage impacts, this assessment must be undertaken in accordance with the requirements of the National Heritage Resources Act (NHRA).

10.3.5 Visual Sensitive Features

Possible receptors within the landscape which due to use could be sensitive to landscape change.

0 – 1km

- There are a two residences/farmsteads known as England located within this zone. However, the one England farmstead is located within the proposed development footprint,
- Additionally, a small section of a secondary road is located within this zone in the south, south west. It is anticipated that the proposed PV facility will be highly visible from this portion of road.

1 – 3km

- Residents of Langverwag and users of the secondary road.
- The rest of the visually exposed areas fall within vacant land and open space.

3 - 6km

- Most of this zone falls within vacant open space
- Residents of Aandrus, Oliënspruit, Witput, Dikbos, Murray, Silverstreams, Outpost and Beadle homesteads.
- A secondary road is also located within this zone, however only small portions may be visually exposed and the intrusion will be fleeting.

> 6km

- At distances exceeding 6km the intensity of visual exposure is expected to be very low and highly unlikely due to the distance between the object (development) and the observer.

In general terms it is envisaged that the structures, where visible from shorter distances (e.g. less than 1km and potentially up to 3km), and where sensitive visual receptors may find themselves within this zone, may constitute a high visual prominence, potentially resulting in a visual impact. This may include residents of the farm dwellings mentioned above, as well as observers travelling along the road in closer proximity to the facility

The site sensitivity concurs with that reflected in the DFFE Screening Tool Report for sensitive receptors in close proximity to the facility. A Visual Impact Assessment is required to be undertaken in accordance with the requirements of the Specialist Protocols to assess potential impacts and recommend appropriate mitigation measures. As no specific protocol exists for visual impacts, this assessment must be undertaken in accordance with the requirements of the EIA Regulations.

10.3.5 Social Sensitive Features

No specific sensitivities to be avoided by the proposed project were identified for the social environment. A number of potential positive and negative impacts were identified to be associated with the proposed project. A Social Impact Assessment is required to be undertaken in accordance with the requirements of the EIA Regulations to assess potential impacts and recommend appropriate mitigation measures.

10.4 Overall Conclusion and Fatal Flaw Analysis

The findings of the Scoping Study indicate that no environmental fatal flaws are associated with the proposed project provided that areas of very high sensitivity are avoided. While some impacts of potential significance do exist, it is anticipated that the implementation of appropriate mitigation measures would assist in reducing the significance of such impacts to acceptable levels. It is however recommended that the project site for the development of the facility be considered outside of the areas identified as no-go areas as far as possible in order to ensure that the development does not have a detrimental impact on the environment. This forms part of the 'funnel-down approach' of the mitigation hierarchy for the identification of an appropriate development footprint within the development area. Even with the appropriate avoidance of sensitive areas, there is an adequate area on the site which can accommodate the planned facility with relatively low impacts on the environment.

With an understanding of which areas within the project site are considered sensitive to the development of the proposed facility, the developer can prepare a detailed facility layout for consideration within the EIA Phase. During the EIA Phase, more detailed environmental studies will be conducted in line with the

Plan of Study for EIA contained in **Chapter 11** of this Scoping Report. These studies will consider the detailed facility layout produced by the developer and make recommendations for the implementation of avoidance strategies (if required), and mitigation and management measures to ensure that the final assessed layout retains an environmental impact within acceptable limits. The sensitivity map will be further refined in the EIA phase on the basis of these specialist studies, in order to provide an assessment of environmental acceptability of the proposed facility footprint.

