

UMMBILA EMOYENI SOLAR ENERGY FACILITY

Mpumalanga Province

Scoping Report

DFFE Reference No.: 14/12/16/3/3/2/2161

June 2022

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PROJECT DETAILS

DFFE Ref No.:	:	<u>14/12/16/3/3/2/2161</u>
Title	:	Environmental Impact Assessment Process: Scoping Report for the Umbila Emoyeni Solar Energy Facility, Mpumalanga Province
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Report Revision	:	Revision 1 – <u>Final Report for authority review and acceptance</u>
Date	:	<u>June 2022</u>

When used as a reference this report should be cited as: Savannah Environmental (2022) Scoping Report for the Umbila Emoyeni Solar Energy Facility, Mpumalanga Province.

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PURPOSE OF THE SCOPING REPORT AND INVITATION TO COMMENT

Emoyeni Renewable Energy Farm (Pty) Ltd has appointed Savannah Environmental as the independent environmental consultant to undertake the Scoping and Environmental Impact Assessment (S&EIA) process for the Umbila Emoyeni Solar Energy Facility, Mpumalanga Province. The EIA process is being undertaken in accordance with the requirements of the 2014 EIA Regulations promulgated in terms of the National Environmental Management Act (No. 107 of 1998) (NEMA).

This Scoping Report represents the findings of the Scoping Phase of the EIA process and contains the following chapters:

- » **Chapter 1** provides background to the Umbila Emoyeni Solar Energy Facility and the EIA process.
- » **Chapter 2** provides a description of the Solar Energy Facility and infrastructure associated with the facility.
- » **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 Umbila Emoyeni 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 Umbila Emoyeni 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 was made available for a 30-day review and comment period from Thursday, 12 May 2022 – Monday, 13 June 2022 on the Savannah Environmental website (<https://savannahsa.com/public-documents/energy-generation/>). All comments received and recorded during the 30-day review and comment period have been included, considered, and addressed within this final Scoping Report for consideration by the DFFE. Changes made in this final report have been underlined for ease of reference.

EXECUTIVE SUMMARY

Emoyeni Renewable Energy Farm (Pty) Ltd is proposing the development of a commercial Solar Energy Facility and associated infrastructure on a site located ~6km south-east of Bethal and 1km east of Morgenzon, within the Mpumalanga Province. The project site is located across the Govan Mbeki, Lekwa, and Msukaligwa Local Municipalities within the Gert Sibande District (refer to **Figure 1**). The facility will have a contracted capacity of up to 150MW and will be known as the Umbila Emoyeni Solar Energy Facility. The project is planned as part of a larger cluster of renewable energy projects (to be known as the Umbila Emoyeni Renewable Energy Farm), which include one 666MW Wind Energy Facility and one 150MW Solar Energy Facility. The grid connection infrastructure for both facilities will include a 400/132kV Main Transmission Substation (MTS), to be located between Camden and SOL Substations, which will be looped in and out of the existing Camden-Sol 400kV transmission line; on-site switching stations (132kV in capacity) at each renewable energy facility (Eskom Portion); 132kV power lines from the switching stations at each renewable energy facility to the new 400/132kV MTS; and a collector substation with 2 x 132kV bus bars and 4 x 132kV IPP feeder bays to onsite IPP Substation.

A technically feasible project site¹, with an extent of ~27 819ha has been identified by Emoyeni Renewable Energy Farm (Pty) Ltd as a technically suitable area for the development of the Umbila Emoyeni Solar Energy Facility. A development area² will be 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 comprises numerous properties as listed in **Table 1** below.

Table 1: Properties affected by the Umbila Emoyeni Solar Energy Facility

Parent Farm Number	Farm Portions
Farm 261 – Naudesfontein	15, 21
Farm 264 – Geluksplaats	0, 1, 3, 4, 5, 6, 8, 9, 11, 12
Farm 268 – Brak Fontein Settlement	6,7,10,11,12
Farm 420 – Rietfontein	8,9,10,11,12,15,16,18,19,22,32
Farm 421 - Sukkelaar	2, 2, 7, 9, 9 10, 10 11, 11 12, 12, 22 ,25, 34, 35, 36, 37, 37, 38, 39, 40, 42, 42
Farm 422 – Klipfontein	0, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 23
Farm 423 – Bekkerust	0, 1, 2, 4, 5, 6, 10, 11, 12, 13 14, 15, 17, 19, 20, 22, 23, 24,25
Farm 454 – Oshoek	4, 13, 18
Farm 455 – Ebenhaezer	0, 1, 2, 3
Farm 456 – Vaalbank	1, 2, 3, 4, 7, 8, 13, 15, 16, 17, 18, 19
Farm 457 – Roodekrans	0, 1, 4, 5, 7, 22, 23, 23
Farm 458 – Goedgedacht	0, 2, 3, 4, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 21, 22, 23, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 39, 41, 42, 43
Farm 467 – Twee Fontein	0, 1, 4, 5, 6, 7, 8, 10
Farm 469 – Klipkraal	5, 6, 7, 8
Farm 548 – Durabel	0

¹ The project site is the area with an extent of 27 819ha, within which the Umbila Emoyeni Solar Energy Facility development footprint will be located.

² The development area is that identified area (located within the project site) where the Umbila Emoyeni Solar Energy Facility is planned to be located. The development area is still to be determined.

Farm 470 – Dorpsplaats	85
Farm 451 - Drinkwater	4, 22
Farm 452 - Brakfontein	5

The full extent of the project site has been considered within this Scoping Report 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 project site, a development area and a development footprint or facility layout within the development area will be defined for assessment in the EIA Phase. The project site is larger than the area required for the development footprint of a 150MW 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.

The Umbila Emoyeni Solar Energy Facility is proposed in response to the identified objectives of national and provincial government and local and district municipalities to develop renewable energy facilities for power generation purposes. It is the developer's intention to bid the Umbila Emoyeni Solar Energy Facility under the Department of Mineral Resources and Energy's (DMRE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme or a similar programme, with the aim of evacuating the generated power into the national grid. 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 Umbila Emoyeni Solar Energy Facility set to inject up to 150MW of electricity into the national grid. Similarly, the location of the new generation in the Mpumalanga Province is important in the context of the Just Energy Transition (JET). The Umbila Emoyeni Solar Energy Facility will provide valuable jobs and socio-economic benefits that are required in an area where coal fired generation will be phased out over the next 10 years (see graph below). This will be vitally important if the JET is to be successfully implemented and is a transition for everyone.

Infrastructure associated with the Umbila Emoyeni Solar Energy Facility will include:

- » PV modules in the range of 330Wp to 450Wp mounted on either a fixed tilt or single axis tracker structure, dependent on optimisation, technology available and cost.
- » Inverters and transformers.
- » 33kV cabling to connect to the onsite collector substation, to be laid underground where practical.
- » 33kV/132kV onsite collector substation (IPP Portion).
- » Battery Energy Storage System (BESS).
- » Cabling between project components.
- » Laydown and O&M hub (approximately 300m x 300m):
 - o Construction compound (temporary).
 - o Maintenance office.
- » Access roads (up to 12m wide) and internal distribution roads (up to 12m wide).

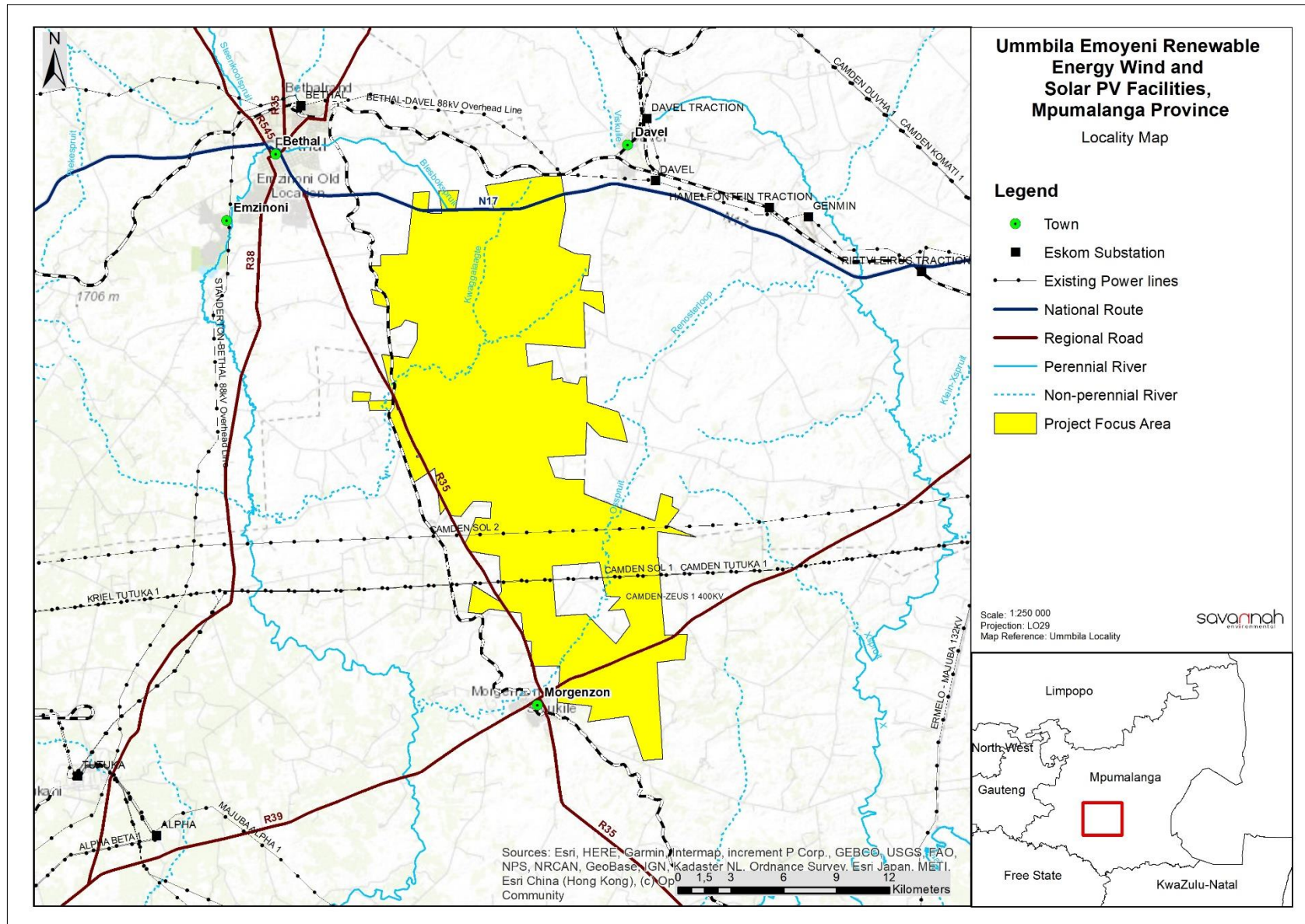


Figure 1: Locality map of the project site within which the Umbila Emoyeni Solar Energy Facility is proposed to be developed

1. Environmental Permitting Requirements

The Umbila Emoyeni 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 Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDL&EA)), 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 ([this 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

Potential impacts associated with the development of the Umbhila Emoyeni Solar Energy Facility are expected to occur during both the construction and operation phases. The conclusion of the findings of the Scoping Study is that the potential impacts identified to be associated with the construction and operation of the Umbhila Emoyeni Solar Energy Facility are anticipated to be at a site or localised level, with few impacts extending from a local to national extent which includes both positive and negative impacts. The following provides a summary of the findings of the specialist studies undertaken:

- » *Terrestrial Ecology*: The extent of the majority of ecological impacts identified during the Scoping Phase is local or restricted to the site and surroundings, with a few impacts, such as impacts on Critical Biodiversity Areas (CBA) and the establishment and spread of declared weeds and alien invader plants being local to regional in extent. The significance of impacts (at the scoping stage) is considered low, medium, or high pre-mitigation. If appropriate mitigation measures are put in place, such as the exclusion of certain sensitive areas from the development footprint, the probability of some of these identified impacts occurring within the identified habitats can be avoided, making it probable for most of the impacts to have low to medium significance. Impacts identified include disturbance to and loss of indigenous natural vegetation, loss of habitat for fauna species of conservation concern, and disturbance to migration routes and associated impacts to species populations.
- » *Freshwater*: The extent of the impacts on the freshwater features identified during the Scoping Phase is local or restricted to the immediate surroundings. Due to the fact that the wetlands identified within the project site have been subjected to very long-term (> 12 years) cultivation practices, as well as other forms of disturbances, these wetlands have lost some of their functions and services with the remainder occurring in a limited and highly altered manner. Subsequently, their value (ecological importance and sensitivity) has been significantly reduced. It is also probable that this value will only slightly increase if rehabilitated to a satisfactory level (will never be able to rehabilitate to original form). Given the current state and value of the wetlands, as well as the rehabilitation potential, the significance of the impacts on freshwater features (at the scoping stage) is considered to be low. The impacts identified include disturbance to and loss of wetland vegetation, impact on freshwater resource systems through the possible increase in surface water runoff, increase in sedimentation and erosion, impact on localized surface water quality, and loss of habitat for fauna dependent on such habitats.
- » *Bats*: The extent of the impacts on bats identified during the Scoping Phase is limited to the site (i.e., local in extent). The significance of the impacts (at scoping stage) will be negative and low to moderate following the implementation of mitigation measures such as the avoidance of the areas classified as no-go areas (i.e., farm dams, wetlands, trees, buildings, river/streams and wetlands) by the development footprint or facility layout. The impacts identified include modification of bat foraging/commuting habitat, destruction/disturbance to bat roosts, and barrier effects, polarized pollution and disturbance to bats.
- » *Avifauna*: The extent of the majority of avifaunal impacts identified during the Scoping Phase is local, with one impact, i.e., the loss of avifauna species due to collision with infrastructure, being regional in extent. The significance of the impacts (at the scoping stage) is considered to be low to medium, subject to the avoidance of the identified no-go areas and the implementation of appropriate mitigation. The impacts include direct habitat destruction, as well as displacement and loss of avifaunal species due to collision with infrastructure and electrocution from energized infrastructure.

- » *Soils and Land Capability*: The extent of the soils and land capability impacts identified during the Scoping Phase is regional and the significance of the impacts (at the scoping stage) will be low to medium post-mitigation due to the moderately low to low and patches of moderately high land capability sensitivities, and the subject to the implementation of appropriate mitigation measures. The impacts include loss of land capability due to compaction/soil stripping/transformation of land use which leads to loss of land capability.
- » *Heritage (including cultural landscape, archaeology and palaeontology)*: Heritage sensitivity relates to archaeological resources, palaeontological resources, heritage resources, and the cultural landscape. The field assessment to be undertaken as part of the EIA Phase will determine the significance of the resources likely to be impacted. Impacts can be minimised through the implementation of appropriate mitigation measures. The impacts on heritage include direct impact to archaeological and palaeontological heritage of scientific significance, as well as indirect impact to significant cultural landscapes and cultural landscape elements.
- » *Visual*: Visual impacts will mainly occur once the Solar Energy Facility is operational. Due to the nature of a Solar Energy Facility, the extent of the majority of the identified visual impacts (at the scoping stage) is expected to be local, with only one impact, i.e., potential visual impact experienced by visitors to Rietvei, being regional in extent. Without an indication of the possible location and layout of the project, it is not possible to be confident regarding possible significance of visual impacts. The industrialisation of the landscape could be in keeping with surrounding development patterns in that it typically consists of contiguous areas with rural character within which relatively large-scale industrial elements are located..
- » *Traffic*: The extent of the impacts identified at the Scoping Phase is local. The significance of the transport impact during the construction phase can be rated as medium. However, considering that this is temporary and short-term in nature, the impact can be mitigated to an acceptable level. Traffic will return to normal levels after construction is completed. Noise, dust, and exhaust pollution during the construction phase cannot be completely mitigated but mitigation measures will significantly reduce the impact. These potential impacts will be limited to the construction period. The traffic generated during the operational phase will be negligible and will not have a significant impact on the surrounding road network. However, the Client/Facility Manager is to ensure that regular maintenance of gravel roads occurs during operation phase to minimise/mitigate dust pollution.
- » *Socio-Economic*: The extent of the impacts identified at the Scoping Phase is local, regional and national 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 skills development, employment creation, increase in the country's Gross Domestic Product (GDP), and impacts on the local economy. The negative impacts will include loss of sense of place, increased pressure on infrastructure and basic services, temporary increase in traffic disruptions and loss of agricultural space.

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. 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 development footprint 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' for the identification of an appropriate development footprint within the development area and project site. Even with the appropriate avoidance of sensitive areas, there is an adequate area on the site which can accommodate the planned 150MW facility with relatively low impacts on the environment. This area is referred to as the development footprint.

Table 2 details the sensitive environmental features which are considered to pose a risk or constraint in terms of the development of a Solar Energy Facility within the identified project site.

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.

Table 2: Overall sensitivity of the project site

<p>Restricted for Development (Highest Risk – No-go Areas)</p>	<ul style="list-style-type: none"> » Confirmed CBAs (Irreplaceable). » Freshwater resource features and the recommended freshwater buffers (100m buffer around exorheic features and 50m buffer around endorheic features). It should be noted that activities relating to route access and cabling are permitted within these features and their recommended buffers. » Farms dams, trees, buildings, rivers/streams, and wetlands (200m buffer inside which no panels may be installed). » Historic farm werfs (1km buffer has been recommended around these sites). » Noise sensitive receptors (160m and 500m no-go buffer). » N17, R35, R39 (250m corridor).
<p>Constrained for Development (Moderate to High Risk)</p>	<ul style="list-style-type: none"> » Primary grassland. » CBA Optimal. » Ecological Support Area (ESA) landscape corridor. » ESA local corridor. » Other Natural Areas.
<p>Preferred for development (Lowest Risk)</p>	<ul style="list-style-type: none"> » Agricultural/cultivated areas. » Areas with infrastructure. » Secondary grassland. » Moderately and heavily modified land. » Valley side slopes.

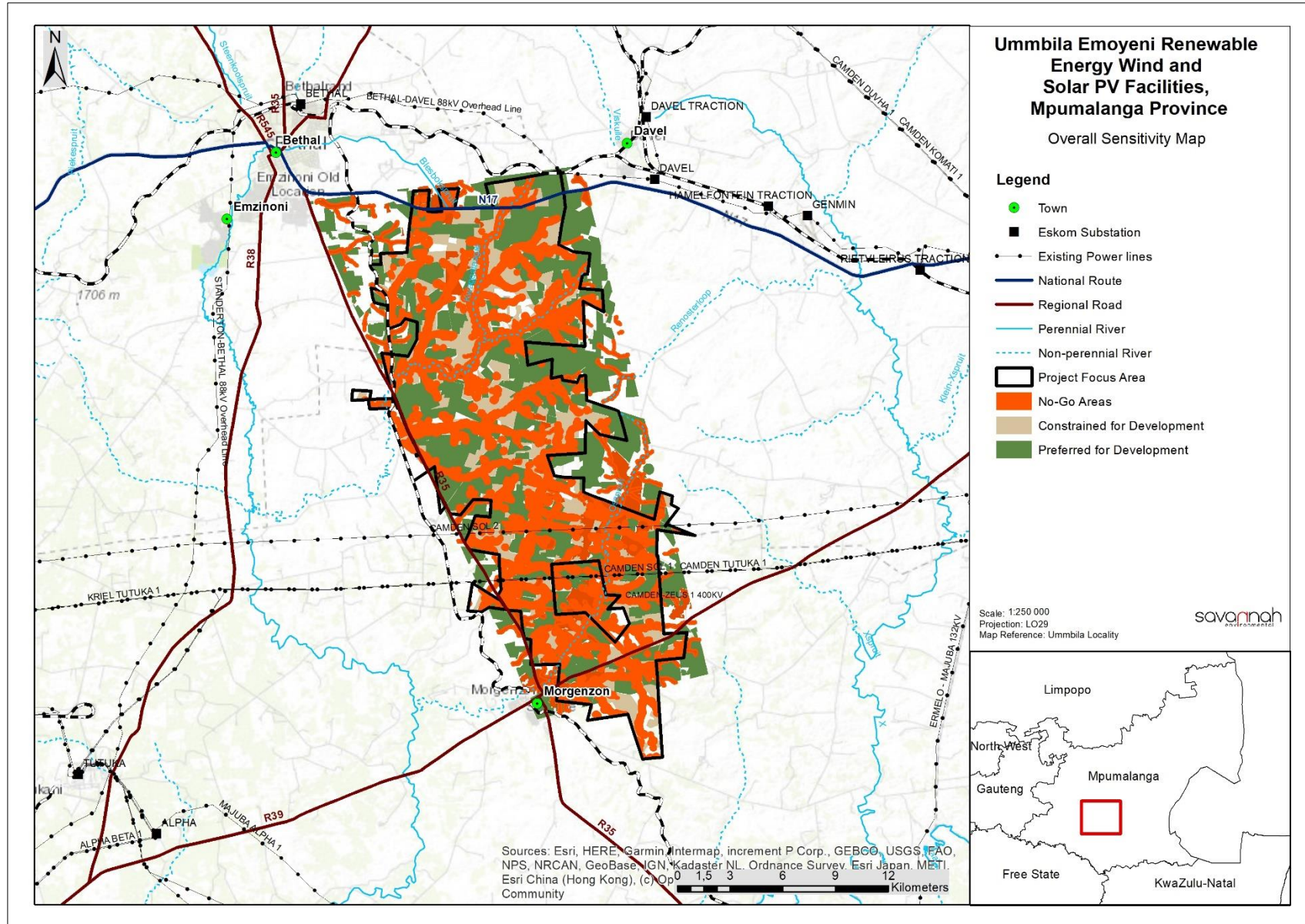


Figure 2: Environmental sensitivity map from the results of the scoping evaluation for the Umbila Emoyeni Solar Energy Facility

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 Umbila Emoyeni Solar Energy Facility is planned to be located. The development area is still to be determined.

Development footprint: The development footprint is the defined area (located within the development area) where the PV array and other associated infrastructure for the Umbila Emoyeni Solar Energy Facility 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 is the area with an extent of 27 819ha, within which the Umbila Emoyeni Solar Energy Facility 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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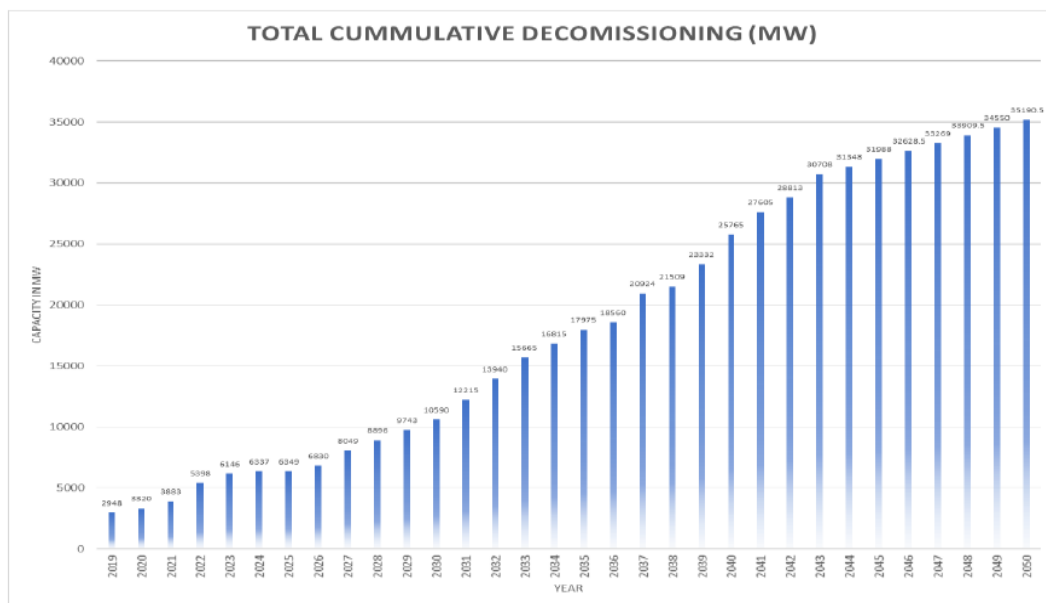
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CHAPTER 1: INTRODUCTION

Emoyeni Renewable Energy Farm (Pty) Ltd is proposing the development of a commercial Solar Energy Facility and associated infrastructure on a site located ~6km south-east of Bethal and 1km east of Morgenzon, within the Mpumalanga Province. The project site is located across the Govan Mbeki, Lekwa, and Msukaligwa Local Municipalities within the Gert Sibande District (refer to **Figure 1.1**). The facility will have a contracted capacity of up to 150MW and will be known as the Umbila Emoyeni Solar Energy Facility. The project is planned as part of a larger cluster of renewable energy projects (to be known as the Umbila Emoyeni Renewable Energy Farm), which include one 666MW Wind Energy Facility and one 150MW Solar Energy Facility. The grid connection infrastructure for both facilities will include a 400/132kV Main Transmission Substation (MTS), to be located between Camden and SOL Substations, which will be looped in and out of the existing Camden-Sol 400kV transmission line; on-site switching stations (132kV in capacity) at each renewable energy facility (Eskom Portion); 132kV power lines from the switching stations at each renewable energy facility to the new 400/132kV MTS; and a collector substation with 2 x 132kV bus bars and 4 x 132kV IPP feeder bays to onsite IPP Substation

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. Similarly, the grid connection solution will be subjected to a separate EIA process.

The Umbila Emoyeni Solar Energy Facility is proposed in response to the identified objectives of national and provincial government and local and district municipalities to develop renewable energy facilities for power generation purposes. It is the developer's intention to bid the Umbila Emoyeni Solar Energy Facility under the Department of Mineral Resources and Energy's (DMRE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme or a similar programme, with the aim of evacuating the generated power into the national grid. 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 Umbila Emoyeni Solar Energy Facility set to inject up to 150MW of electricity into the national grid. Similarly, the location of the new generation in the Mpumalanga Province is important in the context of the Just Energy Transition (JET). The Umbila Emoyeni Solar Energy Facility will provide valuable jobs and socio-economic benefits that are required in an area where coal fired generation will be phased out over the next 10 years (see graph below). This will be vitally important if the JET is to be successfully implemented and is a transition for everyone.



Source: 2019 Finalised Integrated Resource Plan (“IRP”)

From a regional perspective, the identified area within the Mpumalanga Province is considered favourable for the development of a commercial Solar PV Energy Facility by virtue of prevailing climatic conditions, relief, the extent of the affected properties, the availability of a direct grid connection (i.e., a point of connection of the national grid) and the availability of land on which the development can take place.

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 325), 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 Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDL&EA) as the commenting authority.

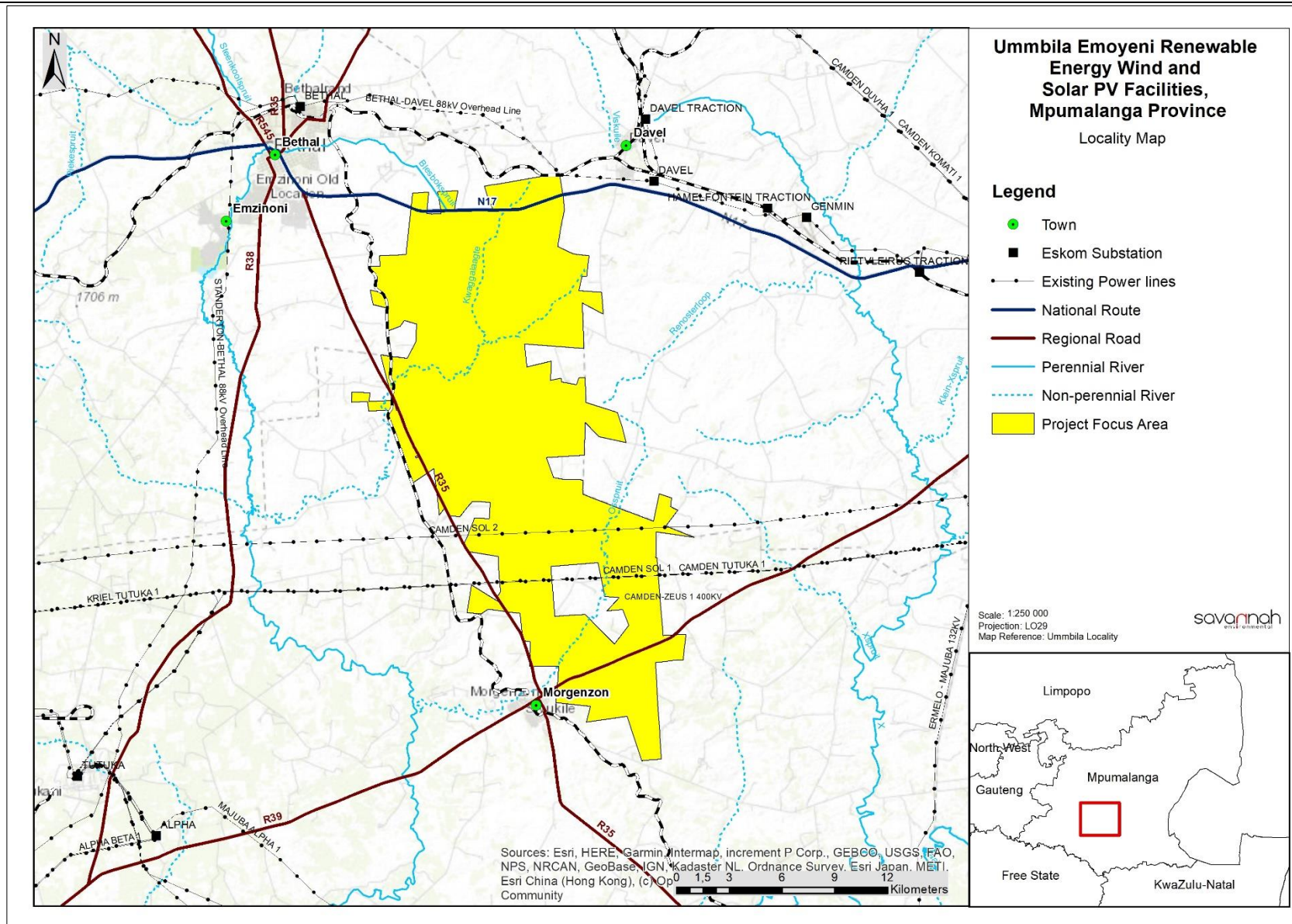


Figure 1.1: Locality map of the project site within which the Umbila Emoyeni Solar Energy Facility is proposed to be developed (also refer to **Appendix L** for project maps).

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
(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 .
(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 Umbila Emoyeni 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 .
(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 Umbila Emoyeni Solar Energy Facility and the EIA process.
- » **Chapter 2** provides a description of the Solar Energy Facility and infrastructure associated with the facility.
- » **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 Umbila Emoyeni 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 Umbila Emoyeni 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.

1.3. Project Overview

A technically feasible project site³, with an extent of ~27 819ha has been identified by Emoyeni Renewable Energy Farm (Pty) Ltd as a technically suitable area for the development of the Umbila Emoyeni Solar Energy Facility. A development area⁴ will be 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 comprises numerous properties as listed in **Table 1.1** below.

Table 1.1: Detailed description of the Umbila Emoyeni Solar Energy Facility project site

Province	Mpumalanga Province	
District Municipality	Gert Sibande District Municipality	
Local Municipality	Govan Mbeki, Lekwa, and Msukaligwa Local Municipalities	
Ward Number (s)	Ward 15 of the Govan Mbeki Local Municipality Ward 12 of the Lekwa Local Municipality Wards 8 and 10 of the Msukaligwa Local Municipality	
Nearest town(s)	Richmond (~35km south-west) and Victoria West (~80km south-east)	
Affected Properties⁵:	Parent Farm Number	Farm Portions
	Farm 261 – Naudesfontein	15, 21
	Farm 264 – Geluksplaats	0, 1, 3, 4, 5, 6, 8, 9, 11, 12
	Farm 268 – Brak Fontein Settlement	6,7,10,11,12
	Farm 420 – Rietfontein	8,9,10,11,12,15,16,18,19,22,32
	Farm 421 - Sukkelaar	2, 2, 7, 9, 9 10, 10 11, 11 12, 12, 22 ,25, 34, 35, 36, 37, 37, 38, 39, 40, 42, 42
	Farm 422 – Klipfontein	0, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 23
	Farm 423 – Bekkerust	0, 1, 2, 4, 5, 6, 10, 11, 12, 13 14, 15, 17, 19, 20, 22, 23, 24,25
	Farm 454 – Oshoek	4, 13, 18
	Farm 455 – Ebenhaezer	0, 1, 2, 3
	Farm 456 – Vaalbank	1, 2, 3, 4, 7, 8, 13, 15, 16, 17, 18, 19
	Farm 457 – Roodekrans	0, 1, 4, <u>5</u> , 7, 22, 23, 23
	Farm 458 – Goedgedacht	0, 2, <u>3</u> , 4, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 21, 22, <u>23</u> , 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, <u>36</u> , 37, 39, <u>41</u> , <u>42</u> , <u>43</u>
	Farm 467 – Twee Fontein	0, 1, 4, 5, 6, 7, 8, 10
	Farm 469 – Klipkraal	5, 6, 7, 8
	Farm 548 – Durabel	0
Farm 470 – Dorpsplaats	<u>85</u>	
Farm 451 - Drinkwater	<u>4</u> , <u>22</u>	
Farm 452 - Brakfontein	<u>5</u>	
Current zoning	Agriculture	
Site Coordinates (centre of project site)	26°36'25.92"S; 29°36'26.38"E	

³ The project site is the area with an extent of 27 819ha, within which the Umbila Emoyeni Solar Energy Facility development footprint will be located.

⁴The development area is that identified area (located within the project site) where the Umbila Emoyeni Solar Energy Facility is planned to be located. The development area is still to be determined.

⁵ Refer to **Appendix Q** for SG codes.

Infrastructure associated with the Umbila Emoyeni Solar Energy Facility will include:

- » PV modules in the range of 330Wp to 450Wp mounted on either a fixed tilt or single axis tracker structure, dependent on optimisation, technology available and cost.
- » Inverters and transformers.
- » 33kV cabling to connect to the onsite collector substation, to be laid underground where practical.
- » 33kV/132kV onsite collector substation (IPP Portion).
- »
- » Battery Energy Storage System (BESS).
- » Cabling between project components.
- » Laydown and O&M hub (approximately 300m x 300m):
 - Construction compound (temporary).
 - Maintenance office.
- » Access roads (up to 12m wide) and internal distribution roads (up to 12m wide).

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

The overarching objective for the Umbila Emoyeni 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 footprint⁶ 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 150MW 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

⁶ The development footprint is the defined area (located within the development area) where the solar PV array and other associated infrastructure for the Umbila Emoyeni Solar Energy Facility is planned to be constructed. This is the actual footprint of the facility, and the area which would be disturbed.

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 (this 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 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), Emoyeni Renewable Energy Farm (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.

- » **Mmakoena Mmola**, the principle author of this Scoping Report, holds a BSc Honours in Geochemistry from the University of the Witwatersrand and 4 years of experience in the environmental management field. Her key focus is on undertaking environmental impact assessments, environmental permitting and authorisations, compliance auditing, public participation, and environmental management programmes. She is registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP), Registration Number: 126748 and an Environmental Assessment Practitioner with the Environmental Assessment Practitioners Association of South Africa, Number 2019/260.

- » **Jo-Anne Thomas**, the principle 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.

- » **Nicolene Venter**, the principle public participation consultant for this project, is a Board Member of IAPSA (International Association for Public Participation South Africa). She holds a Higher Secretarial Diploma and has over 21 years of experience in public participation, stakeholder engagement, awareness creation processes and facilitation of various meetings (focus group, public meetings, workshops, etc.). She is responsible for project management of public participation processes for a wide range of environmental projects across South Africa and neighbouring countries.

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

Specialist	Area of Expertise
Gerhard Botha of Nkurenkuru Ecology and Biodiversity (Pty) Ltd	Ecology
Owen Davies of Arcus Consulting	Avifauna
Jonathan Aronson of Camissa	Bats
Andrew Husted of the Biodiversity Company	Soils and Agricultural Potential
Jon Marshall of Environmental Planning & Design CC	Visual
Pierre van Jaarsveld of Urban-Econ Development Economist (Pty) Ltd	Socio- Economic
Jenna Lavin of CTS Heritage	Heritage (including Archaeology Palaeontology and Cultural Heritage)
Iris Wink of JG Afrika	Traffic

Appendix A includes the curricula vitae for the environmental assessment practitioners from Savannah Environmental and the specialist consultants.

CHAPTER 2: PROJECT DESCRIPTION

This chapter provides an overview of the Umbila Emoyeni Solar Energy Facility and details the project scope which includes the planning/design, construction, operation, and decommissioning activities required for the development. 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(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 is detailed in Chapter 1, Table 1.1 , as well as section 2.2.1 below.
3(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 Umbila Emoyeni Solar Energy Facility

In responding to the growing electricity demand within South Africa, the need to promote renewable energy and sustainability within the Mpumalanga Province, as well as the country's targets for renewable energy, Emoyeni Renewable Energy Farm (Pty) Ltd is proposing the development of a commercial Solar Energy Facility and associated infrastructure to add new capacity to the national electricity grid. The Umbila Emoyeni Solar Energy Facility will be developed in a single phase and will have a contracted capacity of up to 150MW. The project will make use of fixed-tilt, single-axis tracking, and/or double-axis tracking PV technology. Monofacial or bifacial panels are both considered within this Scoping Report.

The Umbila Emoyeni Solar Energy Facility will comprise solar panels which, once installed, will stand less than 5m above ground level. The solar panels will include centralised inverter stations, or string inverters mounted above ground. If centralised inverter stations are used, Mega Volt (MV) distribution transformers are located internally, whereas string inverters are containerised with switchgear. The main transformer capacity varies according to detailed design and project-specific requirements.

2.2.1. Overview of the Project Site

The project is to be developed on a site located approximately 6km south-east of Bethal and 1km east of Morgenzon. The project site is located across the Govan Mbeki, Lekwa, and Msukaligwa Local Municipalities within the Gert Sibande District in the Mpumalanga Province. The full extent of the project site (i.e., 27 819ha) has been considered within this Scoping Phase of the EIA process, within which the Umbilia Emoyeni Solar Energy Facility will be appropriately located from a technical and environmental sensitivity perspective. The project site will consist of numerous properties as listed in **Table 2.1** below.

Table 2.1: Properties within which the Umbila Emoyeni Renewable Energy Farm project site will be located

Parent Farm Number	Farm Portions
Farm 261 – Naudesfontein	15, 21
Farm 264 – Geluksplaats	0, 1, 3, 4, 5, 6, 8, 9, 11, 12
Farm 268 – Brak Fontein Settlement	6,7,10,11,12
Farm 420 – Rieffontein	8,9,10,11,12,15,16,18,19,22,32
Farm 421 - Sukkelaar	2, 2, 7, 9, 9 10, 10 11, 11 12, 12, 22 ,25, 34, 35, 36, 37, 37, 38, 39, 40, 42, 42
Farm 422 – Klipfontein	0, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 23
Farm 423 – Bekkerust	0, 1, 2, 4, 5, 6, 10, 11, 12, 13 14, 15, 17, 19, 20, 22, 23, 24,25
Farm 454 – Oshoek	4, 13, 18
Farm 455 – Ebenhaezer	0, 1, 2, 3
Farm 456 – Vaalbank	1, 2, 3, 4, 7, 8, 13, 15, 16, 17, 18, 19
Farm 457 – Roodekrans	0, 1, 4, <u>5</u> , 7, 22, 23, 23
Farm 458 – Goedgedacht	0, 2, <u>3</u> , 4, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 21, 22, <u>23</u> , 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, <u>36</u> , 37, 39, <u>41</u> , <u>42</u> , <u>43</u>
Farm 467 – Twee Fontein	0, 1, 4, 5, 6, 7, 8, 10
Farm 469 – Klipkraal	5, 6, 7, 8
Farm 548 – Durabel	0
Farm 470 – Dorpsplaats	<u>85</u>
Farm 451 - Drinkwater	<u>4, 22</u>
Farm 452 - Brakfontein	<u>5</u>

Access to the project site is ample with the presence of existing roads mainly consisting of national and regional roads. The project site is situated directly adjacent to the N17 and near the N2 and N11 national road, which provides access to the project site and development area. The components for the Solar Energy Facility, overhead power line and onsite substation will be transported via the N2 highway from the Richards Bay deep-water port, via Ermelo.

Once environmentally constraining factors have been identified through the EIA process, the development area and layout of the solar PV array and associated infrastructure will be determined. 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 Umbila Emoyeni Solar Energy Facility

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

- » PV modules in the range of 330Wp to 450Wp mounted on either a fixed tilt or single axis tracker structure, dependent on optimisation, technology available and cost.
- » Inverters and transformers.
- » 33kV cabling to connect to the onsite collector substation, to be laid underground where practical.
- » 33kV/132kV onsite collector substation (IPP Portion).
- » Battery Energy Storage System (BESS).
- » Cabling between project components.
- » Laydown and O&M hub (approximately 300m x 300m):
 - Construction compound (temporary).
 - Maintenance office.
- » Access roads (up to 12m wide) and internal distribution roads (up to 12m wide).

A summary of the details and dimensions of the planned infrastructure associated with the project is provided in **Table 2.2**.

Table 2.2: Details or dimensions of typical infrastructure required for the 150MW Umbila Emoyeni Solar Energy Facility

Infrastructure	Footprint and dimensions
Number of Panels	To be determined in the EIA phase
Panel Height	Up to 5m
Technology	Use of fixed-tilt, single-axis tracking, and/or double-axis tracking PV technology. Monofacial or bifacial panels are both considered.
Contracted Capacity	Up to 150MW
Area occupied by the solar array	To be determined in the EIA phase
Area occupied by the on-site facility substation (<u>IPP Portion</u>)	~5ha
Capacity of on-site facility substation (<u>IPP Portion</u>)	33kV/132kV
Underground cabling between the PV array and the onsite substation	Cabling will be installed underground where feasible at a depth of up to 1.5m to connect the PV panels to the on-site facility substation. Where not technically feasible to place cabling underground, this will be installed above-ground. The cabling will have a capacity of up to 33kV.
Laydown and Operations and Maintenance (O&M) hub	~ 300m x 300m, comprising: <ul style="list-style-type: none"> * Construction compound (temporary) of approximately 6 ha. * O&M office of approximately 1.5ha.
Area occupied by laydown area	~75m x 120m
Access and internal roads	Wherever possible, existing access roads will be utilised to access the project site and development area. It is unlikely that access roads will need to be upgraded as part of the proposed development. Internal roads of up to 12-13m in width will be required to access the PV panels and the on-site substation.
Grid connection	The grid connection infrastructure will include a 400/132kV Main Transmission Substation (MTS), to be located between Camden and SOL Substations, which will be looped in and out of the existing Camden-Sol 400kV transmission line; <u>on-site</u>

Infrastructure	Footprint and dimensions
	<p><u>switching stations (132kV in capacity) at each renewable energy facility (Eskom Portion); 132kV power lines from the switching stations at each renewable energy facility to the new 400/132kV MTS; and a collector substation with 2 x 132kV bus bars and 4 x 132kV IPP feeder bays to onsite IPP Substation</u> The grid connection infrastructure will be assessed as part of a separate Environmental Impact Assessment process in support of an application for Environmental Authorisation.</p>
Temporary infrastructure	<p>Temporary infrastructure, including laydown areas, hardstand areas and a concrete batching plant, will be required during the construction phase. All areas affected by temporary infrastructure will be rehabilitated following the completion of the construction phase, where it is not required for the operation phase.</p>

Table 2.2 provides details regarding the requirements and the activities to be undertaken during the Umbila Emoyeni 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 Umbila Emoyeni Solar Energy Facility.

2.2.3 Project Development Phases Associated with the Umbila Emoyeni Solar Energy Facility

Table 2.2: Details of the Umbila Emoyeni Solar Energy Facility project development phases (i.e., construction, operation, and decommissioning)

Construction Phase	
Requirements	<ul style="list-style-type: none"> » Project receives Environmental Authorisation from the DFFE, preferred bidder allocation granted by DMRE, a generating license issued by NERSA, and a Power Purchase Agreement secured with Eskom. In addition to bidding into the REIPPPP, the developer is also considering options such as Private Power Purchase Agreements and Wheeling Agreements with Eskom to deliver the generated power to Private Offtakers. » Expected to be 12 – 18 months for the Umbila Emoyeni Solar Energy Facility. » Create direct construction employment opportunities. Approximately 240 employment opportunities will be created. » No on-site labour camps. Employees to be accommodated in the nearby towns such as Bethal or Morgenzon and transported to and from site on a daily basis by bus. » Overnight on-site worker presence would be limited to security staff. » Waste removal and sanitation will be undertaken by a sub-contractor, where possible. Waste containers, including containers for hazardous waste, will be located at easily accessible locations on site when construction activities are undertaken. » Electricity required for construction activities will be generated by a generator. Where low voltage connections are possible, these will be considered. » Either via borehole / municipal / dam or a combination of all three will be used to provide water. Should water availability at the time of construction be limited, water will be transported to site via water tanks. Water will be used for sanitation and potable water on site as well as construction works.
Activities to be undertaken	
Conduct surveys prior to construction	<ul style="list-style-type: none"> » Including, but not limited to: a geotechnical survey, site survey and confirmation of the panel micro-siting footprint, and survey of the on-site collector substation site to determine and confirm the locations of all associated infrastructure.
Establishment of access roads to the Site	<ul style="list-style-type: none"> » Internal access roads within the site will be established at the commencement of construction. » Existing access roads will be utilised, where possible, to minimise impact. It is unlikely that access roads will need to be upgraded as part of the proposed development. » Access roads to be established between the PV panels for construction and/or maintenance activities within the development footprint. » Internal service road alignment will be approximately 12m wide. Location is to be determined by the final micro-siting or positioning of the PV panels.
Undertake site preparation	<ul style="list-style-type: none"> » 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 on site. » 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).

Establishment of laydown areas and batching plant on site	<ul style="list-style-type: none"> » A laydown area for the storage of PV panels components and civil engineering construction equipment. » The laydown will also accommodate building materials and equipment associated with the construction of buildings. » No borrow pits will be required. Infilling or depositing materials will be sourced from licenced borrow pits within the surrounding areas.
Construct foundation	<ul style="list-style-type: none"> » Excavations to be undertaken mechanically. » For PV array installation vertical support posts will be driven into the ground. » Depending on geological conditions, the use of alternative foundations may be considered (e.g., screw pile, helical pile, micropile or drilled post/piles).
Transport of components and equipment to and within the site	<ul style="list-style-type: none"> » The components for the solar PV facility and onsite substation will be transported to site by road. » Components to be transported to the site in sections on flatbed trucks by the PV panel supplier. Imported components to be transported from the most feasible port of entry, which is deemed to be the N3 and Richard Bay port in the Kwa-Zulu Natal Province. » 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. » Components for the establishment of the substation (including transformers) and the associated infrastructures to be transported to site. » Transportation will take place via appropriate National and Provincial roads, and the dedicated access/haul road to the site.
Erect PV Panels and construct substation, inverters and BESS	<ul style="list-style-type: none"> » The construction phase involves installation of the solar PV panels and the structural and electrical infrastructure to make the plant operational. In addition, preparation of the soil and improvement of the access roads would continue for most of the construction phase. For array installation, typically vertical support posts are driven into the ground. Depending on the results of the geotechnical report a different foundation method, such as screw pile, helical pile, micro-pile or drilled post/pile could be used. The posts will hold the support structures (tables) on which PV arrays would be mounted. Brackets attach the PV modules to the tables. Trenches are dug for the underground AC and DC cabling and the foundations of the inverter enclosures and transformers are prepared. While cables are being laid and combiner boxes are being installed, the PV tables are erected. Wire harnesses connect the PV modules to the electrical collection systems. Underground cables and overhead circuits connect the Power Conversion Stations (PCS) to the on-site AC electrical infrastructure and ultimately the project's on-site substation. This process also involves the installation of the BESS facility.
Connection of PV panels to the substation	<ul style="list-style-type: none"> » PV arrays to be connected to the on-site substation via underground electrical cables. » Excavation of trenches is required for the installation of the cables. Trenches will be approximately 1.5m deep. » Underground cables are planned to follow the internal access roads, as far as possible. » Onsite substation to be connected to the collector substation via underground cables.
Establishment of ancillary infrastructure	<ul style="list-style-type: none"> » 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	<ul style="list-style-type: none"> » The grid connection infrastructure will include a 400/132kV MTS, to be located between Camden and SOL Substations, which will be looped in and out of the existing Camden-Sol 400kV transmission line; <u>on-site switching stations (132kV in capacity) at each renewable energy facility (Eskom Portion); 132kV power lines from the switching stations at each renewable energy facility to the new 400/132kV MTS; and a collector substation with 2 x 132kV bus bars and 4 x 132kV IPP feeder bays to onsite IPP Substation</u>
Undertake site rehabilitation	<ul style="list-style-type: none"> » 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	<ul style="list-style-type: none"> » Duration will be 20-30 years. » Requirements for security and maintenance of the project. » Employment opportunities relating mainly to operation activities and maintenance. Approximately 15 to 30 full-time employment opportunities will be available during the operation of the Solar Energy Facility.
Activities to be undertaken	
Operation and Maintenance	<ul style="list-style-type: none"> » Full time security, maintenance, and control room staff. » PV facility will be operational except under circumstances of mechanical breakdown, inclement weather conditions, or maintenance activities. » PV facility to be subject to periodic maintenance and inspection. » 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.
<u>Decommissioning Phase</u>	
Requirements	<ul style="list-style-type: none"> » Decommissioning of the Umbila Emoyeni 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 - 30 years (with maintenance) before decommissioning is required. » Decommissioning activities to comply with the legislation relevant at the time.
Activities to be undertaken	
Site preparation	<ul style="list-style-type: none"> » Confirming the integrity of site access to accommodate the required equipment and lifting cranes. » Preparation of the site (e.g., laydown areas and construction platform). » Mobilisation of construction equipment.
Disassemble and remove PV panels	<ul style="list-style-type: none"> » 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).