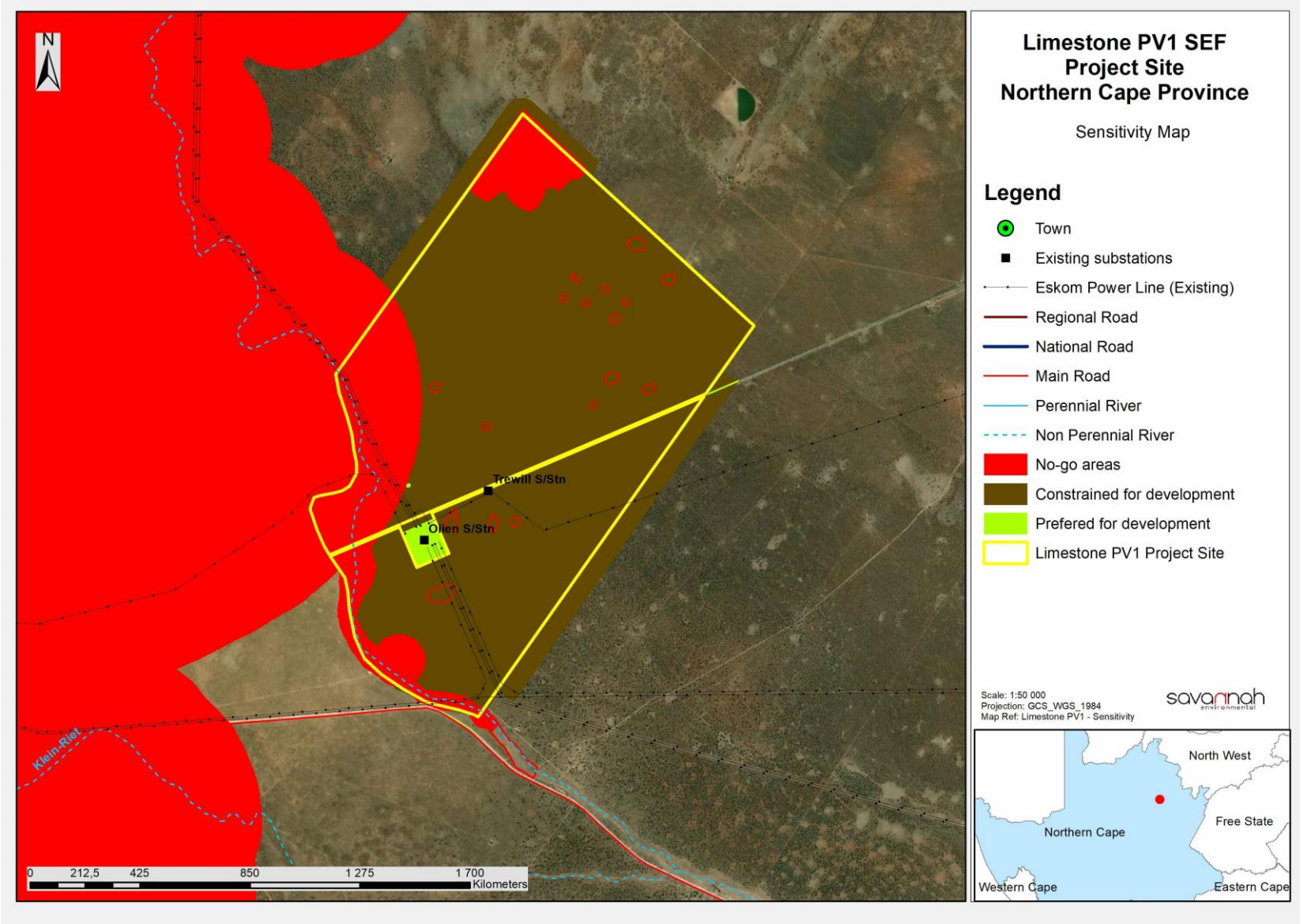


Figure 10.1: Environmental Sensitivity Map from the results of the scoping evaluation for the Limestone PV1 Solar Energy Facility and associated infrastructure

CHAPTER 11: PLAN OF STUDY FOR THE ENVIRONMENTAL IMPACT ASSESSMENT

One of the key objectives of the Scoping Phase is to determine the level of assessment to be undertaken within the EIA Phase of the process. This will include the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken. This is to determine the impacts and risks a particular activity will impose on a preferred site through the life of the activity (including the nature, significance, consequence, extent, duration, and probability of the impacts) to inform the location of the development footprint within the preferred site.

This Chapter contains the Plan of Study for the EIA for the Limestone PV1 Solar Energy Facility, which describes how the EIA Phase will proceed, and includes details of the independent specialist studies required to be undertaken to assess the significance of those impacts identified within the Scoping Study to be of potential significance.

11.1 Legal Requirements as per the EIA Regulations, 2014 (as amended) for the Undertaking of a Scoping Report

This chapter of the scoping report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
2(1)(h) a plan of study for undertaking the environmental impact assessment process to be undertaken, including - (i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity; (ii) a description of the aspects to be assessed as part of the environmental impact assessment process; (iii) aspects to be assessed by specialists; (iv) a description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists; (v) a description of the proposed method of assessing duration and significance: (vi) an indication of the stages at which the competent authority will be consulted; (vii) particulars of the public participation process that will be conducted during the environmental impact assessment process; and (viii) a description of the tasks that will be undertaken as part of the environmental impact assessment process; (ix) identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to	A plan of study for the undertaking of the EIA Phase for the Limestone PV1 Solar Energy Facility is included within this chapter as a whole.

be managed and monitored.