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 Umbila Emoyeni Solar Energy 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 Umbila Emoyeni 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 Umbila Emoyeni 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(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(h)(i) details of the alternative considered	The details of all alternatives considered as part of the Umbila Emoyeni Solar Energy Facility are included in sections 3.3.1 – 3.3.5.
3(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(h)(x) if no alternatives, including alternative locations for the activity were investigated, 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 Umbila Solar Energy Facility, a Solar Energy Facility with capacity of up to 150MW 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)⁷, 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.

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 Umbila Emoyeni 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 Umbila Emoyeni Solar Energy Facility

3.3.1 Property or Location Alternatives

The development site identified for the Umbila Solar Energy Facility is located ~6km south-east of Bethal and 1km east of Morgenon. The preferred project site was identified through an investigation of prospective sites and properties in the area within the Mpumalanga Province. The investigation involved the consideration of specific characteristics that play a role in the opportunities and limitations for the development of a Solar Energy Facility. These are discussed in the sections below.

- » **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

⁷ The Integrated Resource Plan (IRP) is legislated policy which regulates power generation planning.

Global Horizon Irradiation (GHI) for the study area is in the region of approximately 1 826 kWh/m²/annum (refer to **Figure 3.1**). The Mpumalanga Province is ranked 6th 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. The windlab technical team also confirmed the solar resource of the site through a meteorological and solar weather station which has been measuring the conditions of the area over the past years. Based on the solar resource available, no alternative locations are considered.

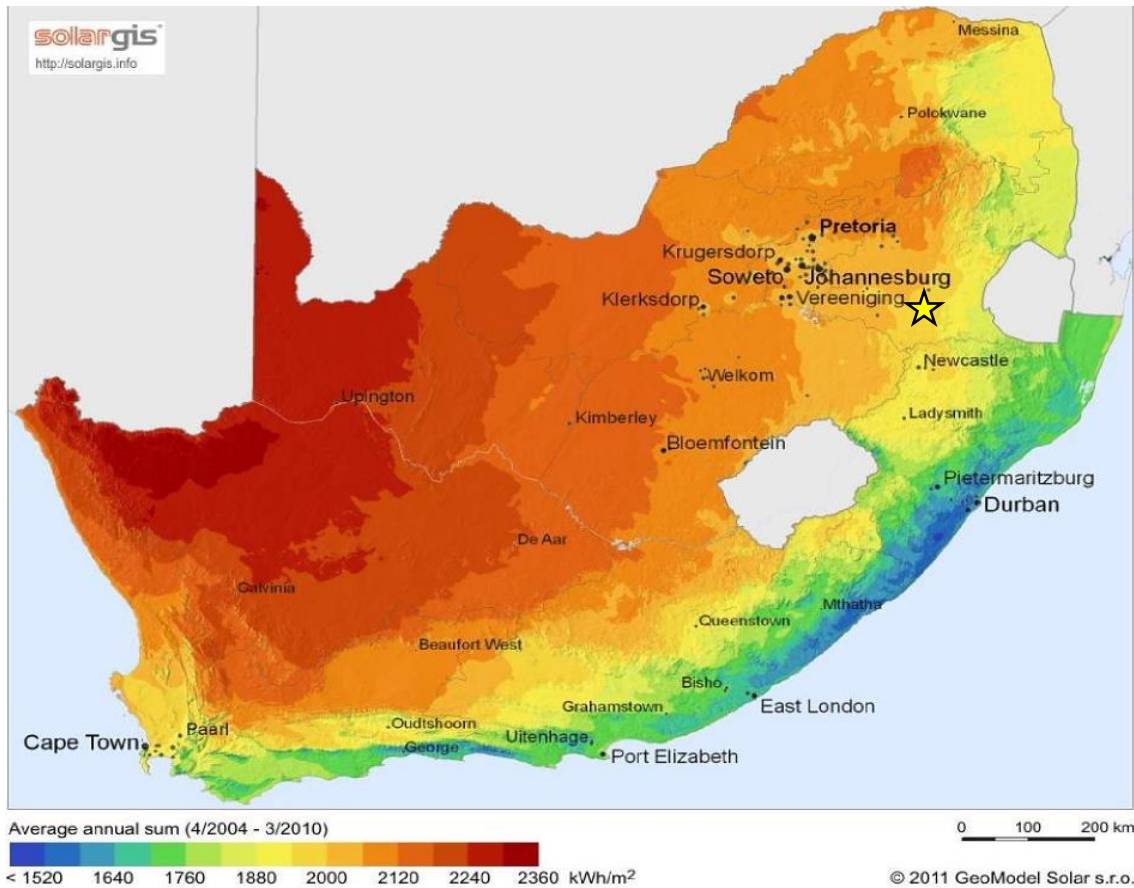


Figure 3.1: Solar irradiation map for South Africa; the proposed Umbila Emoyeni Solar Energy Facility position is shown by the yellow star on the map. (Source: adapted from GeoModel Solar, 2011).

- » **Land Availability:** In order to develop the Umbila Emoyeni Solar Energy Facility with a contracted capacity of up to 150MW, sufficient space is required. The preferred project site was identified within the Mpumalanga Province and in the Bethal / Morgenzon area following the confirmation of a feasible solar resource through a meteorological and solar weather station which has been measuring the conditions of the area over the past years. The properties included in the project site are privately-owned parcels available in the area for a development of this nature through agreement with the landowners, and are deemed technically feasible by the project developer for such development to take place. The combination of the affected properties has an extent of ~27 819ha, which was considered by the developer as sufficient for the development of the Umbila Emoyeni 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 and technical criteria.

- » **Land Use, Geographical and Topographical Considerations:** The character of the greater area surrounding the project site can be described as natural grassland which is interspersed with areas of cultivation. Main crop types include sunflower seed production, sorghum, rye and potatoes. Settlement occurs in the form of isolated homesteads throughout the study area that are generally related to agricultural uses. There is a tourism related establishment (Silver Water Game Lodge) located within the north-eastern section of the proposed site. This facility appears to be focused around a dam. Settlement in the form of towns and villages is limited. The closest towns include Morgenon, Bethal and Ermelo. Other disturbance visible is mining infrastructure, a railway track and power lines.

The proposed focus area is located across a series of valley and ridgelines that run in a general east to west direction. The valley lines all feed into the Blebokspruit which flows in a north to south direction approximately 8.5km to the west of the proposed site.

Based on the location of the project site within an area where supporting transmission and distribution infrastructure is readily available to enable the evacuation of the generated power and the suitable and preferable topography present, the site was identified as being technically preferred for the planned development.

- » **Access to the National Electricity Grid** – A key factor in the siting of any generation project is a viable grid connection. The grid connection infrastructure for the facility will include a 400/132kV Main Transmission Substation (MTS), to be located between Camden and SOL Substations, which will be looped in and out of the existing Camden-Sol 400kV transmission line; on-site switching stations (132kV in capacity) at each renewable energy facility (Eskom Portion); 132kV power lines from the switching stations at each renewable energy facility to the new 400/132kV MTS; and a collector substation with 2 x 132kV bus bars and 4 x 132kV IPP feeder bays to onsite IPP Substation. This proposed grid connection has been confirmed with Eskom as a feasible option. The grid connection solution will be subjected to a separate EIA process.
- » **Site access:** Access to the project site is ample with the presence of existing roads mainly consisting of national and regional roads. The proposed site is bounded by the N17 to the north, the R39 to the east and south and the R35 to the west. It is assumed that if components are imported to South Africa, it will be via the Port of Richard's Bay, which is located in KwaZulu-Natal. The Port is located approximately 460km from the proposed site. Alternatively, components can be imported via the Port of East London, located approximately 1130km from the proposed site, or from the Port of Ngqura, approximately 1200km from the proposed site, both being located in the province of the Eastern Cape.

Based on the above considerations, the Umbila Emoyeni 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. As a result, no property/location alternatives are proposed as part of this Scoping and 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, and 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 provided in order to illustrate the sensitive environmental features located within the project site 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, 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

Emoyeni Renewable Energy Farm (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.

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.

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, Emyeni Renewable Energy (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 less than 5m above ground level. The solar panels will include centralised inverter stations, or string inverters mounted above ground. 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 200 - 800MWh.

3.3.5. The 'Do-Nothing' Alternative

The 'do-nothing' alternative is the option of not constructing and operating the Umbila Emyeni 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. This alternative is evaluated in this Scoping Report (refer to Chapter 9) and 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.

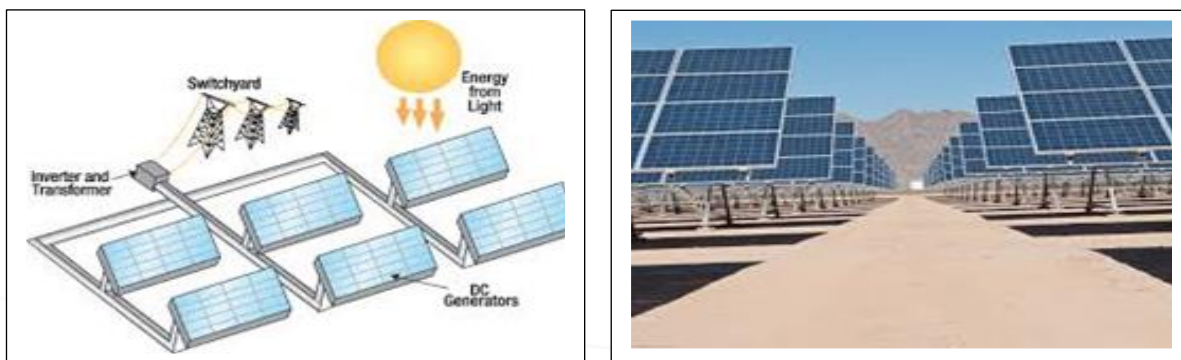


Figure 4.1: Overview of a PV cell, module, and array / panel (Source: pveducation.com)

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.

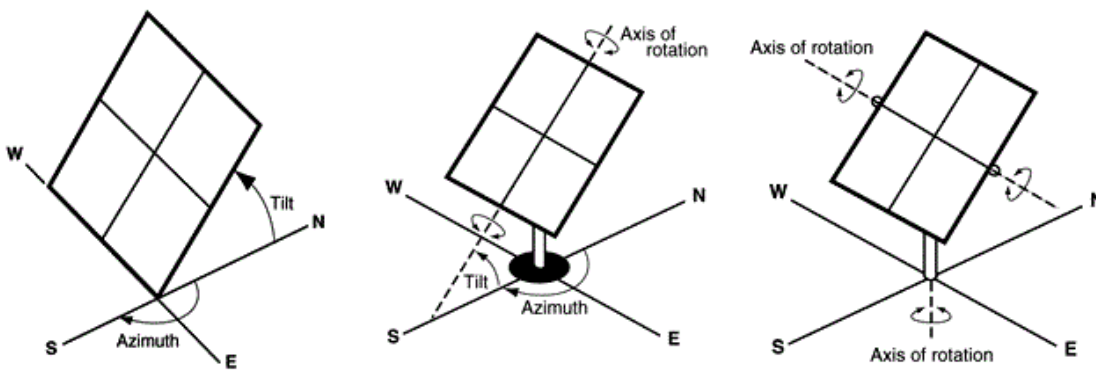


Figure 4.2: Overview of different PV tracking systems (from left to right: fixed-tilt, single-axis tracking, and double-axis tracking (Source: pveducation.com))

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

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: 2 – 3ha, within the footprint of the collector substation.

- » Proposed capacity of battery storage: 200 - 800MWh.
- » 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)
- » Battery types to be considered: Solid State Batteries and Redox Flow Batteries.

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 Umbila Emoyeni 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
(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 Umbila Emoyeni 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 Umbila Emoyeni 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.

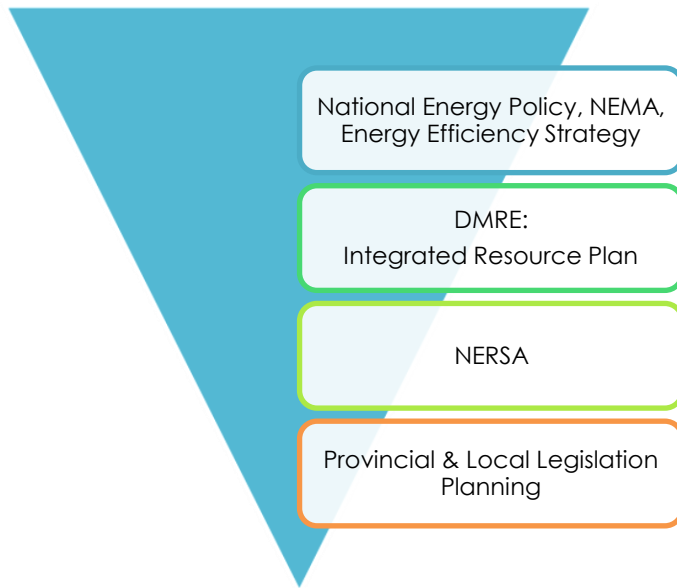


Figure 5.1: Hierarchy of electricity and planning documents

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 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, Rural Development and Land Reform (DARDLR):** 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. Furthermore, 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).

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

- » **Provincial Government of Mpumalanga – Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDL&EA):** This Department is the commenting authority for the EIA process for the project and is responsible for issuing of biodiversity and conservation-related permits.
- » **Mpumalanga Department of Public Works, Roads and Transport:** This Department provides effective co-ordination of crime prevention initiatives, provincial police oversight, traffic management and road safety towards a more secure environment.
- » **Mpumalanga Provincial Heritage Resource Authority (MPHRA):** This Department identifies, conserves and manages heritage resources throughout the Mpumalanga 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 Mpumalanga Province, both the local and district municipalities play a role. The project site is located across the **Govan Mbeki, Lekwa, and Msukaligwa Local Municipalities** within the **Gert Sibande District**. 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 Umbila Emoyeni Solar Energy Facility are provided below in **Table 5.1**. The Umbila Emoyeni 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 Umbila Emoyeni Solar Energy Facility

Relevant policy	Relevance to the Umbila Emoyeni Solar Energy Facility
United Nations Framework Convention on Climate Change (UNFCCC) and Conference of the Party (COP)	<p>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.</p> <p>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.</p> <p>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.</p> <p>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 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,</p>

Relevant policy	Relevance to the Umbila Emoyeni Solar Energy Facility
	<p>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.</p> <p>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.</p> <p>The policy provides support for the Umbila Emoyeni 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.</p>
<p>The Equator Principles IV (October 2020)</p>	<p>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 Umbila Emoyeni Solar Energy Facility) and apply globally to all industry sectors.</p> <p>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 Umbila Emoyeni 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.</p> <p>The Umbila Emoyeni 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.</p>
<p>International Finance Corporation (IFC) Performance Standards and Environmental and Social Sustainability (January 2012)</p>	<p>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.</p> <p>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</p>

Relevant policy	Relevance to the Umbila Emoyeni Solar Energy Facility
	<p>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.</p> <p>Given the nature of the Umbila Emoyeni 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.</p>

5.4. National Policy and Planning Context

Further to the South African government's commitment in August 2011 to support the development of renewable energy capacity, the DMRE initiated the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) to procure renewable energy from the private sector in a series of rounds. According to the IPP Procurement Programme overview report (2021), as at March 2021, 6 422MW of renewable energy capacity from 112 independent power producers (IPPs) has been procured in seven bid rounds⁸, with 5 078MW from 79 IPP projects operational and made available to the grid⁹. National policies have to be considered for the construction and operation of the Solar Energy 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 Umbila Emoyeni 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 Umbila Emoyeni Solar Energy Facility

Relevant legislation or policy	Relevance to Umbila Emoyeni Solar Energy Facility
<p>Constitution of the Republic of South Africa, 1996</p>	<p>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.</p> <p>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,</p>

⁸ Bid windows 1, 2, 3, 3.5, 4 and small BW1(1S2) and small BW2(2S2). 2 583 MW of renewable energy capacity was awarded to IPPs in the REIPPPP bid window 5 in October 2021.

⁹ <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>

Relevant legislation or policy	Relevance to Umbila Emoyeni Solar Energy Facility
	<p>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.</p>
<p>National Environmental Management Act (No. 107 of 1998) (NEMA)</p>	<p>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.</p> <p>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.</p> <p>The need for responsible and informed decision-making by government on the acceptability of environmental impacts is therefore enshrined within the NEMA.</p>
<p>National Energy Act (No. 34 of 2008)</p>	<p>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 into account environmental management requirements and interactions amongst economic sectors, as well as matters relating to renewable energy. The National Energy Act also provides for energy planning, increased generation and consumption of renewable energies, contingency energy supply, holding of strategic energy feedstocks and carriers, adequate investment in, appropriate upkeep and access to energy infrastructure. The Act provides measures for the furnishing of certain data and information regarding energy demand, supply, and generation, and for establishing an institution to be responsible for promotion of efficient generation and consumption of energy and energy research.</p> <p>The Act provides the legal framework which supports the development of power generation facilities.</p>
<p>White Paper on the Energy Policy of the Republic of South Africa (1998)</p>	<p>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.</p> <p>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.</p>
<p>White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)</p>	<p>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.</p>

Relevant legislation or policy	Relevance to Umbila Emoyeni Solar Energy Facility
	<p>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.</p>
<p>The Electricity Regulation Act (No. of 2006)</p>	<p>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 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.</p>
<p>National Development Plan 2030</p>	<p>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.</p> <p>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:</p> <ul style="list-style-type: none"> » 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. <p>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.</p> <p>The NDP aims to provide a supportive environment for growth and development, while promoting a more labour-absorbing economy. The development of Umbila Emoyeni 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.</p>
<p>Integrated Energy Plan (IEP), November 2016</p>	<p>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:</p>

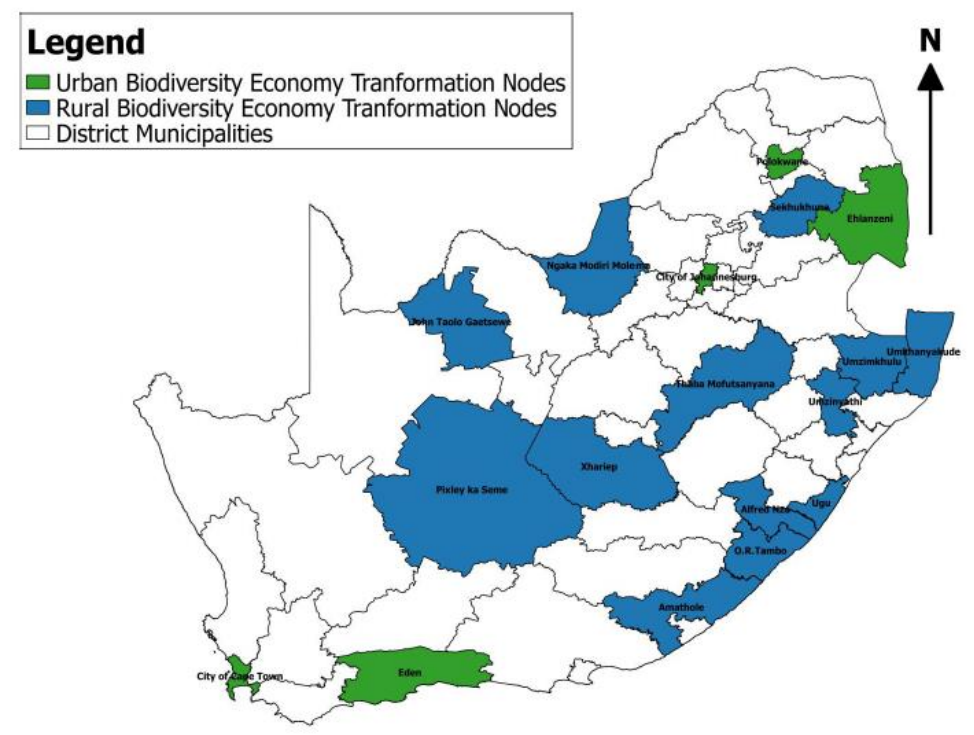
Relevant legislation or policy	Relevance to Umbila Emoyeni Solar Energy Facility
	<ul style="list-style-type: none"> » To guide the development of energy policies and, where relevant, set the framework for regulations in the energy sector. » To guide the selection of appropriate technologies to meet 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. <p>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.</p> <p>The 8 key objectives of the integrated energy planning process are as follows:</p> <ul style="list-style-type: none"> » 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.
<p>Integrated Resource Plan for Electricity (IRP) 2010-2030</p>	<p>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.</p> <p>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.</p> <p>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.</p> <p>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</p>

Relevant legislation or policy	Relevance to Umbila Emoyeni Solar Energy Facility
	<p>available to the grid. IPPs have commissioned 1005MW from two (2) Open Cycle Gas Turbines (OCGT) peaking plants.</p> <p>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.</p> <p>Provision has been made for the following new capacity by 2030:</p> <ul style="list-style-type: none"> » 1 500MW of coal » 2 500MW of hydro » 6 000MW of solar PV » 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 <p>Based on the IRP 2019, 1 600MW has been allocated for wind facilities from 2022 to 2030. This will bring the total installed capacity of solar PV facilities by 2030 to 17 742MW. Therefore, the development of the Umbila Emoyeni Solar Energy Facility is supported by the IRP 2019.</p>
<p>New Growth Path (NGP) Framework, 23 November 2010</p>	<p>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.</p> <p>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.</p>
<p>National Climate Change Bill, 2018</p>	<p>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.</p> <p>Umbila Emoyeni Solar Energy Facility is a renewable energy generation facility and would not result in the generation or release of emissions during its operation.</p>
<p>National Climate Change Response Policy, 2011</p>	<p>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.</p>

Relevant legislation or policy	Relevance to Umbila Emoyeni Solar Energy Facility
	<p>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.</p> <p>The development of the Umbila Emoyeni Solar Energy Facility is aligned with the 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.</p>
<p>National Climate Change Response Strategy for South Africa, 2004</p>	<p>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.</p> <p>A number of principles and factors guided the conception of the strategy and are required to be implemented. These are:</p> <ul style="list-style-type: none"> » 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.

Relevant legislation or policy	Relevance to Umbila Emoyeni Solar Energy Facility
Strategic Integrated Projects (SIPs)	<p>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.</p> <p>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 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:</p> <ul style="list-style-type: none"> » 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 Umbila Emoyeni 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. <p>The Umbila Emoyeni Solar Energy Facility could be registered as a SIP project once it is under development. The project would then contribute to the above-mentioned SIPs.</p>
National Biodiversity Economy Strategy (NBES) (March 2016)	<p>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.</p> <p>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.</p> <p>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</p>

Relevant legislation or policy	Relevance to Umbila Emoyeni Solar Energy Facility
	<p>sector is therefore characterised by an interesting combination of agriculture, eco-tourism and conservation characteristics.</p> <p>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.</p> <p>In order for the wildlife and bioprospecting sub-sectors of the biodiversity economy to 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.</p> <p>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.</p> <p>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.</p> <p>To address these transformation NBES imperatives, NBES has the principles of:</p> <ul style="list-style-type: none"> » 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. <p>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</p>

Relevant legislation or policy	Relevance to Umbila Emoyeni Solar Energy Facility
	<p>biological and/or genetic resources. The Gert Sibande District Municipality within which the Umbila Emoyeni Solar Energy Facility is proposed is not identified as a priority area.</p> 

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 Umbila Emoyeni Solar Energy Facility

Relevant legislation or policy	Relevance to the Umbila Emoyeni Solar Energy Facility
<p>Mpumalanga Vision, 2030 (2013 – 2030)</p>	<p>The Mpumalanga Vision 2030 Strategic Implementation Framework (2013 - 2030) was established as a direct implementation response to the National Development Plan Vision, 2030. The framework describes the province's approach to realising the objectives of the NDP in the provincial context and seeks to achieve the MPG's Provincial Strategic Objectives (PSO's). Mpumalanga Vision, 2030 provides a provincial expression of the key priorities, objectives and targets that enumerated in the NDP and expressed within the policy. It seeks to present and affirm the province's approach towards realising the national vision and development plan. The implementation framework builds on and informs past and existing sectorial and related planning interventions within the province. The Vision 2030 Implementation Framework provides a basis for prioritisation during medium-term and annual planning cycles. The focus of the Mpumalanga Vision 2030 is to provide a summary overview on the facilitation of decision-making and the prioritisation of rolling back poverty, and inequality by raising living standards to an acceptable minimum, which entails a combination of</p>

Relevant legislation or policy	Relevance to the Umbila Emoyeni Solar Energy Facility
	<p>interventions directed at increasing employment, improving the quality of education, productive growth, a social wage and good quality public services.</p> <p>In line with the principles of the NDP, the Vision 2030 highlights socio-economic outcomes such as employment and economic growth as priorities. The Mpumalanga Vision 2030 document formulated a spatial rationale for the province, which is based on nine key drivers, of which key drivers 1 to 6 are focused towards promoting economic development and job creation; key drivers 7 and 8 are focused on human development; and key driver 9 is focused on the conservation and sustainable management of the natural environment. Of relevance to the Umbila Emoyeni Solar Energy Facility are key drivers 1 to 6 as the development of the facility will promote economic development and job creation.</p>
<p>Mpumalanga Economic Growth and Development Path (2011)</p>	<p>The Mpumalanga Economic Growth and Development Path (MEGDP) is informed by the National Economic Growth Path. According to the MEGDP, the Mpumalanga Province is committed to increasing local economic development and job creation in the agricultural, industrial, manufacturing, green economy, tourism, and mining sectors. The focal point of the Economic Growth and Development Path is the creation of appropriate labour absorbing jobs which will have a positive direct, indirect, and induced effects on the Provincial economy and the living standards of its people.</p> <p>The primary objective of the MEGDP is to grow the economy of the province; balance growth and development in order to creates jobs, reduce poverty and inequality, and improve the socio-economic conditions of the province.</p> <p>The Mpumalanga economic growth and development path also discusses climate change and the green economy as one of the focus areas where government will a prioritise effort to support employment creation. The Industrial Development Corporation (IDC) estimates that 296 000 jobs can be created over a ten-year period through investment in green energy alone. R11.7 billion will be invested in green energy. Government is developing an Integrated Resource Plan for energy that will have clear commitments on the level of green energy and renewable energy. A commitment must be made on procurement that favours the local industry. A higher level of skills will also be needed. Small business policies and regulation of the building industry will need to be considered.</p> <p>The proposed development falls directly in line with the Mpumalanga provincial growth path with regards to employment creation in the renewable energy industry, the benefits it will bring to the local community as well as contributing towards diversifying the local economy towards a greener economy.</p>
<p>Mpumalanga Spatial Development Framework (2013)</p>	<p>The Mpumalanga Spatial Development Vision for the future functional spatial development patterns is based on the integration of sustainable natura resources, economic development and job creation and human development to provide: <i>a sustainable urban and rural spatial development pattern focussed on a modern ecologically sustainable economy, supported by a suitably skilled labour force and providing for quality of living.</i></p> <p>Strategic requirements which need to be addressed include the following:</p> <ul style="list-style-type: none"> » Harnessing the opportunities provided by urbanisation forces to achieve effective rural development. » Adopting a flexible approach which suits the province and enables sustainable development rather than inhibits growth and development.

Relevant legislation or policy	Relevance to the Umbila Emoyeni Solar Energy Facility
	<ul style="list-style-type: none"> » Creating world class infrastructure, services and amenities to attract investment. » Integrated infrastructure development planning responding to long term forecasted requirements. » Pro-active planning which integrates aspiring economic activities into the mainstream economies and urban fabric. » Safeguarding existing resources and creating opportunities for renewable energy development. » Consensus on where to develop and not develop the province. » Connecting the spatial frameworks to catalytic programmes of the Mpumalanga Implementation Framework and Plan. » Creating opportunities for increased international, national, provincial and municipal connectivity, linked by strategic transportation routes in the province. » Achieving improved quality of life in our settlements through formalisation, provision of planned amenities and consolidation of land uses. » Gearing up of spatial planning capacity, skills, systems, and procedures to achieve the vision. <p>The development of Umbila Emoyeni Solar Energy Facility supports the Mpumalanga Spatial Development Framework as it is a renewable energy development and will as such assist the province towards achieving its goal of creating opportunities for renewable energy development.</p>
<p>Mpumalanga Biodiversity Sector Plan (2014)</p>	<p>The Mpumalanga Biodiversity Sector Plan (MBSP) is a guideline which is part of a wider set of national biodiversity planning tools and initiatives that are designed for national legislation and policy. It also guides as a spatial tool to inform permissible land uses that support biodiversity and ecological processes. The MBSP contains various classes of environmental features of conservation value, such as protected areas, irreplaceable areas etc.</p> <p>Mapping of critical biodiversity areas is also provided in this document. According to the map of terrestrial critical biodiversity areas contained in the MBSP, the Mpumalanga Province comprises five areas, namely, protected areas, critical biodiversity areas (optimal and irreplaceable), ecological support areas, other natural areas, and moderately or heavily modified areas.</p> <p>According to the Mpumalanga Biodiversity Sector Plan, the project area overlaps with CBA1: Optimal (Terrestrial) and CBA1: Irreplaceable (Freshwater) areas.</p>
<p>Mpumalanga Draft Green Economy Sector Plan, 2016</p>	<p>The Plan aims to provide an integrated approach towards developing the green economy in Mpumalanga by 2030 in line with the Vision 2030. Specific objectives include:</p> <ul style="list-style-type: none"> » Developing a sector plan based on the province's strengths in natural resources endowments » Expanding on the economic, green and environmental initiatives that are already underway in the province in order to facilitate quick wins » Support the DEDT's drive in sustainable economic development – Develop an action plan for implementation
<p>Mpumalanga Tourism and Parks Agency Strategic Plan, 2011</p>	<ul style="list-style-type: none"> » The strategic plan emphasises that Mpumalanga possesses significant potential to capture large numbers of international and domestic tourists. In particular, the Kruger National Park, several other reserves, natural and cultural and historical heritage are attractions that are in demand by all tourist groups. » The plan states that the environmental sector often puts much emphasis on biodiversity conservation without necessarily linking it with eco-tourism. The plan

Relevant legislation or policy	Relevance to the Umbila Emoyeni Solar Energy Facility
	states that much naivety has been observed about what ecotourism can do. The plan calls for improved implementation of policy that will see biodiversity promotion being embraced by the broader tourism industry and the need for improved awareness from players within the sector to reduce the adverse environmental impacts of tourism.

5.6. Local Policy and Planning Context

The local tiers of government relevant to the Umbila Emoyeni Solar Energy Facility are the Govan Mbeki, Lekwa, and Msukaligwa Local Municipalities all of which fall within the Gert Sibande District. Instruments and/or policies at both the district and local level contain objectives which align with the development of Umbila Emoyeni Solar Energy Facility. These include, economic growth, job creation, community upliftment and poverty alleviation.

Table 5.4: Relevant local legislation and policies for Umbila Emoyeni Solar Energy Facility

Relevant policy	Relevance to Umbila Emoyeni Solar Energy Facility
Gert Sibande District Municipality IDP 2021	<ul style="list-style-type: none"> » The Gert Sibande District IDP acknowledges green economy development as a primary objective as per the MEGDP. The IDP further states that investment in research for new technologies will be prioritised. » The IDP identifies the need in enhancing green economy to improve service delivery in all its seven local municipalities. » Interventions to facilitate growth and job creation in the manufacturing sector includes: <ul style="list-style-type: none"> * Supporting the development of clean forms of energy like wind and hydro power generations opportunities » The IDP indicated the following issues/strategic objectives in terms of electricity supply: <ul style="list-style-type: none"> * Eradication of the remaining backlogs * Create capacity to accommodate new developments
Govan Mbeki Local Municipality, LED 2014	<ul style="list-style-type: none"> » The LED indicates side linkage opportunities such as new energy sources (preferably renewable energy such as solar and wind) » Also mentioned in the LED is rural economic sector development with renewable energy as an opportunity. » Renewable energy is listed as and economic sector that the local municipality should focus on.
Govan Mbeki Local Municipality, IDP 2021	<ul style="list-style-type: none"> » One of the strategic goals identified by the IDP is renewable energy and energy efficiency. » The IDP states that the phasing in of renewable energy options, which include concentrated solar power, wind and natural gas, will reduce dependence on coal resources. » THE IDP indicated that the local municipality support the transition to a low-carbon economy by speeding up and expanding renewable energy implementation.
Lekwa Local Municipality, IDP 2021	<ul style="list-style-type: none"> » The IDP indicated that the electricity and energy department should develop and adopt by laws that promote renewable energy and energy efficiency. » Green Economy initiatives to mitigate the negative impact of climate change & create new green job opportunities is seen as a priority area within the local municipality.

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 wise 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
(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 Umbila Emoyeni 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 Umbila Emoyeni 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.
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.

Targets		Indicators	
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 Umbila Emoyeni 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 150MW (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 Umbila Emoyeni 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 Umbila Emoyeni 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 Umbhila Emoyeni 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 Umbhila Emoyeni 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:

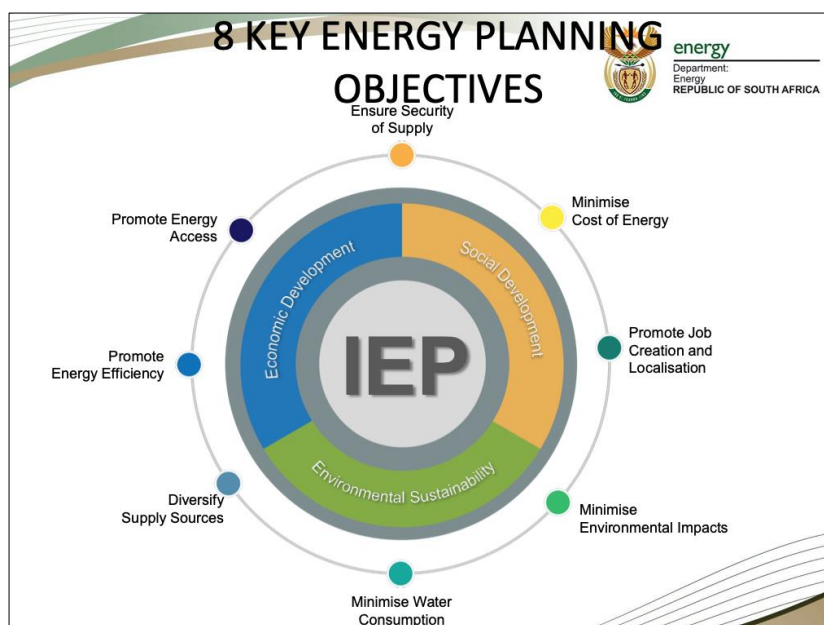


Figure 6.1: Eight key energy objectives as listed in the IEP, 2016 (extract from DOE presentation, December 2016)

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 980MW¹⁰ of wind generated electricity has been awarded to preferred bidders across four (4) 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. 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,

¹⁰<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>

- » Reducing poverty, and
- » Providing critical additional energy to that of Eskom.

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.

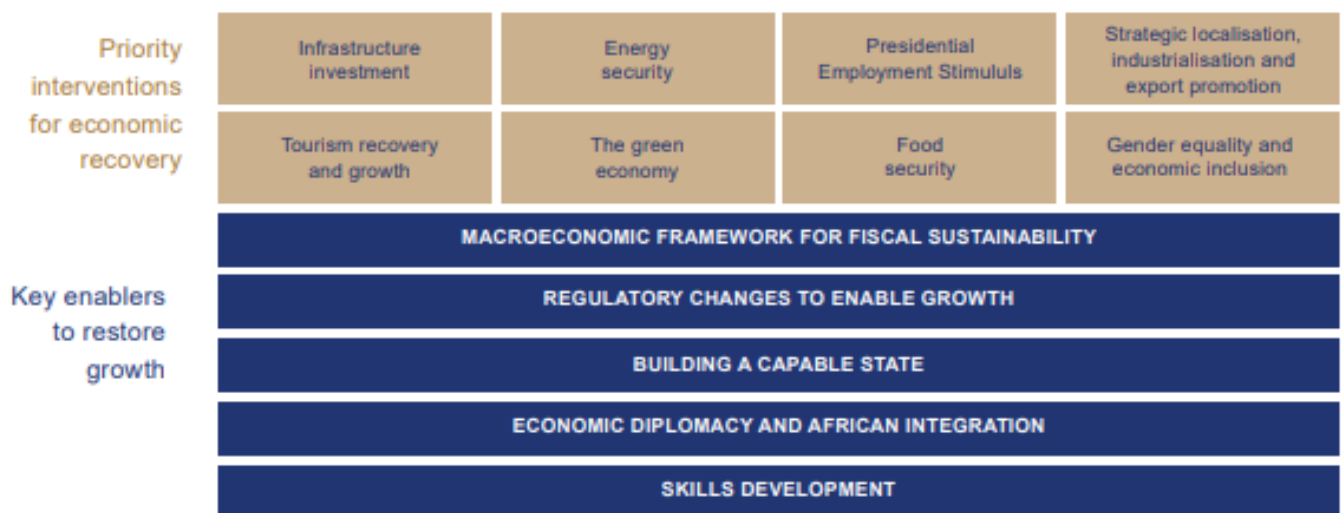


Figure 6.3: Core elements of the Economic Reconstruction and Recovery Plan (source: Building a new economy - Highlights of the Reconstruction and Recovery Plan, Presidency of the Republic of South Africa)

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 Umbila Emoyeni 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 5 million additional jobs by 2020. 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). Even though the project will not form 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 Umbila Emoyeni 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).

Umbila Emoyeni 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, Umbila Emoyeni 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 then-Department of Water and Sanitation's (now the Department of Human Settlements, Water and Sanitation) 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 Umbila Emoyeni 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 59 071 job years for South African citizens to date have been created.

Umbila Emoyeni 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 650 hours in the first half of 2021 (15% of the time) wherein 963GWh of estimated energy was shed (mostly stage 2 load shedding). This is 76% of the total loadshedding experienced during 2020. It is important to note that although extensive load shedding continued during the first half of 2021, record relative variable renewable energy contributions were recorded.

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 March 2021, water savings of 71.7 million kilolitres has been realised by the programme from inception to the date of this publication, of which 4.2 million kilolitres is in the 2021 reporting quarter included in this report.

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 March 2021, the REIPPPP had made the following significant impacts in terms of energy supply:

- » 6 422MW of electricity had been procured from 112 Renewable Energy Independent Power Producers (IPPs) in seven bid rounds¹¹.
- » 5 078 MW of electricity generation capacity from 79 IPP projects has been connected to the national grid.
- » 59 761GWh 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 79 projects that have started operations, 67 projects have been operational for

¹¹ Bid windows 1, 2, 3, 3.5, 4 and small BW1 (1S2) and small BW2(2S2). 2 583 MW of renewable energy capacity was awarded to IPPs in the REIPPPP bid window 5 in October 2021.

longer than a year. The electrical energy generated over the past 12-month period for the 67 projects is 11 679GWh, which is 94% of their annual energy contribution projections of 12 481GWh over a 12-month delivery period. Twenty-six (26) of the 67 projects (39%) 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.

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 (March 2021) in terms of investment and economics:

- » Investment (equity and debt) to the value of R209.7 billion was attracted in seven bid rounds.
- » Socio-economic development contributions of R1.5 billion to date, of which R103.5 million was spent in this 2021 reporting quarter.
- » Enterprise development contributions of R463.5 million to date, of which R34.8 million was spent in this 2021 reporting quarter.

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 (March 2021) indicates that a carbon emission reduction of 60.7 Mton CO₂ has been realised by the IPP programme from inception to date, of which 3.6 Mton is in the 2021 reporting quarter.

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 reductions¹² of 60.7 Mton of CO₂. The development of Umbhila Emoyeni Solar Energy Facility, and the associated electricity generated as a result of the facility, will result in considerable savings on tons of CO₂ 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.

¹² 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 CO₂/MWh.

Employment creation: The development, procurement, installation, maintenance and management of renewable energy facilities have significant potential for job creation and skills development in South 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 majority of South Africa's electricity generation infrastructure (coal-fired power stations) is currently located within Mpumalanga due to the location of coal resources within this province. As this coal capacity is decommissioned as plants come to the end of their useful life (many of the coal fired generators in the Province are more than 50 years old), this capacity will need to be replaced and jobs created for those involved in the coal supply chain. This is what is known as the **Just Energy Transition (JET)**. The Umbhila Emoyeni Solar Energy Facility will have a vital role to play in this transition both in terms of energy generation and socio-economic upliftment. It is also increasingly difficult to finance and procure new coal generation due to environmental concerns from lenders. Additionally, the lowest cost of new generation is wind and solar, taking emission mitigation requirements into consideration (cheaper than coal on a Levelised Cost of Energy (LCOE) basis). The argument for new solar generation in the coal belt province of Mpumalanga is therefore compelling.

The Mpumalanga Province has also 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 Mpumalanga Province is therefore considered to support the Province/Region's generation targets.

The overarching objective for the Umbhila Emoyeni 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 solar resource. The Global Horizon Irradiation (GHI) for the study area is in the region of approximately 1 826 kWh/m²/annum (refer to **Figure 6.4**). The Mpumalanga Province is ranked 6th 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.

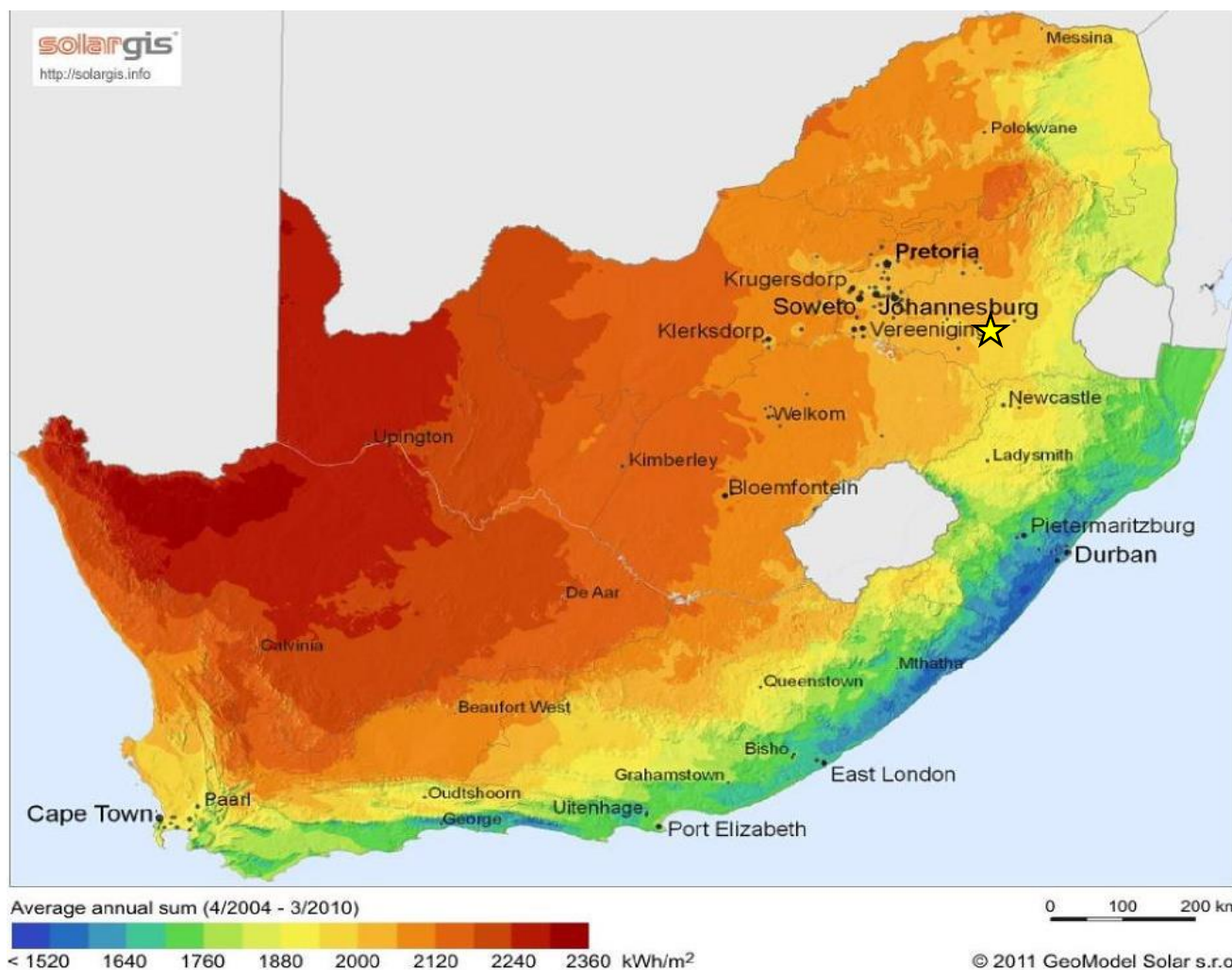


Figure 6.4: Solar irradiation map for South Africa; the proposed Umbhila Emoyeni Solar Energy Facility position is shown by the yellow star on the map. (Source: adapted from GeoModel Solar, 2011).

6.5. Receptiveness of and desirability of the project site to develop the Umbhila Emoyeni Solar Energy Facility

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 Solar Energy Facility due to the following site 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 1 826 kWh/m²/annum. The Mpumalanga Province is ranked 6th 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. The windlab technical team also confirmed the solar resource of the site through a meteorological and solar weather station which has been measuring the conditions of the area over the past years. Based on the solar resource available, no alternative locations are considered.

» **Land Availability:** In order to develop the Umbila Emoyeni Solar Energy Facility with a contracted capacity of up to 150MW, sufficient space is required. The preferred project site was identified within the Mpumalanga Province and in the Bethal / Morgenzon area following the confirmation of a feasible solar resource through a meteorological and solar weather station which has been measuring the conditions of the area over the past years. The properties included in the project site are privately-owned parcels available in the area for a development of this nature through agreement with the landowners, and are deemed technically feasible by the project developer for such development to take place. The combination of the affected properties has an extent of ~27 819ha, which was considered by the developer as sufficient for the development of the Umbila Emoyeni 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 and technical criteria.

» **Land Use, Geographical and Topographical Considerations:** The character of the greater area surrounding the project site can be described as natural grassland which is interspersed with areas of cultivation. Main crop types include sunflower seed production, sorghum, rye and potatoes. Settlement occurs in the form of isolated homesteads throughout the study area that are generally related to agricultural uses. There is a tourism related establishment (Silver Water Game Lodge) located within the north-eastern section of the proposed site. This facility appears to be focused around a dam. Settlement in the form of towns and villages is limited. The closest towns include Morgenzon, Bethal and Ermelo. Other disturbance visible is mining infrastructure, a railway track, power line servitudes and the future development of other renewable energy facilities which have received EAs from the DFFE. The proposed development is compatible with the surrounding land uses and does not present a conflicting land use.

The terrain of the proposed focus area relatively flat with series of valley and ridgelines that run in a general east to west direction. Flat terrains are preferred for the construction and operation of a solar energy facility such as the Umbila Emoyeni Solar Energy Facility.