11.2 Objectives of the EIA Phase

The EIA Phase to be undertaken for the Limestone PV1 Solar Energy Facility and associated infrastructure will aim to achieve the following:

- Provide an overall description and detailed assessment of the social and biophysical environment affected by the development of the Solar Energy Facility and associated infrastructure.
- Assess potentially significant impacts (direct, indirect, and cumulative, where required) associated with the Solar Energy Facility.
- Identify and recommend appropriate avoidance strategies and mitigation measures for potentially significant environmental impacts.
- Undertake a fully inclusive public involvement process to ensure that I&APs are afforded the opportunity to participate, and that their comments are recorded.

The EIA will assess potential environmental impacts and benefits (direct, indirect, and cumulative impacts) associated with each phase of the development, including design, construction, operation and decommissioning; and will aim to provide the Competent Authority with sufficient information to make an informed decision regarding the proposed development. The site layout being proposed for the Limestone PV1 Solar Energy Facility will be assessed through detailed independent specialist studies. As required in terms of the 2014 EIA Regulations (GNR 326), as amended, the assessment will include consideration of the 'do nothing' alternative.

11.3 Consideration of Alternatives

The following project alternatives will be investigated in the EIA Phase:

Nature of Alternatives Considered	Description of the Alternatives relating to the Limestone PV1 Solar Energy Facility
Property/Location and Layout Alternatives	One preferred project site has been identified for the development of the Limestone PV1 Solar Energy Facility due to site specific characteristics such as the solar resource, land availability, topographical considerations, proximity to a viable grid connection and environmental features. The project site is ~1 842ha in extent which is considered to be sufficient for the development of a Solar Energy Facility with a contracted capacity of up to 150MWp. A development area will be identified within the project site by the proponent for the development based on the outcome of the specialist assessments and technical considerations. A facility layout within this development area will be provided by the applicant for assessment in the EIA Phase of the process.
Activity Alternatives	AGV Projects (Pty) Ltd is a renewable energy project developer and as such is only considering renewable energy activities in accordance with the need for such development within the IRP (refer to Chapters 5 and 6 for more detail). Considering the available renewable energy resources within the area and the current significant restrictions placed on other natural resources such as water, it is considered that solar energy is the preferred option for the development of a renewable energy facility within the identified project site. Development of a solar energy facility is also being considered in a separate application process due to the viable solar resource in the area. No other activity alternatives are being considered within this EIA process.
Technology Alternatives	Only the development of a Solar Energy Facility is considered due to the characteristics

Nature of Alternatives Considered	Description of the Alternatives relating to the Limestone PV1 Solar Energy Facility
	of the site, including the natural resources available. The use solar panels for the generation of electricity is considered to be the most efficient technology for the project site.
'Do-nothing' Alternative	This is the option to not construct and operate the Limestone PV1 Solar Energy Facility. No impacts (positive or negative) are expected to occur on the social and environmental sensitive features or aspects located within the project site or the surrounds. The opportunities associated with the development of the Solar Energy Facility for the affected area and other surrounding towns in the area will also not be realised.

11.4 Description of project to be assessed during the EIA Phase

11.4.1 Project description

The aspects or nature and extent of the project to be assessed as part of the EIA below:

- PV modules mounted on either a single axis tracking & fixed structure, dependent on optimisation, technology available and cost.
- Inverters and transformers.
- Low voltage cabling between the PV modules to the inverters.
- Fence around the project development area with security and access control.
- Camera surveillance.
- Internet connection.
- 33kV cabling between the project components and the facility substation.
- 33/132kV onsite facility substation.
- Battery Energy Storage System (BESS) with a footprint of 3-5ha.
- Site offices and maintenance buildings, including workshop areas for maintenance and storage as well as parking for staff and visitors.
- Laydown/staging area on-site in front of mounting structures during installation. Temporary store area close to site entrance (Less than 2ha).
- Access roads (up to 6m wide) and internal distribution roads (up to 5m wide).
- Temporary concrete batching facility.
- Stormwater management infrastructure as required.

A more detailed description of the activities associated with the construction and operation of the project is included in Chapter 2 of this Scoping Report and will be further refined in the EIA.