» **Access to the National Electricity Grid** – A key factor in the siting of any generation project is a viable grid connection. The grid connection infrastructure for the facility will include a 400/132kV Main Transmission Substation (MTS), to be located between Camden and SOL Substations, which will be looped in and out of the existing Camden-Sol 400kV transmission line; on-site switching stations (132kV in capacity) at each renewable energy facility (Eskom Portion); 132kV power lines from the switching stations at each renewable energy facility to the new 400/132kV MTS; and a collector substation with 2 x 132kV bus bars and 4 x 132kV IPP feeder bays to onsite IPP Substation This proposed grid connection has been confirmed with Eskom as a feasible option. The grid connection solution will be subjected to a separate EIA process. Based on the location of the project site within an area where supporting transmission and distribution infrastructure is readily available to enable the evacuation of the generated power, the site was identified as being technically preferred for the planned development.

» **Access Road Infrastructure and Site access:** Access to the project site is ample with the presence of existing roads mainly consisting of national and regional roads. The proposed site is bounded by the N17 to the north, the R39 to the east and south and the R35 to the west. It is assumed that if components are imported to South Africa, it will be via the Port of Richard's Bay, which is located in KwaZulu-Natal. The Port is located approximately 460km from the proposed site. Alternatively, components can be imported via the Port of East London, located approximately 1 130km from the proposed site, or from the Port of Ngqura, approximately 1 200km from the proposed site, both being located in the province of the Eastern Cape. As material and components would need to be transported to the development area

during the construction phase, accessibility to the project site is a key factor in determining the viability of the Umbila Emoyeni Solar Energy Facility, particularly taking transportation costs (direct and indirect) into consideration and the impact of this on the project economics and the ability to submit a competitive bid under the DMRE's REIPPP Programme or a similar programme.

Taking into consideration the solar resource, grid access, land availability, landowner support, access to road infrastructure, the current land use of the project site and development area, the development of the Umbila Emoyeni Solar Energy Facility is considered to be desirable and will ultimately contribute to, and further develop the successful power generation activities already being undertaken within the Mpumalanga Province.

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 Umbila Emoyeni 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 150MW 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
(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 .
(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 Umbila Emoyeni Solar Energy Facility is included in Section 7.5.2 and copies of the supporting documents and inputs are included in Appendix C .
(g)(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which	The main issues raised through the undertaking of the public participation process, including consultation with

Requirement	Relevant Section
the issues were incorporated, or the reasons for not including them.	I&APs are included in the Comments and Responses Report in Appendix C9 .
(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 .
(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 Umbila Emoyeni Solar Energy Facility is included in Section 7.6 .

7.2 Relevant legislative permitting requirements

The legislative permitting requirements applicable to the Umbila Emoyeni 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)

The 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 Umbila Emoyeni 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 Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDL&EA) 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 Umbila Emoyeni 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 Umbila Emoyeni 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 Umbila Emoyeni 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. <i>Internal electrical infrastructure required to connect the Umbila Emoyeni Solar Energy Facility to the grid connection infrastructure will consist of 33kV cabling (buried or overhead), and a 33/132kV onsite collector substation (IPP Portion).</i>
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. <i>The construction and operation of the Umbila Emoyeni 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.</i>
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. <i>The development of the Umbila Emoyeni 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 collector substation, where such storage will occur inside containers with a combined capacity exceeding 80 cubic meters but not exceeding 500 cubic meters.</i>
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. <i>The site for the Umbila Emoyeni 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 watercourses for the development of the Umbila Emoyeni Solar Energy Facility and associated infrastructure.</i>
Listing Notice 1 (GNR 327)	24(ii)	The development of a road –

Notice Number	Activity Number	Description of listed activity
08 December 2014 (as amended on 07 April 2017)		(ii) with a reserve wider than 13.5m, or where no reserve exists where the road is wider than 8m. The construction of the Umbhila Emoyeni Solar Energy Facility will require the construction of new access roads of 12 -13m wide in areas where no road reserve exists to provide access to the facility.
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 Umbhila Emoyeni 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, and 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 150MW.
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 farming. 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 325) 08 December 2014 (as amended on 07 April 2017)	4(f)(i)(ee)	The development of a road wider than 4 metres with a reserve less than 13.5 metres. f. Mpumalanga i. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. The development of the Umbhila Emoyeni Solar Energy Facility will require the development of access roads of 12 – 13m wide, and internal distribution roads up to 12m wide in the Mpumalanga Province and outside urban areas. The project site is associated with the presence of a CBA1: Optimal (Terrestrial) and a CBA1: Irreplaceable (Freshwater).

Notice Number	Activity Number	Description of listed activity
Listing Notice 3 (GNR 325) 08 December 2014 (as amended on 07 April 2017)	10(f)(i)(cc)(ee)(h) h)	<p>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</p> <p>f. Mpumalanga i. Outside urban areas (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. (hh) Areas within a watercourse or wetland, or within 100 metres of a watercourse or wetland.</p> <p><i>The development of the Umbila Emoyeni Solar Energy Facility will require the construction and operation of facilities for the storage and handling of a dangerous goods (combustible and flammable liquids, such as oils, lubricants, solvents) associated with the onsite collector substation, where such storage will include containers with a capacity of 80 cubic meters. The site is associated with the presence of freshwater/drainage features, a CBA1: Optimal (Terrestrial) and a CBA1: Irreplaceable (Freshwater) and is located within the Mpumalanga Province and outside urban areas. Further, parts of the site are located in areas which could be considered sensitive in terms of the Gert Sibande District Environmental Management Framework (EMF).</i></p>
Listing Notice 3 (GNR 325) 08 December 2014 (as amended on 07 April 2017)	12(f)(ii)	<p>The clearance of an area of 300m² or more of indigenous vegetation within:</p> <p>b. Mpumalanga ii. Within critical biodiversity areas identified in bioregional plans.</p> <p><i>The Umbila Emoyeni Solar Energy Facility development will require clearance in excess of 300m² within areas classified as CBA1: Optimal (Terrestrial) and CBA1: Irreplaceable (Freshwater) in the Mpumalanga Province.</i></p>
Listing Notice 3 (GNR 325) 08 December 2014 (as amended on 07 April 2017)	14(ii)(a)(c)(f)(i)(d) d)(ff)	<p>The development of—</p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</p> <p>where such development occurs—</p> <p>(a) within a watercourse; or (c) within 32 metres of a watercourse, measured from the edge of a watercourse.</p> <p>f. Mpumalanga ii. Outside urban areas: (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.</p>

Notice Number	Activity Number	Description of listed activity
		The development of Umbila Emoyeni Solar Energy Facility will require the establishment of infrastructure with a physical footprint exceeding 10m². The site is associated with the presence of freshwater/drainage features, a CBA1: Optimal (Terrestrial) and a CBA1: Irreplaceable (Freshwater), and is located within the Mpumalanga Province, and outside urban areas. Further, parts of the site are located in areas which could be considered sensitive in terms of the Gert Sibande District Environmental Management Framework (EMF).
Listing Notice 3 (GNR 325) 08 December 2014 (as amended on 07 April 2017)	18(f)(i)(ee)	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. f. Mpumalanga i. Outside urban areas: (ee) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. The development of the Umbila Emoyeni Solar Energy Facility will require the widening of roads by more than 4m, outside urban areas, and within areas classified as CBA1: Optimal (Terrestrial) and CBA1: Irreplaceable (Freshwater) in the Mpumalanga Province.

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 Umbila Emoyeni 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.

Notice No.	Activity No.	Description of Water Use
		<i>The site considered for the establishment of the Umbila Emoyeni 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.</i>

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 Umbila Emoyeni Solar Energy Facility

The development of the Umbila Emoyeni 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:

- » 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 (refer to **Figure 7.2**). Following completion of this review period, a Final Scoping Report (this 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.

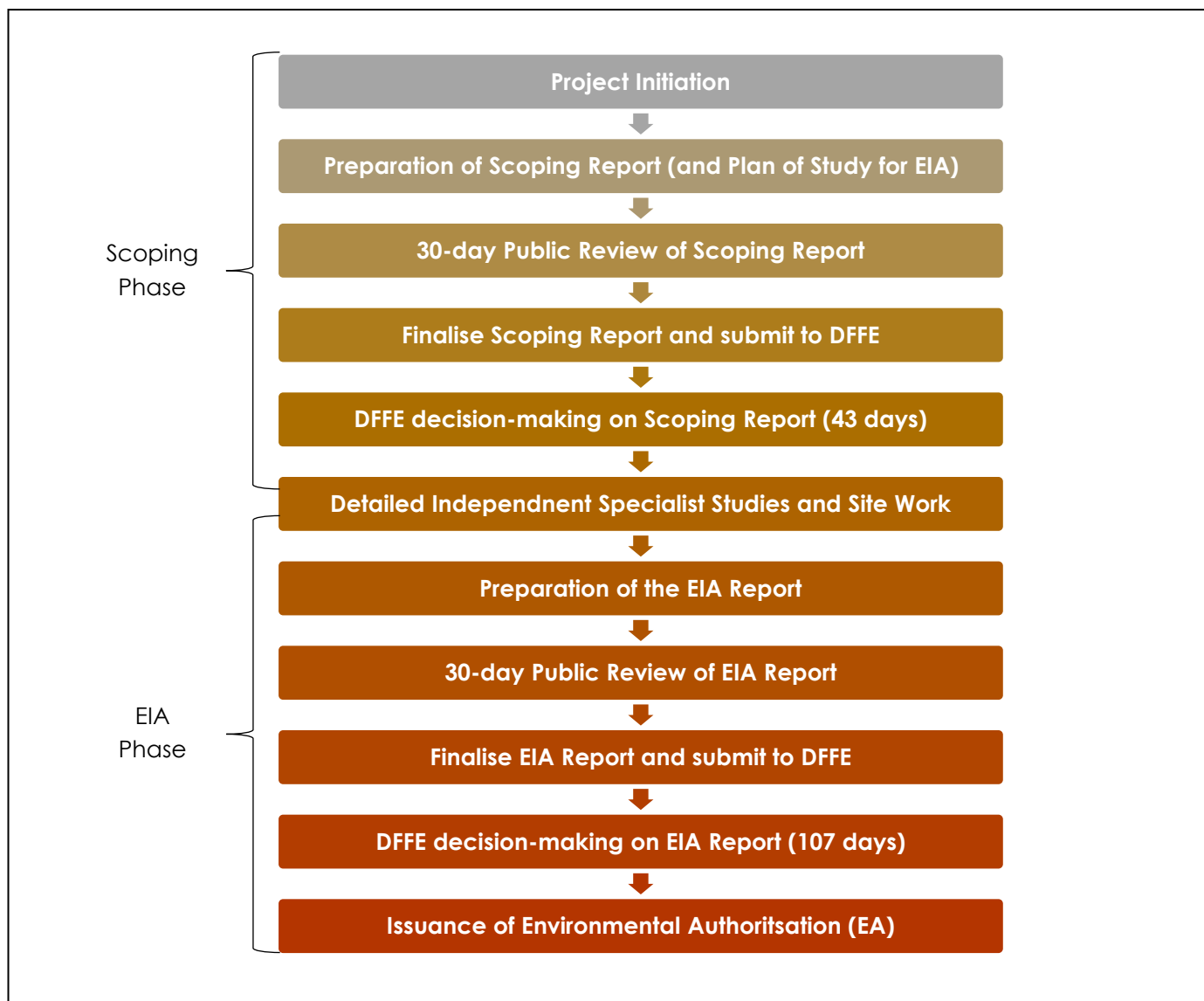


Figure 7.2: Regulated timeframe of an Environmental Impact Assessment (EIA) Process

7.4 Objectives of the Scoping Phase

This Scoping Report documents the evaluation of potential environmental impacts of the Umbila Emoyeni 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 area and the development footprint within the broader project site have been identified.
- » Preferred areas for the development in the form of a development area and a development footprint within the development area associated with low to medium environmental sensitivity have been identified through a desktop level scoping process and on-going consultative process. 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.
- » 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 Mpumalanga Province, the Mpumalanga DARDL&EA 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 the application for Environmental Authorisation to the DFFE via the DFFE Novell Filr 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.

In compliance with the requirements of Chapter 6: Public Participation of the EIA Regulations, 2014, as amended, the following summarises the key public participation activities implemented. The schematic

below provides an overview of the tools that are available to I&APs and stakeholders to access project information and interact with the public participation team to obtain project information and resolve any queries that may arise, and to meet the requirements for public participation.



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 Umbila Emoyeni 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
Air Traffic Navigation Services (ATNS)
Eskom Holdings SOC Limited
National Energy Regulator of South Africa (NERSA)
South African Civil Aviation Authority (CAA)
South African Heritage Resources Agency (SAHRA)
South African National Roads Agency Limited (SANRAL)
South African Radio Astronomy Observatory (SARAO)
South African Weather Services
Telkom SA SOC Limited
Transnet SA SOC Limited
Provincial Government Departments
Mpumalanga Department Agriculture, Rural Development, Land and Environmental Affairs
Mpumalanga Department of Economic Development and Tourism
Mpumalanga Department of Public Works, Roads and Transport
Mpumalanga Provincial Heritage Resources Authority
Mpumalanga Tourism and Parks Agency
Local Government Departments
Gert Sibande District Municipality
Govan Mbeki Local Municipality – including the Ward Councillor, ward committee members, community representative or local community forum members
Lekwa Local Municipality – including the Ward Councillor, ward committee members, community representative or local community forum members
Msukaligwa 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 names¹³ 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.
- » 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 47D of 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 –

¹³ 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).

- (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. 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/IAPs of the proposed Umbila Emoyeni 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 **12 May 2022**. 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 **29 April 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 Ridge Times Newspaper (in English) on **10 May 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.
 - * 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.

A copy of the newspaper advert as sent to the newspaper and the advert tear sheet are included in **Appendix C4** of the Scoping Report.

- » The Scoping Report was made available for review by I&APs for a 30-day review and comment period from **Thursday, 12 May 2022 to Monday, 13 June 2022**. The Scoping Report was made available on the Savannah Environmental website and all registered I&APs were notified of the availability on **12 May 2022** via email which included the link to access the report on the Savannah Environmental website. The evidence of distribution of the Scoping Report is included in this Final Scoping Report submitted to the DFFE for their review and acceptance.
- » A public meeting was held with key stakeholders on **Tuesday, 31 May 2022 at 17:00 – 18:00** via a virtual platform.
- » Focus group meetings were held with key stakeholders on **Wednesday, 15 May 2022 at 09:00 – 10:30, 11:00 – 12:30 and 14:00 – 15:00** via a virtual platform.
- » A discussion session with directly affected landowners was held on **Tuesday, 14 June 2022**.

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 Umbila Emoyeni 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, in one local newspaper: » Ridge Times Newspaper (English advertisement)	10 May 2022
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 stakeholder engagement platform.	12 May 2022
Placement of site notices at the project site, including placement of further notices in the towns of Bethal and Morgenon.	29 April 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.	12 May 2022
30-day review and comment period of the Scoping Report.	Thursday, 12 May 2022 to Monday, 13 June 2022
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.	» <u>A public meeting was held with key stakeholders on Tuesday, 31 May 2022 at 17:00 – 18:00 via a virtual platform.</u> » <u>Focus group meetings were held with key stakeholders on Wednesday, 15 May 2022 at 09:00 – 10:30, 11:00 – 12:30 and 14:00 – 15:00 via a virtual platform.</u> » <u>A discussion session with directly affected landowners was held on Tuesday, 14 June 2022.</u>
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 were 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 Scoping Report was made available in soft copies to I&APs and hard copies were made available on request.

The Scoping Report was 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 **12 May 2022**. Where I&APs were not able to provide written comments (including SMS and WhatsApp), other means of consultation, such as telephonic discussions were 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 have been recorded and included in **Appendix C** 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 C9** 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 has been updated with all comments received during the 30-day review and comment period and is included as **Appendix C9** in this Final Scoping Report submitted to the DFFE for their review and acceptance.

Meeting notes of all the telephonic discussions and meetings conducted during the 30-day review and comment period of the Scoping Report are 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 N** of the Scoping Report) for the Umbila Emoyeni 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 Umbila Emoyeni 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	High	A Soils, Land Use and Agricultural Potential Scoping Assessment is included in this Scoping Report as Appendix G . A detailed assessment will be undertaken in the EIA Phase of the process.
Animal Species	High	A Terrestrial Ecology Scoping Assessment (including fauna) has been undertaken for the solar energy facility and is included as Appendix D of the Scoping Report. 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 I . A detailed assessment will be undertaken in the EIA Phase of the process.
Archaeological and Cultural Heritage	Low	A Heritage Screener has been undertaken for the solar energy facility and is included in this Scoping Report as Appendix H . A full Heritage Impact Assessment (including an assessment of archaeological heritage resources and the cultural landscape) will be undertaken during the EIA Phase and included as an Appendix in the EIA Report.
Palaeontology	Very High	A Heritage Screener has been undertaken for the solar energy facility and is included in this Scoping Report as Appendix H . A full Heritage Impact Assessment (including an assessment of palaeontological heritage resources) will be undertaken during the EIA Phase and included as an Appendix in the EIA Report.
Terrestrial Biodiversity	Very High	A Terrestrial Ecology Scoping Assessment has been undertaken for the solar energy facility and is included as Appendix D of the Scoping Report. 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 D of the Scoping Report. 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 E of the Scoping Report. 12-months pre-construction monitoring as per the BirdLife SA Best Practice Guidelines is underway and 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.

Environmental Theme/Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
Defence	Low	The project site is not located within close proximity of any military base.
RFI	Medium	The project site under consideration for the development of the Umbila Emoyeni Solar Energy Facility is located within 5km of a Sentech High Power Terrestrial Broadcasting Facility, within 1km of a telecommunication facility, and between 30 and 60km from a weather installation and within the radar's line of site. SENTECH and South African Weather Services will be consulted during the 30-day review and comment period of the Scoping Report to provide written comment on the proposed development and details of any requirements for further studies.
Plant Species	Medium	A Terrestrial Ecology Scoping Assessment (including flora) has been undertaken for the Umbila Emoyeni Solar Energy Facility and is included as Appendix D of the Scoping Report. A detailed assessment will be undertaken in the EIA Phase of the process.
Traffic Assessment	The screening report does not indicate a rating for this theme.	A Traffic Scoping Assessment has been undertaken for the solar energy facility and is included as Appendix K of the Scoping Report. A detailed assessment will be undertaken in the EIA Phase of the process.
Bat Assessment	The screening report does not indicate a rating for this theme.	A Bat Scoping Assessment has been undertaken for the solar energy facility and is included as Appendix F of the Scoping Report. 12 months pre-construction monitoring is underway and will inform the assessment of impacts 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 J . 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 Umbila Emoyeni 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 Umbila Emoyeni 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, and grid connection infrastructure).
- » 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 Umbila Emoyeni 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 Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations.
- » Department of Environmental Affairs (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 Umbila Emoyeni Solar Energy Facility

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Legislation			
Constitution of the Republic of South Africa (No. 108 of 1996)	<p>In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that:</p> <p><i>"Everyone has the right –</i></p> <ul style="list-style-type: none"> » <i>To an environment that is not harmful to their health or well-being, and</i> » <i>To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:</i> <ul style="list-style-type: none"> * <i>Prevent pollution and ecological degradation,</i> * <i>Promote conservation, and</i> * <i>Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."</i> 	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)	<p>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).</p> <p>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.</p> <p>Considering the capacity of the proposed Umbila Emoyeni Solar Energy Facility (i.e., contracted capacity of 150MW) and the triggering of Activity 1 of Listing Notice 2</p>	<p>DFFE – Competent Authority</p> <p>Mpumalanga DARDL&EA – Commenting Authority</p>	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.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	(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)	<p>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.</p> <p>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.</p>	<p>DFFE</p> <p>Mpumalanga DARDL&EA</p>	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)	<p>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.</p> <p>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.</p> <p>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).</p>	<p>DFFE</p> <p>Mpumalanga DARDL&EA</p> <p>Govan Mbeki Local Municipality</p> <p>Lekwa Local Municipality</p> <p>Msukaliawa Local Municipality</p>	<p>Noise impacts are expected to be associated with the construction and operation phases of the project.</p> <p>A Noise Impact Assessment will be undertaken during the EIA Phase to determine the impact significance that the project will have from a noise perspective.</p>
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	Regional Department of Water and Sanitation	Freshwater/drainage features are present within the project site of the Umbila

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>1 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.</p> <p>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.</p> <p>Consumptive water uses may include taking water from a water resource (Section 21(a)) and storing water (Section 21(b)).</p> <p>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)).</p>		<p>Emoyeni Solar Energy Facility as identified in the Freshwater Scoping Assessment (Appendix D). As a result, a water use authorisation for the project will be required from the DWS; however, the process will only be completed once a positive EA has been received and the project selected as Preferred Bidder by the DMRE or a private offtaker. This is in line with the requirements from the DWS.</p>
<p>Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA)</p>	<p>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.</p> <p>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 prescribed manner.</p>	<p>Department of Mineral Resources and Energy (DMRE)</p>	<p>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.</p> <p>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 mineral resource that might occur on site.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
<p>National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA)</p>	<p>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.</p> <p>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.</p> <p>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.</p>	<p>Mpumalanga DARDL&EA / Gert Sibande District Municipality</p>	<p>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.</p>
<p>National Heritage Resources Act (No. 25 of 1999) (NHRA)</p>	<p>Section 07 of the NHRA stipulates assessment criteria and categories of heritage resources according to their significance.</p> <p>Section 35 of the NHRA provides for the protection of all archaeological and palaeontological sites, and meteorites.</p> <p>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.</p> <p>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 and furnish it with details regarding the location, nature, and extent of the proposed development.</p>	<p>South African Heritage Resources Agency (SAHRA)</p> <p>Mpumalanga Provincial Heritage Resources Authority – provincial heritage authority</p>	<p>A Heritage Impact Assessment will be undertaken for the project as per the requirements Section 38 of the NHRA. The Heritage Impact Assessment will be made available in the EIA Phase.</p> <p>Should a heritage resource be impacted upon, a permit may be required from SAHRA or the Mpumalanga Provincial Heritage Resources Authority in accordance with Section 48 of the NHRA, and the SAHRA Permit Regulations (GNR 668).</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>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.</p>		
<p>National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)</p>	<p>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.</p> <p>Three government notices have been published in terms of Section 56(1) of NEM:BA as follows:</p> <ul style="list-style-type: none"> » Commencement of TOPS Regulations, 2007 (GNR 150). » Lists of critically endangered, vulnerable and protected species (GNR 151). » TOPS Regulations (GNR 152). <p>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).</p>	<p>DFFE Mpumalanga DARDL&EA</p>	<p>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.</p> <p>A Terrestrial Ecology 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.</p>
<p>National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)</p>	<p>Chapter 5 of NEM:BA pertains to alien and invasive species, and states that a person may not carry out a restricted activity involving a specimen of an alien species without a</p>	<p>DFFE Mpumalanga DARDL&EA</p>	<p>A Terrestrial Ecology Impact Assessment will be undertaken as part of the EIA Phase to</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>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.</p> <p>Applicable, and exempted alien and invasive species are contained within the Alien and Invasive Species List (GNR 864).</p>		<p>identify the presence of any alien and invasive species present on site.</p>
<p>Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA)</p>	<p>Section 05 of CARA provides for the prohibition of the spreading of weeds.</p> <p>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.</p> <p>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.</p>	<p>Department of Agriculture, Land Reform and Rural Development (DALRD)</p>	<p>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.</p> <p>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:</p> <ul style="list-style-type: none"> » 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
			<p>concerned, subject to the provisions of sub-regulation 4.</p> <p>» 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.</p>
<p>National Forests Act (No. 84 of 1998) (NFA)</p>	<p>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.</p> <p>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”.</p>	<p>Department of Agriculture, Land Reform and Rural Development (DALRD)</p>	<p>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.</p> <p>A Terrestrial Ecology 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.</p>
<p>National Veld and Forest Fire Act (No. 101 of 1998) (NVFFA)</p>	<p>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.</p>	<p>DFFE</p>	<p>While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of the Umbila Emoyeni 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.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>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.</p>		
<p>Hazardous Substances Act (No. 15 of 1973) (HAS)</p>	<p>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.</p> <ul style="list-style-type: none"> » 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. <p>The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.</p>	<p>Department of Health (DoH)</p>	<p>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.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
<p>National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA)</p>	<p>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.</p> <p>The Minister may amend the list by –</p> <ul style="list-style-type: none"> » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. <p>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.</p> <p>Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that:</p> <ul style="list-style-type: none"> » The containers in which any waste is stored, are intact and not corroded or in » Any other way rendered unfit 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. 	<p>DFFE – Hazardous Waste</p> <p>Mpumalanga DARDL&EA – General Waste</p>	<p>No waste listed activities are triggered by the Umbila Emoyeni Solar Energy Facility, 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.</p>
<p>National Road Traffic Act (No. 93 of 1996) (NRTA)</p>	<p>The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in</p>	<p>South African National Roads Agency (SANRAL) – national roads</p> <p>Mpumalanga Department of Public</p>	<p>An abnormal load / vehicle permit may be required to transport the various components to site for construction. These include route clearances and permits required for vehicles carrying abnormally heavy or abnormally dimensioned loads and transport vehicles</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>applying for exemption permits are described and discussed.</p> <p>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.</p> <p>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.</p>	<p>Works, Roads and Transport</p>	<p>exceeding the dimensional limitations (length) of 22m. Depending on the trailer configuration and height when loaded, some of the on-site substation and BESS components may not meet specified dimensional limitations (height and width) which will require a permit.</p>
Provincial Policies / Legislation			
<p>The Mpumalanga Nature Conservation Act (Act 10 of 1998)</p>	<p>This Act makes provision with respect to nature conservation in the Mpumalanga province. It provides for, among other things, protection of wildlife, hunting, fisheries, protection of endangered fauna and flora as listed in the Convention on international Trade in Endangered Species of Wild Fauna and Flora, the control of harmful animals, freshwater pollution, and enforcement.</p>	<p>Mpumalanga DARDL&EA</p>	<p>A collection/destruction permit must be obtained from Mpumalanga DARDL&EA for the removal of any protected plant or animal species found on site.</p> <p>Should these species be confirmed within the development footprint during any phase of the project, permits will be required.</p> <p>A Terrestrial Ecology 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.</p>

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 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, the PV transects are counted 4 times in Spring and then again 4 times in Autumn. The spring survey has already been conducted and the findings have been used to inform the avifauna scoping report completed for the scoping phase. The results from the Autumn season bird monitoring 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 possible effects of the proposed project on the environment within which it is proposed to be developed. 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
(g)(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	<p>The environmental attributes associated with the development of the Umbhila Emoyeni Solar Energy Facility are included as a whole within this chapter. The environmental attributes that are assessed within this chapter include the following:</p> <ul style="list-style-type: none"> » The regional setting of the broader study area and the project site indicates the geographical aspects associated with the Umbhila Emoyeni 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, bats, 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 traffic conditions within the broader study area and the project site have been considered in Section 8.7. » The socio-economic characteristics associated with the broader study area and the project site have been included in Section 8.8.

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

8.2. Regional Setting

The Umbila Emoyeni Solar Energy Facility is located ~6km south-east of Bethal and 1km east of Morgenzon, across the Govan Mbeki, Lekwa, and Msukaligwa Local Municipalities within the Gert Sibande District in the Mpumalanga Province.

The Mpumalanga Province, within which the project site is located, is the second-smallest province in South Africa and is located in the north-eastern part of the country, bordering Swaziland and Mozambique (Mpumalanga Spatial Development Framework, 2018). The Mpumalanga Province covers an area of 76 495km² and has a population of 4 335 964, making it one of the most populous provinces in South Africa (Mpumalanga Spatial Development Framework, 2018). Mpumalanga is known for its mining, manufacturing, forestry, and service sectors. The Maputo Corridor, which links Mpumalanga with Gauteng and Maputo in Mozambique, harbours extensive potential in terms of economic development and growth for the region (Mpumalanga Spatial Development Framework, 2018). The Mpumalanga Province comprises of three district municipalities, namely, Ehlanzeni, Gert Sibande and Nkangala (refer to **Figure 8.1**) – which contain seventeen local municipalities collectively, with the project site being located within the Gert Sibande District Municipality.



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

The Gert Sibande District Municipality is a Category C municipality¹⁴ bordered by the Ehlanzeni and Nkangala District Municipalities to the north, KwaZulu-Natal and the Free State to the south, Swaziland to the east, and Gauteng to the west. It is the largest of the three districts in the Mpumalanga Province, making up almost half of its geographical area. The Gert Sibande District Municipality comprises seven local municipalities, namely, Govan Mbeki, Chief Albert Luthuli, Msukaligwa, Dipaleseng, Mkhondo, Lekwa and Dr Pixley ka Isaka Seme (refer to **Figure 8.2**). According to Stats SA (2016 Community Survey), Gert Sibande's population increased from 1 043 194 in 2011 to 1 135 409 people in 2016. This makes the district the smallest district in terms of population amongst the three districts in the province. The economy of the Gert Sibande District Municipality is driven by manufacturing, agriculture, transport, trade, community services, construction, electricity, finance and mining.



Figure 8.2: Local municipalities of the Gert Sibande District Municipality (Source: Municipalities of South Africa)

The Govan Mbeki Local Municipality has the largest underground coal mining complex in the world, which makes it an important strategic area within the national context. It covers an aerial extent of 2 955km² and is bordered by the Nkangala District in the north, Dipaleseng and Lekwa in the south, Msukaligwa in the east, and the Gauteng Province in the west. It is one of the smallest of seven municipalities that make up the district, accounting for 9% of its geographical area. Secunda is the seat of the municipality, as well as the seat of the district municipality. According to Stats SA (2011), the population in Govan Mbeki Local Municipality's sits at 340 091. Primary economic sectors in the municipality include mining, manufacturing, trade, and construction.

The Lekwa Local Municipality is Category B municipality situated within the Gert Sibande District in the Mpumalanga Province. It is one of seven municipalities in the district. It was established on 05 December 2000 after the amalgamation of three former Transitional Local Councils, namely, Standerton, Sakhile and Morgenzon. It is located in the south-west of the district, with immediate entrances to the KwaZulu-Natal, Gauteng and Free State Provinces. Newcastle, Heidelberg and Vrede are respective immediate entrances.

¹⁴ A municipality that has municipal executive and legislative authority in an area that includes more than one municipality.

Standerton serves as an urban node, whilst Morgenzon, which is 45km north-east of Standerton, serves as a satellite node.

The Lekwa Municipality lies on the large open plains of the Highveld region, which is characterised by tall grass, and it is traversed by the Vaal River, which flows in a western direction. The municipality is named after the Vaal River, which is commonly known as Lekwa (the Sesotho name for the Vaal River). Agriculture, forestry and fishing constitute about 30% of the Lekwa Local Municipality's economy.

The Msukaligwa Local Municipality is a Category B municipality situated within the Gert Sibande District in the Mpumalanga Province. It is bordered in the north by the Nkangala District and Chief Albert Luthuli, in the south by Lekwa and Dr Pixley Ka Isaka Seme, in the east by Mkhondo, and in the west by Govan Mbeki. It is the largest of the seven municipalities that make up the district, accounting for 19% of its geographical area. Ermelo is the seat of the municipality. The main economic sectors in the Msukaligwa Local Municipality are finance (23.8%), community services (20.9%), transport (17.5%), trade (14.4%), and mining (12.2%).

8.3. Climatic Conditions

The region within which the project site is located is characterised by summer rainfall and experiences a mean annual precipitation of up to 662mm. The region is also characterised by high and low extreme temperatures during the summer and winter, respectively, with frost occurring frequently (refer to **Figure 8.3**).

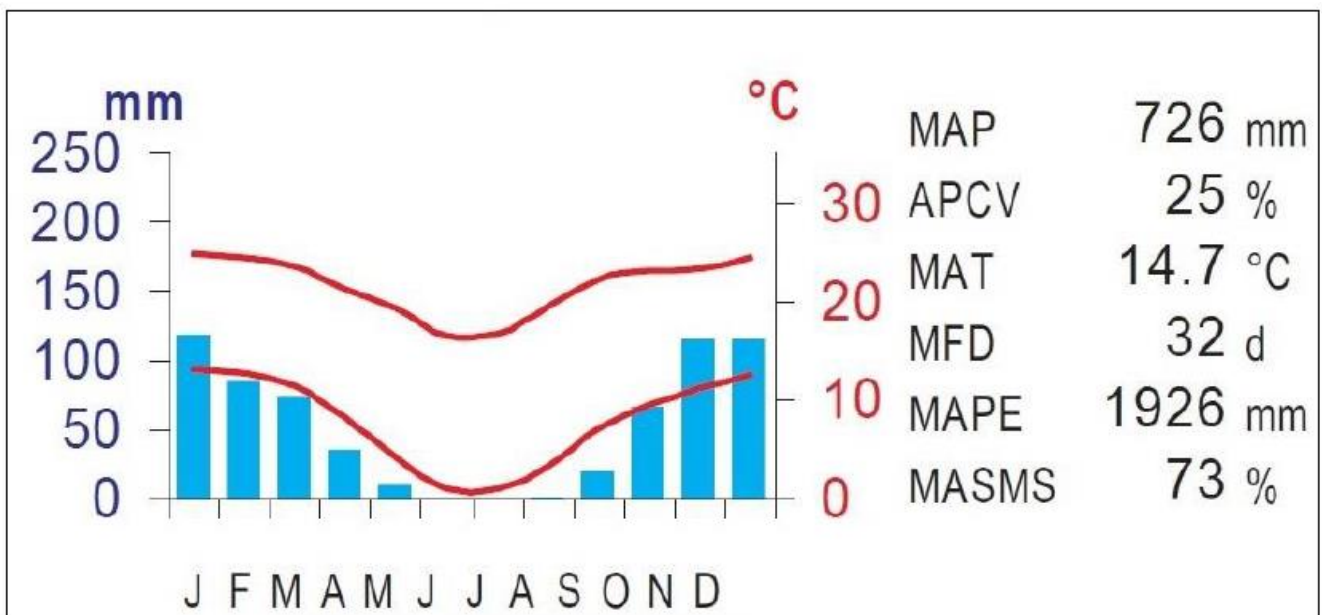


Figure 8.3: Climatic graph for the broader region within which the proposed project site is located

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 (**Appendix D - K**) undertaken for this Scoping Report.

8.4.1. Topographical profile

The project site occurs on land that ranges in elevation from approximately 1 581m to 1 778m. The general landform of the project site is undulating and is comprised of a series of similar size rounded ridgelines that

extend approximately 20 – 30m above broad valley lines. The valley lines all feed into the Blebokspruit, which flows in a north to south direction approximately 8.5km to the west of the proposed site. The Blesbokspruit flows into the Vaal River approximately 15km to the south-west of the site.

The slope percentage of the project site has been calculated and is illustrated in **Figure 8.4**. Most of the project site is characterised by a slope percentage between 0 and 4%, with some smaller patches within the project site characterised by a slope percentage ranging from 4 to 81%. This illustration indicates a non-uniform topography in scattered areas. The majority of the site is however characterised by a gentle slope.

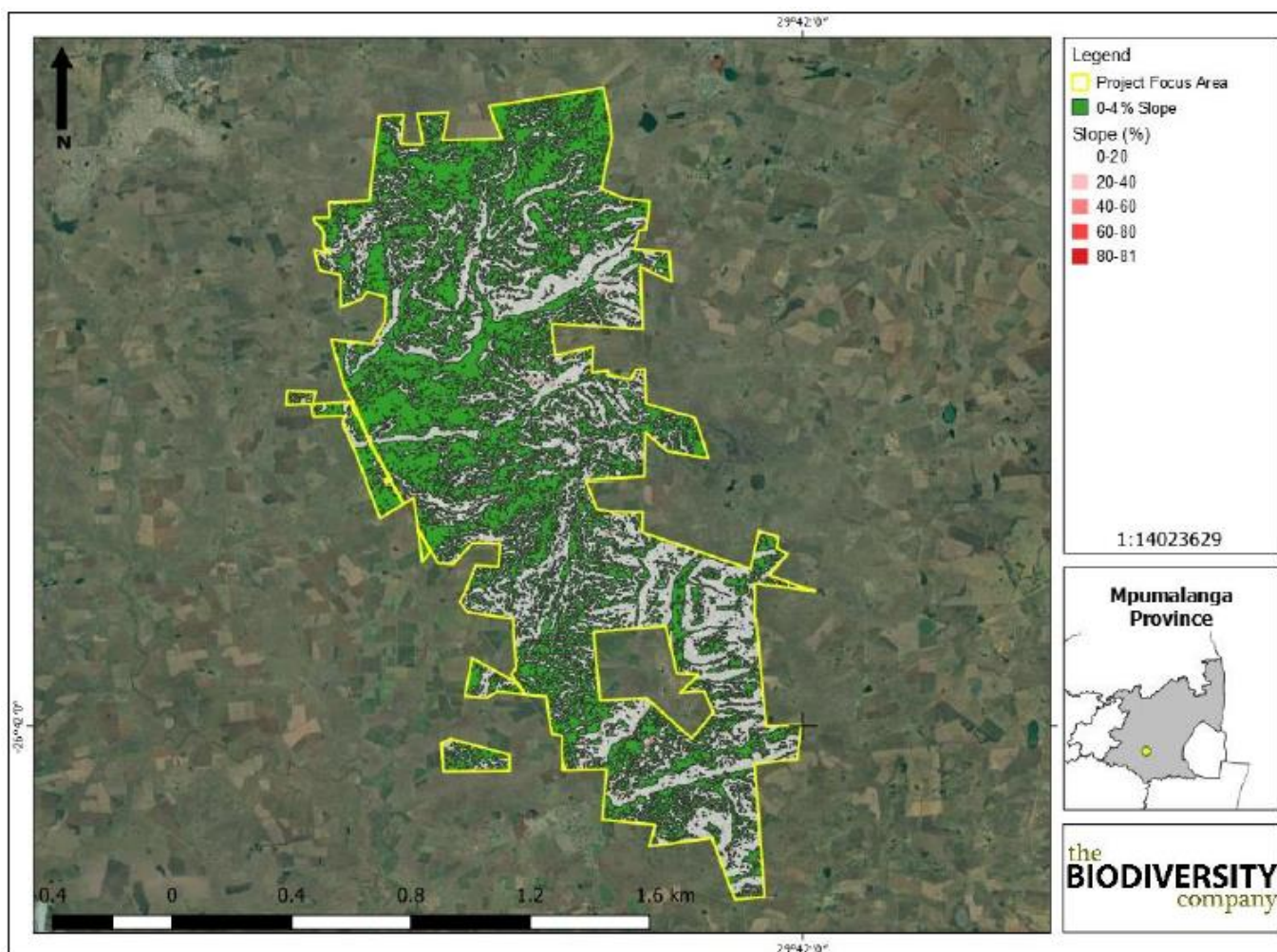


Figure 8.4: Slope percentage calculated for the project site within which the Umbila Emoyeni Solar Energy Facility is proposed

8.4.2. Geology, Soils and Agricultural Potential

Geological Setting

The geology of the project site is characterised by the Madzaringwe Formation shale, mudstone and sandstone from the Karoo Supergroup or the Karoo Suite dolerites which feature prominently in this area. To the west, the rocks of the Ventersdorp, old Transvaal and Witwatersrand Supergroups are significant with the south being characterised by the Volksrust Formation from the Karoo Supergroup. The geology of the project site for the Umbila Emoyeni Solar Energy Facility site is indicated in **Figure 8.5** below.

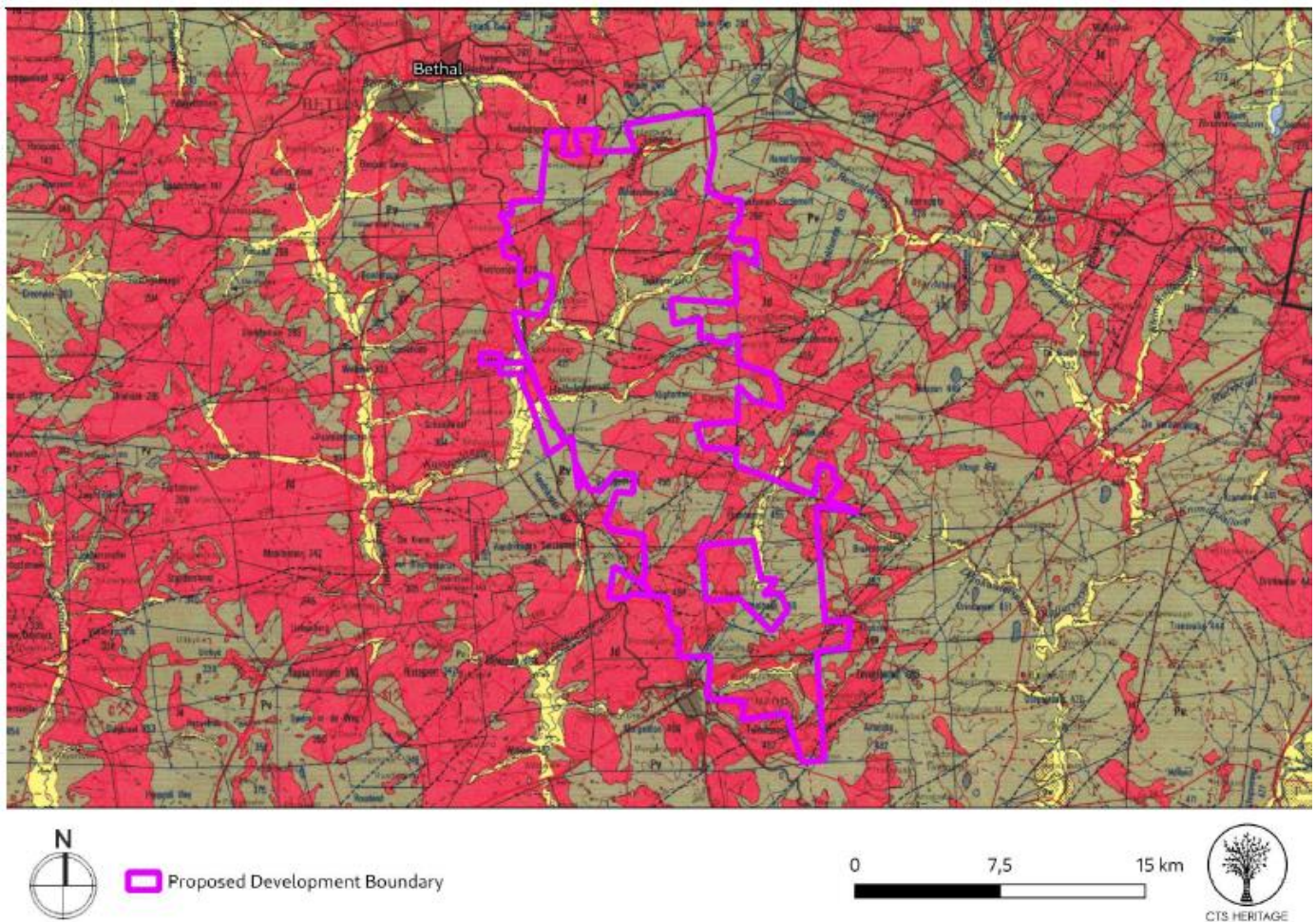


Figure 8.5: Extract from the CGS 2628 East Rand Map indicating the geological setting of the project site

Land Type, Soil Forms and Land Capability

According to the land type database, the project site is characterised by the Dc 3, Ea 20, Ea 21 and the Ea 22 land types (refer to **Figure 8.6**). The Dc land type is characterised by Prismaeutanic and/or pedocutanic diagnostic horizons, with the addition of one or more of the following: Vertic, melanic and red structured diagnostic horizons. The Ea land type consists of one or more of the following soils: Vertic, Melanic, and red structured diagnostic horizons, of which these soils are all undifferentiated.

The various soil forms expected throughout the project site are commonly associated with high land capabilities. Even though the soil depth, texture and permeability of these soils ensure high land capability,

the climatic capability of the area often reduces the land potential considerably. Therefore, very few areas characterised by “High” land potential are expected.

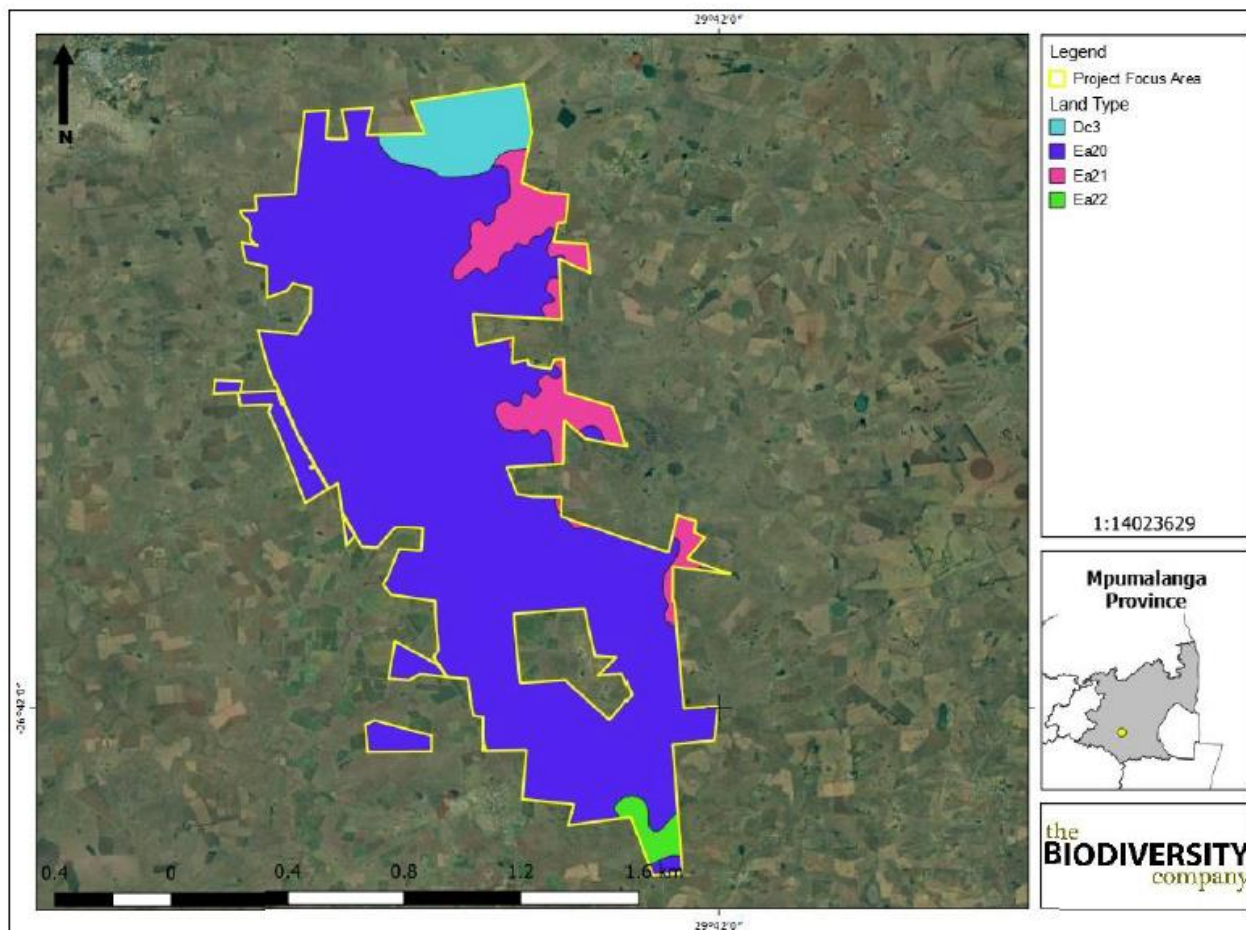


Figure 8.6: Land types present within the project site for the Umbila Emoyeni Solar Energy Facility

8.4.3. Land Use

The predominant land use within the project site is farming. The study area consists of a mosaic of buildings/structures, active farmland (“agriculture”), fallow land (abandoned farmlands which consist of secondary vegetation; “fallow”), natural grasslands, and freshwater resource features or drainage areas (which is comprised of small streams, wetlands, shallow pans and depressions, and artificial dams).

Farming practices comprise a mixture of cultivation (mainly maize with some soya bean cultivation), livestock farming (predominantly cattle on natural to near-natural grasslands and planted pastures), and to a lesser extent game farming.

In spite of the rural and natural character of the area within which the project site is proposed, there are major high voltage overhead power lines that traverse the project site, namely, the Camden Sol 2 400kV power line, and the Camden Tutuka 400kV power line.