11.4.2. Scope of the EIA phase and EIA report

The EIA Report will be compiled in terms of the requirements of the EIA Regulations and include the information as required in Appendix 3 of GNR 326. The results of the specialist studies and other available information will be integrated, synthesised, and presented in the EIA Report by the Savannah Environmental project team. The EIA Report will assess the overall environmental impacts associated with the development, consider mitigation measures as may be required, and make recommendations regarding the best development alternative. The EIA Report will also identify mitigation measures and provide management recommendations to minimise negative impacts and enhance benefits. The EIA Report will include:

- The details and expertise of the **EAP** who prepared the report.
- The **location** of the development footprint of the activity and a locality map illustrating the location of the proposed activity.
- A **description** of the scope of the proposed activity including all listed activities triggered and a description of associated structures and infrastructure.
- The **policy and legislative** context within which the development is located and an explanation of how the development complies and responds to the legislation and policy context.
- The **need and desirability** of the proposed development of the activity in the context of the preferred location.
- A motivation for the **preferred development footprint** within the approved site as contemplated in the accepted scoping report.
- A description of the **process** followed to reach the proposed development footprint within the approved site, including:
  - details of the development footprint considered;
  - details of the public participation process undertaken in terms of Regulation 41 of the 2014 EIA Regulations, including copies of supporting documents;
  - a summary of issues raised by interested and affected parties and the manner in which the issues were incorporated;
  - the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
  - the impacts and risks identified including the nature, significance, consequence extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources and can be avoided, managed or mitigated;
  - the methodology used for determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks;
  - positive and negative impacts that the activity and alternatives will have on the environment and the community;
  - possible mitigation measures to be applied and the level of residual risk;
  - a motivation for not considering alternative development locations;
  - a concluding statement indicating the location of the preferred alternative development location; and
  - a full description of the process followed to identify, assess and rank impacts of the activity and associated infrastructure on the preferred location including all environmental issues and risks that have been identified and an assessment of the significance of each issue and risk and the extent to which the issue/risk can be avoided or mitigated.
- An **assessment** of the identified potentially significant impacts and risks.
- A summary of the **findings and recommendations** of any specialist report and an indication as to how these findings and recommendations have been included.
- An **environmental impact assessment** containing a summary of key findings, an environmental sensitivity map and a summary of the positive and negative impacts and risks of the proposed activity.
- An **Environmental Management Programme** (EMPr), as per Appendix 4 of GNR326, containing the recommendations from specialists, the impact management **objectives,** and the impact management **outcomes**.
- The final **alternatives** which respond to the impact management measures, avoidance and mitigation measures identified.

- Any aspects which were **conditional** to the findings of the assessment.
- Description of the assumptions, uncertainties and gaps in knowledge relating to the assessment and mitigation measures proposed.
- An **opinion** as to whether the proposed activity should or should not be authorised and the conditions thereof.
- An undertaking under **affirmation** by the EAP in relation to the correctness of the information, the inclusion of comments and inputs from stakeholders and Interested and affected parties, the inclusion of inputs and recommendations from the specialists and any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties.

The EIA Report will be released to the public and relevant stakeholders, Organs of State and Authorities for a 30-day review and comment period. Comments received from I&APs will be captured within a Comments and Response Report, which will be included within the Final EIA Report, for submission to the authorities for decision-making.

11.5 Specialist Assessments to be undertaken during the EIA Phase

A summary of the aspects which require further investigation within the EIA Phase through specialist studies, the terms of reference for each specialist study, as well as the proposed activities to be undertaken in order to assess and ground-truth the significance of the potential impacts is provided within **Table 11.1**. The specialists proposed to undertake detailed studies in the EIA Phase are also reflected within this table. These specialist studies will consider the development footprint proposed for the Solar Energy Facility and all associated infrastructure, as well as feasible and reasonable alternatives identified for the project.

Based on the studies undertaken within the Scoping Phase, it was concluded that no further study is required in terms of Soils and Agricultural Potential. A Compliance Statement has been included in Appendix I of this report and will also be included as part of the EIA Report.

Table 11.1: Aspects requiring further investigation by specialists during the EIA Phase and terms of reference to assess the significance of the potential impacts relevant to the Limestone PV1 Solar Energy Facility