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

i. Broad-Scale Vegetation Patterns

The national vegetation map for the project site is depicted in **Figure 8.7**. The entire project site is mapped as falling within one vegetation type, namely, the Soweto Highveld Grassland (Gm 8). Other vegetation types occur nearby, namely, Amersfoort Highveld Clay Grassland (Gm 13) and Eastern Highveld Grassland (Gm 12). These other vegetation types have the potential to occur on site and are therefore also described within this section.

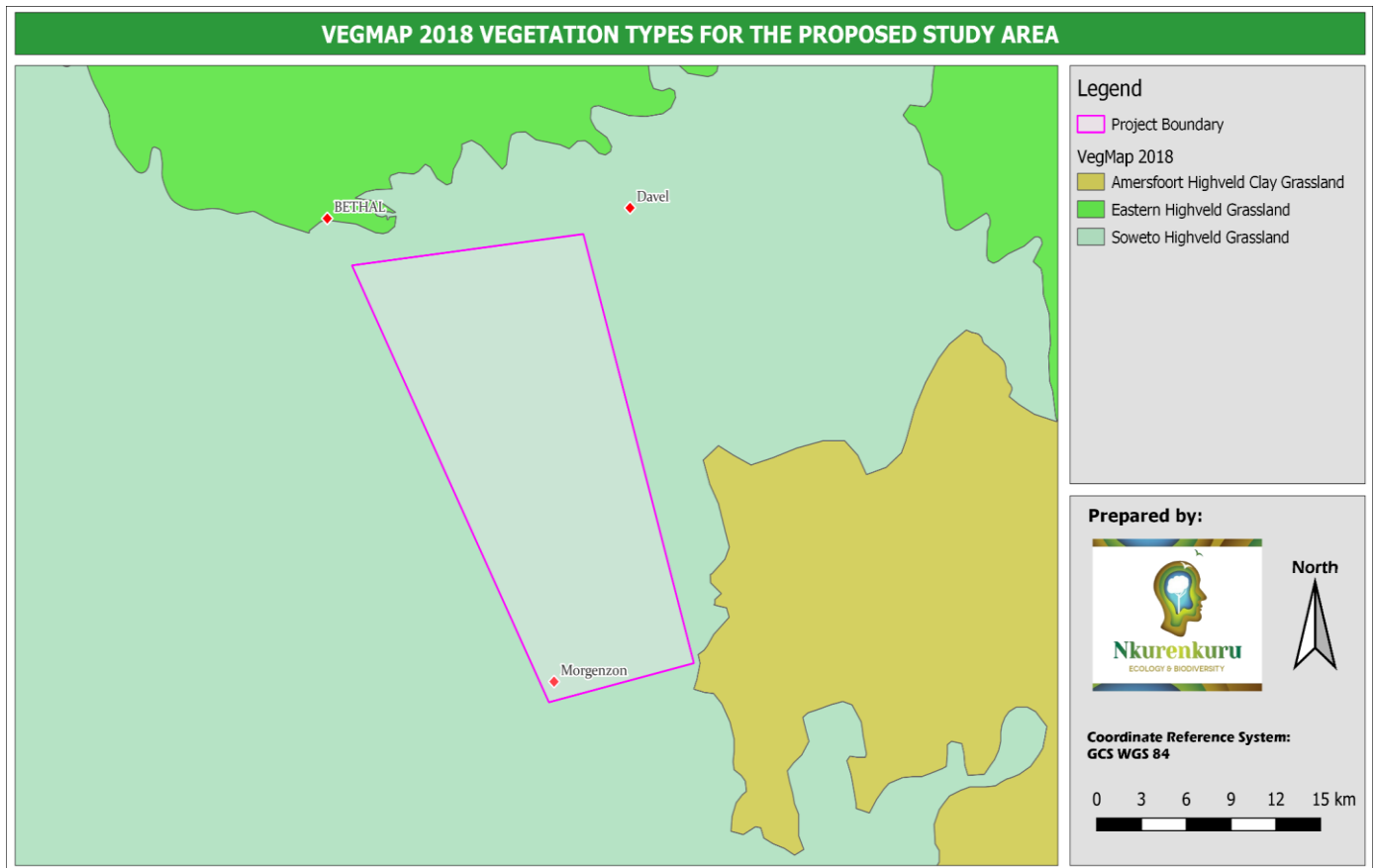


Figure 8.7: National vegetation map of the project site showing that the Umbila Emoyeni Solar Energy Facility falls within the Soweto Highveld Grassland vegetation type.

Soweto Highveld Grassland (Gm 8)

This vegetation type is distributed mainly in Mpumalanga and Gauteng, with small outliers in the Free State and North-West Provinces. It has an altitudinal range of 1 420 – 1 760m. It is distributed in a broad band roughly delimited by the N17 road between Ermelo and Johannesburg in the north, Perdekop in the southeast, and the Vaal River in the south. The vegetation type extends further westwards along the southern edge of the Johannesburg Dome with parts of Soweto, and as far as Randfontein. In southern Gauteng, it includes parts of Vanderbijlpark and Vereeniging, as well as Sasolburg in the northern Free State.

The vegetation type is characterised by gentle to moderate undulating landscapes on the Highveld plateau, and supports short to medium-high, dense, tufted grassland, which is dominated by *Themeda triandra* together with a variety of other grasses, such as *Elionurus muticus*, *Eragrostis racemosa*,

Heteropogon contortus, and *Tristachya leucothrix*. In undisturbed areas, scattered small wetlands, narrow stream alluvia, pans, and occasional ridges or rocky outcrops occur as a mosaic within the grassland.

Table 8.1: Key species associated with Soweto Highveld Grassland (Gm 8)

IMPORTANT SPECIES	
Growth Form (d = Dominant)	Key Species
Graminoids	<i>Andropogon appendiculatus</i> (d), <i>Brachiaria serrata</i> (d), <i>Cymbopogon pospischilii</i> (d), <i>Cynodon dactylon</i> (d), <i>Elionurus muticus</i> (d), <i>Eragrostis capensis</i> (d), <i>E. chloromelas</i> (d), <i>E. curvula</i> (d), <i>E. plana</i> (d), <i>E. planiculmis</i> (d), <i>E. racemosa</i> (d), <i>Heteropogon contortus</i> (d), <i>Hyparrhenia hirta</i> (d), <i>Setaria nigrirostris</i> (d), <i>S. sphacelata</i> (d), <i>Themeda triandra</i> (d), <i>Tristachya leucothrix</i> (d), <i>Andropogon schirensis</i> , <i>Aristida adscensionis</i> , <i>A. bipartita</i> , <i>A. congesta</i> , <i>A. junciformis</i> subsp. <i>galpinii</i> , <i>Cymbopogon caesius</i> , <i>Digitaria diagonalis</i> , <i>Diheteropogon amplectens</i> , <i>Eragrostis micrantha</i> , <i>E. superba</i> , <i>Harpochloa falx</i> , <i>Microchloa caffra</i> , <i>Paspalum dilatatum</i> .
Herbs	<i>Hermannia depressa</i> (d), <i>Acalypha angustata</i> , <i>Berkheya setifera</i> , <i>Dicoma anomala</i> , <i>Euryops gilfillanii</i> , <i>Geigeria aspera</i> var. <i>aspera</i> , <i>Graderia subintegra</i> , <i>Haplocarpha scaposa</i> , <i>Helichrysum miconiifolium</i> , <i>H. nudifolium</i> var. <i>nudifolium</i> , <i>H. rugosum</i> , <i>Hibiscus pusillus</i> , <i>Justicia anagalloides</i> , <i>Lippia scaberrima</i> , <i>Rhynchosia effusa</i> , <i>Schistostephium crataegifolium</i> , <i>Seago densiflora</i> , <i>Senecio coronatus</i> , <i>Vernonia oligocephala</i> , <i>Wahlenbergia undulata</i> .
Geophytic Herbs	<i>Haemanthus humilis</i> subsp. <i>hirsutus</i> , <i>H. montanus</i> .
Herbaceous Climber	<i>Rhynchosia totta</i> .
Low Shrubs	<i>Anthospermum hispidulum</i> , <i>A. rigidum</i> subsp. <i>pumilum</i> , <i>Berkheya annectens</i> , <i>Felicia muricata</i> , <i>Ziziphus zeyheriana</i> .

Eastern Highveld Grassland (Gm 8)

This vegetation type is distributed throughout Mpumalanga and Gauteng Provinces, and occurs as plains between Belfast in the east, and the eastern side of Johannesburg in the west, and extends southwards to Bethal, Ermelo, and west of Piet Retief. The vegetation type has an altitudinal range of 1 520 – 1 780m, but some parts are as low as 1 300m.

The vegetation type consists of slight to moderate undulating plains and includes low hills and pan depressions. The vegetation is short, dense grassland dominated by grasses of the genera *Aristida*, *Digitaria*, *Eragrostis*, *Themeda*, *Tristachya*. Small, scattered rocky outcrops have wiry, sour grasses and some woody species, such as *Acacia caffra*, *Celtis africana*, *Diospyros lycioides* subsp. *lycioides*, *Parinari capensis*, *Protea caffra*, *P. welwitschii*, and *Searsia magalismsontanum*.

Table 8.2: Key species associated with Eastern Highveld Grassland (Gm 12)

DOMINANT SPECIES	
Growth Form (d = Dominant)	Key Species
Graminoids	<i>Aristida aequiglumis</i> (d), <i>A. congesta</i> (d), <i>A. junciformis</i> subsp. <i>galpinii</i> (d), <i>Brachiaria serrata</i> (d), <i>Cynodon dactylon</i> (d), <i>Digitaria monodactyla</i> (d), <i>D. tricholaenoides</i> (d),

DOMINANT SPECIES	
Growth Form (d = Dominant)	Key Species
	<i>Elionurus muticus</i> (d), <i>Eragrostis chloromelas</i> (d), <i>E. curvula</i> (d), <i>E. plana</i> (d), <i>E. racemosa</i> (d), <i>E. sclerantha</i> (d), <i>Heteropogon contortus</i> (d), <i>Loudetia simplex</i> (d), <i>Microchloa caffra</i> (d), <i>Monocymbium ceresiiforme</i> (d), <i>Setaria sphacelata</i> (d), <i>Sporobolus africanus</i> (d), <i>S. pectinatus</i> (d), <i>Themeda triandra</i> (d), <i>Trachypogon spicatus</i> (d), <i>Tristachya leucothrix</i> (d), <i>T. rehmannii</i> (d), <i>Alloteropsis semialata</i> subsp. <i>eckloniana</i> , <i>Andropogon appendiculatus</i> , <i>A. schirensis</i> , <i>Bewisia biflora</i> , <i>Ctenium concinnum</i> , <i>Diheteropogon amplectens</i> , <i>Eragrostis capensis</i> , <i>E. gummiflua</i> , <i>E. patentissima</i> , <i>Harpochloa fax</i> , <i>Panicum natalense</i> , <i>Rendlia altera</i> , <i>Schizachyrium sanguineum</i> , <i>Setaria nigrirostris</i> , <i>Urelytrum agropyroides</i> .
Herbs	<i>Berkheya setifera</i> (d), <i>Haplocarpha scaposa</i> (d), <i>Justicia anagalloides</i> (d), <i>Pelargonium luridum</i> (d), <i>Acalypha angustata</i> , <i>Chamaecrista mimosoides</i> , <i>Dicoma anomala</i> , <i>Eryops gilfillanii</i> , <i>E. transvaalensis</i> subsp. <i>setilobus</i> , <i>Helichrysum aureonitens</i> , <i>H. caespitium</i> , <i>H. callicomum</i> , <i>H. oreophilum</i> , <i>H. rugulosum</i> , <i>Ipomoea crassipes</i> , <i>Pentanisia prunelloides</i> subsp. <i>latifolia</i> , <i>Seago densiflora</i> , <i>Senecio coronatus</i> , <i>Vernonia oligocephala</i> , <i>Wahlenbergia undulata</i> .
Geophytic Herbs	<i>Gladiolus crassifolius</i> , <i>Haemanthus humilis</i> subsp. <i>hirsutus</i> , <i>Hypoxis rigidula</i> var. <i>pilosissima</i> , <i>Ledebouria ovatifolia</i> .
Succulent Herb	<i>Aloe ecklonis</i> .
Low Shrubs	<i>Anthospermum rigidum</i> subsp. <i>pumilum</i> , <i>Stoebe plumosa</i> .

Amersfoort Highveld Clay Grassland (Gm 13)

This vegetation type is distributed throughout Mpumalanga and Kwa-Zulu Natal Provinces, extending in a north-south band from south of Ermelo, down through Amersfoort to the Memel area in south. The vegetation type has an altitudinal range of 1 580 – 1 860m.

The vegetation type is comprised of undulating grassland plains, with small, scattered patches of dolerite outcrops in some areas. The vegetation is comprised of a short, closed grassland cover, largely dominated by a dense *Themeda triandra* sward, often severely grazed to form a short lawn.

Table 8.3: Key species associated with Amersfoort Highveld Clay Grassland (Gm 13)

DOMINANT SPECIES	
Growth Form (d = Dominant)	Key Species
Graminoids	<i>Andropogon appendiculatus</i> (d), <i>Brachiaria serrata</i> (d), <i>Digitaria monodactyla</i> (d), <i>D. tricholaenoides</i> (d), <i>Elionurus muticus</i> (d), <i>Eragrostis capensis</i> (d), <i>E. chloromelas</i> (d), <i>E. plana</i> (d), <i>E. racemosa</i> (d), <i>Harpochloa fax</i> (d), <i>Heteropogon contortus</i> (d), <i>Microchloa caffra</i> (d), <i>Panicum natalense</i> (d), <i>Setaria nigrirostris</i> (d), <i>S. sphacelata</i> (d), <i>Themeda triandra</i> (d), <i>Trichoneura grandiglumis</i> (d), <i>Tristachya leucothrix</i> (d), <i>Abildgaardia ovata</i> , <i>Andropogon schirensis</i> , <i>Aristida bipartita</i> , <i>A. congesta</i> , <i>A. junciformis</i> subsp. <i>galpinii</i> , <i>A. stipitata</i> subsp. <i>graciliflora</i> , <i>Bulbostylis contexta</i> , <i>Chloris virgata</i> , <i>Cymbopogon caesius</i> , <i>C. pospischilii</i> , <i>Cynodon dactylon</i> , <i>Digitaria diagonalis</i> ,

DOMINANT SPECIES	
Growth Form (d = Dominant)	Key Species
	<i>D. ternata</i> , <i>Diheteropogon amplexans</i> , <i>Eragrostis curvula</i> , <i>Koeleria capensis</i> , <i>Panicum coloratum</i> , <i>Setaria incrassata</i> .
Herbs	<i>Berkheya setifera</i> (d), <i>Vernonia natalensis</i> , <i>V. oligocephala</i> (d), <i>Acalypha peduncularis</i> , <i>A. wilmsii</i> , <i>Berkheya insignis</i> , <i>B. pinnatifida</i> , <i>Crabbea acaulis</i> , <i>Cynoglossum hispidum</i> , <i>Dicoma anomala</i> , <i>Haplocarpha scaposa</i> , <i>Helichrysum caespititium</i> , <i>H. rugulosum</i> , <i>Hermannia coccocarpa</i> , <i>H. depressa</i> , <i>H. transvaalensis</i> , <i>Ipomoea crassipes</i> , <i>I. oblongata</i> , <i>Jamesbrittenia silenoides</i> , <i>Pelargonium luridum</i> , <i>Pentanisia prunelloides</i> subsp. <i>latifolia</i> , <i>Peucedanum magalismontanum</i> , <i>Pseudognaphalium luteoalbum</i> , <i>Rhynchosia effusa</i> , <i>Salvia repens</i> , <i>Schistostephium crataegifolium</i> , <i>Sonchus nanus</i> , <i>Wahlenbergia undulata</i> .
Herbaceous Climber	<i>Rhynchosia totta</i> .
Geophytic Herbs	<i>Boophone disticha</i> , <i>Eucomis autumnalis</i> subsp. <i>clavata</i> , <i>Hypoxis villosa</i> var. <i>obliqua</i> , <i>Zantedeschia albomaculata</i> subsp. <i>macrocarpa</i> .
Tall Shrubs	<i>Diospyros austroafricana</i> , <i>D. lycioides</i> subsp. <i>guerkei</i> .
Low Shrubs	<i>Anthospermum rigidum</i> subsp. <i>pumilum</i> (d), <i>Helichrysum melanacme</i> (d), <i>Chaetacanthus costatus</i> , <i>Euphorbia striata</i> var. <i>cuspidata</i> , <i>Gnidia burchellii</i> , <i>G. capitata</i> , <i>Polygala uncinata</i> , <i>Searsia discolor</i> .
Succulent Shrub	<i>Euphorbia clavarioides</i> var. <i>truncata</i> .

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. On a national scale the thresholds are as depicted in **Table 8.4** below, as determined by best available scientific approaches. The level at which an ecosystem becomes Critically Endangered differs from one ecosystem to another and varies from 16% to 36%.

Table 8.4: Conservation status of different vegetation types occurring within the project site and broader study area

Vegetation Type	Target (%)	Transformed (%)	Conserved (Statutorily & other reserves)	Conservation Status	
				National Vegetation Map (SANBI, 2018)	National Ecosystem List (NEMA:BA. 2011)
Soweto Highveld Grassland	24%	47.3%	0.2%	Vulnerable	Vulnerable
Amersfoort Highveld Clay Grassland	27%	24.5%	0%	Least Threatened	Not Listed
Eastern Highveld Grassland	24%	44%	0.3%	Vulnerable	Vulnerable

Determining ecosystem status (Driver *et al.*, 2005). *BT = biodiversity target (the minimum conservation requirement).

Habitat remaining (%)	80-100	least threatened	LT
	60-80	vulnerable	VU
	*BT-60	endangered	EN
	0-*BT	critically endangered	CR

According to scientific literature (Driver *et al.*, 2005; Mucina *et al.*, 2006), and as shown in **Table 8.4**, Soweto Highveld Grassland and Eastern Highveld Grassland are both listed as Vulnerable, and Amersfoort Highveld Clay Grassland is listed as Least Threatened.

The National List of Ecosystems that are Threatened and in need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), lists national vegetation types that are afforded protection on the basis of rates of transformation. The thresholds for listing in this legislation are higher than in the scientific literature, which means there are fewer ecosystems listed in the National Ecosystem List versus in scientific literature.

According to the National Ecosystem List, Soweto Highveld Grassland and Eastern Highveld Grassland are listed as Vulnerable and Amersfoort Highveld Clay Grassland is not listed in the National List of Ecosystems that are Threatened and in need of protection (GN1002 of 2011).

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

A list was obtained from the SANBI database (POSA — Plants of Southern Africa) containing all plant species that have been recorded to date from the surroundings of the project site. POSA generated species lists also contain updated Red List information according to the Red List of South African Plants. Species listed as protected were also identified in the list.

A total of 1 076 species have been recorded within the broader area based on the online plant search (see Appendix 1 of the Terrestrial Ecology Report for the full list). Of this, the top three representative families were Poaceae (148 spp., 14%), Asteraceae (140 spp., 13%), and Fabaceae (97 spp., 9%).

Furthermore, this list included a total of 18 Species of Conservation Concern (SCC) (Red List and highly range restricted species) and a further 88 provincially protected species (note that some of the Red List species are also protected; thus some overlap occurs between these numbers) (**Table 8.5**). The protected species are listed under Schedule 11 (Protected Plants) of the Mpumalanga Nature Conservation Act, no. 10 of 1998. The initial screening report also revealed the potential presence of an additional three Medium Sensitive species, namely species 851, 691, and 1252 (for their protection, the identities of these species will not made public).

No plant species protected under the National Environmental Management: Biodiversity Act (No. 10 of 2004) are expected to occur within the project site.

Table 8.5: Species of Conservation Concern that have been recorded within the broader region surrounding the study area, as per the SANBI POSA online database.

Family	Species	IUCN	Protection Schedule
Apocynaceae	<i>Schizoglossum peglerae</i>	EN	
Asparagaceae	<i>Asparagus fractiflexus</i>	EN	
Aizoaceae	<i>Khadia carolinensis</i>	VU	
Amaryllidaceae	<i>Nerine gracilis</i>	VU	
Apocynaceae	<i>Aspidoglossum xanthosphaerum</i>	VU	
Apocynaceae	<i>Miraglossum davyi</i>	VU	
Apocynaceae	<i>Pachycarpus suaveolens</i>	VU	
Iridaceae	<i>Gladiolus paludosus</i>	VU	11
Apocynaceae	<i>Stenostelma umbelliferum</i>	NT	
Asphodelaceae	<i>Kniphofia typhoides</i>	NT	11
Asteraceae	<i>Cineraria austrotransvaalensis</i>	NT	
Fabaceae	<i>Argyrolobium campicola</i>	NT	
Hyacinthaceae	<i>Merwillia plumbea</i>	NT	
Iridaceae	<i>Gladiolus robertsoniae</i>	NT	11
Orchidaceae	<i>Habenaria barbertoni</i>	NT	11
Euphorbiaceae	<i>Acalypha caperonioides</i> var. <i>caperonioides</i>	DD	
Hyacinthaceae	<i>Drimia elata</i>	DD	
Iridaceae	<i>Hesperantha rupestris</i>	DD	
Agapanthaceae	<i>Agapanthus inapertus</i> subsp. <i>intermedius</i>	LC	11
Amaryllidaceae	<i>Boophone disticha</i>	LC	11
Amaryllidaceae	<i>Brunsvigia natalensis</i>	LC	11
Amaryllidaceae	<i>Brunsvigia radulosa</i>	LC	11
Amaryllidaceae	<i>Crinum bulbispermum</i>	LC	11
Amaryllidaceae	<i>Crinum graminicola</i>	LC	11
Amaryllidaceae	<i>Cyrtanthus breviflorus</i>	LC	11
Amaryllidaceae	<i>Haemanthus humilis</i> subsp. <i>hirsutus</i>	LC	11
Amaryllidaceae	<i>Haemanthus montanus</i>	LC	11
Amaryllidaceae	<i>Scadoxus puniceus</i>	LC	11
Araceae	<i>Zantedeschia albomaculata</i> subsp. <i>albomaculata</i>	LC	11
Araceae	<i>Zantedeschia albomaculata</i> subsp. <i>macrocarpa</i>	LC	11
Araceae	<i>Zantedeschia rehmannii</i>	LC	11
Asphodelaceae	<i>Aloe ecklonis</i>	LC	11
Asphodelaceae	<i>Aloe graciliflora</i>	LC	11
Asphodelaceae	<i>Aloe jeppeae</i>	LC	11
Asphodelaceae	<i>Aloe maculata</i> subsp. <i>maculata</i>	LC	11
Asphodelaceae	<i>Kniphofia albescens</i>	LC	11
Asphodelaceae	<i>Kniphofia porphyrantha</i>	LC	11
Dioscoreaceae	<i>Dioscorea dregeana</i>	LC	11
Hyacinthaceae	<i>Eucomis montana</i>	LC	11
Hyacinthaceae	<i>Eucomis pallidiflora</i> subsp. <i>pallidiflora</i>	LC	11
Iridaceae	<i>Gladiolus crassifolius</i>	LC	11
Iridaceae	<i>Gladiolus dalenii</i> subsp. <i>dalenii</i>	LC	11
Iridaceae	<i>Gladiolus ecklonii</i>	LC	11
Iridaceae	<i>Gladiolus elliotii</i>	LC	11
Iridaceae	<i>Gladiolus longicollis</i> subsp. <i>longicollis</i>	LC	11
Iridaceae	<i>Gladiolus longicollis</i> subsp. <i>platypetalus</i>	LC	11
Iridaceae	<i>Gladiolus papilio</i>	LC	11
Iridaceae	<i>Gladiolus sericeovillosus</i> subsp. <i>calvatus</i>	LC	11

Family	Species	IUCN	Protection Schedule
Iridaceae	<i>Gladiolus sericeovillosus</i> subsp. <i>sericeovillosus</i>	LC	11
Iridaceae	<i>Gladiolus vinosomaculatus</i>	LC	11
Iridaceae	<i>Gladiolus woodii</i>	LC	11
Iridaceae	<i>Hesperantha coccinea</i>	LC	11
Iridaceae	<i>Watsonia bella</i>	LC	11
Iridaceae	<i>Watsonia pulchra</i>	LC	11
Orchidaceae	<i>Brachycorythis ovata</i> subsp. <i>ovata</i>	LC	11
Orchidaceae	<i>Brachycorythis pubescens</i>	LC	11
Orchidaceae	<i>Brownleea parviflora</i>	LC	11
Orchidaceae	<i>Disa aconitoides</i> subsp. <i>aconitoides</i>	LC	11
Orchidaceae	<i>Disa cooperi</i>	LC	11
Orchidaceae	<i>Disa nervosa</i>	LC	11
Orchidaceae	<i>Disa patula</i> var. <i>transvaalensis</i>	LC	11
Orchidaceae	<i>Disa stachyoides</i>	LC	11
Orchidaceae	<i>Disa versicolor</i>	LC	11
Orchidaceae	<i>Disperis cooperi</i>	LC	11
Orchidaceae	<i>Disperis fanniniae</i>	LC	11
Orchidaceae	<i>Eulophia cooperi</i>	LC	11
Orchidaceae	<i>Eulophia hians</i> var. <i>hians</i>	LC	11
Orchidaceae	<i>Eulophia hians</i> var. <i>inaequalis</i>	LC	11
Orchidaceae	<i>Eulophia hians</i> var. <i>nutans</i>	LC	11
Orchidaceae	<i>Eulophia ovalis</i> var. <i>bainesii</i>	LC	11
Orchidaceae	<i>Eulophia ovalis</i> var. <i>ovalis</i>	LC	11
Orchidaceae	<i>Eulophia parvilabris</i>	LC	11
Orchidaceae	<i>Habenaria clavata</i>	LC	11
Orchidaceae	<i>Habenaria dives</i>	LC	11
Orchidaceae	<i>Habenaria epipactidea</i>	LC	11
Orchidaceae	<i>Habenaria falcicornis</i> subsp. <i>caffra</i>	LC	11
Orchidaceae	<i>Habenaria lithophila</i>	LC	11
Orchidaceae	<i>Neobolusia tysonii</i>	LC	11
Orchidaceae	<i>Orthochilus foliosus</i>	LC	11
Orchidaceae	<i>Orthochilus leontoglossus</i>	LC	11
Orchidaceae	<i>Orthochilus welwitschii</i>	LC	11
Orchidaceae	<i>Pterygodium dracomontanum</i>	LC	11
Orchidaceae	<i>Pterygodium nigrescens</i>	LC	11
Orchidaceae	<i>Satyrium hallackii</i> subsp. <i>ocellatum</i>	LC	11
Orchidaceae	<i>Satyrium neglectum</i> subsp. <i>neglectum</i> var. <i>neglectum</i>	LC	11
Orchidaceae	<i>Satyrium parviflorum</i>	LC	11
Orchidaceae	<i>Satyrium trinerve</i>	LC	11
Orchidaceae	<i>Schizochilus zeyheri</i>	LC	11
Proteaceae	<i>Protea roupelliae</i> subsp. <i>roupelliae</i>	LC	11
Hyacinthaceae	<i>Eucomis autumnalis</i> subsp. <i>clavata</i>	NE	11
Orchidaceae	<i>Satyrium longicauda</i> var. <i>longicauda</i>	NE	11
Amaryllidaceae	<i>Cyrtanthus stenanthus</i>		11
Amaryllidaceae	<i>Cyrtanthus tuckii</i>		11
Apocynaceae	<i>Ceropegia breviflora</i>		11
Apocynaceae	<i>Ceropegia rehmannii</i>		11
Asphodelaceae	<i>Aloe boylei</i>		11
Asphodelaceae	<i>Aloe davyana</i>		11
Asphodelaceae	<i>Aloe hlangapies</i>		11

Family	Species	IUCN	Protection Schedule
Iridaceae	<i>Gladiolus sp.</i>		11
Orchidaceae	<i>Eulophia sp.</i>		11
Orchidaceae	<i>Orthochilus sp.</i>		11
Orchidaceae	<i>Orthochilus vinosus</i>		11

iv. Trees Protected in Terms of the National Forests Act

No trees protected under the National Forests Act (No. 84 of 1998) are expected to occur within the project site.

v. Alien Plant Species

Eight-two (82) alien plant species were recorded within the project area, with thirteen (13) of them being listed invasive species within NEM:BA Act No. 10 of 2004 (Alien and Invasive Species List, 2016) namely:

- » *Acacia dealbata* (Silver wattle; Category 2)
- » *Cestrum parqui* (Chilean cestrum; Category 1b)
- » *Convolvulus arvensis* (Field bindweed, Wild morning-glory; Category 1b)
- » *Datura stramonium* (Common thorn apple; Category 1b)
- » *Echium plantagineum* (Patterson's curse; Category 1b)
- » *Eucalyptus camaldulensis* (River red gum; Category 1b)
- » *Ligustrum vulgare* (Common privet; Category 1b)
- » *Linaria vulgaris* (Common toadflax, Butter-and-eggs; Category 1b)
- » *Mirabilis jalapa* (Four-o'clock, Marvel-of -Peru; Category 1b)
- » *Nasturtium officinale* (Watercress; Category 2)
- » *Verbena brasiliensis* (Brazilian verbena; Category 1b)
- » *Verbena rigida* (Veined verbena; Category 1b)
- » *Xanthium spinosum* (Spiny cocklebur; Category 1b)

vi. Critical Biodiversity Areas

According to **Figure 8.8**, the majority of the project site is located within a Critical Biodiversity Area (CBA): Optimal area (41%), whilst 36% of the project site has been modified to some extent, either through cultivation, ploughing (historical and current) or through infrastructure. Only 6% of the project site is regarded as Irreplaceable CBA. Furthermore, 4% of the project site is regarded as potential important corridor areas. These areas are either associated with ridge/hill systems or are areas that are closely associated with extensive freshwater features.

According to **Figure 8.9**, more than half of the project site is located within Other Natural Areas (54.8%), whilst 19% of the project site comprises of Heavily Modified Areas. Only about 1% of the project site comprises Freshwater CBAs (CBA Rivers: 0.7% and CBA Wetlands: 0.3%). In terms of Ecological Support Areas (ESAs), approximately 24% of the project site is located within an Important Catchment Area, whilst ESA Wetlands and Wetland Cluster, combined, only cover a little more than 1% of 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 41.6km north-west from the nearest focus area (Moist Escarpment Grassland focus area), while the nearest Formal Protected Area is located approximately 88km south of the site (Seekoeivlei Nature Reserve), and the nearest Informal Protected Area approximately 16km to the east of the site (Rietvlei Private Nature Reserve).

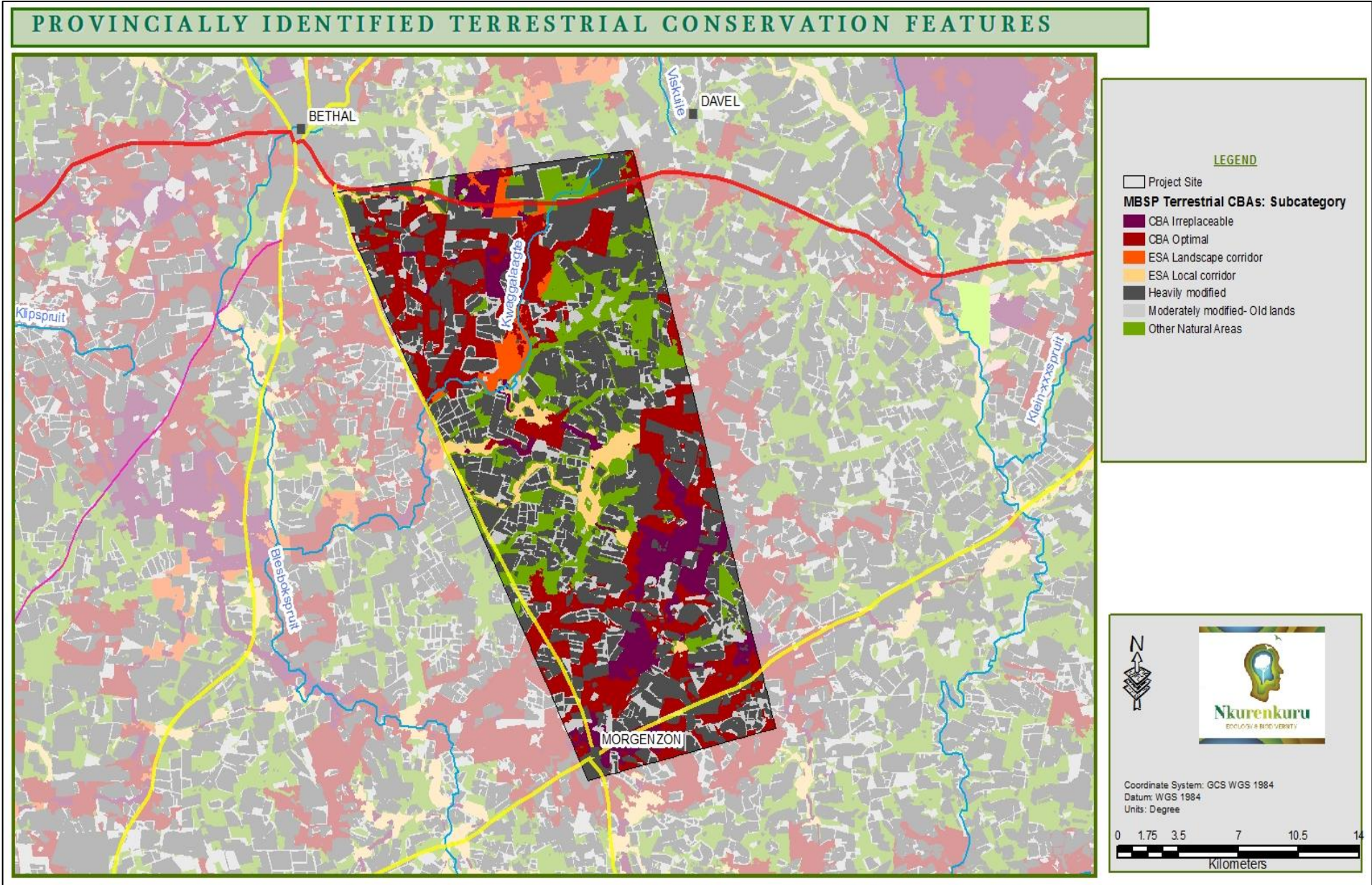


Figure 8.8: Provincially identified terrestrial conservation priority areas found within the greater surroundings of project site

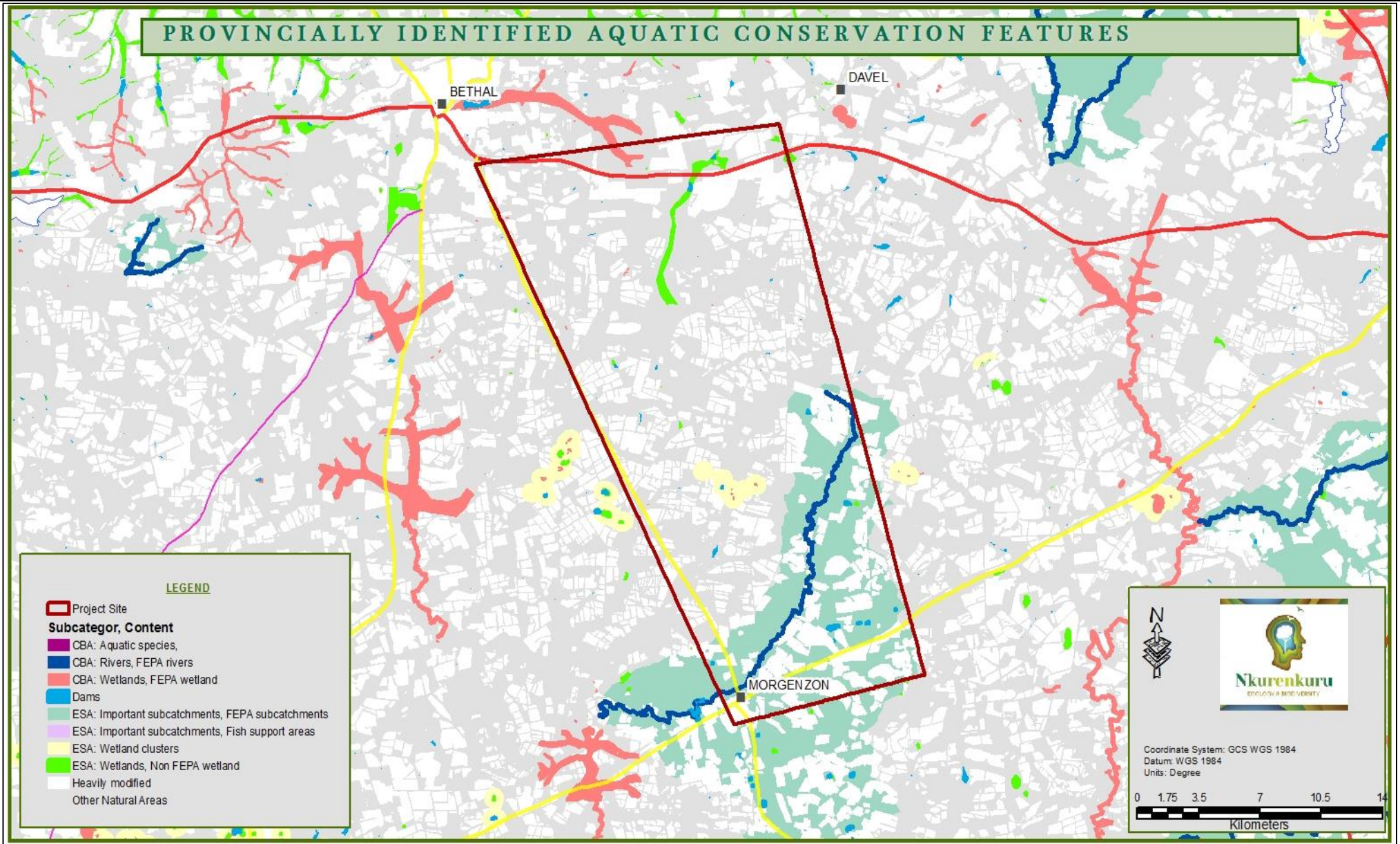


Figure 8.9: Provincially identified freshwater conservation priority areas found within the greater surroundings of project site

viii. Habitats on Site

A preliminary mapping of the project site based on observable land features via Google Earth Satellite Imagery, has revealed that the project site consists primarily of five main functional types, namely, buildings/structures, active farmlands, fallow land (abandoned farmlands), natural grassland areas, and freshwater/drainage areas (which is comprised of small streams, wetlands, and natural or artificial dams) (refer to **Figure 8.10** and **Table 8.6**).

Almost half of the project site seems to consist of natural grasslands (44%), while agriculture (38.6%) comprises much of the rest of the project site. Fallow land seems to comprise almost a tenth (8.2%) of the project site.

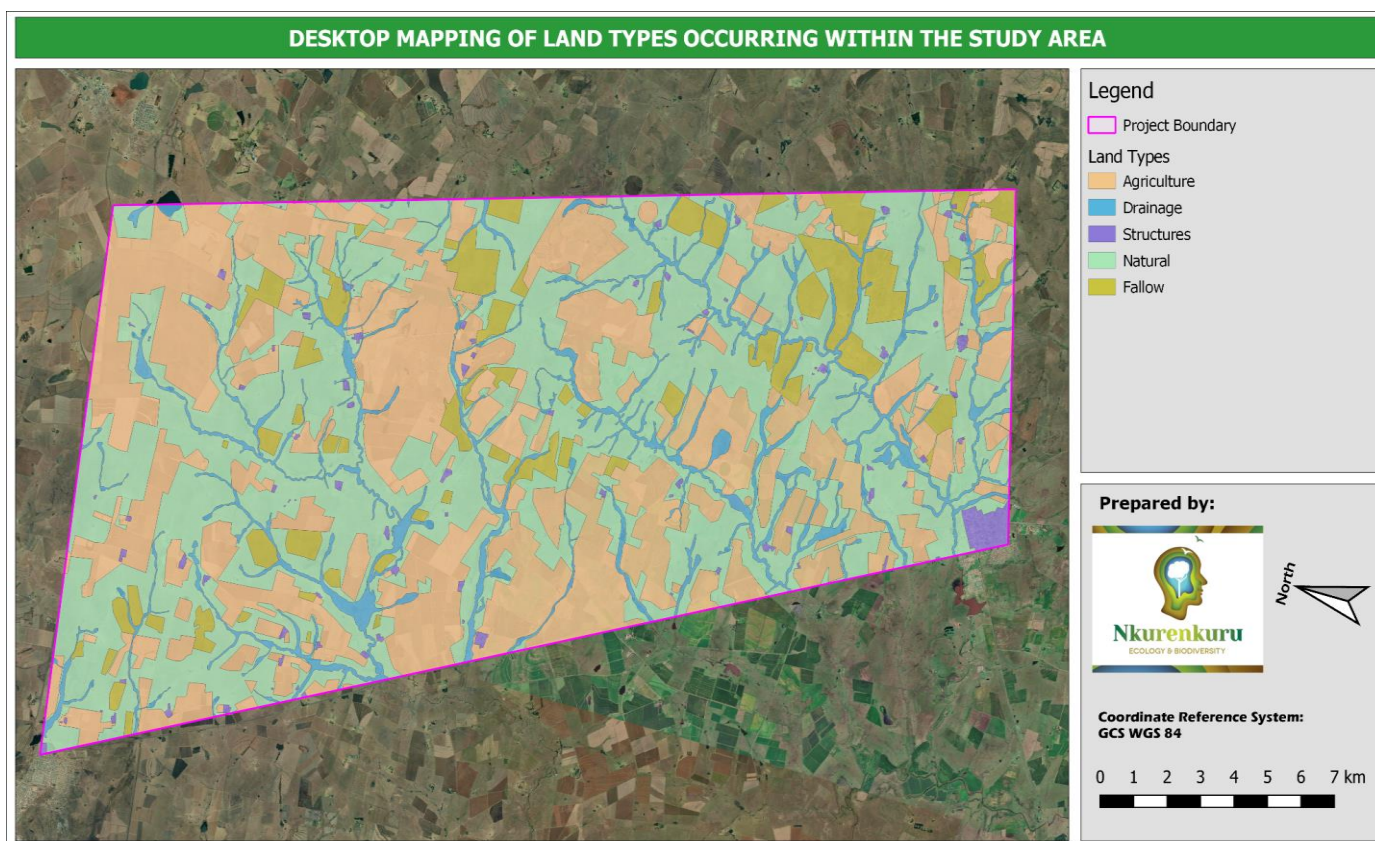


Figure 8.10: Desktop mapping of the land cover/habitat types occurring within the study area. Note that the map has been rotated sideways to optimize space (see the direction of the north arrow)

Table 8.6: Total area sizes (approximately) for land types occurring within the study area, as mapped based on currently available Google Earth Satellite Imagery

Land Type	Total Area (ha)	Total Area (%)
Agriculture	15 166	38.6
Drainage	2 949	7.5
Fallow land	3 210	8.2
Natural areas	17 519	44.6
Structures	435	1.1
Grand Total	39 279	100.0

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

The project site is located outside of any Strategic Water Source Areas (SWSA) for groundwater but is located within a SWSA for surface water; namely, the Upper Vaal SWSA.

A review of the National Freshwater Ecosystems Priority Areas (NFEPA) coverage for the project site (refer to **Figure 8.11**) revealed that one FEPA1 priority sub-quaternary catchment covers about 25% of the project site. The river associated with this sub-quaternary catchment is the Osspruit River (FEPA1 Priority River,) which is a fairly short (34km) perennial watercourse, flowing in a largely south-western direction, feeding into the Blesbokspruit River. According to the Department of Water and Sanitation's 1999 Present Ecological State for mainstream rivers, this watercourse was classified as Moderately Modified (Class C).

Furthermore, five Upstream sub-quaternary catchments are located within the project site (covering the remaining 75% of the project site). Most of these sub-quaternary catchments are fairly small to moderate in size, apart from the sub-quaternary catchment covering most of the central portion of the project site. Three of these sub-quaternary catchments are drained by the Kwaggaslaagte River and its associated tributaries, whilst the other two sub-quaternary catchments are drained by the Blesbokspruit River. The Present Ecological State (DWS, 1999) of the Kwaggaslaagte River and its associated tributaries are classified as Moderately Modified (Class C).

A review of the NFEPA coverage for the study area (refer to **Figure 8.11**) revealed that a large amount of wetland features occur within the project site (332 wetland features). Of these wetland features, most (188 features) are classified as Non-FEPA, artificial wetland features, and represent the numerous dams/reservoirs (mainly instream), that characterize the project site. Most of these artificial dam features are fairly small in size (average size of dam features; 0.85 ha). Of the 144 natural wetlands, only 20 wetlands have been listed as FEPA priority wetland features (Nel, et al., 2011). A summary of the natural wetlands, occurring within the project site, as mapped within the NFEPA spatial coverage map, is provided in **Table 8.7** below.

Table 8.7: Summary of NFEPA Wetlands mapped within the project site.

Hydrogeomorphic Unit	Number of Wetlands	Average Size (ha)	Largest Feature (ha)	FEPA Priority Wetlands (amount)	Average Size of FEPA Priority Wetlands (ha)	Largest FEPA Priority Wetland (ha)	WETLAND CONDITION				
							AB: Natural or Good	C: Moderately Modified	Heavily to Critically Modified		
									Z1 ¹⁵	Z2 ¹⁶	Z3 ¹⁷
Channelled valley-bottom	59	3.4	167	9	0.8	6	11	17	5		26
Unchannelled valley-bottom	14	0.2	0.5	9	0.1	0.3	11	2	1		
Depression	8	2.7	15	1	N/A	1.2	4	3	1		
Flat	8	0.2	1	0	N/A	N/A	2	2			4
Seep	53	5.3	197	1	N/A	61	11	2	1		39

¹⁵ Wetlands that overlap with a 1:50,000 "artificial" inland waterbody from the Department of Land Affairs: Chief Directorate of Surveys and Mapping (2005-2007).

¹⁶ Majority of the wetland unit is classified as "artificial" in the wetland delineation GIS layer.

¹⁷ Percentage natural land cover <25%.

Hydrogeomorphic Unit	Number of Wetlands	Average Size (ha)	Largest Feature (ha)	FEPA Priority Wetlands (amount)	Average Size of FEPA Priority Wetlands (ha)	Largest FEPA Priority Wetland (ha)	WETLAND CONDITION				
							AB: Natural or Good	C: Moderately Modified	Heavily to Critically Modified		
									Z1 ¹⁵	Z2 ¹⁶	Z3 ¹⁷
Valleyhead Seep	2	0.1	0.2	0	N/A	N/A	1				1
TOTAL	144	3.6	167	20	3.6	61	40	26	8	0	70

The above table indicates that almost half (48.6%) of all the wetland features have been significantly modified (less than 25% of natural land cover remain). Approximately 27.8% of all wetlands found within the project area can be regarded as largely natural or in a good condition. Of these forty intact wetlands, twenty are regarded as FEPA priority wetlands. Most of these FEPA priority wetlands are fairly small in size (>4 ha), apart from single seepage wetland that is fairly significant in terms of size (61 ha) (refer to **Figure 8.11**). The bulk of the wetlands that occur within the project site are closely associated with the watercourse/river features (channelled valley bottom wetlands, unchanneled valley bottom wetlands and most of the seepages) (refer to **Figure 8.11**).

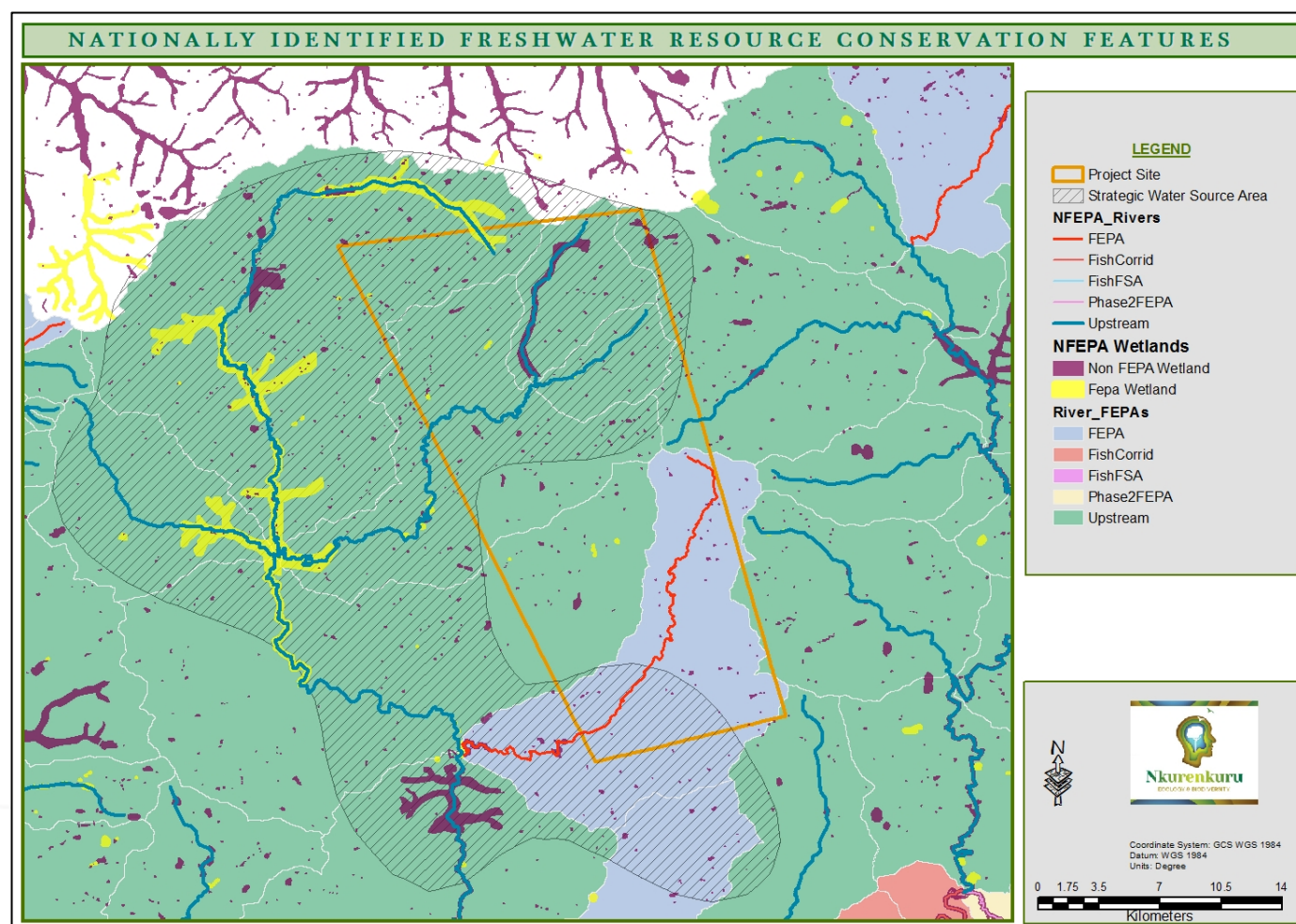


Figure 8.11: Nationally identified aquatic resource conservation priority areas found within the greater surroundings of the proposed project site

x. Freshwater/Drainage Features

Freshwater/drainage features cover approximately 2 949ha (7.5%) of the project site and are mainly characterised by channelled valley-bottom wetlands, followed by seepage wetlands (**Figure 8.12**). Where the larger watercourses flow across flatter, broader plains, floodplains are typically present. No large depression wetlands are present within the project site, with most of the depression wetlands being small and endorheic.

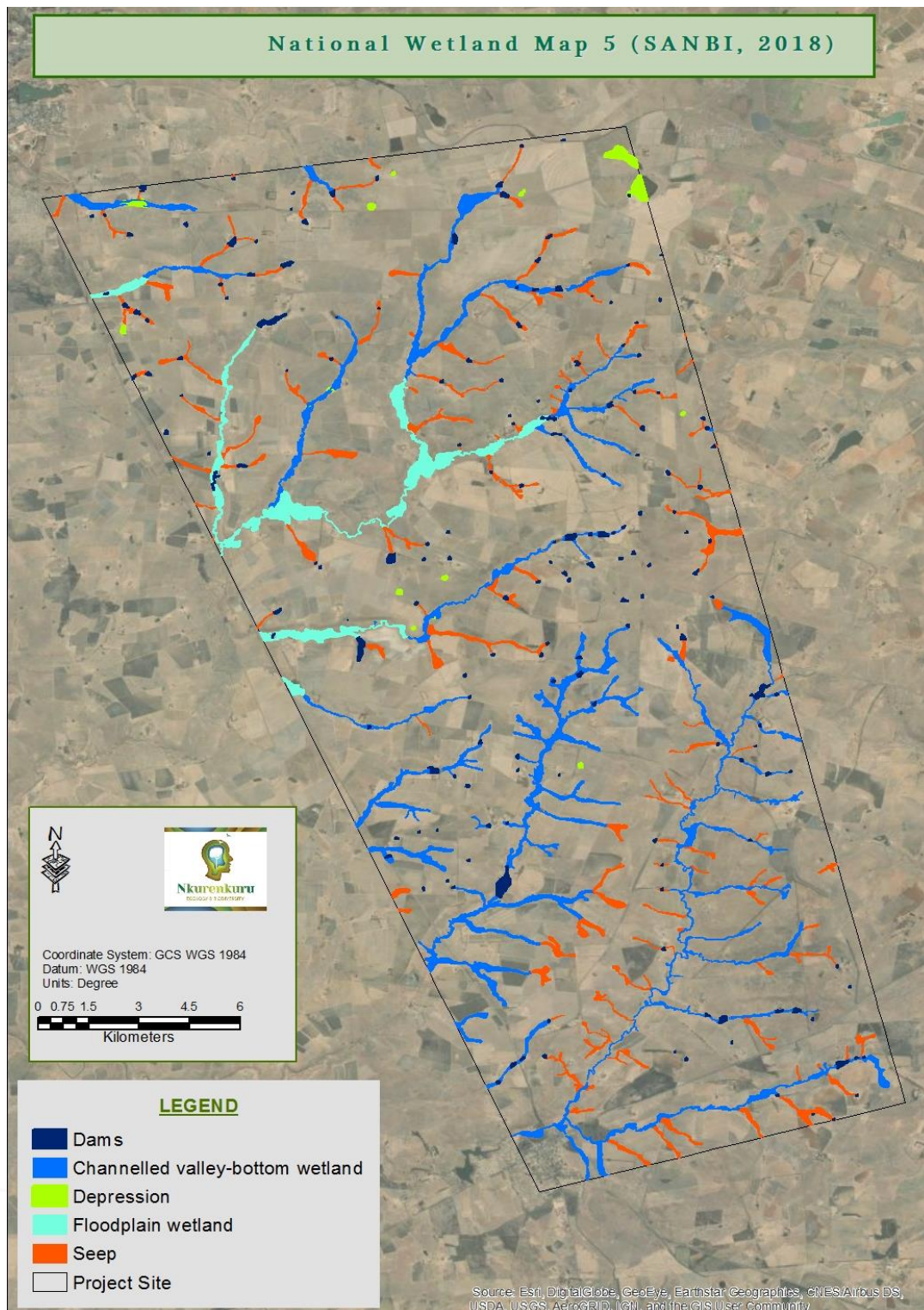


Figure 8.12: Freshwater/wetland features as mapped within SANBI's National Wetland Map 5.

xi. Terrestrial Fauna Communities within the Study Area

Mammals

The International Union for Conservation of Nature (IUCN) Red List Spatial Data lists eighty-five (85) mammal species that could be expected to occur within the vicinity of the project site. This is regarded as a moderately-low species diversity. Of these species, sixteen (16) are medium to large conservation dependant species, or species that had a historical range that included the project area, but with natural populations since becoming locally "extinct" in these areas. These species are not expected to occur in the project site and are removed from the expected Species of Conservation Concern (SCC) list.

Of the sixty-nine (69) remaining mammals, two (2) are introduced/exotic mammals (House Mouse – *Mus musculus* and Brown Rat – *Rattus norvegicus*). The remaining sixty-seven (67) mammals are regarded as indigenous species that contain or may contain natural populations within the area. Of these naturally occurring mammals, thirty-five (35) species been previously recorded within the larger survey area (Quarter Degree Grids: 2629DA, 2629CB, 2629AD, 2629BC) according to the Animal Demographic Unit (ADU) database, indicating a significant undersupplying within the area.

Of the remaining sixty-seven (67) small- to medium sized mammal species, that have a natural distribution range that include the project site and have a likelihood of occurring within the project site, fourteen (14) are listed as being of conservation concern on a regional or global basis (refer to **Table 8.8**).

Table 8.8: 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
		Red Data	IUCN	TOPS	
<i>Redunca fulvorufula</i>	Mountain Reedbuck	NT	LC		Moderate
<i>Panthera pardus</i>	Leopard	NT	NT	Protected	High
<i>Poecilogale albinucha</i>	African Striped Weasel	EN	LC		High
<i>Crocidura mariquensis</i>	Swamp Musk Shrew	LC	VU	VU	Low
<i>Dasymys incomtus</i>	African Marsh Rat	NT	LC		Moderate
<i>Otomys auratus</i>	Southern African Vlei Rat	NT	LC		Moderate
<i>Aonyx capensis</i>	Cape Clawless Otter	NT	LC		Low
<i>Parahyaena brunnea</i>	Brown Hyaena	NT	LC		High
<i>Leptailurus serval</i>	Serval	NT	NT	Protected	High
<i>Ambysomus septentrionalis</i>	Highveld Golden Mole	NT	NT	Protected	Moderate
<i>Crocidura maquassiensis</i>	Maquassie Musk Shrew	NT	NT	Protected	High
<i>Mystromys albicaudatus</i>	White-tailed Mouse	NT	NT		Moderate
<i>Hydrictis maculicollis</i>	Spotted -necked Otter	VU	LC		Moderate
<i>Chrysochloris villosus</i>	Rough-haired Golden Mole	VU	LC		Moderate

Of the identified mammal species that may occur in the project area, twelve (12) are either nationally within TOPS (Threatened and Protected Species Issued in terms of Section 56(1) of the National Environmental Management: Biodiversity Act, 2004) or provincially within Schedule 1 and 2 of the Mpumalanga Nature Conservation Act, No. 10 of 1998 (refer to **Table 8.9**).

Table 8.9: List of Protected mammal species (according to national provincial regulations) that have a distribution that include the project site

Species	Common Name	TOPS (NEM:BA)	CITES	MPNCA Schedule 1	MPNCA Schedule 4	Likelihood of Occurrence
<i>Aonyx capensis</i>	Cape Clawless Otter	Protected	II	2		High
<i>Hydrictis maculicollis</i>	Spotted-necked Otter	Protected	II	2		Moderate
<i>Mellivora capensis</i>	Honey Badger	Protected		2		High
<i>Parahyaena brunnea</i>	Brown Hyaena	Protected		2		Moderate
<i>Orycteropus afer</i>	Aardvark	Protected		2		High
<i>Proteles cristatus</i>	Aardwolf		II	2		High
<i>Redunca fulvorufula</i>	Mountain Reedbuck			2		High
<i>Raphicerus campestris</i>	Steenbok			2		High
<i>Atelerix frontalis</i>	Southern African Hedgehog			2		High
<i>Panthera pardus</i>	Leopard	VU	I		4	Low
<i>Leptailurus serval</i>	Serval	Protected	II			High
<i>Vulpes chama</i>	Cape Fox	Protected				Moderate

Reptiles

The IUCN Red List Spatial Data lists sixty-six (66) reptile species that could be expected to occur within the vicinity of the project site. This is comparatively moderate-low suggesting that reptile diversity at the site is likely to be fairly moderate. Of the sixty-six (66) reptile species, twenty-four (24) have been previously recorded within the larger survey area (Quarter Degree Grids: 2629DA, 2629CB, 2629AD, 2629BC) according to the Animal Demographic Unit (ADU) database, indicating under sampling within the region. Species that has been frequently observed within these QDGs are:

- » Speckled Rock Skink – *Trachylepis punctatissima* (No. of Records: 15)
- » Eastern Thread Snake – *Leptotyphlops scutifrons conjunctus* (No. of Records: 14)
- » Bibron's Blind Snake – *Afrotiphlops bibronii* (No. of Records: 10)
- » Distant's Ground Agama – *Agama aculeata distanti* (No. of Records: 7)
- » Black-headed Centipede-eater – *Aparallactus capensis* (No. of Records: 7)
- » Rhombic Egg-eater – *Dasyplepeltis scabra* (No. of Records: 7)

Of the sixty-six (66) reptile species that have a natural distribution range that includes the project site and have a likelihood of occurring within the project site, only one is listed as being of conservation concern on a regional or global basis, namely, Coppery Grass Lizard – *Chamaesaura aenea* (Near Threatened and Endemic). This species has a moderate likely hood of occurrence

All of the reptilian species apart from the water leguaan (*Varanus niloticus*), rock leguaan (*Varanus exanthematicus*) as well as all species of snakes (Order *Serpentes*) are regarded as Schedule 2 Protected Species in terms of the Mpumalanga Province Nature Conservation Act No 10 of 1998. Apart from the above mentioned provincially protected species, no TOPS species are likely to occur within the project site.

Amphibians

The IUCN Red List Spatial Data lists nineteen (19) amphibian species that occur within the region. Of these nineteen (19) amphibian species, thirteen (13) species have been previously recorded within the larger survey area (Quarter Degree Grids: 2629DA, 2629CB, 2629AD, 2629BC) according to the Animal Demographic Unit (ADU) database. The most frequently recorded species are:

- » Rattling Frog – *Semnodactylus wealii* (No. of Records: 10)
- » Cape River Frog – *Amietia fuscigula* (No. of Records: 8)
- » Common Caco – *Cacosternum boettgeri* (No. of Records: 8)
- » Natal Sand Frog – *Tomopterna natalensis* (No. of Records: 7)
- » Raucous Toad – *Sclerophrys capensis* (No. of Records: 7)

Of the nineteen (19) amphibian species that have a natural distribution range that include the project site, none are listed as being of conservation concern on a regional or global basis. Only one species protected under the Mpumalanga Province Nature Conservation Act No 10 of 1998 has a distribution range that includes the project site, namely African Bull Frog (*Pyxicephalus adspersus*). This species has a Moderate likelihood of occurrence.

xii. Bats

Bat Species and Important Bat Habitats

Based on current taxonomic information and bat occurrence data, twenty-four (24) species could occur within the project site (refer to **Table 8.10**). The majority have a low likelihood of occurrence and acoustic monitoring has confirmed the presence in the project site of six species.

Table 8.10: Bat Species Potentially Occurring within the project site

Common Name Species Name	Key Habitat Requirements*	Prob. of Occurrence	Conservation Status	
			IUCN†	RSA‡
Natal Long-fingered bat <i>Miniopterus natalensis</i>	Temperate or subtropical species. Primarily in savannas and grasslands. Roosts in caves, mines, and road culverts. Clutter-edge forager.	Confirmed (1,828 passes)	LC/U	LC
Cape Serotine <i>Laephotis capensis</i>	Arid semi-desert, montane grassland, forests, savanna and shrubland. Roosts in vegetation and human-made structures. Clutter-edge forager.	Confirmed (65,374 passes)	LC/S	LC
Mauritian tomb bat <i>Taphozous mauritanus</i>	Savanna woodland preferring open habitat. Roosts on rock faces, the outer bark of trees or on the outer walls of buildings under the eaves of roofs. Forages in urban areas and over cultivation. Open-air forager.	High	LC/U	LC
Little Free-tailed bat <i>Chaerephon pumilus</i>	Semi-arid savannah, forested regions, woodland habitats. Roosts in narrow cracks in rock and trees but also in buildings. Open-air forager. Forages in urban areas and over cultivation.	Confirmed (1,188 passes)	LC/U	LC

Common Name Species Name	Key Habitat Requirements*	Prob. of Occurrence	Conservation Status	
			IUCN†	RSA‡
Midas Free-tailed bat <i>Mops midas</i>	Hot low-lying savanna and woodland. Roosts in narrow cracks in rock and trees but also in buildings. Open-air forager.	Low	LC/D	LC
Egyptian Free-tailed bat <i>Tadarida aegyptiaca</i>	Desert, semi-arid scrub, savanna, grassland, and agricultural land. Roosts in rocky crevices, caves, vegetation, and human-made structures. Open-air forager.	Confirmed (18,184 passes)	LC/U	LC
Wahlberg's Epauletted fruit bat <i>Epomophorus wahlbergi</i>	Roost in dense foliage of large, leafy trees. Associated with forest and forest-edge habitats but will forage in urban environments.	Low	LC/S	LC
African Straw-coloured fruit bat <i>Eidolon helvum</i>	Non-breeding migrant in the PAOI.	Low	NT/D	LC
Egyptian Rousette <i>Rousettus aegyptiacus</i>	Distribution influenced by availability of suitable caves roosts.	Low	LC/S	LC
Temminck's Myotis <i>Myotis tricolor</i>	Montane forests, rainforests, coastal forests, savannah woodlands, arid thicket, and fynbos. Roosts communally in caves (and mines) and closely associated with mountainous terrain. Migratory. Clutter-edge forager.	Low	LC/U	LC
Welwitsch's Myotis <i>Myotis welwitschii</i>	Mainly open woodland and savannah but also high-altitude grassland, tropical dry forest, montane tropical moist forest, savannah and shrublands. Clutter-edge forager.	Low	LC/U	LC
Yellow-bellied house bat <i>Scotophilus dinganii</i>	Occurs throughout the Savannah Biome but avoids open habitats such as grasslands and Karoo scrub. Roosts in hollow trees and buildings. Clutter-edge forager.	Confirmed (321 passes)	LC/U	LC
Green House bat <i>Scotophilus viridis</i>	Savannah woodland species: restricted to low-lying, hot savannahs and avoids open habitats such as grasslands. Roosts in hollow trees and buildings. Clutter-edge forager.	Low	LC/U	LC
Dusky Pipistrelle <i>Pipistrellus hesperidus</i>	Woody habitats, such as riparian vegetation and forest patches. Recorded roosting in narrow cracks in rocks and under the loose bark of dead trees. Clutter-edge forager.	Low	LC/U	LC
Rusty Pipistrelle <i>Pipistrellus rusticus</i>	Savannah woodland and associated with open water bodies. Roosts in trees and old buildings. Clutter-edge forager.	Low	LC/U	LC
Long-tailed Serotine <i>Eptesicus hottentotus</i>	Montane grasslands, marshland and well-wooded riverbanks, mountainous terrain near water. Roosts in caves, mines, and rocky crevices. Clutter-edge forager.	Confirmed (357 passes)	LC/U	LC
Egyptian Slit-faced bat <i>Nycteris thebaica</i>	Savannah, desert, arid rocky areas, and riparian strips. Gregarious and roosts in caves but also in mine adits, Aardvark holes, rock crevices, road culverts, roofs, and hollow trees. Clutter forager.	Medium	LC/U	LC

Common Name Species Name	Key Habitat Requirements*	Prob. of Occurrence	Conservation Status	
			IUCN†	RSA‡
Geoffroy's Horseshoe bat <i>Rhinolophus clivosus</i>	Savannah woodland, shrubland, dry, riparian forest, open grasslands, and semi-desert. Roosts in caves, rock crevices, disused mines, hollow baobabs, and buildings. Clutter forager.	Medium	LC/U	LC
Bushveld Horseshoe bat <i>Rhinolophus simulator</i>	Occurs in caves within areas of moist savannah, adjacent to rivers and savannah woodland, montane habitats, and coastal mosaics. Commonly associated with riparian forest and along wooded drainage lines. Roosts in caves and mines. Clutter forager.	Medium	LC/D	LC
Blasius's Horseshoe bat <i>Rhinolophus blasii</i>	Savannah woodlands and are dependent on the availability of daylight roosting sites such as caves, mines, or boulder piles. Clutter forager.	Low	LC/D	NT
Darling's Horseshoe bat <i>Rhinolophus darlingi</i>	Mesic woodland savannahs. Roosts in caves, boulder piles, mines, culverts, large hollow trees and disused buildings. Clutter forager.	Low	LC/U	LC
Sundevall's Leaf-nosed bat <i>Hipposideros caffer</i>	Savannah, bushveld and/or coastal forests, near to rivers and other water sources. Roosts in caves, sinkholes, rock fissures, hollow trees, mines, and culverts. Clutter forager.	Low	LC/D	LC
Percival's Short-eared Trident bat <i>Cloeotis percivali</i>	Savannah and woodland areas. Roosts in caves and mine tunnels. Clutter forager.	Low	LC/U	EN
Botswana Long-eared bat <i>Laephotis botswanae</i>	Dry and moist savannah, grassland, and heathland habitats. Often found in the vicinity of rivers or in association with rocky outcrops. No information on roosting sites.	Low	LC/U	LC

Bat roosting sites in the project site are relatively limited and unlikely to support large congregations of bats, with no underground sites (e.g., caves, mines, sinkholes) present. The closest known major bat roost is approximately 75km north of the project site. Although occasional ridges and rocky outcrops are features of the landscape, none are present in the project site. Bats are likely to roost in buildings associated with farmsteads within and bordering the project site, especially Cape Serotine and Egyptian Free-tailed Bat. The building inspections on site did not reveal any roosting bats but evidence (e.g., fur-oil-stained exit/entry points) suggests that bats are using these features. Trees growing at these farmsteads and elsewhere on site where they form clumps could also provide roosting spaces for bats.

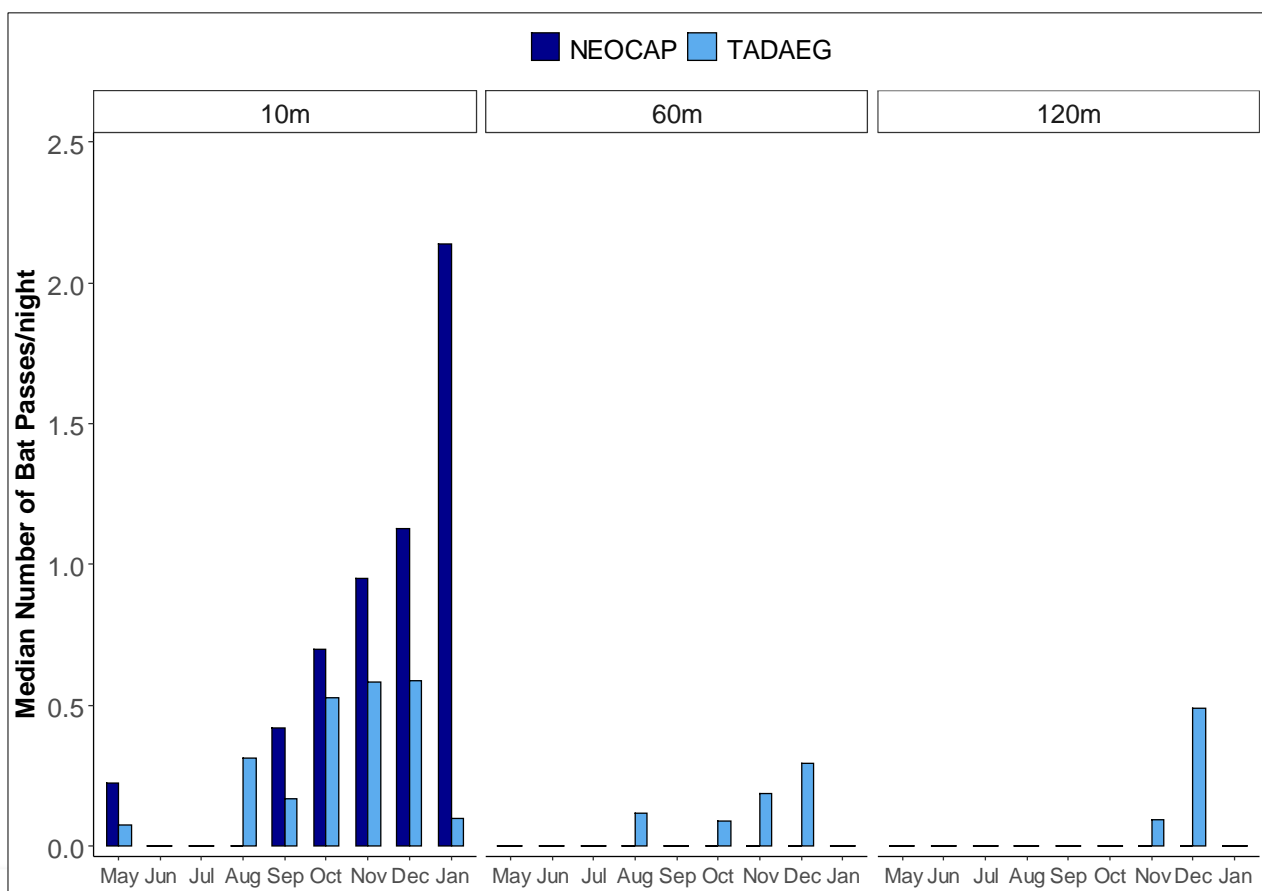
Sensitive features within the project site at which bat foraging activity may be concentrated include farm buildings (and within built up areas for some species) where they would forage for insects attracted to lighting, dams and wetland areas, within and along the edge of woodland/tree patches, and over cultivated areas.

Summary of the Pre-Construction Bat Monitoring to date

Nine (9) months of pre-construction bat monitoring have been completed to date for the Umbhila Solar Energy Facility. The preliminary monitoring results of the ten (10) bat detectors across the site are presented within this section.

A total of 87 252¹⁸ bat passes were recorded across 259 sample nights, 75 % of which were attributed to Cape serotine. 20% of total activity was attributed to Egyptian free-tailed bat. The remaining four (4) species accounted for 5 % of all activity.

Bat activity varied seasonally with lowest activity in winter and activity increasing through spring and summer. Egyptian free-tailed bat activity at 10m peaked in December (summer) with a median of 0.6 bat passes per night while Cape serotine activity peaked in January (summer) with a median of 2.1 bat passes per night (refer to **Figure 8.13**). At 60m and 120m, median activity of Cape serotine was 0 for all months while for Egyptian free-tailed bats, activity was highest in December with 0.5 bat passes per night at 120m. This species was not recorded at height in all months, and activity was highest in December across all heights. Based on the median number of bat passes at height, Egyptian free-tailed bats are expected to be at high risk in December, medium risk between August and November and low risk during winter. Cape serotine, and all other bat species, are expected to be at low collision risk at height across all months. Additional baseline data currently being collected will inform the magnitude of risk to bats during late summer and early autumn.



¹⁸ This excludes an additional 15,098 bat passes that were unable to be assigned to any particular species by the Wildlife Acoustics library "Bats of South Africa Version 5.4.0", and were thus classified as No ID. These calls were excluded from all analyses but are reported on here to highlight that they may include call fragments from species not confirmed for the site, and hence, the species list for the project site may not be complete.

Figure 8.13: Bar chart showing bat passes/night by month for Cape serotine and Egyptian free-tailed bat

xiii. Avifauna

Important Bird and Biodiversity Areas (IBA)

The Amersfoort-Bethal-Carolina (SA018) Important Bird and Biodiversity Area (IBA) is a large IBA bounded by the roads connecting Bethal, Carolina, Ermelo and Amersfoort. The proposed project site is largely located within this IBA. The key species within this IBA is the globally Endangered Botha's Lark. Other globally threatened species include Blue Crane, Southern Bald Ibis, Black Harrier, Blue Korhaan, Black-winged Pratincole, Secretarybird, Martial Eagle and Denham's Bustard. Regionally threatened species include African Grass Owl, White-bellied Korhaan and Lanner Falcon. Range- and biome-restricted species include Kurrichane Thrush and Buff-streaked Chat. The Chrissie Pans (SA019) IBA is a grouping of lakes and pans and situated approximately 45km north-east of the proposed project site. This IBA supports a large population of threatened birds, both wetland and grassland, such as Southern Bald Ibis, Wattled and Blue Crane, Lesser Flamingo and Chestnut-banded Plover.

Avifauna Habitats

A large portion of the proposed project site has been transformed through agricultural practices such as ploughed maize fields as well as cattle and small stock grazing, which occurs throughout. Available avifaunal habitats also include watercourses and drainage lines which cross the site with several wetlands and man-made farm dams under various degrees of existing impact and transformation from farming practices (refer to **Figure 8.14**). Unploughed grassland areas have been considered to be in a natural or near-natural state of function for avifauna even if utilised for low density grazing.

Bird Community within the Surrounding Area and the Project Site

Expected Species

A list of possible species that could occur within the proposed project site was consolidated from the various data sources used during the desktop study. Threatened, Near- Threatened, Endemic/Near-endemic and Priority Species were identified as potential impact receptors of the proposed development that could occur in the area (refer to **Table 8.11**).

Table 8.11: 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	Global Status	Regional Status	Priority Score	Data Source					
				IBA	Screening Tool	SABAP2	C A R	C W A C	Avisense (2020)
African Fish-eagle	LC	LC	290			x			
African Grass Owl	LC	VU (A2c; C1)	289	x	x				x
African Harrier-hawk	LC	LC	190			x			
African Marsh Harrier	LC	EN (A2c+3c+4c; C1)	300		x				x

Species	Global Status	Regional Status	Priority Score	Data Source					
				IBA	Screening Tool	SABAP2	C A R	C W A C	Avisense (2020)
Amur Falcon	LC	LC	210			x			x
Black Harrier	EN (C2a(ii))	EN (C1+2a(ii))	345	x		x			x
Black Sparrowhawk	LC	LC	170			x			
Black Stork	LC	VU (A2c; D1)	330						x
Black-chested Snake-eagle	LC	LC	230			x			
Black-winged Kite	LC	LC	174			x			
Black-winged Pratincole	NT (A2bc+3bc+4bc)	NT (A2bc+3bc+4bc)	202	x		x			x
Blue Crane	VU (A3cde+4cde)	NT (A2acde)	320	x		x	x		x
Blue Korhaan	NT (A3c;C1)	LC	270	x		x	x		x
Botha's Lark	EN (A3c+4c)	EN (B2ab(ii,iii,iv,v); C1+2a(i))	-	x					x
Buff-streaked Chat	LC	LC	-	x					
Burchell's Courser	LC	VU (A2c+4c; C1+2a(i))	210						x
Cape Eagle-owl	LC	LC	250						x
Cape Vulture	VU (A2acde+3cde+4acde; C2a(ii))	EN (A2a)	405						x
Caspian Tern	LC	VU (A2a;C1; D1, D2)	240						x
Chestnut-banded Plover	LC	NT (C1+2a(i))	230	x					
Common Buzzard	LC	LC	210			x			
Denham's Bustard	LC	VU (A2bcd+3bcd+4bcd; C1)	300	x	x				x

Species	Global Status	Regional Status	Priority Score	Data Source					
				IBA	Screening Tool	SABAP2	C A R	C W A C	Avisense (2020)
Greater Flamingo	LC	NT (A2bd)	290			x		x	x
[Redacted]	EN (A2acd+4acd)	EN (A2acd+4acd)	[Red]		x	x			x
Grey-winged Francolin	LC	LC	190			x			
Jackal Buzzard	LC	LC	250			x			
Kurrichane Thrush	LC	LC	-	x					
Lanner Falcon	LC	VU (A2bc; C1)	300	x		x			x
Lesser Flamingo	NT (A2c+3c+4c)	NT (A2c+3c+4c)	290	x		x			x
Maccoa Duck	EN (A2acde)	NT (C1)	-			x			x
Marsh Owl	LC	LC	190			x			
Martial Eagle	EN (A2acde+3cde+4acde)	EN (A2cde; C1)	350	x					x
Montagu's Harrier	LC	LC	210			x			
Northern Black Korhaan	LC	LC	180				x		
Pallid Harrier	NT (A2cde+3cde+4cde)	NT (A2cde+3cde+4cde)	260			x			
Rudd's Lark	EN (A2bc+3bc+4bc)	EN (A2c+3c+4c; B2ab(i,ii,iii,iv,v); C1)	230						x
Secretarybird	EN (A2acde+3cde+4acde)	VU (A4acd; C1)	320	x	x	x			x
Southern Bald Ibis	VU (C1+2a(ii))	VU (C1+2a(ii))	330	x	x	x			x
Spotted Eagle-owl	LC	LC	170			x			
Wattled Crane	VU (A2acde+3cde+4acde)	CR (C1+2a(ii))	349	x					

Species	Global Status	Regional Status	Priority Score	Data Source					
				IBA	Screening Tool	SABAP2	C A R	C W A C	Avisense (2020)
White Stork	LC	LC	220			x	x		
White-bellied Korhaan	LC	VU (A2c+3c+4c; C1)	270	x					x
Yellow-billed Stork	LC	EN (B2c(i,v); D)	330						x
Yellow-breasted Pipit	VU (A3c; C2a(i); D1)	VU (A2b,c+4c; B1b,c,+2b,c; C1)	245						x

Observed Species

Greater Kestrel was recorded on site during the pre-construction monitoring despite this species not being identified in the list above. No Botha's Lark, Rudd's Lark or Yellow-breasted Pipit have been recorded on site to-date.

Avifaunal Species of Conservation Concern (SCC)

The expected and observed species informed the list of avifaunal SCCs (and other notable avifaunal species) as relevant impact receptors for the proposed development and taken forward for further assessment and consideration. Botha's Lark, Rudd's Lark, Yellow-breasted Pipit and Buff-streaked Chat were not included at this stage due to the lack of preferred habitat/low habitat suitability found across the proposed project site. Avifaunal monitoring will however include surveys designed to increase the likelihood of locating these species if they are present across the proposed development site.

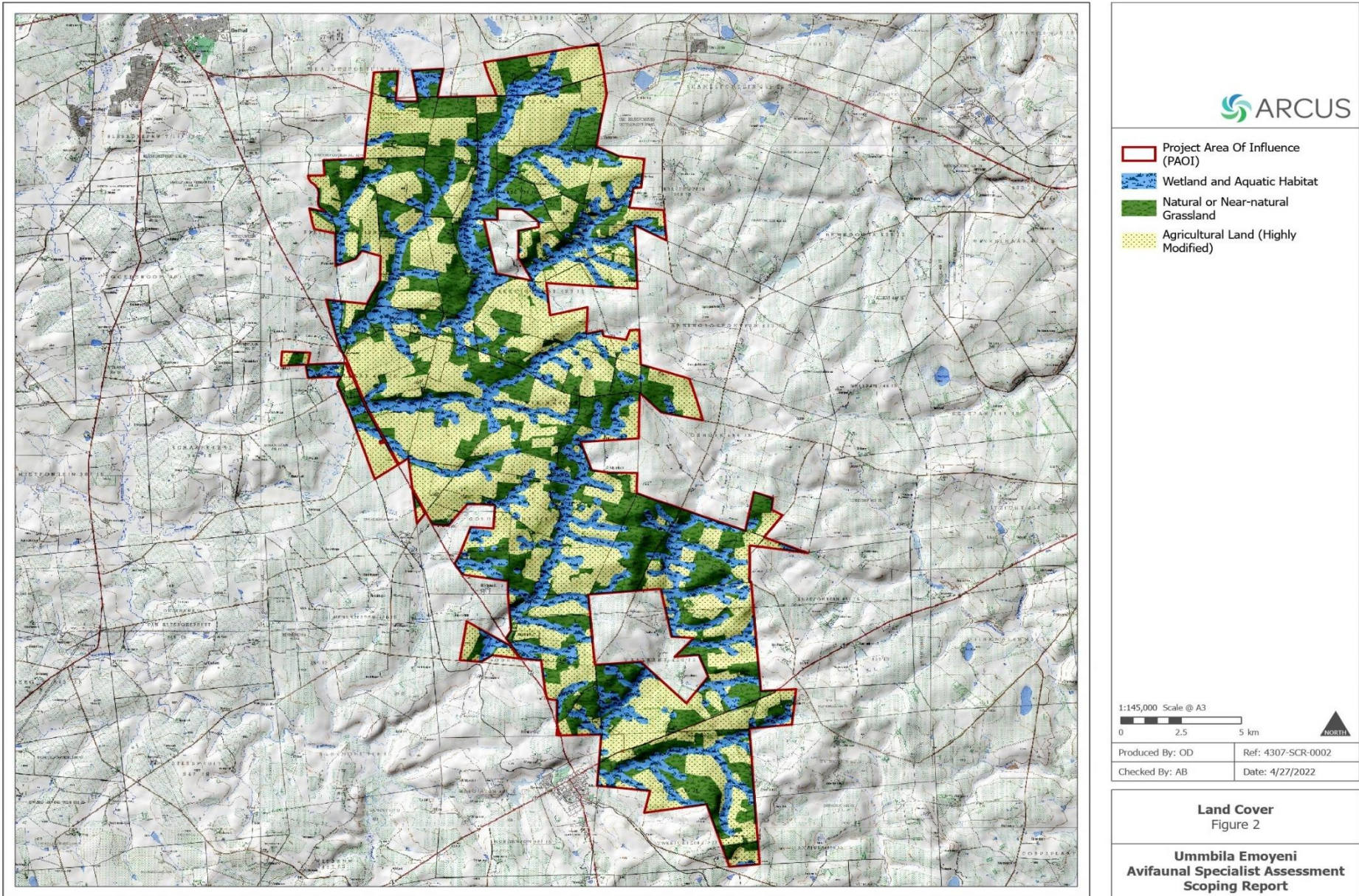


Figure 8.14: Avifauna habitats identified within the project site for the Umbila Emoyeni Solar Energy Facility

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

8.5.1 Cultural Landscape

Van Vollenhoven (2015) describes the broader assessment area as “*disturbed by recent human activities, mainly agriculture. This consists of maize fields. Other disturbance visible is mining infrastructure, a railway track, and power lines. Signs of old fields were also present which could be seen in the pioneer plant species consisting of weeds and grass. Almost half of the surveyed area consists of natural grassland. The vegetation cover varies between short and long grass. The topography of the area forms part of the rolling hills of the surrounding landscape.*”

Van Vollenhoven (2015) notes that “at the beginning of the 19th century, the Phuthing, a South Sotho group, stayed in the vicinity of modern-day Bethal. During the Difaquane, they fled to the south (Bergh 1999: 10-11; 109). In 1829, the traveller Robert Scoon passed through an area to the north of Bethal (Bergh 1999: 13). The first white farmers only settled here during the late 1850's. By the 1890's, this area was inhabited by many white farmers (Bergh 1999: 18-20). The town of Standerton was established in 1879 although it already was a district in 1878. Bethal was established in 1880 and it became an independent district in 1898 (Bergh 1999: 20-21). During the Anglo-Transvaal War (1880-1881), the British garrison in Standerton was beleaguered by the Boer forces (Bergh 1999: 46). The Highveld areas also saw much action consisting of various skirmishes between Boer and Brit during the Anglo-Boer War (1899-1902). It includes skirmishes on the farms Oshoek (4 December 1901), Trigaardsfontein (10 December 1901), Witbank (11 January 1902) and Nelspan (26 January 1902) (Bergh 1999: 51, 54). At Standerton, there was both a concentration camp for white and for black people (Bergh 1999: 54).”

This brief history points to the layered cultural landscape that is present in this area. Due to the scale of the proposed development, it is likely to change the sense of place associated with this landscape and may impact the way that this historic landscape reads by obscuring layers of the past.

8.5.2. Archaeology

The area proposed for development has not been previously assessed in any heritage impact assessment process. Heritage Impact Assessments have been completed nearby for projects in Secunda and these can be used to infer the archaeological sensitivity in the project site. Van Vollenhoven (2015) notes that the geographical area around the towns of Standerton and Bethal is not known to conserve Stone Age archaeology. He notes that “no such sites are indicated on maps contained in a historical atlas of this area (Bergh 1999: 4-5). However, this may only be since no research has actually been done in this area. The closest known Stone Age occurrences are a Late Stone Age site at the town of Ermelo and rock art sites far to the west of Standerton (Bergh 1999: 4-5).” Van Vollenhoven (2015) noted no natural shelters during the survey; however, the good vegetation in the surrounding area and the rivers indicate that ample grazing and water may have been available, making it a prime spot for hunting in the past. Therefore, one may assume that Stone Age people probably would have moved through the area. Late Iron Age sites are found in a large area around the towns of Bethal and Standerton and number at least 585 such sites.

In the heritage assessment of a powerline upgrade at the nearby Syferfontein Mine, Nel & Karodia (2013), noted that “a heritage assessment was conducted in 2000 by the National Cultural History Museum and included in the Syferfontein Mine EMP in 2010. During the survey, a few Stone Age artefacts were identified. These artefacts were not considered to have any primary context and therefore were interpreted to have

low significance value. No Early Iron Age sites were identified. The Late Iron Age sites found here conform to those identified in the literature for the Southern Highveld area (former southern Transvaal, northern Orange Free State) as Type V sites. As the soil is mostly turf, Iron Age settlement usually took place on the various dolerite outcrops. The added benefit of choosing these locations was that it was located at the source of building material used in constructing the settlements. One such site shows interesting features as the living units were actually excavated to obtain enough building material for the surrounding walls. A few of the farmsteads dating to early part of this century were identified as possibly having historical-architectural significance. A number of abandoned homesteads are located in the areas that were investigated. These seem to belong to farm labourers and were all abandoned within the last few years. They are therefore not viewed to be of cultural or historical significance. However, some graves are located in the vicinity of the homesteads, and it is possible that more graves will be located nearby".

None of the sites identified in the assessment referenced are located within or near the project site; however, the text provides a good assessment of resources that may be present. It is clear that the project site has not previously been assessed. It is therefore possible that the proposed development will impact negatively on archaeological resources associated with the Late Iron Age, burial grounds and graves as well as stone age archaeological resources. **Figure 8.15** shows the heritage resources previously identified within the study area.

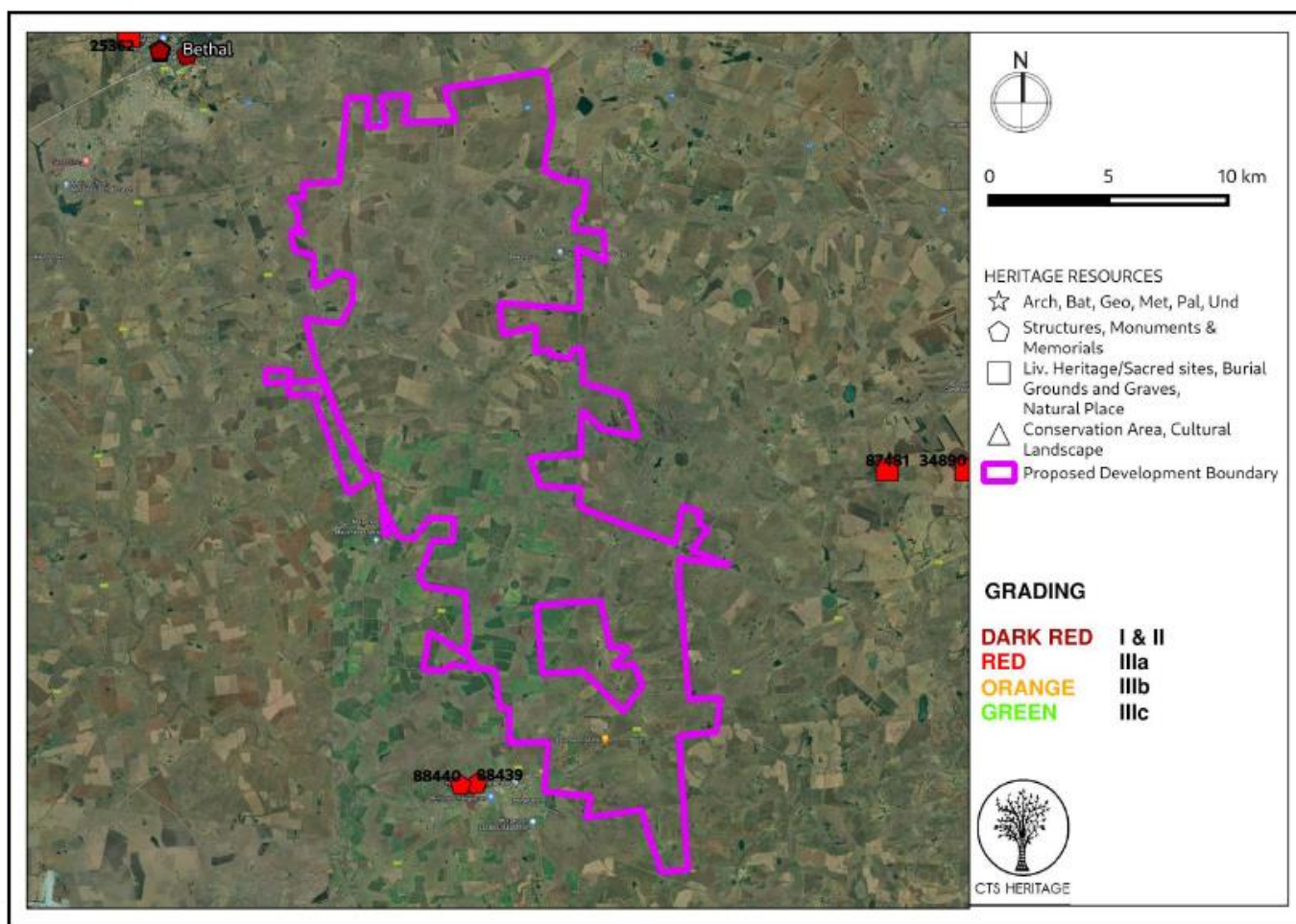


Figure 8.15: Heritage resources previously identified within the study area.

8.5.3. Palaeontology

According to the SAHRIS Palaeosensitivity Map (refer to **Figure 8.16**), the area proposed for development is underlain by sediments of zero, moderate and very high palaeontological sensitivity. The palaeontologically sensitive geology of the area is ascribed to the Vryheid Formation of the Ecca Group of sediments. The nature of the excavations associated with Renewable Energy facilities tends to be deep and as such, given the very high palaeontological sensitivity of the sediments that underlay the project site, the likelihood of impacting intact Vryheid Formation sediments is high.



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

8.6. Visual Quality

The landscape of the project site and broader area is characterised by three general character types, namely, rural landscape areas, urban landscape areas and industrial landscape areas. The general landform of the project site is undulating and comprises a series of similar size rounded ridgelines that extend approximately 20-30m above broad valley lines.

The landcover within the project site and broader area comprises four main categories, namely natural grassland, arable agriculture, settlements in the form of isolated homesteads, and settlements in the form of towns and villages. Local roads in the area include the N17, R35, R38 and R39, which are busy

national/regional distributors that are likely to carry a full range of traffic types, including tourism-related traffic.

Electrical infrastructure is relatively common in the area including low voltage and medium voltage lines in close proximity to roads. Other land cover includes heavy industry, including mining operations and electricity generation. However, these uses are generally located some distance from the proposed focus area. These industrial uses are generally large, isolated, individual industrial operations within the surrounding rural landscape. Major high voltage overhead power lines cross the proposed project site, namely, the Camden Sol 2 400kV power line and the Camden Tutuka 400kV power line.

8.6.1 Identified Visual Receptors

This section is intended to highlight possible receptors within the landscape which due to use could be sensitive to landscape change.

- » Area receptors may include:
 - * The towns of Bethal, Ermelo and Morgenzon.
 - * The Silver Water Reserve.
 - * The Protected Areas of the Rietvlei Nature Reserve.
- » Point receptors may include (**Figure 8.17**):
 - * There are a number of Local Farmsteads and Homesteads located both within the focus area and the surrounding landscape.
- » Line receptors may include (**Figure 8.17**):
 - * The N17, the R35, the R38 and the R39 as well as the unsurfaced local roads that that run through the study area. All of these are used mainly by local people with little tourism / recreational importance.



Figure 8.17: Local farmsteads and roads within the project site and broader area

8.7. Traffic Conditions

It is assumed that if components are imported to South Africa, it will be via the Port of Richard's Bay in KwaZulu-Natal, which is located approximately 460km from the proposed site, the Port of East London, which is located approximately 1 130km from the proposed site, or the Port of Ngqura, which is located approximately 1 200km from the proposed site. The preferred route from the Port of Richard's Bay is shown in yellow in **Figure 8.19**. The route follows the N2 north, passing through Pongola and Piet Retief before turning off on to the N17 in Ermelo that leads to an unnumbered gravel road towards the proposed site.

The alternative route from the Port of East London, shown in green in **Figure 8.19**, will follow the N6 north-west to Bloemfontein before taking the N1 north-east to Johannesburg. Vehicles will head east on the N12 and N17, passing through Bethal before turning off onto an unnumbered gravel road that leads to the proposed site.

The Port of Ngqura can also be considered as an alternative and the route is shown in blue in **Figure 8.19**. The route is approximately 1200km long and follows the N10 north up to Cradock before taking the R390 further north, passing through the town of Steynsburg and turning onto the N1 at Gariiep. The route will continue north-east along the N1, through Bloemfontein, up to Johannesburg. Vehicles will head east on the N12 and N17, passing through Bethal before turning off onto an unnumbered gravel road that leads to the proposed site.