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
Terrestrial and Freshwater Ecology	<u>The EIA Phase will include the following activities:</u> A detailed Flora and Fauna survey will be conducted. The Flora survey will include: » The fieldwork and sample sites will be placed within targeted areas (i.e., target sites) perceived as ecologically sensitive based on the preliminary interpretation of satellite imagery (Google Corporation) and GIS analysis (which will included the latest applicable biodiversity datasets) available prior to the fieldwork. » Homogenous vegetation units will be subjectively identified using satellite imagery and existing land cover maps. » The floristic diversity and search for flora SCC will be conducted through timed meanders within representative habitat units delineated during the fieldwork. Emphasis will be placed mostly on sensitive habitats overlapping with the proposed project areas. » Suitable habitat for SCC will be identified according to Raimondo et al. (2009) and targeted as part of the timed meanders. » At each sample site notes will be made regarding current impacts (e.g., livestock grazing, erosion etc.), subjective recording of dominant vegetation species, and any sensitive features (e.g., wetlands, outcrops etc.). In addition, opportunistic observations will be made while navigating through the project area. The Fauna (herpetofauna (amphibians, reptiles and mammals) survey will include: » Visual and auditory searches - This typically comprises of meandering and using binoculars to view species from a distance without them being disturbed; and listening to species calls » Active hand-searches - Used for species that shelter in or under particular micro-habitats (typically rocks, exfoliating rock outcrops, fallen trees, leaf litter, bark etc) » Point counts for the avifauna » Utilization of local knowledge Relevant field guides and texts that will be consulted for identification purposes included the following: » Field Guide to Snakes and other Reptiles of Southern Africa (Branch, 1998); » A Complete Guide to the Snakes of Southern Africa (Marais, 2004); » Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland (Bates et al, 2014); » A Complete Guide to the Frogs of Southern Africa (du Preez and Carruthers, 2009);	Andrew Husted of The Biodiversity Company

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Smithers' Mammals of Southern Africa (Apps, 2000); and » A Field Guide to the Tracks and Signs of Southern and East African Wildlife (Stuart and Stuart, 2000). Assessment of Impacts for the EIA The methodology described in **Section 11.6** assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. Environmental Management Programme For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	
Avifauna	The EIA Phase will include the following activities: » The field survey will be undertaken. Effort will be made to cover all the different habitat types within the limits of time and access. Areas surrounding the project area will also be surveyed, this included areas on the river just south of the project area. » Sampling will consist of standardized point counts as well as random diurnal incidental surveys and vantage point surveys. Standardized point counts (following Buckland et al. 1993) will be conducted to gather data on the species composition and relative abundance of species within the broad habitat types identified. » Each point count was run over a 10 min period. The horizontal detection limit will be set at 500 m. » At each point the observer will document the date, start time, and end time, habitat, numbers of each species, detection method (seen or heard), behaviour (perched or flying) and general notes on habitat and nesting suitability for conservation important species. To supplement the species inventory with cryptic and illusive species that may not be detected during the rigid point count protocol, diurnal incidental searches will be conducted. » This involved the opportunistic sampling of species between point count periods and road cruising. Camera traps will also be deployed for passive sampling. Relevant field guides and texts that will be consulted for identification purposes included the following: » Book of birds of South Africa, Lesotho and Swaziland (Taylor et al., 2015); and	Andrew Husted of The Biodiversity Company

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Roberts – Birds of Southern Africa (Hockey et al., 2005). Assessment of Impacts for the EIA: The methodology described in **Section 11.6** assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. Environmental Management Programme: For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	
Heritage (including Cultural Landscape, Archaeology and Palaeontology)	The EIA Phase will include the following activities: As part of the EIA, it is necessary to undertake a Heritage and Archaeological Study to fulfil the SAHRA requirements in accordance with the National Heritage Resources Act (No. 25 of 1999). A Heritage and Archaeological Impact Assessment (including cultural landscape and palaeontology) will therefore be conducted, the primary objective of which is to determine the heritage and archaeological significance of features on the site as well as the significance of the cultural landscape. The following activities will be undertaken during the EIA Phase: » Undertake field assessments in order to fill the identified gaps in knowledge. The archaeological field surveys will provide sufficient ground-coverage of the areas to be developed to be able to determine the nature of the resources likely to be impacted. The palaeontological and cultural landscape field surveys will target sensitive geological and cultural landscape features. » Draft a report in accordance with the requirements for Heritage Impact Assessments. Assessment of Impacts for the EIA: The methodology described in **Section 11.6** assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive).	Jenna Lavin of CTS Heritage

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. Environmental Management Programme: For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	
Visual	The EIA Phase will include the following activities: A visual impact assessment (VIA) will be undertaken during the EIA Phase. The VIA will comprise the following activities: » Determine potential visual exposure » Determine visual distance/observer proximity to the facility » Determine viewer incidence/viewer perception (sensitive visual receptors) » Determine the visual absorption capacity of the landscape » Calculate the visual impact index » Determine impact significance » Propose mitigation measures » Reporting and map display » Site visit Assessment of Impacts for the EIA: The methodology described in **Section 11.6** assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. Environmental Management Programme: For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	Lourens du Plessis of LOGIS
Social	The EIA Phase will include the following activities: A full EIA level Socio-Economic Impact Assessment will be conducted as part of the EIA Phase. The following activities will be	Molatela Ledwaba of Savannah