It should be noted that, although shorter routes exist, travel on national routes is proposed as the condition of some of the roads on the shorter routes are poor and not deemed suitable for hauling with heavy vehicles. There are also a number of toll plazas located on the national routes, but alternative roads can be considered in order to bypass these toll roads. This can however only be done at a later stage when more information is available regarding the type of heavy/abnormal vehicles, number of trips, etc.

The proposed site is bounded by the N17 in the north, the R39 in the south and the east and the R35 in the west, as shown in **Figure 8.20**. Access to the proposed site can be obtained from any of these three roads, depending on the traffic volumes of each road. The road carrying the least traffic will be considered as the best option. However, the N17 is a toll route and should be avoided as main access if other alternatives exist along either the R39 or the R35.

There is also an existing network of unnumbered gravel roads that might be suitable as a main access road to the proposed site as shown in pink and blue in **Figure 8.21**. Once the site layout and project capacity has been reduced as a result of the environmental constraints identified during the Scoping Phase of the EIA process, the options for a main access road and assess points can be further investigated.

The proposed main access road should link to the site access road, and possible access points are shown in **Figure 8.21**. Other alternative site access roads and points can be investigated at a later stage once the project area has been more clearly defined. All options should however conform to the requirements of access spacing and sufficient shoulder sight distances at these locations.



Figure 8.19: Preferred and alternative routes to the proposed site

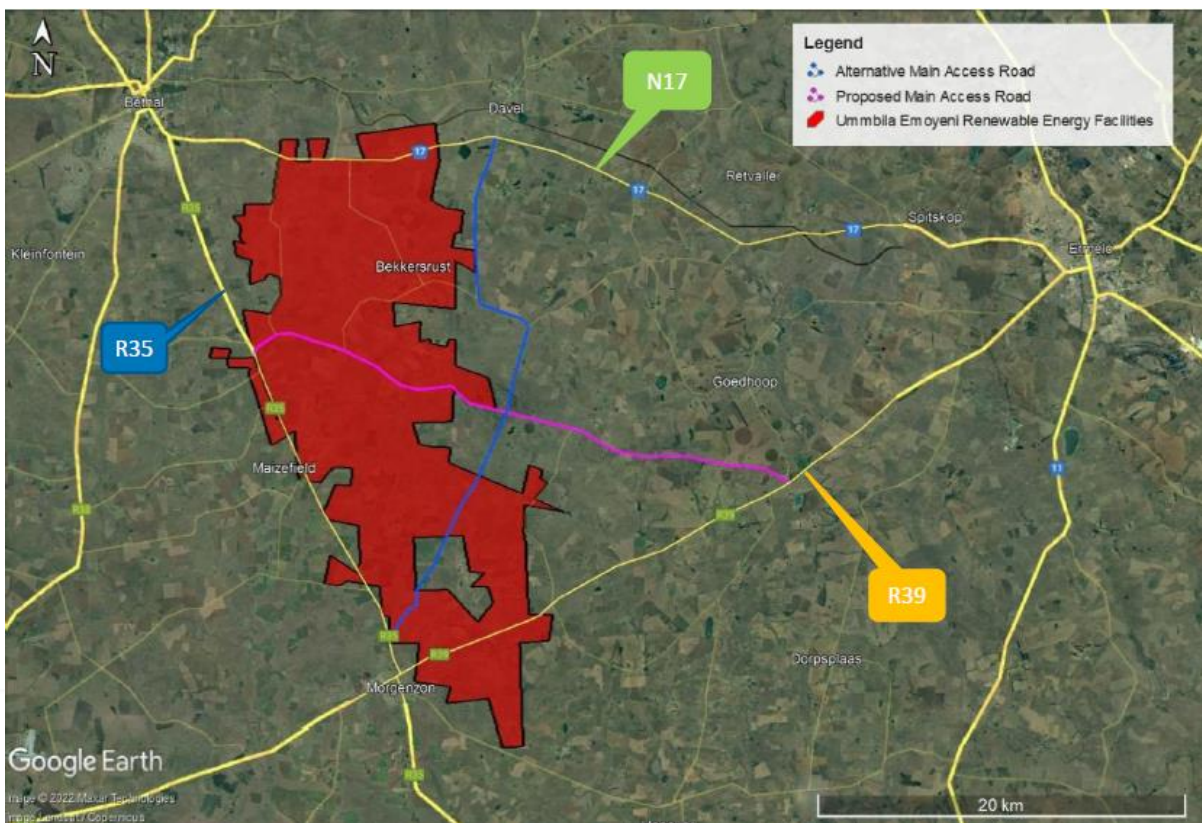


Figure 8.20: Proposed main access roads and alternatives to the project site

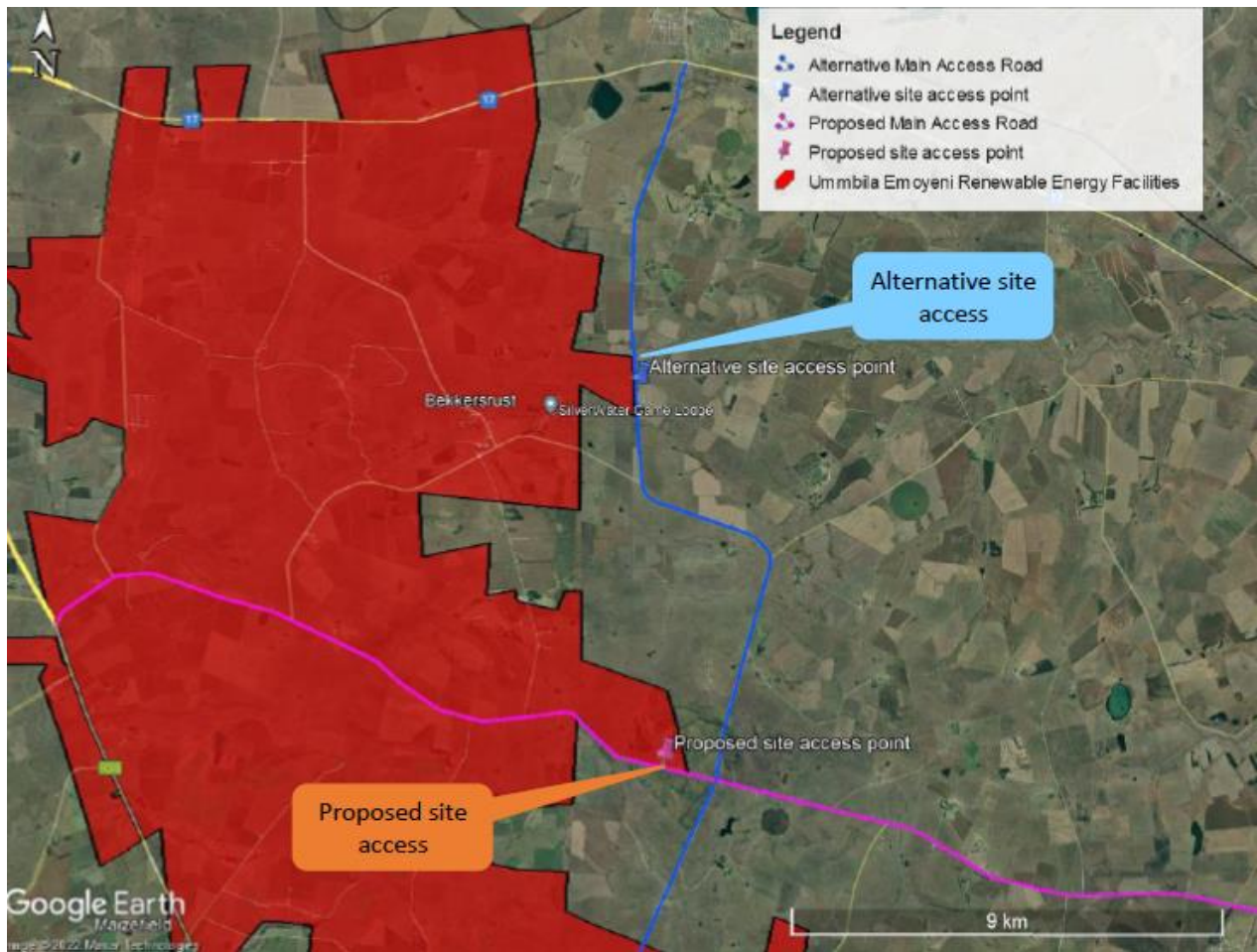


Figure 8.21: Proposed site access points

8.8. Socio-Economic Profile

8.8.1. Profile of the Broader Area

The project site is located within Ward 15 of the Govan Mbeki Local Municipality, Ward 12 of the Lekwa Local Municipality and Wards 8 and 10 of the Msukaligwa Local Municipality, which form part of the Gert Sibande District Municipality.

Population, Income and Employment Profile

The Govan Mbeki Local Municipality accounts for 28% of the population, and 30% of the households in the Gert Sibande District Municipality and Lekwa Local Municipality accounts for 12% of the population as well as households in the district. The Msukaligwa LM accounts for 14% of the population and 15% of the Households in the district.

Population growth between 2010 and 2020 was 1,9% (Lekwa), 2,2% (Govan Mbeki) and 2,0% (Msukaligwa) year-on-year for the local municipalities which compared favourably or similar to the district municipality (1,9%) and Mpumalanga (1,6%) over the same period. The high population growth in Govan Mbeki and Msukaligwa indicates that the municipality offers several opportunities, attracting people towards the area, this can also be motivated by the high population density (121 km²) in comparison to the other areas as well as the higher average monthly household income, which is the highest (R16 755.00) of all the areas in review.

The average household income for the Gert Sibande District Municipality in 2022 is estimated to be R10 851.00. The proposed UEREF will also attract additional population to the study area as several employment opportunities will be created through the development, this will ensure a sustainable population growth.

Table 8.12: Overview of the primary study area's population structure (Source: Quantec Standardised Regional (2022))

Indicator	Mpumalanga	Gert Sibande District Municipality	Lekwa Local Municipality	Govan Mbeki Local Municipality	Msukaligwa Local Municipality
Area (km ²)	76 495	31 840	4 585	2 954	6 015
Population	4 821 139	1 290 117	148 706	356 532	186 123
Number of Households	1 291 462	338 534	39 993	102 847	50 850
Population density (km ²)	63	41	32	121	31
Average household size	3,8	3,7	3,6	3,6	3,8
Annual population growth (2010-2020)	1,6%	1,9%	1,9%	2,2%	2,0%
Average monthly household income	R10 504	R10 851	R10 797	R16 755	R10 952

Table 8.13 indicates the number of people employed and not economically active, the percentage of the population unemployed as well as the labour force participation rate for areas in review. The relatively lower unemployment rate and higher labour force participation relative to the district averages further suggests that both the local municipalities are subject to inward migration due to the employment opportunities available within the local municipalities.

Table 8.13: Employment profile of the study area (Source: Quantec Standardised Regional (2022))

Indicator	Mpumalanga	Gert Sibande District Municipality	Lekwa Local Municipality	Govan Mbeki Local Municipality	Msukaligwa Local Municipality
Employed	1 112 708	302 264	42 973	108 682	48 694
Unemployment Rate	31,7%	31,0%	26,5%	28,5%	28,2%
Not Economically Active	1 420 762	379 585	40 093	89 777	52 845
Labour force participation rate	36,5%	37,0%	43,6%	44,9%	40%

Economic Profile

The following subsection outlines the economic profile at a national as well as a provincial, district municipal and local municipal level.

Nationally, South Africa's Gross Domestic Product (GDP) recorded its fourth consecutive quarter growth, expanding with 1,2% in the second quarter of 2021 (April-June), this followed the increase of 1% in the first quarter (January-March). However, despite the gains made over the last four quarters, the economy is 1,4% smaller than what it was before the COVID-19 pandemic (StatsSA, 2021).

The GVA (Gross Value Added) of the Lekwa Local Municipality was R 19 million in 2020 (constant prices), which collectively accounts for just over 10% of the district economy's GVA, and 3% of the Mpumalanga's. The Govan Mbeki Local Municipality had a GVA of R 103 million in 2020, which accounts for 53% of the district's economy, and 17% of the province. The proposed Umbila Emoyeni Solar Energy Facility will contribute further to the economy and ensure sustainability.

The growth in the local municipalities over the last few years was largely due to the strong performance of the agriculture, trade, finance business services sectors. Manufacturing indicated a contraction in the last 10-years in the district and local municipalities, but remains a large contributor in the economy. Many of these are linked to and service the large mining and manufacturing-based sectors that is present in the town of Secunda. Electricity is an average size industry in the municipalities, any new development would likely greatly increase the contribution of the utilities and construction sectors to the GVA.

Over the last ten years, the Compound Average Growth Rate (CAGR) of Lekwa Municipality contracted with 0,32%, whereas Govan Mbeki Local Municipality contracted with 0,16% and Msukaligwa LM increase with 0,99%. The sectors responsible for the contraction of the overall GVA a growth over the 10-year period in Lekwa Local Municipality was mining, manufacturing, utilities and construction. The mining, manufacturing and construction sectors were responsible for the overall contraction of the Govan Mbeki Local Municipality. It is a good indication that the utilities sector indicates a growth of 1,14% in the Govan Mbeki Local Municipality, the proposed Umbila Emoyeni Solar Energy Facility will further increase this sector's performance. The increase in GVA for Msukaligwa LM is due to the strong performance in the electricity, gas and water sector, with a 3,62% growth as well as in the agriculture and hunting sector, which increase with 3,64%.

The trade sector employs the most with a 24,5% and 21,7% and 18,1% contribution in 2020 in the Lekwa and Govan Mbeki and Msukaligwa Local Municipality, respectively. The utilities sector employs the least to employment in both municipalities, the proposed Umbila Emoyeni Solar Energy Facility will increase the number of employees in this sector. The local agricultural sector includes limited subsistence (informal) farming, unlike other areas in Mpumalanga, where this practice is more dominant. The presence of this subsistence agricultural activity means that the number of households that are dependent on agricultural activities for income could be slightly greater.

In general, agricultural activities are relatively labour intensive, thus a small decline in the size of the sector would generally lead to greater job losses than for example in manufacturing or utilities, which tend to be more capital intensive in nature. The agricultural sector is also frequently one of the largest employers in rural areas and it is for these two reasons that the sector is generally prioritised in development strategies.

8.8.2. Profile of the Immediate Affected Area

The project site is covered by natural grassland which is interspersed with areas of cultivation. Main crop types cultivated in the study area are include sunflower seed, sorghum, rye and potatoes. The project site is characterised by isolated homesteads that are generally related to agricultural uses. There is a tourism related establishment (Silver Water Game Lode) located within the north-eastern section of the proposed site, which appears to be focussed around a dam.

Settlement in the form of towns and villages is limited within the broader project site. The closest settlements include Morgenzon, which is a small town on the R39 less than 1km to the west of the proposed project site; Bethal, which is also a small town located on the N17 and approximately 6.2km north-west of the proposed project site; and Ermelo, which is located approximately 32km to the east of the proposed project site. Ermelo is the district centre of the Gert Sibande District Municipality.

Local roads in the area include the N17, R35, R38 and R39, which are busy national / regional distributors that are likely to carry a full range of traffic types, including tourism related traffic. Electrical infrastructure is relatively common in the area, including low voltage and medium voltage lines in close proximity to roads. Other land cover within the broader project site includes heavy industry, including mining operations and electricity generation. However, these uses are generally located some distance from the proposed project site. These industrial uses are generally large, isolated, individual industrial operations within the surrounding rural landscape.

CHAPTER 9: SCOPING OF POTENTIAL ISSUES

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

Environmental issues associated with construction and decommissioning activities of the project may include, among others, impacts on vegetation and protected plant species, direct faunal impacts, soil erosion and associated degradation of ecosystems, alien plant invasion, impacts on Critical Biodiversity Areas and Broad-Scale Ecological Processes, disturbance to and loss of wetland vegetation, impacts on water quality, modification of bat habitat and bat mortality, impacts on the social environment and current land use, visual impact; change to ambient noise levels, and avian mortality resulting from collisions with blade. Benefits during both the construction and operation phases include the creation of employment and business opportunities, and the opportunity for skills development and on-site training, improvement in energy security and support towards the renewable sector, benefits for local landowners, and benefits associated with socio-economic contributions to community development.

The project site considered for the proposed Umbila Emoyeni Solar Energy Facility is up to ~27 819ha 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: Properties affected by the proposed development

Parent Farm Number	Farm Portions
Farm 261 – Naudesfontein	15, 21
Farm 264 – Geluksplaats	0, 1, 3, 4, 5, 6, 8, 9, 11, 12
Farm 268 – Brak Fontein Settlement	6,7,10,11,12
Farm 420 – Rietfontein	8,9,10,11,12,15,16,18,19,22,32
Farm 421 - Sukkelaar	2, 2, 7, 9, 9 10, 10 11, 11 12, 12, 22, 25, 34, 35, 36, 37, 37, 38, 39, 40, 42, 42
Farm 422 – Klipfontein	0, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 23
Farm 423 – Bekkerust	0, 1, 2, 4, 5, 6, 10, 11, 12, 13 14, 15, 17, 19, 20, 22, 23, 24,25
Farm 454 – Oshoek	4, 13, 18
Farm 455 – Ebenhaezer	0, 1, 2, 3
Farm 456 – Vaalbank	1, 2, 3, 4, 7, 8, 13, 15, 16, 17, 18, 19
Farm 457 – Roodekrans	0, 1, 4, 5, 7, 22, 23, 23
Farm 458 – Goedgedacht	0, 2, 3, 4, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 21, 22, 23, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 39, 41, 42, 43
Farm 467 – Twee Fontein	0, 1, 4, 5, 6, 7, 8, 10
Farm 469 – Klipkraal	5, 6, 7, 8
Farm 548 – Durabel	0

Farm 470 – Dorpsplaats	<u>85</u>
Farm 451 - Drinkwater	<u>4, 22</u>
Farm 452 - Brakfontein	<u>5</u>

Section 9.2 provides a summary of the findings of the desktop scoping study undertaken for the construction, operation, and decommissioning phases of the Umbila Emoyeni Solar Energy Facility. Those 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 D - K**.

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 serves to identify the potential environmental impacts associated with the development of the Umbila Emoyeni Solar Energy Facility from a desktop level. It includes the following information required in terms of the EIA Regulations, 2014 - Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(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 Umbila Emoyeni 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.
(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 Umbila Emoyeni Solar Energy Facility have been included in sections 9.2 and 9.3 .
(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 Terrestrial Ecology (including flora and fauna)

The entire project site is mapped as falling within the Soweto Highveld Grassland vegetation type. Other vegetation types occur nearby, namely, Amersfoort Highveld Clay Grassland and Eastern Highveld Grassland. These other vegetation types have the potential to occur on site. Soweto Highveld Grassland and Eastern Highveld Grassland are both listed as Vulnerable, and Amersfoort Highveld Clay Grassland is listed as Least Threatened in terms of the National Vegetation Map (SANBI, 2018). According to the National Ecosystem List, Soweto Highveld Grassland and Eastern Highveld Grassland are listed as Vulnerable and Amersfoort Highveld Clay Grassland is not listed in the National List of Ecosystems that are Threatened and in need of protection (GN1002 of 2011).

A total of 1 076 species have been recorded within the broader area based on the online plant search. This list included a total of 18 species of conservation concern and a further 88 protected species listed under Schedule 11 (Protected Plants) of the Mpumalanga Nature Conservation Act, no. 10 of 1998. No trees protected under the National Forests Act (No. 84 of 1998) are expected to occur within the project site. Eight-two (82) alien plant species were recorded within the project area, with thirteen (13) of them being listed invasive species within NEM:BA Act No. 10 of 2004 (Alien and Invasive Species List, 2016).

The project site overlaps with areas classified as CBA: Optimal, CBA: Irreplaceable, Other Natural Areas, Heavily Modified Areas, Freshwater CBAs and ESAs. The site is not located within any NPAES focus areas or any Formal-/Informal Protected Areas.

There are 14 mammal species of conservation concern- that could potentially occur on site. Of the identified mammal species that may occur in the project area, 12 are either nationally within TOPS (Threatened and Protected Species Issued in terms of Section 56(1) of the National Environmental Management: Biodiversity Act, 2004) or provincially within Schedule 1 and 2 of the Mpumalanga Nature Conservation Act, no. 10 of 1998.

This is only one reptile species of conservation concern that was assessed as having a possibility of occurring on site, namely, Coppery Grass Lizard – *Chamaesaura aenea*, which is regarded to be Near Threatened and Endemic. All of the reptilian species expected to occur on site, apart from the water leguaan (*Varanus niloticus*), rock leguaan (*Varanus exanthematicus*) as well as all species of snakes (*Order Serpentes*) are regarded as Schedule 2 Protected Species in terms of the Mpumalanga Province Nature Conservation Act No 10 of 1998. Apart from the above mentioned provincially protected species, no TOPS species are likely to occur within the project site.

No amphibian species of conservation concern are expected to occur on site. Only one amphibian species protected under the Mpumalanga Province Nature Conservation Act No 10 of 1998 has a distribution range that includes the project site, namely African Bull Frog (*Pyxicephalus adspersus*).

Impacts associated with the construction, operation and decommissioning phases of the proposed Energy Facility and associated infrastructure on terrestrial ecology include the following:

» Impacts on vegetation and protected plant species

- * general loss of habitat for sensitive species;
- * loss in variation within sensitive habitat due to a loss of portions thereof;
- * general reduction in biodiversity;
- * increased fragmentation (depending on the location of the impact);
- * disturbance to processes maintaining biodiversity and ecosystem goods and services;
- * loss of ecosystem goods and services.
- * fragmentation of populations of affected species;
- * reduction in the area of occupancy of affected species; and
- * loss of genetic variation within affected species.
- » Direct Faunal Impacts
 - * fragmentation of populations of affected species;
 - * reduction in area of occupancy of affected species; and
 - * loss of genetic variation within affected species.
- » Soil erosion and associated degradation of ecosystems
- » Alien plant invasions
 - * further loss and displacement of indigenous vegetation;
 - * change in vegetation structure leading to a change in various habitat characteristics;
 - * change in plant species composition;
 - * change in soil chemistry properties;
 - * loss of sensitive habitats;
 - * loss or disturbance to individuals of rare, endangered, endemic and/or protected species;
 - * fragmentation of sensitive habitats;
 - * change in flammability of vegetation, depending on alien species;
 - * hydrological impacts due to increased transpiration and runoff; and
 - * impairment of wetland function.
- » Impacts on Critical Biodiversity Areas and Broad-Scale Ecological Processes

Sensitivity Analysis of the Site

Sensitivities that occur specifically within the project site for the Umbila Emoyeni Solar Energy Facility that may be vulnerable to damage from the proposed project are as follows (refer to **Figure 9.1**):

- » Primary Grassland (CBA1: Optimal) – High Sensitivity

- » Cultivated Areas – Low Sensitivity
- » Infrastructure – Low Sensitivity
- » Secondary Grassland – Low – Medium Sensitivity
- » Primary Grassland – Medium Sensitivity
- » Freshwater Resources – Very High Sensitivity
- » Primary Grassland (CBA1: Irreplaceable) – Very High Sensitivity

From a developmental perspective, development within the Low (cultivated areas) and Low-Medium (secondary grassland) sensitive area is most suitable/preferable. Development within the primary grassland areas, that are not included within the CBAs (medium sensitive) is regarded as acceptable, with the implementation of appropriate mitigation measures. Development within the Irreplaceable CBAs is regarded as unacceptable, and these areas should be regarded as “No-Go” areas for the Solar Energy Facility development. The Optimal CBAs are regarded as unsuitable/unacceptable for the development of the Solar Energy Facility due to the nature of the development (transformation of large contiguous areas). Placement of cabling and access roads, within these Optimal Natural Areas, is regarded acceptable. Construction activities within these areas, will however have to be restricted as far as possible, and to a small as possible area. Existing access routes should be used as far as possible.

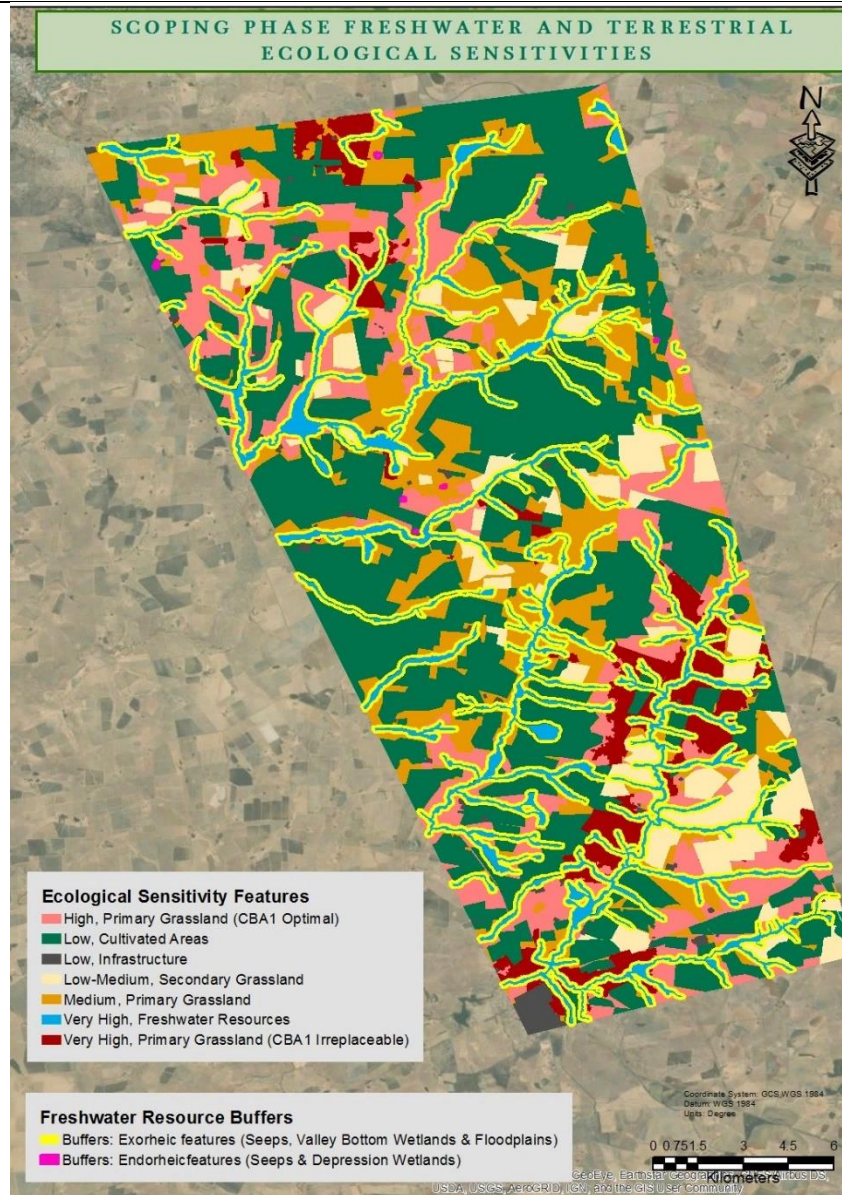


Figure 9.1: Preliminary terrestrial ecological sensitivity map of the project site

Issue	Nature of Impact during the <u>Construction and Decommissioning Phases</u>	Extent of Impact	No-Go Areas
Disturbance to and loss of indigenous natural vegetation.	<p>Construction of infrastructure will lead to direct loss of vegetation, causing a localised or more extensive reduction in the overall extent of vegetation. Consequences of the clearing and loss of indigenous semi – to near-natural vegetation occurring may include:</p> <ul style="list-style-type: none"> » Increased vulnerability of remaining vegetation to future disturbance, including extreme climatic events; » General loss of habitat for sensitive fauna and flora species; » Loss in variation within sensitive habitats due to loss of portions of it; » General reduction in biodiversity; » Increased fragmentation (depending on the location of the impact) and associated reduced viability of species populations; » Alteration of the habitat suitable for plant populations by altering surface structure. This will change species composition and associated species interactions; » Disturbance to processes maintaining biodiversity and ecosystem goods and services; and » Loss of ecosystem goods and services. 	Local	<p>The following areas have been classified as "No-Go" areas for most of the activities associated with the proposed development:</p> <ul style="list-style-type: none"> » Confirmed CBAs (Irreplaceable) » Recommended Freshwater Buffers » Freshwater Resource Features » Confirmed CBAs (Optimal): Only for PV facility
Loss of habitat for fauna species of conservation concern.	<p>Fauna species of conservation concern are indirectly affected primarily by a loss of or alteration of habitat and associated resources. Animals are mobile and, in most cases, can move away from a potential threat, unless they are bound to a specific habitat that is also spatially limited and will be negatively impacted by a development. Nevertheless, the proposed development will reduce the extent of habitat available to fauna.</p> <p>For any species, a loss of individuals or localised populations is unlikely to lead to a change in the conservation status of the species. However, in the case of threatened animal species, loss of a suitable habitat, population, or individuals could lead to a direct change in the conservation status of the species. This may arise if the proposed infrastructure is located where it will impact on such individuals or populations or the habitat that they depend on. Consequences may include:</p> <ul style="list-style-type: none"> » Loss of populations of affected species; » Reduction in area of occupancy of affected species; » Loss of genetic variation within affected species; and 	Local	No "No-Go" areas have been identified to date.

Issue	Nature of Impact during the <u>Construction and Decommissioning Phases</u>	Extent of Impact	No-Go Areas
	<p>» Future extinction debt of a particular species.</p> <p>There are a number of red data species that have been recorded for the wider area within which the study area is located. Their presence and the necessity to keep their habitats intact in the study area needs to be confirmed during a field survey in the EIA phase.</p>		
<p>Disturbance to migration routes and associated impacts to species populations.</p>	<p>Site preparation and construction activities may interfere with the current migration routes of fauna species. This may lead to:</p> <p>» Reduced ability of species to move between breeding and foraging grounds, reducing breeding success rates; and</p> <p>» Reduced genetic variation due to reduced interaction amongst individuals or populations as a result of fragmentation effects caused by the proposed developments.</p>	<p>Site and surroundings</p>	<p>No "No-Go" areas have been identified to date.</p>
<p>Impact on Critical Biodiversity Areas.</p>	<p>Development within the CBAs and ESAs may negatively impact biodiversity and the ecological functioning of these features.</p>	<p>Local and Regional</p>	<p>The following areas have been classified as "No-Go" areas for most of the activities associated with the proposed development:</p> <p>» Confirmed CBAs (Irreplaceable)</p> <p>» Confirmed CBAs (Optimal): Only for PV facility</p>
<p>Establishment and spread of declared weeds and alien invader plants.</p>	<p>Major factors contributing to invasion by alien invader plants include excessive disturbance to vegetation, creating a window of opportunity for the establishment of alien invasive species. In addition, regenerative material of alien invasive species may be introduced to the site by machinery traversing through areas with such plants or materials that may contain regenerative materials of such species. Consequences of the establishment and spread of invasive plants include:</p> <p>» Loss of indigenous vegetation;</p> <p>» Change in vegetation structure leading to change in or loss of various habitat characteristics;</p>	<p>Local and Regional</p>	<p>No "no-go" areas have been identified to date but the potential for alien invasive species present in or around the study area is regarded as moderate.</p> <p>The extent to which the site contains alien plants will be determined in the EIA phase</p>

Issue	Nature of Impact during the <u>Construction and Decommissioning Phases</u>	Extent of Impact	No-Go Areas
	<ul style="list-style-type: none"> » Change in plant species composition; » Altered and reduced food resources for fauna; » Change in soil chemical properties; » Loss or disturbance to individuals of rare, endangered, endemic and/or protected species; » Fragmentation of sensitive habitats; » Change in flammability of vegetation, depending on alien species; » Hydrological impacts due to increased transpiration and runoff; » Increased production and associated dispersal potential of alien invasive plants, especially to lower-lying wetland areas; and » Impairment of wetland function. 		<p>through detailed investigation and field-survey in the EIA phase.</p>
<p>Gaps in knowledge & recommendations for further study</p> <ul style="list-style-type: none"> » The initial desk-top investigation of the study area indicates that a few protected and red-data species as well as sensitive habitats potentially occur on the site. However, once the final layout has been designed in accordance with findings of a field investigation, the likelihood that the development will compromise the survival of any species of conservation concern is expected to be limited. » Plant species of conservation concern will only be identifiable during the growing season; thus, any field survey of vegetation should only commence from November and be completed by April. » Although previous collection records from the area exist, the study area itself may not have been previously surveyed and there may be additional species that have not yet been captured in the existing species databases for the area. A detailed ecological survey and sensitivity assessment will be undertaken during the EIA phase. 			

Issue	Nature of Impact during the <u>Operational Phase</u>	Extent of Impact	No-Go Areas
<p>Disturbance or loss of indigenous natural vegetation.</p>	<p>Hard and engineered surface create areas of altered surface characteristics, rainfall interception patterns. Consequently, it can be expected that within the Facility development footprint, the species composition and topsoil characteristics will change significantly. A sparser or less stable vegetation, together with the altered surface and runoff characteristics may lead to:</p> <ul style="list-style-type: none"> » Increased vulnerability of the remaining vegetation to future disturbance, including erosion; » General loss or significant alteration of habitats for sensitive species; » Loss in variation within sensitive habitats due to a loss of portions of it; 	<p>Local</p>	<p>No "no-go" areas have been identified to date.</p>

Issue	Nature of Impact during the <u>Operational Phase</u>	Extent of Impact	No-Go Areas
	<ul style="list-style-type: none"> » General reduction in biodiversity; » Increased fragmentation (depending on location of impact); » Future extinction debt of a particular species; » Disturbance to processes maintaining biodiversity and ecosystem goods and services; and » Loss of ecosystem goods and services. 		
<p>Altered runoff patterns due compacted areas.</p>	<p>Hard, engineered surfaces create surfaces of rainfall interception, where rainfall is collected and concentrated at the edges from where it then moves onto the ground in larger, concentrated quantities as opposed to small drops being directly intercepted and raindrop impact dispersed by vegetation, then absorbed by the ground. This may lead to a localised increase in runoff during rainfall events, which may result in localised accelerated erosion.</p> <p>Likewise, access roads and areas where soils have been compacted during construction will have a low rainfall infiltration rate, hence creating more localised runoff from those surfaces. Runoff will thus have to be monitored and channelled where necessary to prevent erosion over larger areas.</p>	<p>Site and surroundings</p>	<p>No “no-go” areas regarding high risk erodible soils have been identified to date. This must be verified during a detailed investigation and field-survey as part of the EIA phase</p>
<p>Establishment and spread of declared weeds and alien invader plants.</p>	<p>The envisaged altered vegetation cover after construction and during the operation phase of the proposed development will create a window of opportunity for the establishment of alien invasive species. In addition, regenerative material of alien invasive species may be introduced to the site by machinery or persons traversing through areas with such plants or materials that may contain regenerative materials of such species. Consequences of the establishment and spread of invasive plants include:</p> <ul style="list-style-type: none"> » Loss of indigenous vegetation or change in vegetation structure leading to an even more significant change in or loss of various habitat characteristics; » Loss of plant resources available to fauna; » Change in soil chemical properties; » Loss or fragmentation of sensitive or restricted habitats; » Loss or disturbance to individuals of rare, endangered, endemic and/or protected species; » Change in flammability of vegetation, depending on alien species; » Hydrological impacts due to increased transpiration and runoff; 	<p>Local to regional</p>	<p>No “no-go” areas have been identified to date but the potential for alien invasive species present in or around the study area is regarded as moderate.</p> <p>The extent to which the site contains alien plants will be determined in the EIA phase through detailed investigation and field-survey in the EIA phase.</p>

Issue	Nature of Impact during the <u>Operational Phase</u>	Extent of Impact	No-Go Areas
	Increased production and associated dispersal potential of alien invasive plants		
Gaps in knowledge & recommendations for further study			
<ul style="list-style-type: none"> » The largest opportunity for mitigating any negative impacts exists during the design phase, if layouts adhere to the findings and recommendations of detailed field studies and investigations carried out during the EIA phase. » Limited knowledge does, however, exist on the potential and ease with which vegetation can be re-established after construction given the variable rainfall regime of the region; which species would be able to persist in the altered environment on and around the proposed development; and what effect this altered species composition and –density will have on ecosystem intactness and –functionality. » Regular monitoring of a minimum set of environmental parameters throughout the operational phase, coupled with an adaptive environmental management program, will thus be essential to prevent any environmental degradation and any cumulative effects of the development beyond its periphery. 			
Description of expected significance of impact			
<ul style="list-style-type: none"> » Most of the above-mentioned impacts are probable, although the extent, duration, and magnitude of these impacts can be minimised to levels where these impacts can be regarded as low significance by having the necessary mitigation measures implemented. By exclusion of certain sensitive areas from the development footprint area, the probability of some of these above-mentioned impacts occurring within these habitats can be avoided. » The duration of the project is expected to be long term (~20-25 years) and subsequently most of the impacts are also expected to be long term. However, some impacts are expected to be of short term and confined to the construction phase. For example, the disturbance of some animal species will be confined to the construction phase and as human movement decreases during the operation phase some species may return to the site. Furthermore, impacts such as erosion and invasion of alien invasive species, with effective mitigation measures including regular monitoring in place, can be retained to a medium to short duration although monitoring and implementation of mitigation measures will have to be implemented throughout the lifespan of the proposed development. » Although most impacts associated with the proposed development are expected to be local, affecting mainly the immediate environment, the potential does exist for some impacts to be exacerbated and even spread outside the development footprint area if left unattended, eventually posing a potential threat to important environmental processes and functionality. Impacts that may potentially pose a threat to the magnitude and duration, if left unattended or not mitigated accordingly, include invasion by invasive alien species, soil erosion, significant disturbance and alteration of important wetland habitats and watercourses. » The most significant cumulative impact that the proposed development will have is the potential impact on Broad-Scale Ecological possesses and the impact on Critical Biodiversity Areas. » Cumulative impacts of developments on population viability of species can be reduced significantly if new developments are kept as close as possible to existing developed and/or transformed areas or, where such is not possible, different sections of a development be kept as close together as possible. Thus, new power lines should follow routes of existing servitudes if such exist. Renewable energy facilities, like solar WEFs and PVs should be constructed as close as possible to existing infrastructure or substations, and if several developments are planned within close proximity, these developments should be situated as close together as possible, not scattered throughout the landscape. <ul style="list-style-type: none"> * Excessive clearing of vegetation can and will influence runoff and stormwater flow patterns and dynamics, which could cause excessive accelerated erosion of plains, and this could also have detrimental effects on the downslope freshwater resource systems. 			

Issue	Nature of Impact during the <u>Operational Phase</u>	Extent of Impact	No-Go Areas
	<ul style="list-style-type: none"> ○ Rehabilitation and revegetation of all surfaces disturbed or altered during construction is desirable. ○ Runoff from sealed surfaces or surfaces that need to be kept clear of vegetation to facilitate operation of a development needs to be monitored regularly to ensure that erosion control and stormwater management measures are adequate to prevent the degradation of the surrounding environment. * Large-scale disturbance of indigenous vegetation creates a major opportunity for the establishment of invasive species and the uncontrolled spread of alien invasives into adjacent agricultural land and rangelands. ○ A regular monitoring and eradication protocol must be part of all developments long term management plans. 		

9.3.2. Impacts on Freshwater Features

Freshwater/drainage features cover approximately 2 949ha (7.5%) of the project site and are mainly characterised by channelled valley-bottom wetlands, followed by seepage wetlands. Where the larger watercourses flow across flatter, broader plains, floodplains are typically present. No large depression wetlands are present within the project site, with most of the depression wetlands being small and endorheic. Construction and operation may lead to potential indirect loss of / or damage to potential freshwater resource habitats. This may potentially lead to localised loss of sensitive habitat and may lead to downstream impacts that affect a greater extent of freshwater resources or impact on these systems functions and biodiversity. Where these habitats are already stressed due to degradation and transformation, the loss may lead to increased vulnerability (susceptibility to future damage) of the habitat. Physical alteration to wetlands can have an impact on the functioning of those wetlands. Consequences may include:

- » Increased loss of soil.
- » Loss of/or disturbance to indigenous wetland vegetation.
- » Loss of sensitive wetland habitats.
- » Loss or disturbance to individuals of rare, endangered, endemic and/or protected species that occur in wetlands.
- » Fragmentation of sensitive habitats.
- » Impairment of wetland function.
- » Change in channel morphology in downstream wetlands, potentially leading to further loss of wetland vegetation.
- » Reduction in water quality in wetlands downstream.

Sensitivity Analysis for the Site

Sensitivities that occur specifically within the project site for the Umbila Emoyeni Solar Energy Facility that may be vulnerable to damage from the proposed project are as follows (refer to **Figure 9.2**):

- » Freshwater Resources – Very High Sensitivity
- » 100m Buffer: Exorheic Features (Seeps, Vallay Bottom Wetlands and Floodplains – High Ecological Importance)
- » 50m Buffer: Endorheic Features (Seeps and Depression Wetlands – Low and Moderate Ecological Importance)

All freshwater features with their buffer areas have been classified as either Very High- or High sensitivity and should be regarded as “No-Go” areas apart from the following activities and infrastructure which may be allowed (although restricted to an absolute minimum footprint):

» only activities relating to the route access and cabling:

- * The use/upgrade of existing roads and watercourse crossings are the preferred options.
- * Where no suitable existing roads and watercourse crossings exist, the construction of new access roads and watercourse crossings can be allowed, however this should be deemed as a last resort.
- * All underground cabling should be laid either within access roads or next to access roads (as close as possible).

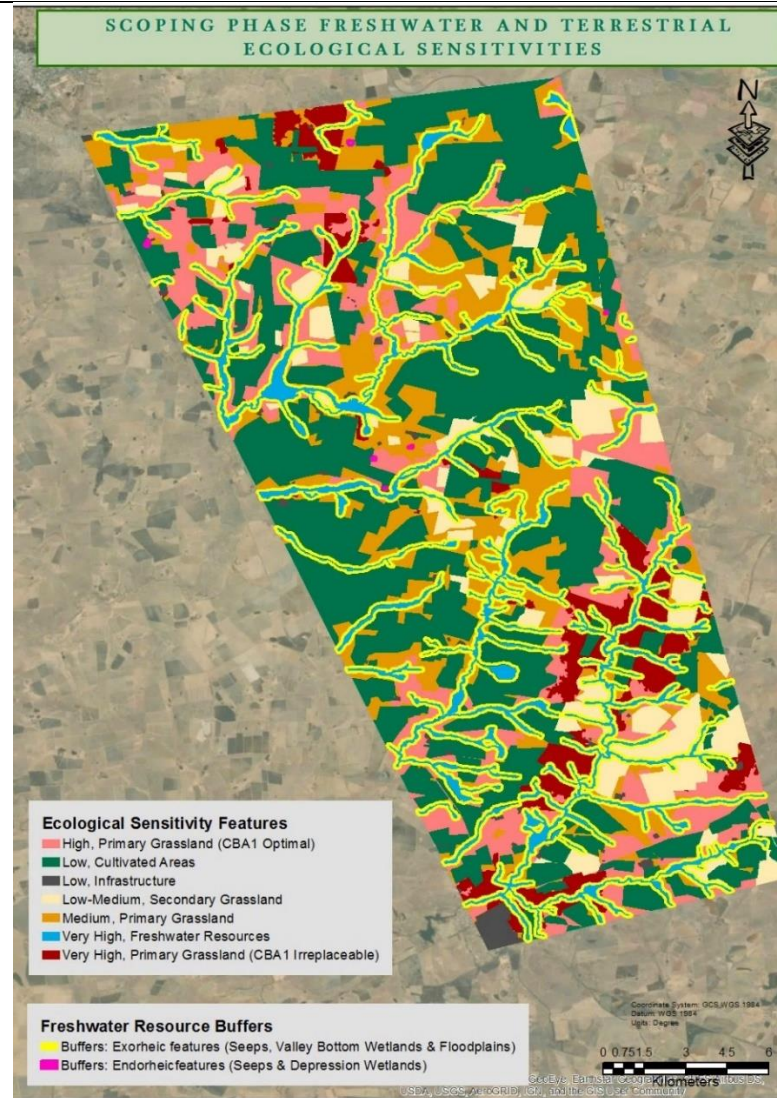


Figure 9.2: Freshwater sensitivity map for the project site

Issue	Nature of Impact during the <u>Construction and Decommissioning Phases</u>	Extent	No-Go Areas
Disturbance to and loss of wetland vegetation	<p>Construction of infrastructure may lead to direct loss of vegetation, causing a localised or more extensive reduction in the overall extent of vegetation.</p> <p>Potential consequences include:</p> <ul style="list-style-type: none"> » General loss of habitat for sensitive fauna and flora species; » General reduction in biodiversity; » Reduction in the ability of the wetlands to fulfil their ecological services and functions such as flood attenuation and the enhancement of water quality through the precipitation and storage of nitrates and toxicants; » Disturbance to processes maintaining biodiversity and ecosystem goods and services; and » Exposure of soil to erosion. 	Local	<p>The following areas have been classified as "No-Go" areas for most of the activities associated with the proposed development:</p> <ul style="list-style-type: none"> » All Freshwater Resource features; and » All Freshwater Buffer Areas <p>The only activities allowed within these areas are the use/upgrade of existing routes and watercourse crossings (new routes only as last resort) as well as underground cabling (within roads).</p>
Impact on freshwater resource systems through the possible increase in surface water runoff	<ul style="list-style-type: none"> » An increase in the surface water budget of the wetlands and watercourses, due to an increase in volume and velocity of surface water flow from the cleared construction areas into the wetlands, may result in the loss of natural wetland/aquatic vegetation and potentially expose the wetland/aquatic soils to erosion. 	Local and immediate surroundings	<p>The following areas have been classified as "No-Go" areas for most of the activities associated with the proposed development:</p> <ul style="list-style-type: none"> » All Freshwater Resource features; and » All Freshwater Buffer Areas <p>The only activities allowed within these areas are the use/upgrade of existing routes and watercourse crossings (new routes only as last resort) as well as underground cabling (within roads).</p>
Increase sedimentation and erosion	Activities associated with the construction phase may potentially lead to some direct or indirect loss of or damage to	Local and immediate surroundings	The following areas have been classified as "No-Go" areas for most of the activities

Issue	Nature of Impact during the <u>Construction and Decommissioning Phases</u>	Extent	No-Go Areas
	<p>the identified wetlands and watercourses. Impacts on these systems will most likely be:</p> <ul style="list-style-type: none"> » Vegetation clearing within the development area may result in an increase in surface water flow and expose areas prone to erosion and these areas may expand / spread into the wetlands. » The eroded material may enter the wetlands and may potentially impact these systems through siltation. 		<p>associated with the proposed development:</p> <ul style="list-style-type: none"> » All Freshwater Resource features; and » All Freshwater Buffer Areas <p>The only activities allowed within these areas are the use/upgrade of existing routes and watercourse crossings (new routes only as last resort) as well as underground cabling (within roads).</p>
Impact on localized surface water quality	<ul style="list-style-type: none"> » Chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement etc.) could potentially be washed downslope into the wetlands and potentially affect water quality. 	Local and immediate surroundings	<p>The following areas have been classified as "No-Go" areas for most of the activities associated with the proposed development:</p> <ul style="list-style-type: none"> » All Freshwater Resource features; and » All Freshwater Buffer Areas <p>The only activities allowed within these areas are the use/upgrade of existing routes and watercourse crossings (new routes only as last resort) as well as underground cabling (within roads).</p>
Loss of habitat for fauna dependent on such habitats.	<p>Fauna species of conservation concern are indirectly affected primarily by a loss of or alteration of habitat and associated resources. Animals are mobile and, in most cases, can move away from a potential threat, unless they are bound to a specific habitat that is also spatially limited, such as isolated, endorheic pans, and will be negatively impacted by a development.</p> <p>For any species, a loss of individuals or localised populations is unlikely to lead to a change in the conservation status of the</p>	Local	<p>The following areas have been classified as "No-Go" areas for most of the activities associated with the proposed development:</p> <ul style="list-style-type: none"> » All Freshwater Resource features; and » All Freshwater Buffer Areas <p>The only activities allowed within these areas are the use/upgrade of existing routes and watercourse crossings (new routes only as</p>

Issue	Nature of Impact during the <u>Construction and Decommissioning Phases</u>	Extent	No-Go Areas
	<p>species. However, in the case of threatened animal species, loss of a suitable habitat, population, or individuals could lead to a direct change in the conservation status of the species. This may arise if the proposed infrastructure is located where it will impact on such individuals or populations or the habitat that they depend on. Consequences may include:</p> <ul style="list-style-type: none"> » Loss of populations of affected species. » Reduction in area of occupancy of affected species. » Loss of genetic variation within affected species. » Future extinction debt of a particular species. » There is SCC that may potentially utilised these habitat types. 		<p>last resort) as well as underground cabling (within roads).</p>
<p>Gaps in knowledge & recommendations for further study</p> <ul style="list-style-type: none"> » A detailed Surface Hydrological survey and assessment will be undertaken during the EIA phase according to methods outlined in the specialist report and Plan of Study for EIA. » Following, the determination of habitat integrity and sensitivity (during EIA phase), especially towards the impacts associated with such a WEF development; appropriate buffers will be recommended as well as activities which may be acceptable within the buffer areas without threatening the integrity of the wetland areas. 			