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	undertaken as part of the process: » Gathering information and reviewing of reports and baseline socio-economic data on the area. » Identification of the elements involved in the construction and operational phase of the project, such as an estimate of total capital expenditure, number of employments created and breakdown of the employment opportunities in terms in skill levels. » Review from key findings of specialist studies that have an impact on SIA, such as the Visual Impact Assessment (VIA), Soils and Agricultural Potential Impact Assessment and Heritage Impact Assessment. The engagement with the impacted landowners that was initiated on the 09 November 2022 will be used as part of data gathering. » The project's construction, operational, and decommissioning phases all have potential implications, both positive and negative, which should be identified and evaluated. » Identification and assessment of key issues, as well as assessment of potential impacts (both positive and negative) associated with the project's construction, operational and decommissioning phases. » Identifying and assessing cumulative impacts (positive and negative). » Identifying appropriate measures to avoid, mitigate, enhance and compensate for potential social impacts. » Compilation of Social Impact Assessment (SIA) Report. <u>Assessment of Impacts for the EIA:</u> The methodology described in **Section 11.6** assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. <u>Environmental Management Programme:</u> For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	Environmental with peer review by Tony Barbour
Cumulative Assessment	Assess the cumulative impacts associated with the construction and operation of more than one development (i.e., renewable energy developments) within the immediate surrounding areas of the project site and within a 30km radius of the site on the ecological, heritage, soil and agricultural potential, avifaunal, social, and visual impact of the area.	All specialists and Savannah Environmental

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	The objective is to identify and focus on potentially significant cumulative impacts so these may be taken into consideration in the decision-making process. The following will be considered: » Unacceptable loss of threatened or protected vegetation types, habitat, or species through clearing, resulting in an impact on the conservation status of such flora, fauna, or ecological functioning. » Unacceptable risk to freshwater features through disturbance associated with construction activities and increased runoff and erosion during the operation phase. » Unacceptable risk to avifauna through habitat loss, displacement, and collision with solar panels. » Unacceptable loss of high agricultural potential areas presenting a risk to food security and increased soil erosion. » Unacceptable loss of heritage resources (including palaeontological and archaeological resources). » Complete or whole-scale change in the sense of place and character of an area and unacceptable visual intrusion. » Unacceptable impact to socio-economic factors and components.	

11.6 Methodology for the Assessment of Potential Impacts

Direct, indirect, and cumulative impacts of the above issues identified through this Scoping Study will be assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional:
  - local extending only as far as the development site area – assigned a score of 1;
  - limited to the site and its immediate surroundings (up to 10 km) – assigned a score of 2;
  - will have an impact on the region – assigned a score of 3;
  - will have an impact on a national scale – assigned a score of 4; or
  - will have an impact across international borders – assigned a score of 5.
- The **duration**, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - medium-term (5–15 years) – assigned a score of 3;
  - long term (> 15 years) - assigned a score of 4; or
  - permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - 0 is small and will have no effect on the environment;
  - 2 is minor and will not result in an impact on processes;
  - 4 is low and will cause a slight impact on processes;
  - 6 is moderate and will result in processes continuing but in a modified way;
  - 8 is high (processes are altered to the extent that they temporarily cease); and
  - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:
  - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  - Assigned a score of 2 is improbable (some possibility, but low likelihood);
  - Assigned a score of 3 is probable (distinct possibility);
  - Assigned a score of 4 is highly probable (most likely); and
  - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- the **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- the **status**, which will be described as either positive, negative or neutral.
- the degree to which the impact can be reversed.
- the degree to which the impact may cause irreplaceable loss of resources.
- the *degree* to which the impact can be *mitigated*.

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

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

S = Significance weighting

E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

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

Other aspects to be taken into consideration in the specialist studies and EIA report are:

- Impacts should be described in terms of before and after the proposed mitigation and management measures have been implemented.
- All impacts should be evaluated for the full lifecycle of the proposed development, including construction, operation, and decommissioning.
- The impact assessment should take into consideration the cumulative effects associated with this and other similar developments which are either developed or in the process of being developed in the region. The purpose of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e., whether the addition of the proposed project in the area will increase the impact). In this regard, specialist studies will consider whether the construction of the proposed development will result in:
  - Unacceptable risk
  - Unacceptable loss
  - Complete or whole-scale changes to the environment or sense of place
  - Unacceptable increase in impact
- A conclusion regarding whether the proposed development will result in any unacceptable loss or impact considering all the projects proposed in the area is included in the respective specialist reports.