Issue	Nature of Impact during the <u>Operational Phase</u>	Extent of Impact	No-Go Areas
<p>Impact on freshwater resource systems through the possible increase in surface water runoff</p>	<p>An increase in the surface water budget of the wetlands and watercourses, due to an increase in volume and velocity of surface water flow from the cleared areas and from any compacted and hard surfaces.</p> <p>This may result in:</p> <ul style="list-style-type: none"> » a change in vegetation composition and structure, » the exposure of wetland soils leaving these areas prone to soil erosion; » increase in sedimentation and subsequently a reduction in water quality; and 	<p>Local to immediate surroundings</p>	<p>The following areas have been classified as "No-Go" areas for most of the activities associated with the proposed development:</p> <ul style="list-style-type: none"> » All Freshwater Resource features; and » All Freshwater Buffer Areas <p>The only activities allowed within these areas are the use/upgrade of existing routes and watercourse crossings (new routes only as</p>

Issue	Nature of Impact during the <u>Operational Phase</u>	Extent of Impact	No-Go Areas
	<ul style="list-style-type: none"> » reduction in the ability of the wetlands to fulfil vital ecological functions and services such as flood attenuation and precipitation of minerals such as nitrates and toxicants. 		last resort) as well as underground cabling (within roads).
Impact on localized surface water quality	Chemical pollutants (hydrocarbons from service equipment and vehicles etc.) could potentially be washed downslope into these wetlands and potentially affect water quality.	Local to immediate surroundings	<p>The following areas have been classified as “No-Go” areas for most of the activities associated with the proposed development:</p> <ul style="list-style-type: none"> » All Freshwater Resource features; and » All Freshwater Buffer Areas <p>The only activities allowed within these areas are the use/upgrade of existing routes and watercourse crossings (new routes only as last resort) as well as underground cabling (within roads).</p>
<p>Description of expected significance of impact</p> <p>The duration of the project is expected to be long term (~20-25 years) and subsequently most of the impacts are also expected to be long term. However, some impacts are expected to be of short term and confined to the construction phase. Due to the fact that these identified wetlands have been subjected to very long term (>12 years) cultivation practices, as well as other forms of disturbances these wetlands have lost some of their functions and services with the remainder occurring in a limited and highly altered manner. Subsequently, their value (ecological importance and sensitivity) has been significantly reduced. It is also probable that this value will only slightly increase if rehabilitated to a satisfactory level (will never be able to rehabilitate to original form). Taking the current state, value and rehabilitation potential into account, the potential significance, magnitude, extent of the above-described impacts is regarded as very low. Furthermore, with the necessary mitigation measures, the significance of these impacts can be even further reduced.</p> <p>Furthermore, potential cumulative impacts are:</p> <ul style="list-style-type: none"> » The compromise of ecological processes as well as ecological functioning of these important freshwater resource habitats » Transformation of intact habitat could potentially compromise ecological processes as well as ecological functioning of important habitats and would contribute to habitat fragmentation and potentially disruption of habitat connectivity and furthermore impair their ability to respond to environmental fluctuations. This is especially of relevance for larger watercourses and wetlands serving as important groundwater recharge and floodwater attenuation zones, important microhabitats for various organisms and important corridor zones for faunal movement. <ul style="list-style-type: none"> * The following mitigation measures will be taken into account during the EIA phase Impact Assessment (in order to reduce the contribution of this development to cumulative impacts): 			

Issue	Nature of Impact during the <u>Operational Phase</u>	Extent of Impact	No-Go Areas
	<ul style="list-style-type: none"> ○ The recommended buffer areas between the delineated freshwater resource features and proposed project activities should be maintained. ○ Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared. ○ The potential stormwater impacts of the proposed developments areas should be mitigated on-site to address any erosion or water quality impacts. ○ Good housekeeping measures as stipulated in the EMPr for the project should be in place where construction activities take place to prevent contamination of any freshwater features. ○ Where possible, infrastructure should coincide with existing infrastructure or areas of disturbance (such as existing roads). <p>* Disturbed areas should be rehabilitated through reshaping of the surface to resemble that prior to the disturbance and vegetated with suitable local indigenous vegetation.</p>		
<p>Gaps in knowledge & recommendations for further study</p> <ul style="list-style-type: none"> » A detailed Surface Hydrological survey and assessment will be undertaken during the EIA phase according to methods outlined in this report. » Following the determination of habitat integrity and sensitivity (during EIA phase), especially towards the impacts associated with such a WEF development; appropriate buffers will be recommended as well as activities which may be acceptable within the buffer areas without threatening the integrity of the wetland areas. 			

9.3.3 Impacts on Bats

Bats play a critical role in many ecosystems and are important indicators of biodiversity and ecosystem health. They provide many essential ecosystem services which increase human well-being such as pollination, seed dispersal and the consumption of important agricultural pests.

Based on current taxonomic information and bat occurrence data, twenty-four (24) species could occur within the project site. The majority have a low likelihood of occurrence and acoustic monitoring has confirmed the presence in the project site of six species.

The potential impacts to bats as a result of construction and operation activities include the following:

- » Modification of bat foraging/commuting habitat.
- » Destruction of/Disturbance to bat roosts.
- » Barrier effects.
- » Polarized light pollution.
- » Disturbance to bats.

Sensitivity Analysis for the Site

Bat sensitivities identified within the project site for the Umbila Emoyeni Solar Energy Facility are listed in **Table 9.2** and depicted in **Figure 9.3**. To reduce impacts on bats, habitat features such as tree clumps, buildings, dams/wetlands, and rivers/streams have been buffered and classified as No-Go areas since activity around these features

was higher during the site visits undertaken to date as part of the pre-construction bat monitoring. Turbine placement should be prioritised for low sensitivity areas (i.e., open grassland and cultivated areas), and only if needed, then in medium sensitivity areas

Table 9.2: Sensitive features identified within the project site for the Umbila Emoyeni Solar Energy Facility

Risk Level			
Low	Medium	High	No-Go
Heavily modified land	CBA Optimal	CBA Irreplaceable Areas	Farm Dams
Moderately modified land	ESA Landscape corridor		Wetlands
	ESA Local corridor		Trees
	Other Natural Areas		Buildings
			Rivers/Streams
			Wetlands

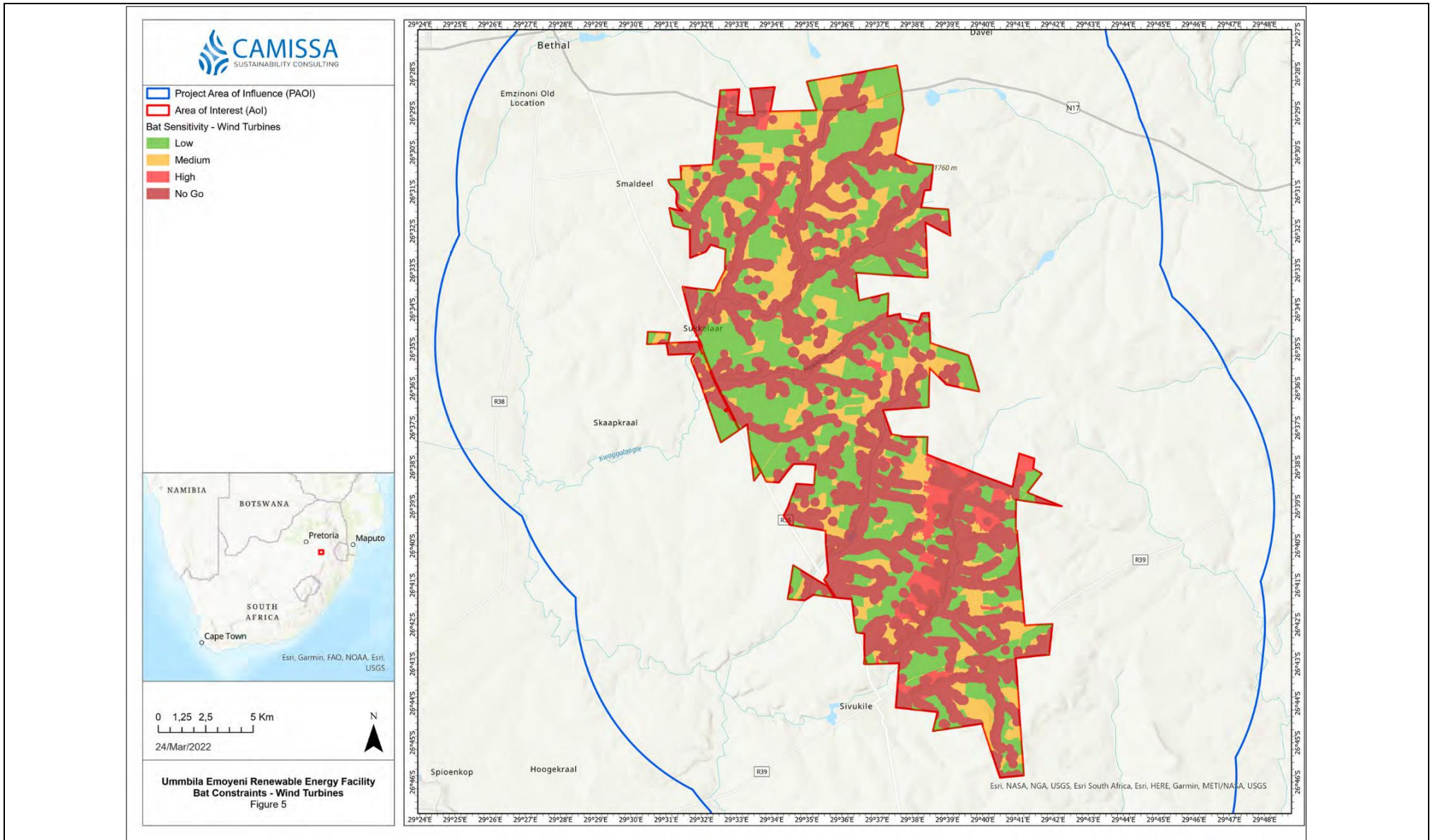


Figure 9.3: Bat sensitivities identified within the project site for the Umbila Emoyeni Solar Energy Facility

Issue	Nature of Impact during the <u>Construction Phase</u>	Extent	No-Go Areas
Modification of bat foraging/commuting habitat	<u>Indirect impacts:</u> » Removal of vegetation can reduce foraging opportunities and modify commuting spaces for bats » Noise and dust generated through construction activities can disturb bats	Local	Key habitat features have been buffered (Table 9.2, Figure 9.3)
Destruction of/Disturbance to batroosts	<u>Direct impacts:</u> » Destruction of bat roosts (trees, buildings) <u>Indirect impacts:</u> » Disturbance of bat roosts (trees, buildings) resulting in roost abandonment » Installation of new infrastructure in the landscape (e.g., buildings, turbines, road culverts) can inadvertently provide new roosting spaces for some bat species, attracting them to areas with solar panels and potentially increasing the likelihood of collisions.	Local	Key habitat features have been buffered (Table 9.2, Figure 9.3)
Description of expected significance of impact » These impacts are expected to be low and negative with mitigation. No major bat roosts are located in the project site although it is likely that bats are roosting in buildings based on roost surveys on site, as well as in trees.			
Gaps in knowledge » There is a lack of knowledge on the impacts of solar PV facilities on bats, both globally and in South Africa. » Although roost surveys have been undertaken at two farmsteads, locating bats in roosts is challenging especially if the roost contains a few individuals. This study assumes that all buildings are potentially roosts and must be buffered since numerous species use buildings for roosting. » Bats are likely roosting in trees on site however surveying all individual trees in the project site is impractical due to the large number of trees in the project site. This study assumes that all trees are potential roosting spaces and must be buffered since numerous species use trees for roosting. Recommendations with regards to general field surveys » Undertake roost surveys at additional buildings in the project site to locate roosting bats or evidence of roosting bats.			

Issue	Nature of Impact during the <u>Operational Phase</u>	Extent	No-Go Areas
Barrier effects	<u>Indirect impacts:</u> » Exclusion of bats from foraging and commuting habitat.	Local	Key habitat features have been buffered (Table 9.2, Figure 9.3)

Issue	Nature of Impact during the <u>Operational Phase</u>	Extent	No-Go Areas
Polarized light pollution	<ul style="list-style-type: none"> » The reflection of horizontally polarized light by solar panels can attract insects and in turn foraging bats, bringing them into the vicinity of wind turbines. » increasing the probability of collisions. 	Local	Key habitat features have been buffered (Table 9.2, Figure 9.3)
<p>Description of expected significance of impact</p> <ul style="list-style-type: none"> » The impact of barrier effects is expected to be low, and negative. Bats are volant mammals, thus these effects should not be major as bats should still be able to maintain sufficient foraging areas between and above solar panels. Little research has been done on this regard for bats, but it is assumed that bats will be able to adjust their commuting routes if needed. » The impact of polarized light pollution is expected to be low with mitigation. Buffers of 200 m have been » placed around water bodies (Figure 6). Bennun et al. (2021) recommend placing non-polarising white tape around and/or across panels to minimise reflection which can attract aquatic insects. <p>Gaps in knowledge</p> <ul style="list-style-type: none"> » There is a lack of knowledge on the impacts of solar PV facilities on bats, both globally and in South Africa, including the impact of polarized light pollution. <p>Recommendations with regards to general field surveys</p> <ul style="list-style-type: none"> » Current field surveys are fit for purpose and based on best practise thus no additional surveys are planned beyond the completion of the 12 months of baseline data collection. 			

Issue	Nature of Impact during the <u>Decommissioning Phase</u>	Extent	No-Go Areas
Disturbance to bats	<p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> » Disturbance to bats due to decommissioning activities through noise and dust, and damage to vegetation 	Local	Key habitat features have been buffered (Table 9.2, Figure 9.3)
<p>Description of expected significance of impact</p> <ul style="list-style-type: none"> » Provided decommissioning activities are restricted to daylight hours, the impact to bats are likely to be low and negative. Restoration of all disturbed areas will reduce the impact of habitat modification. <p>Gaps in knowledge & recommendations for further study</p> <ul style="list-style-type: none"> » None 			

9.3.4. Impacts on Avifauna

The following key potential impacts on avifauna, arising from the proposed development of the Solar Energy Facility (and associated infrastructure) have been identified for assessment:

Construction Phase:

- » Direct Habitat Destruction – modification, removal and clearing of vegetation for development of infrastructure such as temporary laydown areas, site buildings, solar PV arrays, access roads and servitudes.
- » Disturbance/Displacement – indirect habitat loss and/or reduced breeding success due to displacement by noise and activity associated with machinery and construction activity.
- » Direct Mortality – fatalities of avifauna due to vehicle collision, entrapment, entanglement, or collision with temporary infrastructure (e.g., fencing), entrapment in uncovered excavations and increased predation pressure.

Operational Phase:

- » Direct Habitat Destruction – Contamination of habitats due to routine operational maintenance activity (e.g., cleaning of solar PV arrays).
- » Disturbance/Displacement – indirect habitat loss, reduced breeding success, obstruction of movement corridors due to displacement by infrastructure and noise/activity associated with ongoing, routine operational tasks/maintenance activity; and
- » Direct Mortality – fatalities of avifauna due to collision with solar PV arrays, collision or entrapment with perimeter fencing, collision with overhead power lines, and electrocution from electrical components.

Decommissioning Phase:

- » As per construction phase.

Sensitivity Analysis for the Site

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 is currently underway). 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:

- » Wetlands - Very High Avifaunal Site Ecological Importance
- » Natural Grasslands – High Avifaunal Site Ecological Importance
- » Agricultural/cultivated fields – Very Low 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.

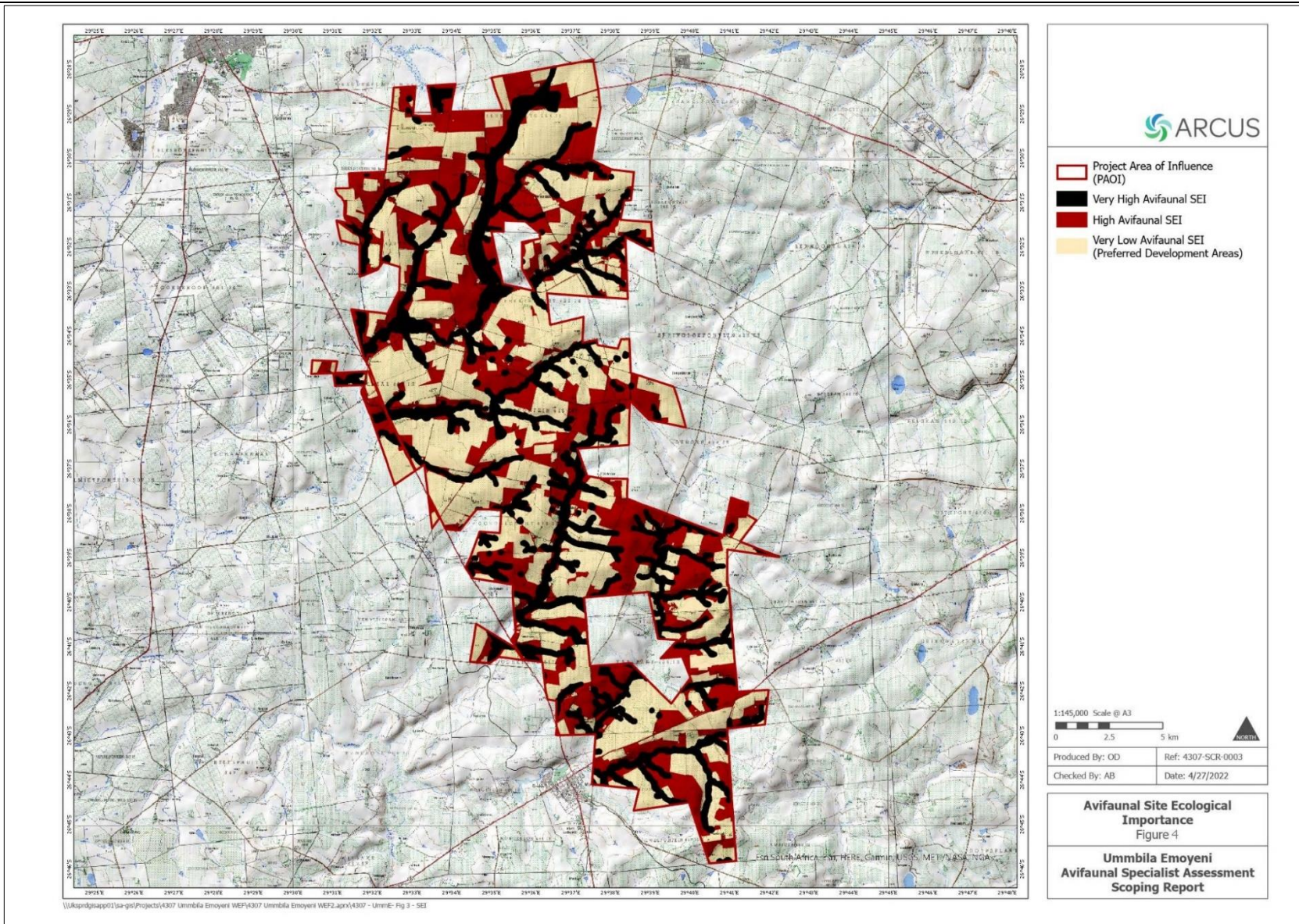


Figure 9.4: Avifaunal sensitivities identified as the project site

Issue	Nature of Impact during the <u>Construction Phase</u>	Extent	No-Go Areas
Displacement habitat destruction	<u>Direct impacts:</u> » Loss of habitat will potentially lead to displacement of avifaunal species <u>Indirect impacts:</u> » None	Local	Wetland and Aquatic habitats
<p>Description of expected significance of impact</p> <p>The remaining patches of natural or near-natural vegetation that occur across the site are already under existing levels of disturbance from agricultural activities that include the regular use of large agricultural machinery required for commercial crop production in immediately adjacent fields. Similarly, disturbance resulting from grazing of livestock occur within the natural or near-natural areas themselves and therefore it is expected that any species particularly sensitive to anthropogenic disturbance are unlikely to occur within the proposed project area through displacement by existing impacts.</p> <p>The habitats present in vicinity of the proposed development are not unique to the site and are relatively widespread in the area so any displacement from the immediate vicinity that may occur will not likely incur a high energetic cost as suitable habitat is widely available nearby. The proximity of nearby suitable habitat makes it likely that species will return to areas that have not been physically altered by the proposed development once construction activity ceases.</p> <p>Gaps in knowledge & recommendations for further study</p> <ul style="list-style-type: none"> » Describing the current land use and indicating these on a sensitivity map. » Nesting locations of target species that may occur on the proposed development site are unknown. » Indication of the nesting locations of target species to occur on the proposed development site. <p>Recommendations with regards to general field surveys</p> <ul style="list-style-type: none"> » Avifaunal pre-construction monitoring surveys to be informed by a pre-application avifaunal monitoring plan. » Avifaunal activity recorded across the proposed development site to be used to inform focus areas for a nest survey. » Walk transects to include the period between September/October to mid-summer to coincide with peak breeding/display periods of larks and pipits to increase the chances of their detection. 			

Issue	Nature of Impact during the <u>Construction Phase</u>	Extent of Impact	No-GoAreas
Displacement of avifaunal species	<u>Direct impacts:</u> » Disturbance will potentially lead to displacement of avifaunal species <u>Indirect impacts:</u> » Loss of habitat	Local	Wetland and Aquatic habitats

Description of expected significance of impact

The remaining patches of natural or near-natural vegetation that occur across the site are already under existing levels of disturbance from agricultural activities that include the regular use of large agricultural machinery required for commercial crop production in immediately adjacent fields. Similarly, disturbance resulting from grazing of livestock occur within the natural or near-natural areas themselves and therefore it is expected that any species particularly sensitive to anthropogenic disturbance are unlikely to occur within the proposed project area through displacement by existing impacts.

The habitats present in vicinity of the proposed development are not unique to the site and are relatively widespread in the area so any displacement from the immediate vicinity that may occur will not likely incur a high energetic cost as suitable habitat is widely available nearby. The proximity of nearby suitable habitat makes it likely that species will return to areas that have not been physically altered by the proposed development once construction activity ceases.

Gaps in knowledge & recommendations for further study

- » Describing the current land use and indicating these on a sensitivity map.
- » Nesting locations of target species that may occur on the proposed development site are unknown.
- » Indication of the nesting locations of target species to occur on the proposed development site.

Recommendations with regards to general field surveys

- » Avifaunal pre-construction monitoring surveys to be informed by a pre-application avifaunal monitoring plan.
- » Avifaunal activity recorded across the proposed development site to be used to inform focus areas for a nest survey.
- » Walk transects to include the period between September/October to mid-summer to coincide with peak breeding/display periods of larks and pipits to increase the chances of their detection.

Issue	Nature of Impact during the <u>Construction Phase</u>	Extent of Impact	No-Go Areas
Loss of avifaunal species	<u>Direct impacts:</u> » Fatalities of individuals <u>Indirect impacts:</u> » Loss of breeding potential and » reduced recruitment into the local population	Local	Wetland and Aquatic habitats

Description of expected significance of impact

Fatalities of avifaunal species can occur through collision with vehicles as traffic in the area increases due to construction activity. Large-bodied and ground dwelling species (e.g., korhaans and bustards) are at increased risk, but this impact can be effectively mitigated against. Temporary fencing can result in collisions, entrapment or entanglement if not suitably installed. Similarly ground dwelling avifauna (particularly chicks) can fall into uncovered excavations and become entrapped. The construction phase is finite and relatively short in duration. The expected significance of this impact is likely to be low.

Gaps in knowledge & recommendations for further study

- » Describing the current land use and indicating these on a sensitivity map; and
- » Indication of the nesting locations of target species to occur on the proposed development site.

Recommendations with regards to general field surveys

- » Avifaunal pre-construction monitoring surveys to be informed by a pre-application avifaunal monitoring plan.
- » Avifaunal activity of larger-bodied terrestrial species to be recorded across the proposed development site through walk-transects, drive transects and incidental records.

Issue	Nature of Impact during the <u>Operational Phase</u>	Extent	No-Go Areas
Direct habitat destruction	<u>Direct impacts:</u> » Loss of habitat will potentially lead to displacement of avifaunal species <u>Indirect impacts:</u> » None	Local	Wetland and Aquatic habitats

Description of expected significance of impact

The natural or near-natural habitats present are linked to fire and rainfall/water regimes and are particularly sensitive to alterations of flow characteristics, infiltration rates and the water table. Contamination of water sources and uncontrolled runoff from hard surfaces would lead to habitat loss and negative down-stream effects on habitats beyond the proposed development site.

There are, however, highly effective mitigation measures available to reduce the likelihood of this impact occurring to acceptable levels and these measures are largely standard practice for this type of development and therefore the impact significance is expected to be low.

Gaps in knowledge & recommendations for further study

- » Utilisation of the proposed development site by species reliant on wetland and aquatic habitats (e.g., cranes).
- » Aquatic study to be undertaken.

Recommendations with regards to general field surveys

- » Avifaunal pre-construction monitoring surveys to be informed by a pre-application avifaunal monitoring plan.
- » Surveys to include the rainy season (i.e., summer).

Issue	Nature of Impact during the <u>Operational Phase</u>	Extent	No-Go Areas
Displacement of avifaunal species	<u>Direct impacts:</u> » Disturbance will potentially lead to displacement of avifaunal species <u>Indirect impacts:</u> » Loss of habitat	Local	Wetland and Aquatic habitats

Description of expected significance of impact

Issue	Nature of Impact during the <u>Operational Phase</u>	Extent	No-Go Areas
	<p>The remaining patches of natural or near-natural vegetation that occur across the site are already under existing levels of disturbance from agricultural activities that include the regular use of large agricultural machinery required for commercial crop production in immediately adjacent fields. Similarly, disturbance resulting from grazing of livestock occur within the natural or near-natural areas themselves and therefore it is expected that any species particularly sensitive to anthropogenic disturbance are unlikely to occur within the proposed project area through displacement by existing impacts.</p> <p>The habitats present in vicinity of the proposed development are not unique to the site and are relatively widespread in the area so any displacement from the immediate vicinity that may occur will not likely incur a high energetic cost as suitable habitat is widely available nearby. The proximity of nearby suitable habitat makes it likely that species will return to areas that have not been physically altered by the proposed development during the operational phase. This impact is therefore expected to have a low significance.</p>		
<p>Gaps in knowledge & recommendations for further study</p> <ul style="list-style-type: none"> » Describing the current land use and indicating these on a sensitivity map. » Nesting locations of target species that may occur on the proposed development site are unknown. » Indication of the nesting locations of target species to occur on the proposed development site. <p>Recommendations with regards to general field surveys</p> <ul style="list-style-type: none"> » Avifaunal pre-construction monitoring surveys to be informed by a pre-application avifaunal monitoring plan. » Avifaunal activity recorded across the proposed development site to be used to inform focus areas for a nest survey. » Walk transects to include the period between September/October to mid-summer to coincide with peak breeding/display periods of larks and pipits to increase the chances of their detection. 			

Issue	Nature of Impact during the <u>Operational Phase</u>	Extent	No-Go Areas
Loss of avifaunal species due to collision with infrastructure	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> » Fatalities of individuals <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> » Loss of breeding potential and reduced recruitment into the local population 	Broader Area	Wetland and Aquatic habitats
<p>Description of expected significance of impact</p> <p>Habitat suitability models predict a low likelihood that the proposed development area supports significant populations of SCCs such as Botha's Lark, Rudd's Lark or Yellow-breasted Pipit, nor does it appear to cover highly suitable foraging habitat for Black Harrier. If avifaunal monitoring survey results indicate otherwise, the extent of the impact may increase to regional or national scales depending on the species concerned.</p> <p>At this stage, however, this impact is expected to have a medium to low significance based on the SCCs predicted to occur across the proposed development site and the relatively low availability of suitable natural or near-natural habitat indicated by habitat suitability models.</p>			

Issue	Nature of Impact during the <u>Operational Phase</u>	Extent	No-Go Areas
<p>Gaps in knowledge & recommendations for further study</p> <ul style="list-style-type: none"> » Spatio-temporal utilisation of the site by target species and species of special concern including levels of flight activity. » Mapping of all target species and species of special concern within the development footprint. » Mapping of known and potential habitats used in breeding, foraging and roosting. » Describing the current land use and indicating these on a sensitivity map. » Indication of the nesting locations of target species to occur on the proposed development site. » Indication of the potential of target species to occur on the proposed development site. <p>Recommendations with regards to general field surveys</p> <ul style="list-style-type: none"> » Avifaunal pre-construction monitoring surveys to be informed by a pre-application avifaunal monitoring plan. » Avifaunal activity of larger-bodied terrestrial species to recorded across the proposed development site through vantage points, walk-transects, drive transects and incidental records. » Surveys to include periods of expected species-specific peak avifaunal abundance (e.g., autumn for Black Harrier). 			

Issue	Nature of Impact during the <u>Operational Phase</u>	Extent	No-Go Areas
<p>Loss of avifaunal species due to electrocution from energized infrastructure</p>	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> » Fatalities of individuals <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> » Loss of breeding potential and reduced recruitment into the local population 	<p>Local</p>	<p>Wetland and Aquatic habitats</p>
<p>Description of expected significance of impact</p> <p>Overhead power line infrastructure with a capacity of 132kV or more do not generally pose a risk of electrocution due to the large size of the clearances between the electrical infrastructure components. Electrocutions are therefore more likely for larger species whose wingspan is able to bridge the gap such as eagles. Mitigation measures nevertheless remain effective at reducing the potential risk of electrocution. This impact is therefore expected to have a low significance.</p> <p>Gaps in knowledge & recommendations for further study</p> <ul style="list-style-type: none"> » Spatio-temporal utilisation of the site by target species and species of special concern including levels of flight activity. » Mapping of all target species and species of special concern within the development footprint. » Mapping of known and potential habitats used in breeding, foraging and roosting. » Describing the current land use and indicating these on a sensitivity map. » Indication of the nesting locations of target species to occur on the proposed development site. » Indication of the potential of target species to occur on the proposed development site. 			

Issue	Nature of Impact during the <u>Operational Phase</u>	Extent	No-Go Areas
<p>Recommendations with regards to general field surveys</p> <p>» Avifaunal pre-construction monitoring surveys to be informed by a pre-application avifaunal monitoring plan.</p>			

The impacts of the decommissioning phase are similar to those of the construction phase, with the exception of a reduced impact of habitat destruction. Temporary disassembly and storage areas associated with the decommission phase are to be positioned on the same sites as those used for temporary laydown areas during the construction phase where possible to reduce the incidence of novel habitat destruction.

9.3.5. Impacts on Soils and Land Capability

According to the land type database, the project site is characterised by the Dc 3, Ea 20, Ea 21 and the Ea 22 land types (refer to Figure 8.6). The Dc land type is characterised by Prisma-cutanic and/or pedocutanic diagnostic horizons, with the addition of one or more of the following: Vertic, melanic and red structured diagnostic horizons. The Ea land type consists of one or more of the following soils: Vertic, Melanic, and red structured diagnostic horizons, of which these soils are all undifferentiated.

The various soil forms expected throughout the project site are commonly associated with high land capabilities. Even though the soil depth, texture and permeability of these soils ensure high land capability, the climatic capability of the area often reduces the land potential considerably. Therefore, very few areas characterised by "High" land potential are expected.

The primary impact on soils expected to be associated with the proposed development is compaction/soil stripping/transformation of land use, which leads to loss of land capability.

Sensitivity Analysis for the Site

The land capability sensitivity (refer to **Figure 9.5**) indicates a range of sensitivities expected throughout the project focus area, namely, "Moderately Low" to "Moderate" sensitivities. Smaller patches are characterised by sensitivities up to "Moderately High". Furthermore, various crop field boundaries were identified by means of the DFFE Screening Tool (2022), which are predominantly characterised by "High" sensitivities with one area being classified as "Very High" sensitivity (refer to **Figure 9.6**).

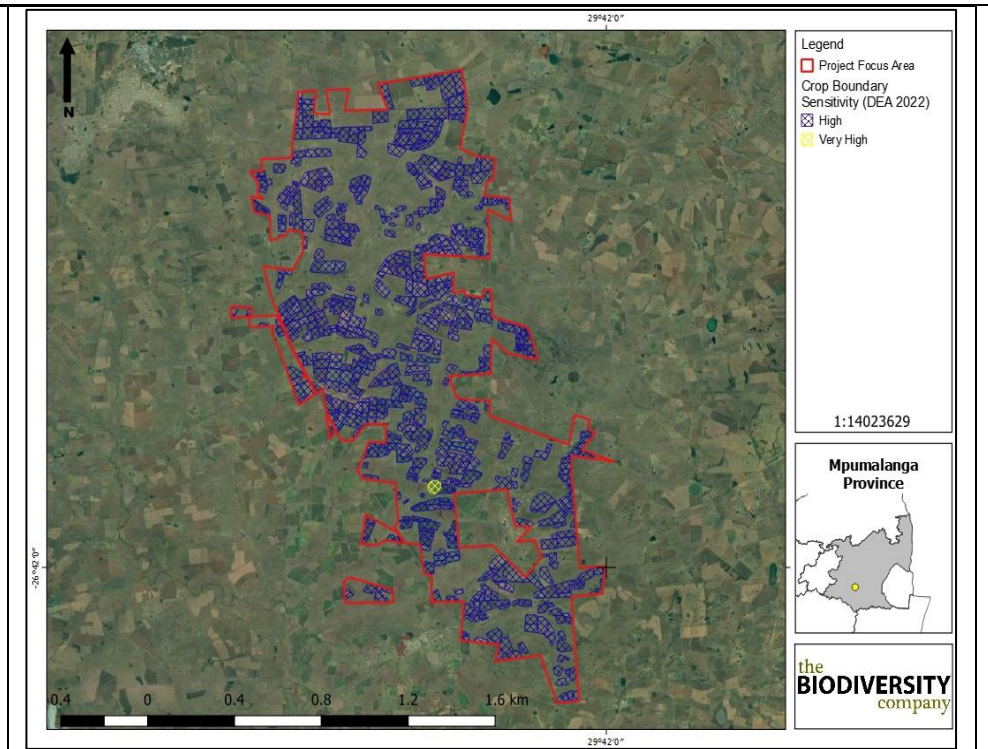
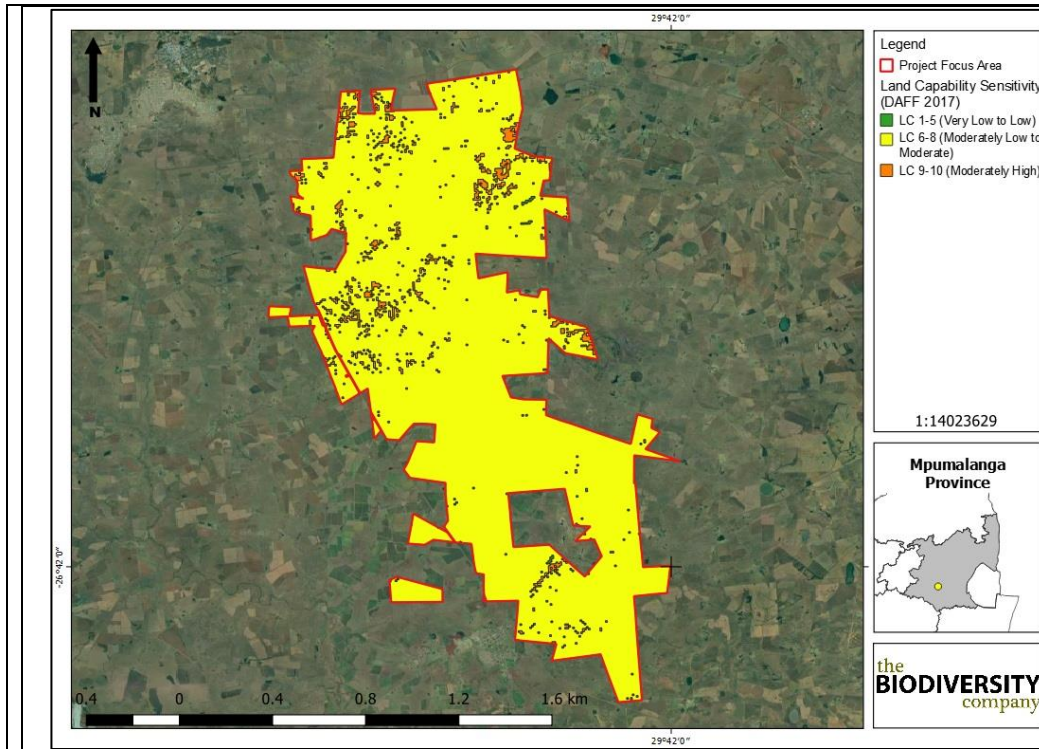


Figure 9.5: The land capability sensitivity of the project site

Figure 9.6: Crop boundary sensitivity of the project site

Issue	Nature of Impact	Extent	No-Go Areas
Compaction/soil stripping/transformation of land use which leads to loss of land capability	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> » Loss of soil / land capability <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> » Loss of land capability 	Regional	None identified at this stage
<p>Description of expected significance of impact</p>			
<p>The development of the area could result in the encroachment into areas characterised by high land potential properties, which can ultimately result in the loss of land capability. These disturbances could also result in the infestation and establishment of alien vegetation, which in turn can have a detrimental impact on soil resources. Earthworks will expose and mobilise earth materials which could result in compaction and/or erosion. 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 soil resources, which could affect the salinity or pH of the soil,</p>			

which can render the fertility of the soil unable to provide nutrition to plants. During the operational phase, the impacts associated with the substation and collector sub will be easily managed by best "housekeeping" practices.

Gaps in knowledge & recommendations for further study

- » This study is completed at a desktop level only.
- » Identification and delineation of soil forms.
- » Determine of soil sensitivity.

Recommendations with regards to general field surveys

- » Field surveys to prioritise the development areas.

9.3.6. Impacts on Heritage (Cultural Landscape, Archaeology and Palaeontology)

Cultural Landscape

The broader study area has been disturbed by recent human activities, mainly agricultural. This consists of maize fields. Other disturbance visible is mining infrastructure, a railway track and power lines. The topography of the area forms part of the rolling hills of the surrounding landscape. Due to the scale of the proposed development, it is likely to change the sense of place associated with this landscape and may impact the way that this historic landscape reads by obscuring layers of the past. Cognisance must be taken of this unique cultural landscape, consisting of farm werfs etc in the proposed layout.

Archaeology

Late Iron Age sites were found around the towns of Bethal and Standerton. Although no Late Iron Age sites have been identified within or near the project, heritage assessment undertaken in the nearby areas provide a good assessment of resources that may be present. It is clear that the project site has not previously been assessed. It is therefore possible that the proposed development will impact negatively on archaeological resources associated with the Late Iron Age, burial grounds and graves as well as stone age archaeological resources

Palaeontology

According to the extract from the Council for GeoSciences, the project site is underlain by sediments of the Vryheid Formation of the Ecca Group. The Vryheid Formation consists of interbedded very coarse-grained sandstone and mudstone that yields plant and trace fossils as well as some prominent coal seams.

Sensitivity Analysis for the Site

According to the SAHRIS Palaeosensitivity Map (refer to **Figure 9.7**), the area proposed for development is underlain by sediments of zero, moderate and very high palaeontological sensitivity. The palaeontologically sensitive geology of the area is ascribed to the Vryheid Formation of the Ecca Group of sediments. The nature of the excavations associated with Renewable Energy facilities tends to be deep and as such, given the very high palaeontological sensitivity of the sediments that underlay the project site, the likelihood of impacting intact Vryheid Formation sediments is high.

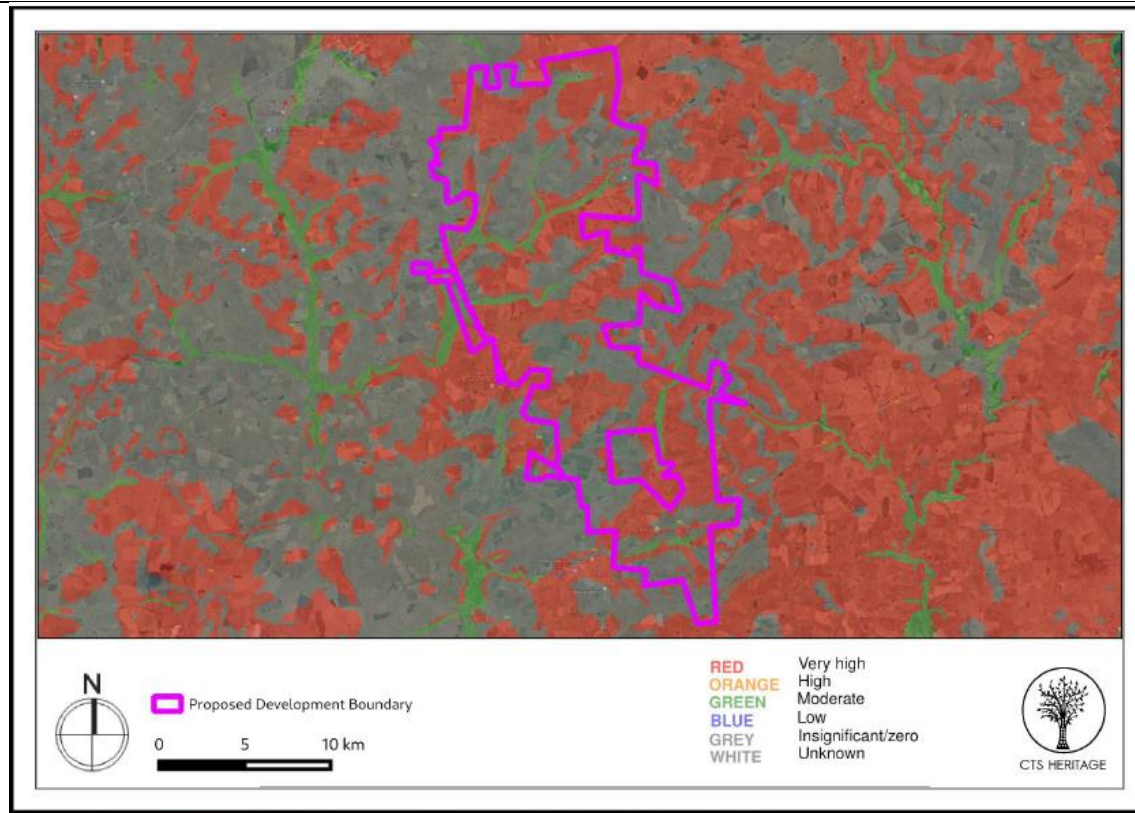


Figure 9.7: Palaeosensitivity map indicating fossil sensitivity underlying the project site

Issue	Nature of Impact	Extent	No-Go Areas
Destruction of archaeological heritage	» Direct impact to archaeological heritage of scientific significance	Within project boundary	None identified at this stage
Destruction of palaeontological heritage	» Direct impact to palaeontological heritage of scientific significance	Within project boundary	None identified at this stage
Negative impact to significance cultural landscapes	» Indirect impact to significant cultural landscapes and cultural landscape elements including historic farm werfs	Regional	Buffer areas identified around farm werfs - 1km recommended
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 project area and the area more broadly have not been subjected to many heritage impact assessments and therefore substantial gaps in knowledge exist. Field assessment will fill these gaps.

Recommendations with regards to general field surveys

- » Archaeological field surveys must provide sufficient ground-coverage of the areas to be developed to be able to determine the nature of the resources likely to be impacted.
- » Palaeontological and cultural landscape field surveys will target sensitive geological and cultural landscape features.

9.3.7. Impacts on the Visual Quality of the Area

The landscape of the project site and broader area is characterised by three general character types, namely, rural landscape areas, urban landscape areas and industrial landscape areas. The general landform of the project site is undulating and comprises a series of similar size rounded ridgelines that extend approximately 20-30m above broad valley lines. The landcover within the project site and broader area comprises four main categories, namely natural grassland, arable agriculture, settlements in the form of isolated homesteads, and settlements in the form of towns and villages. Local roads in the area include the N17, R35, R38 and R39, which are busy national/regional distributors that are likely to carry a full range of traffic types, including tourism-related traffic.

Identified visual receptors within the project site and broader area include:

- » The towns of Bethal, Ermelo and Morgenon.
- » The Silver Water Reserve.
- » The Protected Areas of the Rietvlei Nature Reserve.
- » There are a number of Local Farmsteads and Homesteads located both within the focus area and the surrounding landscape.
- » The N17, the R35, the R38 and the R39 as well as the unsurfaced local roads that run through the study area. All of these are used mainly by local people with little tourism / recreational importance.

Possible impacts identified include:

- » Potential change to the rural landscape.
- » Potential visual impacts as experienced by visitors to the Rietvlei Reserve.
- » Potential visual impacts as experienced by visitors to the Silver Stream Reserve.
- » Potential visual impacts as experienced by users of adjacent local roads particularly users of the N17, the R35, the R38 and the R39.
- » Potential visual impacts as experienced by residents of homesteads.
- » Potential visual impacts as experienced by residents of local settlements particularly residents on the south-eastern edge of Bethal and the north-western edge of Morgenon.
- » Potential Shadow Flicker impacts particularly affecting local homesteads.

Sensitivity Analysis for the Site

The following sensitivities were identified from a visual perspective (refer to **Figure 9.8**):

- » Highly sensitivity areas include:
 - * Areas immediately surrounding settlement and homesteads development of which is likely to significantly change the character of views for residents. A 500m buffer is proposed which should be sufficient to ensure that development does not totally dominate views. It is possible that receptors (owners /residents) have no concern regarding the development of these areas, in which case the sensitivity rating will reduce.
 - * Corridors beside the main roads that could be affected including the N2, the R35, the R 38 and the R39. This is deemed sensitive because development in this corridor is likely to be highly obvious to people travelling along the roads and because it is possible that motorists could be affected by glare and the proposed 250m corridor should be sufficient to enable mitigation in the form of screening to be undertaken.
 - * Areas on and immediately beside ridgelines as the development of these areas is likely to be more visible to surrounding areas including protected areas.
- » Medium sensitivity areas include:
 - * Watercourses and a buffer of 250m either side of watercourses. These areas are proposed in order to protect these natural features within the proposed focus area.
- » Low sensitivity areas include:
 - * Valley side slopes the development of which is likely to make the project least obvious from surrounding areas. The fact that development may be focused on areas with relatively low sensitivity does not preclude the necessity for mitigation.