As AGV Projects (Pty) Ltd has the responsibility to avoid and/or minimise impacts as well as plan for their management (in terms of the EIA Regulations), the mitigation of significant impacts will be discussed. Assessment of mitigated impacts will demonstrate the effectiveness of the proposed mitigation measures.

11.7 Authority Consultation

Consultation with the regulating authorities (i.e., DFFE and Northern Cape DAEARDLR) has been undertaken in the Scoping Phase and will continue throughout the EIA process. On-going consultation will include the following:

- Submission of a Final Scoping Report following a 30-day review period which will include all comments and issues raised during the review period as well as appropriate responses to the comments.
- Submission of an EIA Report and EMPr for a 30-day review and comment period.

» Submission of a Final EIA Report and EMPr following a 30-day review period which will include all comments and issues raised during the review period as well as appropriate responses to the comments received.
» Consultation and an authority site visit (if required) in order to discuss the findings and conclusions of the EIA Report.

11.8 Public Participation Process

A public participation process will be undertaken by Savannah Environmental during the EIA phase in accordance with the requirements of the EIA Regulations, 2014 (as amended). Consultation with key stakeholders and I&APs will be on-going throughout the EIA Phase. Through this consultation process, stakeholders and I&APs will be encouraged to verify that their issues were recorded in the Scoping Phase, identify additional issues of concern or highlight positive aspects of the proposed project, and comment on the findings of the EIA Phase. In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their inputs, various opportunities will be provided for stakeholders and I&APs to be involved in the EIA Phase of the process, as follows:

» Focus group meetings (pre-arranged and I&APs invited to attend) via the use of virtual platforms (Zoom or MS Teams).
» One-on-one consultation meetings (for example with directly affected and surrounding landowners) via telephone or virtual platforms.
» Telephonic consultation sessions (consultation with various parties from the EIA project team, including the public participation consultant, lead EIA consultant, as well as specialist consultants).
» Written, faxed or e-mail correspondence.

The public participation process will include the following activities:

» Placement of an advertisement in one local newspaper (NoordkaapBulletin).
» Maintenance and finalisation of the I&AP database.
» Release of the EIA Report and EMPr for a 30-day review and comment period.
» Ongoing consultation with all registered I&APs regarding the progress of the EIA process and the outcomes or findings of the EIA Report through stakeholder consultation via notification letters, telephone calls and virtual focus group meetings.
» Compile a Comments and Responses Report and evidence of the public participation process undertaken to be included in the final EIA Report for decision-making.

11.9 Key Milestones of the Programme for the EIA

The envisaged key milestones of the programme for the EIA Phase are outlined in the following table (and include indicative dates):

Key Milestone Activities	Proposed timeframe[10]
Make the Scoping Report available to the public, stakeholders, and authorities for 30 days	06 January 2023 – 06 February 2023
Finalisation of Scoping Report, and submission of the Final Scoping Report to DFFE	23 February 2023
Authority acceptance of the Final Scoping Report and Plan of Study to undertake the EIA	43 days from submission of the Final Scoping Report
Undertake specialist studies and public participation process	January 2023 – March 2023
Make Draft EIA Report and EMPr available to the public, stakeholders, and authorities for 30 days	April 2023
Finalisation of EIA Report, and submission of the Final EIA Report to DFFE	May 2023 – June 2023
Authority review period and decision-making (107 calendar days)	June 2023 – September 2023

[10] Indicative dates

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Nid	Report Type	Author/s	Date	Title
109815	HIA Phase 1	Wouter Fourie	22/03/2012	132 kV Power line connection to the Humasrus Solar Thermal Energy Power plant, postmasburg.
114648	PIA Desktop	John E Almond	01/09/2012	Palaeontological specialist assessment: desktop study PROPOSED 16 MTPA EXPANSION OF TRANSNETâ€™S EXISTING MANGANESE ORE EXPORT RAILWAY LINE & ASSOCIATED INFRASTRUCTURE BETWEEN HOTAZEL AND THE PORT OF NGQURA, NORTHERN & EASTERN CAPE. Part 1: Hotazel to Kimberley, Northern Cape
122772	HIA Phase 1	Wouter Fourie	01/09/2011	Heritage Impact Assessment for the Humansrus Solar Thermal Energy Power Plant, Postmasburg
129751	HIA Phase 1	Elize Becker	20/02/2013	Phase 1 Heritage Impact Assessment Hotazel to Kimberley and De Aar to Port of Ngqura
145149	HIA Phase 1	Louisa Hutten	01/11/2013	HERITAGE IMPACT ASSESSMENT REPORT FOR THE FARMS PLAAS 438 PORTION 1 & PLAAS 588 RE
155262	PIA Desktop	John E Almond	22/12/2013	Palaeontological Heritage Basic Assessment: Desktop Study - Proposed construction of a 132 kV power line and switchyard associated with the Redstone Solar Thermal Energy Plant near Postmasburg, Northern Cape Province
162535	AIA Phase 1	David Morris	02/03/2012	Archaeological Impact Assessment Phase 1: Proposed development of a PV Power Station at Welcome Wood (extended area), near Owendale, Northern Cape
162542	PIA Desktop	John E Almond	01/02/2012	PALAEONTOLOGICAL IMPACT ASSESSMENT: DESKTOP STUDY Proposed PV power stations Welcome Wood II and III adjacent to Welcome Wood Substation, near DaniÃ«lskuil, Northern Cape Province

163992		Wouter Fourie	03/12/2013	Proposed Construction of the Limestone 1 - 132kV Power Line and the associated Switchyards on Portion 0 (remaining extent) of the Farm 267, Northern Cape Province
173943	Heritage Impact Assessment Specialist Reports	Marko Hutten, John Almond	15/07/2014	Proposed Construction of two 132kV Power Lines and Switchyards to connect the ACWA Power SolarReserve Redstone Solar Thermal Power Plant with the Olien Substation â€“ Option 1: ACWA Power SolarReserve Redstone Solar Thermal Power Plant to Olien Substation, in the ZF Ngcawu District Municipality â€“ Heritage Impact Assessment
173967	Heritage Impact Assessment Specialist Reports	Marko Hutten	15/07/2014	Proposed Construction of two 132kV Power Lines and Switchyards to connect the Redstone Solar Thermal Energy Plant with the Olien Substation in the ZF Ngcawu District Municipality â€“ Heritage Impact Assessment Option 2: Silverstreams substation to Olien Substations
344620	PIA Phase 1	John E Almond	09/11/2015	Palaeontological Heritage Report for the proposed 132 kV power lines between the ACWA Power SolarReserve Redstone Solar Thermal Energy Plant Site and Olien Main Transmission Substation near Lime Acres, Northern Cape Province
361351	AIA Phase 1	Karen Van Ryneveld	20/03/2016	Archaeological Impact Assessment Report
361357	PIA Phase 1	Lloyd Rossouw	03/05/2016	Palaeontological Impact Assessment
4604	AIA Phase 1	David Morris, Peter Beaumont	01/10/1994	Ouplaas 2 Rock Engravings, Danielskuil
6958	AIA Phase 1	Wouter Fourie	10/06/2011	Humansrus Solar Thermal Energy Power Plant, Postmasburg
73252	HIA Phase 1	Wouter Fourie	13/09/2012	Heritage Impact Assessment - Proposed Construction of 132kv Power Line and Switchyard Associated with the Redstone Solar Thermal Energy Plant in the Northern Cape Province
7842	AIA Phase 1	Cobus Dreyer	19/11/2007	Archaeological and Historical Investigation of the Proposed Mining Activities at the Farm Rosslyn, Lime Acres, Northern Cape
8240	AIA Phase 1	David Morris	11/06/2010	Proposed development of PV Power Station at Welcome Wood, near Owendale, Northern Cape
83272	HIA Phase 1	David Morris	01/08/2012	Archaeological & Cultural Heritage Impact Assessment Phase 1: Proposed Olien Solar Project development on Portion 4 of Farm 300, Barkly West, near Limeacres, Northern Cape
83273	PIA Desktop	Jennifer Botha-	26/06/2012	PALAEONTOLOGICAL IMPACT ASSESSMENT OF THE PROPOSED OLIEN SOLAR PROJECT ON FARM 300, BARKLY WEST, NORTHERN CAPE

		Brink		PROVINCE
8899	PIA Phase 1	John E Almond	04/05/2011	Recommended exemption from further palaeontological studies: Proposed Humansrus Solar Thermal Energy Power Plant development on Farm 469, near Postmasburg, Northern Cape Province
9047	PIA Phase 1	John E Almond	11/06/2010	Proposed photovoltaic power station adjacent to Welcome Wood Substation, Owendale near Postmasburg, Northern Cape Province

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