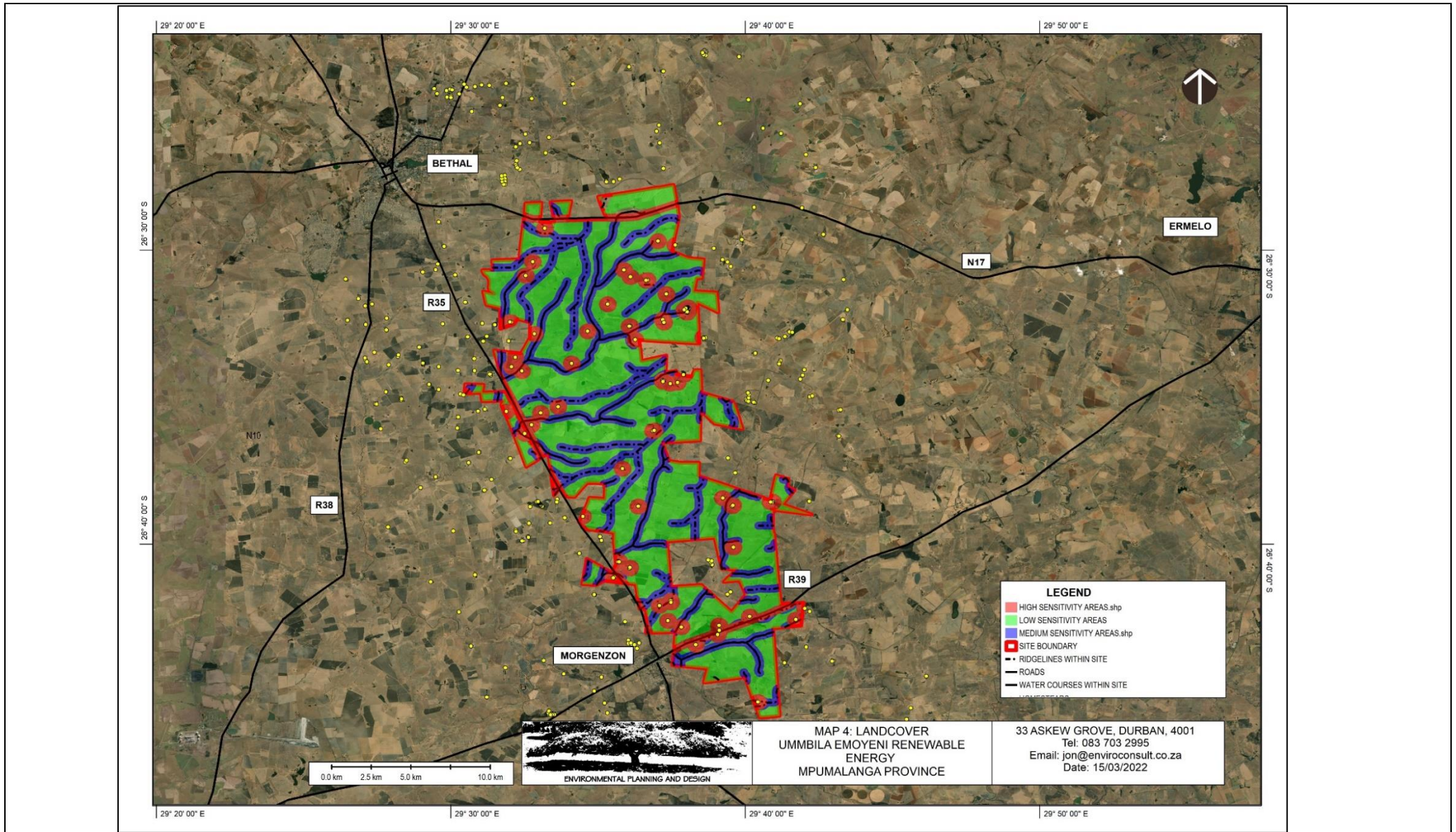


Figure 9.8: Sensitivities identified from a visual perspective

Issue	Nature of Impact	Extent	No-Go Areas
Potential change to the rural landscape	<u>Direct impacts:</u> » Loss of rural landscape. » The landscape is not protected. The character is also relatively common within the region. <u>Indirect impacts:</u> » No indirect impacts	Local	None identified at this stage
Description of expected significance of impact Without an indication of the possible location and layout of the project it is not possible to be confident regarding possible significance of impacts. The industrialisation of the landscape could be in keeping with surrounding development patterns in that it typically consists of contiguous areas with rural character within which relatively large-scale industrial elements are located.			
Gaps in knowledge & recommendations for further study » The proposed development layout. Recommendations with regard to general field surveys » Assessing the extent of change that will be obvious.			

Issue	Nature of Impact	Extent	No-Go Areas
Potential visual impact experienced by visitors to Silver Stream Reserve	<u>Direct impacts:</u> » Loss of visitor experience of rural landscape that is no doubt enhanced by view over the water body. The view could be industrialised by the proposed development. <u>Indirect impacts:</u> » Reduction in visitor numbers	Local	None identified at this stage
Description of expected significance of impact The industrialisation of views of the landscape within the reserve. Without an indication of the possible location and layout of the project it is not possible to be confident regarding possible significance of impacts. It has to be assumed that people visit the reserve for its tranquil rural nature. If the proposed development should change this situation, it could be a significant issue.			
Gaps in knowledge & recommendations for further study » The proposed development layout. Recommendations with regard to general field surveys » Assessing the extent of the proposed development that is likely to be visible from within the reserve.			

Issue	Nature of Impact	Extent	No-Go Areas
Potential visual impacts as experienced by users of adjacent local roads particularly users of the N17, the R35, the R38 and the R39	<u>Direct impacts:</u> » Industrialisation of views from roads. <u>Indirect impacts:</u> » No indirect impacts	Local	None identified at this stage
<p>Description of expected significance of impact The landscape is neither protected or of a particularly high quality. The landscape character is also relatively common in the region. Views over large scale industrial development is common from local roads. Without an indication of the possible location and layout of the project it is not possible to be confident regarding possible significance of impacts. However, as long as the proposed development does not dominate views from roads (outside high sensitivity area), the change in view is unlikely to have a high significance.</p> <p>Gaps in knowledge & recommendations for further study » The proposed development layout.</p> <p>Recommendations with regard to general field surveys » Assessing the extent of change that will be obvious.</p>			

Issue	Nature of Impact	Extent	No-Go Areas
Potential visual impacts as experienced by residents of homesteads	<u>Direct impacts:</u> » Industrialisation of views from homesteads. <u>Indirect impacts:</u> » Possible loss of income from homesteads that have a tourism related use.	Local	None identified at this stage
<p>Description of expected significance of impact It is possible that residents of homesteads that have a purely agricultural use may not be concerned regarding possible change in view due to the proposed development. However, for residents of homesteads with a tourism related use, subject to the proximity and extent of the proposed development that is visible, this could be an important issue. Without an indication of the possible location and layout of the project it is not possible to be confident regarding possible significance of impacts.</p> <p>Gaps in knowledge & recommendations for further study » The proposed development layout.</p> <p>Recommendations with regard to general field surveys » Assessing the extent of change that will be obvious.</p>			

Issue	Nature of Impact	Extent	No-Go Areas
Potential visual impacts as experienced by residents of local settlements.	<u>Direct impacts:</u> » Industrialisation of views from residential areas. <u>Indirect impacts:</u> » Possible loss of property value due to change in outlook.	Local	None identified at this stage
<p>Description of expected significance of impact</p> <p>Without an indication of the possible location and layout of the project it is not possible to be confident regarding possible significance of impacts. However, views of the proposed development are likely to be largely screened by vegetation and structures from the majority of settlement areas. Views could be possible from a limited number of dwellings on settlement edges; however, it is likely that these will be seen at a distance. It is unlikely therefore that views of the proposed development as seen from residential areas will be a significant issue</p>			
<p>Gaps in knowledge & recommendations for further study</p> <p>» The proposed development layout.</p> <p>Recommendations with regard to general field surveys</p> <p>» Assessing the extent of change that will be obvious.</p>			

Issue	Nature of Impact	Extent	No-Go Areas
Lighting Impacts.	<u>Direct impacts:</u> » Light pollution affecting areas that would otherwise be dark at night. <u>Indirect impacts:</u> » No indirect impact.	Local	None identified at this stage
<p>Description of expected significance of impact</p> <p>Lighting is likely to be required for security, for aircraft safety, for maintenance and for the safety / convenience of workers. There are other large scale industrial operations including a power station and mines, that create islands of light in the night-time sky. There are also numerous homesteads that create low levels of light. It is possible to mitigate lighting impacts to a large degree through design, the use of motion sensors for security lighting and ensuring that lighting is only used in areas where workers are located / working. Without an indication of the possible location and layout of the project it is not possible to be confident regarding possible significance of impacts. However, if suitable mitigation measures are used, it is unlikely that lighting impacts will be significant.</p>			
<p>Gaps in knowledge & recommendations for further study</p> <p>» The proposed layout and the nature of the proposed lighting.</p> <p>Recommendations with regard to general field surveys</p> <p>» Assessing the existing levels of impact.</p>			

Issue	Nature of Impact	Extent	No-Go Areas
Glare impacts	<u>Direct impacts:</u> » Glare affecting drivers on the N17, R35 and R39. <u>Indirect impacts:</u> » Road safety.	Local	None identified at this stage
<p>Description of expected significance of impact</p> <p>Shadow flicker could affect residents of homesteads close to turbines particularly in the early morning and late afternoon when the sun is low in the sky and during clear Glare on the affected roads could impair road safety particularly in the early morning and late afternoon when the sun is low in the sky. Glare impacts are relatively easily mitigated through screening as long as there is sufficient space between possible receptors and solar panels.</p> <p>Without an indication of the possible location and layout of the project it is not possible to be confident regarding possible significance of impacts. However, if suitable mitigation measures are used, it is unlikely that glare impacts will be significant.</p> <p>Gaps in knowledge & recommendations for further study</p> <p>» The proposed layout and the nature of the proposed array.</p> <p>Recommendations with regard to general field surveys</p> <p>» Undertake a basic geometric assessment.</p>			

9.3.8. Impacts on Traffic

<p>Impacts on traffic are expected in the construction and decommissioning phases. No impacts on traffic are expected during the operation phase. The decommissioning phase will have a similar impact as the Construction Phase i.e., traffic congestion, air pollution and noise pollution, as similar trips/movements are expected.</p> <p>Impact – Construction Phase</p> <p>Traffic congestion due to an increase in traffic caused by the transportation of equipment, material, and staff to site.</p> <p>Desktop Sensitivity Analysis of the Site</p> <p>Traffic congestion possible along the N17, R39 and R35, depending on the main access route selected.</p>			
Issue	Nature of Impact during the <u>Construction Phase</u>	Extent	No-Go Areas
Traffic congestion	Potential traffic congestion and delays on the surrounding road network. The associated noise, dust, and exhaust pollution due to the increase in traffic.	Local	None identified.
<p>Description of expected significance of impact</p>			

The significance of the transport impact during the construction phase can be rated as medium. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level. Traffic will return to normal levels after construction is completed.

Noise and dust pollution during the construction phase cannot be completely mitigated but mitigation measures will significantly reduce the impact. These potential impacts are limited to the construction period.

Gaps in knowledge & recommendations for further study

Gaps:

The following items need to be clarified:

- » Existing traffic volumes along the N17, R35 and R39
- » Alternative routes to bypass toll routes if required
- » Condition of the existing gravel road network if used as main access road
- » Local or imported components
- » Water source to be clarified – borehole or transported to site.
- » Number of components
- » Number of abnormal loads
- » Dimensions and weight of components
- » Construction period
- » Number of site staff
- » Fleet size
- » Site layout (depending on environmental constraints identified during the EIA and scoping processes), site access road and internal road layouts

Recommendations:

- » To clarify the items above, an additional site visit during the EIA phase is recommended.
- » Transport Specialist requires the above information when it becomes available.

Issue	Nature of Impact during the <u>Operational Phase</u>	Extent	No-Go Areas
The traffic generated during this phase will be negligible and will not have a significant impact on the surrounding road network. However, the Client/Facility Manager is to ensure that regular maintenance of gravel roads occurs during operation phase to minimise/mitigate dust pollution.			
Gaps in knowledge & recommendations for further study			
<ul style="list-style-type: none"> » The number of permanent employees » Availability of acceptable gravel sources required for maintenance of gravel roads 			

9.3.9. Impacts on Socio-Economic Environment

Construction Phase Impacts

Impact: Expenditure associated with the construction of the proposed Solar Energy Facility will impact on the production of the local economy.			
Desktop Sensitivity Analysis of the Site: No sensitivity identified.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
The economic impact arising from the initial investment will be felt throughout the economy with windfall effects benefitting related sectors in the economy. The effect is allocated according to direct, indirect and induced impacts, together forming the "multiplier effect"	Positive – The initial investment spend on the project will inject significant business sales/ production for the local and regional economy.	The impact will occur at a local, regional and national level.	N/A
Description of expected significance of impact			
» The estimated capital expenditure of the project will provide a significant injection into the local and regional economies. The impact will be positive, temporary, short-term, local to national extend, and the significance is medium.			
Gaps in knowledge and recommendations for further study			
» Information on the exact direct and indirect employment impact on business output / production will be determined during the EIA phase of the impact assessment.			

Impact: Temporary increase in country's GDP due to capital expenditure during construction			
Desktop Sensitivity Analysis of the Site: No sensitivity identified.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
The primary method of expanding GDP levels is through investment into infrastructure and enterprises that generate goods and services. Investment into the creation of new and improved goods and services, creates heightened levels of value added within the economy. Industries that will experience the largest temporary growth in value added, as a result of this,	Positive – The initial investment spend on the project will create significant value added for the local and regional economy.	The impact will occur at a local, regional and national level.	N/A

will include the building and construction, manufacturing and trade and accommodation sectors.			
Description of expected significance of impact			
» The estimated capital expenditure of the project will create significant value added to the local and regional economy. The exact value of that impact will be determined during the EIA phase of the impact assessment. The impact will be positive, short term, have local to national extend and the significance is medium.			
Gaps in knowledge and recommendations for further study			
» Information on the exact direct and indirect value added will be determined during the EIA phase when the economic modelling is done.			

Impact			
The construction of the Solar Energy Facility will positively impact the community and beyond by creating a number of job opportunities (albeit temporary).			
Desktop Sensitivity Analysis of the Site:			
No sensitivity identified.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
The unemployment rates in the local municipalities are between 26% and 29%. The development of this Solar Energy Facility will create significant employment opportunities during the construction period.	Positive – The construction period of the Solar Energy Facility will create a significant number of employment opportunities for the local economy.	The impact will occur at a local, regional and national level.	N/A
Description of expected significance of impact			
» The number of employment opportunities will be confirmed.			
Gaps in knowledge and recommendations for further study			
» Information on the exact number of job opportunities will be determined during the EIA phase when the economic modelling is done.			

Impact: Employees will develop and enhance skills thereby increasing experience and knowledge			
Desktop Sensitivity Analysis of the Site:			
No sensitivity identified.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Skills are imperative for satisfying job requirements and adequately performing tasks that ultimately boost the economy. The construction of the Solar Energy Facility requires a variation of skill sets	Positive – The transfer of skills to the workers, especially the semi-skilled workers will create a more capable workforce.	The impact will occur at a local, regional level.	N/A

ranging from semi-skilled construction workers to highly skilled engineers.			
Description of expected significance of impact			
» Employees who are new to the market will develop and attain new skills, whilst workers adept in particular skills will sharpen their abilities. In addition, the employees will improve their marketability for future employment and will be perceived positively by future employers. The impact will be long term, the extent will be local to regional, and the significance is high.			
Gaps in knowledge and recommendations for further study			
» None.			

Impact: Employed individuals will increase the income of their respective households and thereby experience an improvement in their standard of living			
Desktop Sensitivity Analysis of the Site: No sensitivity identified.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
The employment creation during the construction period will temporarily increase affected households' income	Positive – The increased income earned during the construction for workers will improve their standard of living as well as those of their households.	The impact will occur at a local and regional level and National.	N/A
Description of expected significance of impact			
» Employed individuals will increase the income of their respective households and therefore improve their standard of living during the construction period. In the context of the proposed power plant, workers employed in the construction as well as their households can expect an improvement in their quality of life and standard of living. The impact will be short term, local in extent and of medium significance.			
Gaps in knowledge and recommendations for further study			
» None.			

Impact: The investment in the facility will generate revenue for the government during the construction period through a combination of personal income tax, VAT, companies' tax etc.			
Desktop Sensitivity Analysis of the Site: No sensitivity identified.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Government earnings will be distributed by national government to cover public spending which includes amongst others the provision and maintenance of	Positive – The increased income earned during the construction for workers will generate revenue for government.	The impact will occur at a local and regional level and National.	N/A

transport infrastructure, health, and education services as well as other public goods.			
Description of expected significance of impact			
» The impact will be short term, local in extent and of medium significance.			
Gaps in knowledge and recommendations for further study			
» None.			

Impact: Sense of place impacts (visual, noise and dust).			
Desktop Sensitivity Analysis of the Site: No sensitivity identified.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Sense of place impacts in terms of visual change of the area, increase in noise and dust levels due to construction activities.	Negative – The impact will negatively impact sensitive receptors and could cause disruptions for neighbouring properties.	The impact will occur at a local level.	N/A
Description of expected significance of impact			
» Impacts associated with construction related activities include visual, noise and dust to adjacent properties. Site clearing activities increase the risk of dust and noise being generated, which can in turn negatively impact on adjacent properties. The impact is likely to be negative, local in extent, short-term, and of medium significance.			
Gaps in knowledge and recommendations for further study			
» None.			

Impact: An impact on the demographics of the area as a result of in-migration in response to job opportunities will occur			
Desktop Sensitivity Analysis of the Site: No sensitivity identified.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Increased pressure on infrastructure and basic services, and social conflicts during construction as a result of in-migration of people.	Negative – The in-migration of job seekers to the area could result in increased pressure being placed on infrastructure and basic services, and a rise in social conflicts.	The impact will occur at a local and regional level.	N/A
Description of expected significance of impact			

» The in-migration of people to the area as either non-local workforce and / or jobseekers could result in increased pressure being placed on infrastructure and basic services on the local population (rise in social conflicts). An influx of people into the area, could lead to a temporary increase in crime levels, cause social disruption, and put pressure on basic services. An influx of people looking for economic opportunities could result in pressure on the local population such as rise in social conflicts and change in social dynamics, increase in HIV, pregnancies and drug abuse. Adverse impacts could occur if a large in-migrant workforce, which is culturally different from the local population, is brought in during construction. The impact is likely to be negative, local in extent, short-term, and of low significance due to the number of jobs expected to be created, and the proportion of which would accrue to the non-local workforce.

Gaps in knowledge and recommendations for further study

» None.

Impact: Impacts on daily living and movement patterns.

Desktop Sensitivity Analysis of the Site:

No sensitivity identified.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Temporary increase in traffic disruptions and movement patterns during the construction period.	Negative – An increase in traffic due to construction vehicles and heavy vehicles could create short-term disruptions and safety hazards for current road users.	The impact will occur at a local level.	N/A

Description of expected significance of impact

» Increased traffic due to construction vehicles and heavy vehicles could cause disruptions to road users and increase safety hazards. The use of local roads and transport systems may cause road deterioration and congestion. The impact is likely to be negative, local in extent, short-term, and of medium significance.

Gaps in knowledge and recommendations for further study

» Number of vehicle trips anticipated during construction.

Operation Phase Impacts

Impact: Expenditure associated with the operation of the proposed Solar Energy Facility will have a positive impact on production			
Desktop Sensitivity Analysis of the Site: No sensitivity identified.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Once operational, it is estimated that the proposed Solar Energy Facility will stimulate production.	Positive – The operational spend on the project will inject business sales/production for the local and regional economy.	The impact will occur at a local, regional and national level.	N/A
Description of expected significance of impact			
» The operational expenditure will provide an injection into the local and regional economies. The power plant will have to acquire inputs from a variety of sectors such as trade and accommodation, transport and storage, and government services.			
Gaps in knowledge and recommendations for further study			
» Information on the exact direct and indirect employment impact on business output / production will be determined during the EIA phase of the impact assessment.			

Impact: Positive impact on GDP due to operating expenditure during operations			
Desktop Sensitivity Analysis of the Site: No sensitivity identified.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
The primary method of expanding GDP levels is through investment into infrastructure and enterprises that generate goods and services. Industries that will experience the largest growth in value added, as a result of this, will include the transport, storage and manufacturing sectors.	Positive – The operational spend on the project will create significant value added for the local and regional economy.	The impact will occur at a local and regional level and national.	N/A
Description of expected significance of impact			
» The operational expenditure will create value added to the local and regional economy. The exact value of that impact will be determined during the EIA phase of the impact assessment. The impact will be positive, long term, local to national in extent and of medium significance.			
Gaps in knowledge and recommendations for further study			
» Information on the exact direct and indirect value added will be determined during the EIA phase when the economic modelling is done.			

Impact: The Solar Energy Facility will create additional employment due to maintenance of the solar panels.			
Desktop Sensitivity Analysis of the Site: No sensitivity identified.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
The operation of this Solar Energy Facility will create employment opportunities during the operational period.	Positive – The operations of the Solar Energy Facility will create a number of employment opportunities for the local economy.	The impact will occur at a local, regional, and national level.	N/A
Description of expected significance of impact			
» The operation of this Solar Energy Facility will create minor employment opportunities during the operational period. Only maintenance will be needed, as the solar panels operates independently.			
Gaps in knowledge and recommendations for further study			
» Information on the exact number of job opportunities will be determined during the EIA phase when the economic modelling is done.			

Impact: Employed individuals will increase the income of their respective households and thereby experience an improvement in their standard of living			
Desktop Sensitivity Analysis of the Site: No sensitivity identified.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
The employment creation during the operational period will permanently increase affected households' income	Positive – The increased income earned during the operations for workers will improve their standard of living as well as those of their households.	The impact will occur at a local and regional level and National.	N/A
Description of expected significance of impact			
» Employed individuals will increase the income of their respective households and therefore improve their standard of living during the operational period. In the context of the proposed Solar Energy Facility, workers employed in the operations as well as their households can expect an improvement in their quality of life and standard of living. The impact will be long term, local in extent and of medium significance.			
Gaps in knowledge and recommendations for further study			
» None.			

Impact: The investment in the facility will generate revenue for the government during the operational period through a combination of personal income tax, VAT, companies' tax etc.			
Desktop Sensitivity Analysis of the Site: No sensitivity identified.			

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Government earnings will be distributed by national government to cover public spending which includes amongst others the provision and maintenance of transport infrastructure, health, and education services as well as other public goods.	Positive – The increased income earned during the operations for workers will generate revenue for government.	The impact will occur at a local and regional level and National.	N/A
Description of expected significance of impact The impact will be long term, local in extent and of medium significance.			
Gaps in knowledge and recommendations for further study » None.			

Impact: Increase in revenue due to rental paid for landowners where the PV array will be located			
Desktop Sensitivity Analysis of the Site: No sensitivity identified.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
It is anticipated that farms where the PV array is located on will enter into a rental agreement with the developer. The owners will likely thus receive rental revenue as a result of hosting the turbines on their property.	Positive – The increased income earned	The impact will occur at a local and regional level and National. Local (2)	N/A
Description of expected significance of impact » The impact will be long term, local in extent and of medium significance.			
Gaps in knowledge and recommendations for further study » Information on the amount to be paid to landowners could change the significance of the impact.			

Impact: Improved energy security and energy sector will result due to the development of the Solar Energy Facility			
Desktop Sensitivity Analysis of the Site: No sensitivity identified.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas

<p>The Solar Energy Facility will provide the important national service of providing new electricity capacity into the national grid. Strategically, the proposed project will assist in improving electricity security and reducing transmission losses in the national grid.</p>	<p>Positive – The operational phase of the Solar Energy Facility will improve energy and grid security.</p>	<p>The impact will occur at a local and regional and national level.</p>	<p>N/A</p>
<p>Description of expected significance of impact</p> <p>» The ability and operational flexibility are to be ramped up or down to suit the system demand on an hourly or daily basis, will additionally increase efficiency. The impact will be positive, long term, local to national extend and of high significance.</p>			
<p>Gaps in knowledge and recommendations for further study</p> <p>» None.</p>			

<p>Impact: Visual and sense of place impacts.</p>			
<p>Desktop Sensitivity Analysis of the Site: No sensitivity identified.</p>			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
<p>Sense of place impacts from a social perspective associated with the operation phase of the Solar Energy Facility</p>	<p>Negative – The project could alter the areas sense of place which could negatively impact on sensitive receptors.</p>	<p>The impact will occur at a local level.</p>	<p>N/A</p>
<p>Description of expected significance of impact</p> <p>» The presence of the solar PV array could impact the “sense of place” for the local community. The impact is likely to be negative, local in extent, long-term, and of medium significance considering it is located within an agricultural dominated area.</p>			
<p>Gaps in knowledge and recommendations for further study</p> <p>» None.</p>			

<p>Impact: Loss of agricultural space</p>			
<p>Desktop Sensitivity Analysis of the Site: No sensitivity identified.</p>			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
<p>The solar panels will take up a certain amount of space, this will result in loss of agricultural land.</p>	<p>Negative – Loss of arable land to generate income</p>	<p>The impact will occur at a local level.</p>	<p>N/A</p>
<p>Description of expected significance of impact</p>			

» The impact is likely to be negative, local in extent, long-term, and of medium significance.

Gaps in knowledge and recommendations for further study

» Information on the number of solar panels will determine to approximate arable land that is lost.

9.4 Evaluation of Potential Cumulative Impacts Associated with the Umbila Emoyeni 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 Umbila Emoyeni 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 Umbila Emoyeni Solar Energy Facility have been viewed from two perspectives within this Scoping Report:

- » Cumulative impacts associated with the scale of the project (one 150MW 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 9.10**):

Project Name	Project Status
Majuba Solar PV Facility	Authorised
Tutuka Solar PV Facility	Authorised
Forzando North Coal Mine Solar PV Facility	Authorised

In addition to the renewable energy facilities listed above, one new renewable energy facility (i.e., one Solar Energy Facility is proposed adjacent to the Umbila Emoyeni Solar Energy Facility, namely:

Project Name	Contracted Capacity
Umbila Emoyeni Wind Energy Facility	666MW

The cumulative impacts that have the potential to be compounded through the development of the Umbila Emoyeni 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 Umbila Emoyeni Solar Energy Facility within the project site being considered for the development:

- » 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).
- » Unacceptable increase in ambient noise conditions.
- » Complete or whole-scale change in the sense of place and character of an area and unacceptable visual intrusion.
- » Unacceptable impact on traffic and road conditions.
- » 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.

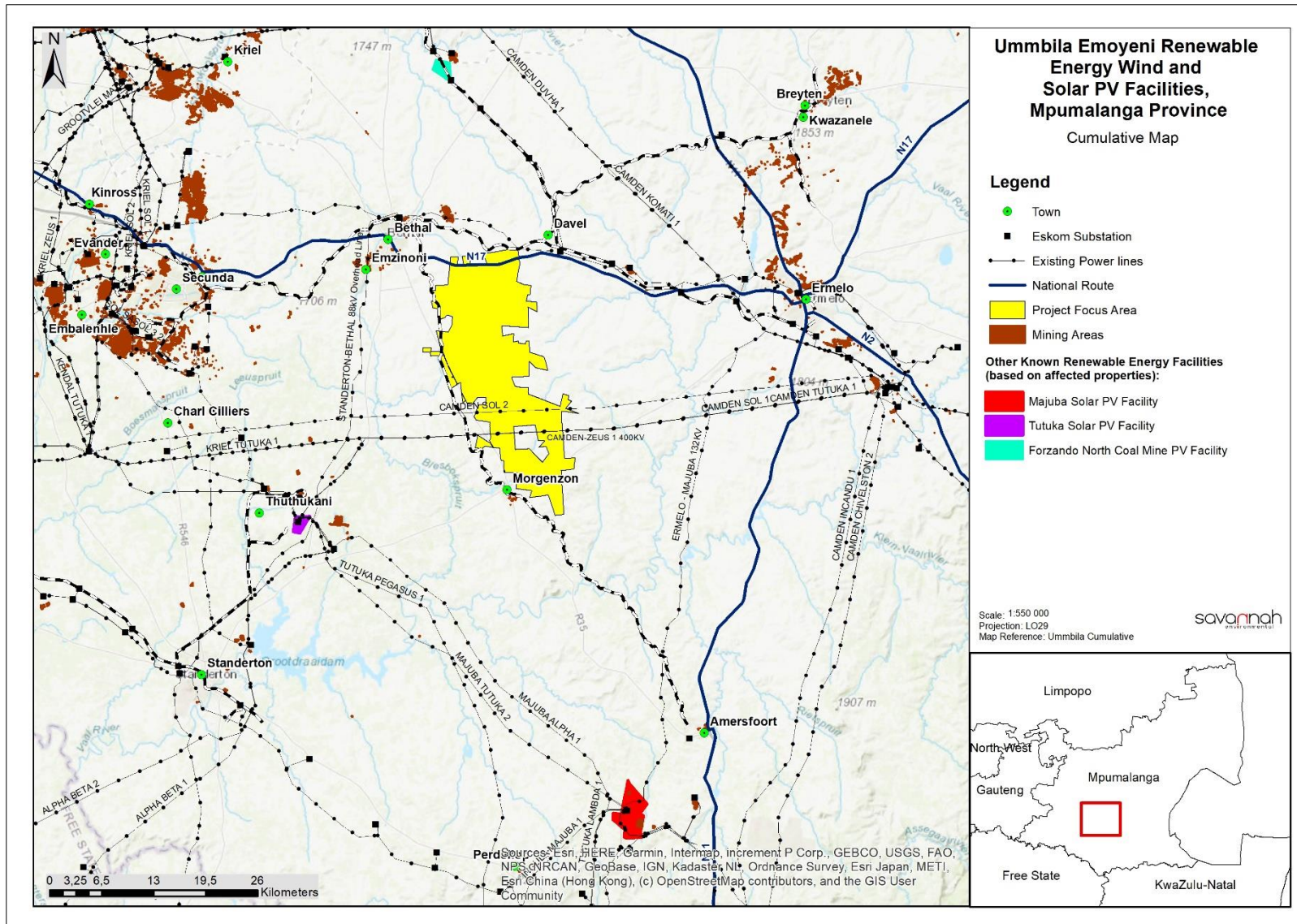


Figure 9.10: Cumulative map illustrating other approved and/or constructed renewable energy facilities located within a 30km radius of the Umbila Emoyeni Solar Energy Facility

CHAPTER 10: CONCLUSIONS

This Scoping Report is aimed at detailing the nature and extent of the proposed development, identifying and describing potential issues associated with developing the Umbila Emoyeni Solar Energy Facility and associated infrastructure on the identified site, potential environmental fatal flaws and/or areas of sensitivity, and defining the extent of studies required to be undertaken as part of the detailed EIA phase. 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 Umbila Emoyeni Solar Energy Facility is included within this chapter as a whole.

10.2. Overview of the Umbila Emoyeni Solar Energy Facility

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.
- » Consideration of feasible alternatives to be assessed during the EIA Phase.
- » 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 Report.

The Umbila Emoyeni Solar Energy Facility is proposed on a site located ~6km south-east of Bethal and 1km east of Morgenzon. The project site is located within Ward 15 of the Govan Mbeki Local Municipality, Ward 12 of the Lekwa Local Municipality and Wards 8 and 10 of the Msukaligwa Local Municipality, which form part of the Gert Sibande District Municipality in the Mpumalanga Province on the following affected properties:

Parent Farm Number	Farm Portions
Farm 261 – Naudesfontein	15, 21
Farm 264 – Geluksplaats	0, 1, 3, 4, 5, 6, 8, 9, 11, 12
Farm 268 – Brak Fontein Settlement	6,7,10,11,12
Farm 420 – Rietfontein	8,9,10,11,12,15,16,18,19,22,32
Farm 421 - Sukkelaar	2, 2, 7, 9, 9 10, 10 11, 11 12, 12, 22 ,25, 34, 35, 36, 37, 37, 38, 39, 40, 42, 42
Farm 422 – Klipfontein	0, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 23
Farm 423 – Bekkerust	0, 1, 2, 4, 5, 6, 10, 11, 12, 13 14, 15, 17, 19, 20, 22, 23, 24,25
Farm 454 – Oshoek	4, 13, 18
Farm 455 – Ebenhaezer	0, 1, 2, 3
Farm 456 – Vaalbank	1, 2, 3, 4, 7, 8, 13, 15, 16, 17, 18, 19
Farm 457 – Roodekrans	0, 1, 4, <u>5</u> , 7, 22, 23, 23
Farm 458 – Goedgedacht	0, 2, <u>3</u> , 4, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 21, 22, <u>23</u> , 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, <u>36</u> , 37, 39, <u>41</u> , <u>42</u> , <u>43</u>
Farm 467 – Twee Fontein	0, 1, 4, 5, 6, 7, 8, 10
Farm 469 – Klipkraal	5, 6, 7, 8
Farm 548 – Durabel	0
Farm 470 – Dorpsplaats	<u>85</u>
Farm 451 - Drinkwater	<u>4, 22</u>
Farm 452 - Brakfontein	<u>5</u>

The Umbila Emoyeni 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 150MW:

- » PV modules in the range of 330Wp to 450Wp mounted on either a fixed tilt or single axis tracker structure, dependent on optimisation, technology available and cost.
- » Inverters and transformers.
- » 33kV cabling to connect to the onsite collector substation, to be laid underground where practical.
- » 33kV/132kV onsite collector substation (IPP Portion).
- » Battery Energy Storage System (BESS).
- » Cabling between project components.
- » Laydown and O&M hub (approximately 300m x 300m):
 - o Construction compound (temporary).
 - o Maintenance office.
- » Access roads (up to 12m wide) and internal distribution roads (up to 12m wide).

The Scoping study included the identification of potential impacts associated with the project through specialist inputs and consultation with affected parties and key stakeholders. A preliminary evaluation of the extent and expected significance of potential impacts associated with the development of the Umbila Emoyeni Solar Energy Facility has been detailed in Chapter 9. These will be assessed in detail through the EIA Phase assessment, which will include independent specialist assessments.

This scoping study has identified sensitive areas within the project site to assist in focussing the location of the development footprint for the Umbila Emoyeni Solar Energy Facility to minimise the potential for environmental impact. The extent of the project site is ~27 819ha and has been considered in this Scoping Report. 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. The size of the development footprint within the development area will be confirmed in the EIA Phase once the facility layout is available for assessment.

The majority of potential impacts identified to be associated with the construction of the Umbila Emoyeni 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.

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

- » Impacts on vegetation and protected plant species.
- » Direct faunal impacts.
- » Soil erosion and associated degradation of ecosystems.
- » Alien plant invasion.
- » Impacts on CBAs and broad-scale ecological processes.
- » Loss of sensitive wetland habitats and loss of/or disturbance of wetland vegetation.
- » Reduction in water quality in wetland systems.
- » Modification of bat foraging/commuting habitat.
- » Destruction of/Disturbance to bat roosts.
- » Barrier effects.
- » Polarized light pollution.
- » Disturbance to bats.
- » Mortality of priority bird species due to collision with the solar panels and electrocution and collisions with voltage power lines within the facility.
- » Direct avifauna habitat destruction and displacement of bird species.
- » Compaction/soil stripping/transformation of land use which leads to loss of land capability Destruction of archaeological and palaeontological heritage.
- » Negative impact to significant cultural landscapes.
- » Visual impacts on the landscape and sense of place.
- » Traffic congestion during construction.
- » Social impacts, both positive and negative (job creation and business opportunities, impacts associated with construction workers in the area, and economic benefits).

10.3. Site Sensitivity Analysis for the Umbila Emoyeni 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 Umbila Emoyeni Solar Energy Facility.

10.3.1 Terrestrial Ecology Sensitive Features

Sensitivities that occur specifically within the project site for the Umbila Emoyeni Solar Energy Facility that may be vulnerable to damage from the proposed project are as follows:

- » Primary Grassland (CBA1: Optimal) – High Sensitivity
- » Cultivated Areas – Low Sensitivity
- » Infrastructure – Low Sensitivity
- » Secondary Grassland – Low – Medium Sensitivity
- » Primary Grassland – Medium Sensitivity
- » Freshwater Resources – Very High Sensitivity
- » Primary Grassland (CBA1: Irreplaceable) – Very High Sensitivity

From a developmental perspective, development within the Low (cultivated areas) and Low-Medium (secondary grassland) sensitive area is most suitable/preferable. Development within the primary grassland areas, that are not included within the CBAs (medium sensitive) is regarded as acceptable, with the implementation of appropriate mitigation measures. Development within the Irreplaceable CBAs is regarded as unacceptable, and these areas should be regarded as “No-Go” areas for the Solar Energy Facility development. The Optimal CBAs are regarded as unsuitable/unacceptable for the development of the Solar Energy Facility due to the nature of the development (transformation of large contiguous areas). Placement of cabling and access roads, within these Optimal Natural Areas, is regarded acceptable. Construction activities within these areas, will however have to be restricted as far as possible, and to a small as possible area. Existing access routes should be used as far as possible.

10.3.2 Freshwater Sensitive Features

Sensitivities that occur specifically within the project site for the Umbila Emoyeni Solar Energy Facility that may be vulnerable to damage from the proposed project are as follows:

- » Freshwater Resources – Very High Sensitivity
- » 100m Buffer: Exorheic Features (Seeps, Valley Bottom Wetlands and Floodplains – High Ecological Importance)
- » 50m Buffer: Endorheic Features (Seeps and Depression Wetlands – Low and Moderate Ecological Importance)

All freshwater features with their buffer areas have been classified as either Very High- or High sensitive and should be regarded as “No-Go” areas apart from the following activities and infrastructure which may be allowed (although restricted to an absolute minimum footprint):

- » only activities relating to the route access and cabling:
 - * The use/upgrade of existing roads and watercourse crossings are the preferred options.

- * Where no suitable existing roads and watercourse crossings exist, the construction of new access roads and watercourse crossings can be allowed, however this should be deemed as a last resort.
- * All underground cabling should be laid either within access roads or next to access roads (as close as possible).

10.3.3 Bat Sensitive Features

Bat sensitivities identified within the project site for the Umbila Emoyeni Solar Energy Facility are listed in **Table 10.1** below. Habitat features such as tree clumps, buildings, dams/wetlands, and rivers/streams have been buffered and classified as No-Go areas for PV panel placement. Panel placement should be prioritised for low sensitivity areas (i.e., open grassland and cultivated areas), and only if needed, then in medium sensitivity areas.

Table 10.1: Bat sensitive features identified within the project site for the Umbila Emoyeni Solar Energy Facility

Risk Level			
Low	Medium	High	No-Go
Heavily modified land	CBA Optimal	CBA Irreplaceable Areas	Farm Dams
Moderately modified land	ESA Landscape corridor		Wetlands
	ESA Local corridor		Trees
	Other Natural Areas		Buildings
			Rivers/Streams
			Wetlands

10.3.4 Avifaunal Sensitive Features

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 is currently underway). 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:

- » Wetlands - Very High Avifaunal Site Ecological Importance
- » Natural Grasslands – High Avifaunal Site Ecological Importance
- » Agricultural/cultivated fields – Very Low Avifaunal Site Ecological Importance

The wetlands and aquatic habitats are regarded as no-go areas for development. Avoidance mitigation within the high sensitivity areas is recommended wherever possible. Development within the very low sensitivity areas is permitted/preferred.

10.3.5 Soils and Land Capability Sensitive Features

The land capability sensitivity indicates a range of sensitivities expected throughout the project focus area, namely, “Moderately Low” to “Moderate” sensitivities. Smaller patches are characterised by sensitivities up to “Moderately High”. Furthermore, various crop field boundaries were identified by means of the DFFE Screening Tool (2022), which are predominantly characterised by “High” sensitivities with one area being classified as “Very High” sensitivity.

There are no areas identified which are required to be excluded from the proposed development footprint at this stage. This will be confirmed during the EIA Phase.

10.3.6 Heritage Sensitive Features (incl. Archaeology, Palaeontology, and Cultural Landscape)

Heritage sensitivity relates to archaeological resources, palaeontological resources, heritage resources, and the cultural landscape. According to the SAHRIS Palaeosensitivity, the area proposed for development is underlain by sediments of zero, moderate and very high palaeontological sensitivity. The palaeontologically sensitive geology of the area is ascribed to the Vryheid Formation of the Ecca Group of sediments. The Vryheid Formation consists of interbedded very coarse-grained sandstone and mudstone that yields plant and trace fossils as well as some prominent coal seams.

There are no sites of archaeological and palaeontological significance identified at this stage which are required to be excluded from the proposed development footprint at this stage. This will be confirmed during the EIA Phase. In terms of cultural landscape, the historic farm werfs identified within the project site are regarded as no-go areas for development and a 1km buffer has been recommended around these sites.

10.3.7 Visual Sensitive Features

The following sensitivities were identified from a visual perspective:

- » Highly sensitive areas include:
 - * Areas immediately surrounding settlement and homesteads development of which is likely to significantly change the character of views for residents. A 500m buffer is proposed which should be sufficient to ensure that development does not totally dominate views. It is possible that receptors (owners /residents) have no concern regarding the development of these areas, in which case the sensitivity rating will reduce.
 - * Corridors beside the main roads that could be affected including the N2, the R35, the R 38 and the R39. This is deemed sensitive because development in this corridor is likely to be highly obvious to people travelling along the roads and because it is possible that motorists could be affected by glare and the proposed 250m corridor should be sufficient to enable mitigation in the form of screening to be undertaken.
- » Medium sensitivity areas include:
 - * Watercourses and a buffer of 250m either side of watercourses. These areas are proposed in order to protect these natural features within the proposed focus area.
- » Low sensitivity areas include:
 - * Valley side slopes the development of which is likely to make the project least obvious from surrounding areas. The fact that development may be focused on areas with relatively low sensitivity does not preclude the necessity for mitigation.

10.4 Overall Conclusion and Fatal Flaw Analysis

The project site for the Umbila Emoyeni Solar Energy Facility is outlined in black in **Figure 10.1**. The findings of the Scoping Study indicate that no environmental fatal flaws are associated with the proposed project.

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 150MW facility with relatively low impacts on the environment. This area is referred to as the development footprint.

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 final design of the facility.

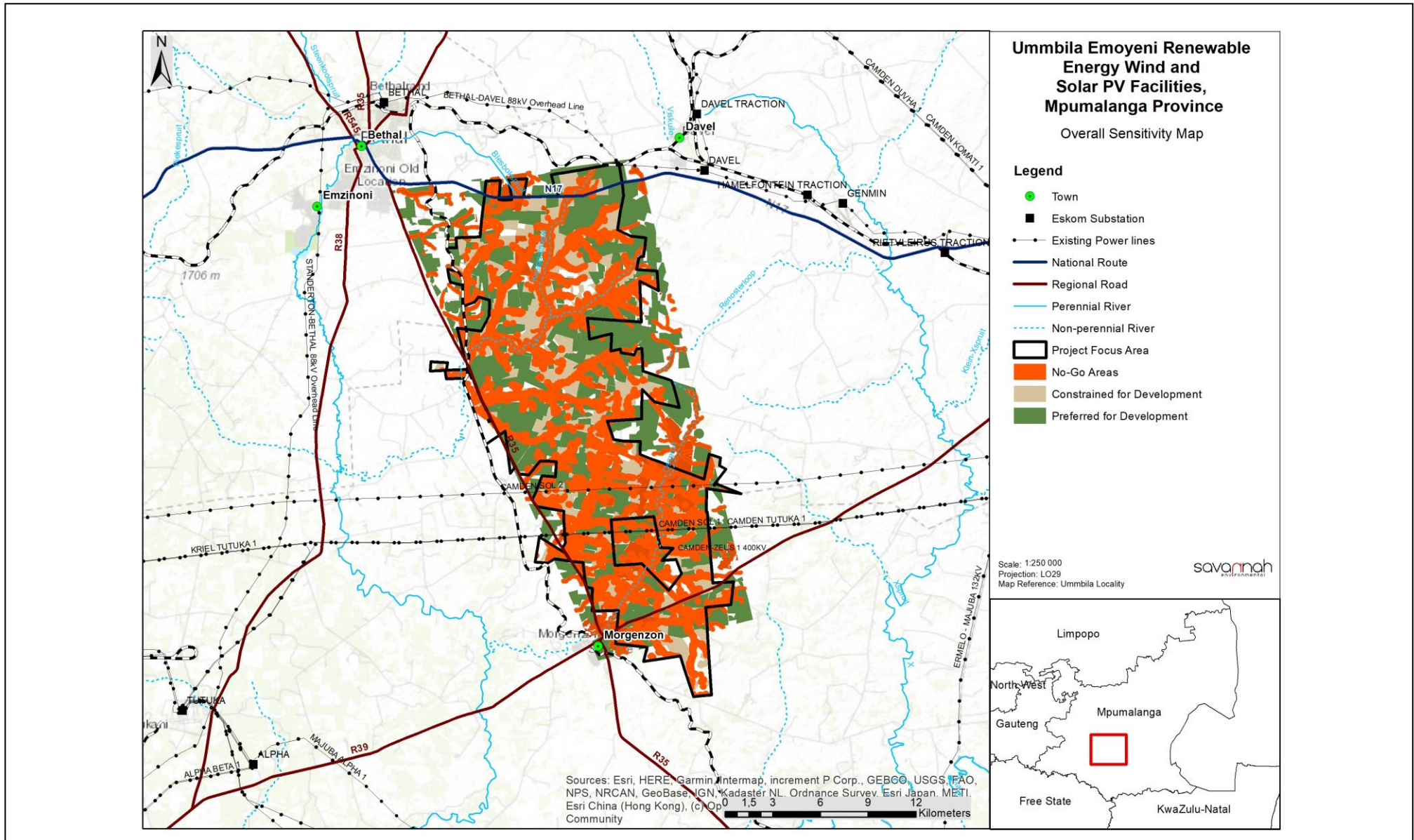


Figure 10.1: Environmental Sensitivity Map from the results of the scoping evaluation for the Umbila Emoyeni Solar Energy Facility and associated infrastructure

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 Umbila Emoyeni 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
(h) a plan of study for undertaking the environmental impact assessment process to be undertaken, including - <ul style="list-style-type: none"> (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 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 be managed and monitored. 	A plan of study for the undertaking of the EIA Phase for the Umbila Emoyeni Solar Energy Facility is included within this chapter as a whole.

11.2 Objectives of the EIA Phase

The EIA Phase to be undertaken for the Umbhila Emoyeni 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 Umbhila Emoyeni 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 Umbhila Emoyeni Solar Energy Facility
Property/Location and Layout Alternatives	One preferred project site has been identified for the development of the Umbhila Emoyeni 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 ~27 819ha in extent which is considered to be sufficient for the development of a Solar Energy Facility with a contracted capacity of up to 150MW. 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	Emoyeni Renewable Energy <u>Farm</u> (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 of the site, including the natural resources available. The use solar panels for the

Nature of Alternatives Considered	Description of the Alternatives relating to the Umbila Emoyeni Solar Energy Facility
	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 Umbila Emoyeni 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 are detailed in **Table 11.1** below. 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.

Table 11.1: Activities and associated infrastructure to be assessed in the EIA

Infrastructure	Footprint and dimensions
Number of Panels	To be determined in the EIA phase
Panel Height	Up to 5m
Technology	Use of fixed-tilt, single-axis tracking, and/or double-axis tracking PV technology. Monofacial or bifacial panels are both considered.
Contracted Capacity	Up to 150MW
Area occupied by the solar array	To be determined in the EIA phase
Area occupied by the on-site facility substation (IPP Portion)	~5ha
Capacity of on-site facility substation (IPP Portion)	33kV/132kV
Underground cabling between the PV array and the onsite substation	Cabling will be installed underground where feasible at a depth of up to 1.5m to connect the PV panels to the on-site facility substation. Where not technically feasible to place cabling underground, this will be installed above-ground. The cabling will have a capacity of up to 33kV.
Laydown and Operations and Maintenance (O&M) hub	~ 300m x 300m, comprising: <ul style="list-style-type: none"> * Construction compound (temporary) of approximately 6 ha. * O&M office of approximately 1.5ha.
Area occupied by laydown area	~75m x 120m
Access and internal roads	Wherever possible, existing access roads will be utilised to access the project site and development area. It is unlikely that access roads will need to be upgraded as part of the proposed development. Internal roads of up to 12-13m in width will be required to access the PV panels and the on-site substation.
Grid connection	The grid connection infrastructure will include a 400/132kV Main Transmission Substation (MTS), to be located between Camden and SOL Substations, which will be looped in and out of the existing Camden-Sol 400kV transmission line; <u>on-site switching stations (132kV in capacity) at each renewable energy facility (Eskom Portion); 132kV power lines from the switching stations at each renewable energy facility to the new 400/132kV MTS; and a collector substation with 2 x</u>

Infrastructure	Footprint and dimensions
	132kV bus bars and 4 x 132kV IPP feeder bays to onsite IPP Substation. The grid connection infrastructure will be assessed as part of a separate Environmental Impact Assessment process in support of an application for Environmental Authorisation.
Temporary infrastructure	Temporary infrastructure, including laydown areas, hardstand areas and a concrete batching plant, will be required during the construction phase. All areas affected by temporary infrastructure will be rehabilitated following the completion of the construction phase, where it is not required for the operation phase.

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 11.2**. 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.

Table 11.2: 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 Umbila Emoyeni Solar Energy Facility

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
<p>Terrestrial Ecology (Fauna and Flora)</p>	<p>The Terrestrial Biodiversity (Fauna and Flora and Terrestrial Habitat) Assessment will be conducted in accordance with the protocols and procedures (3(a-d)) as set out in Section 24(5)(a) and (h) of the National Environmental Act, 1998, which has been gazetted on 10 January 2020. Furthermore, the Terrestrial Biodiversity (Fauna and Flora) Impact Assessment will be undertaken in accordance with the Species Environmental Assessment Best Practice Guidelines.</p> <p><u>The EIA Phase will include the following activities:</u></p> <ul style="list-style-type: none"> » Detailed baseline field survey to assess baseline terrestrial vegetation status, species composition, condition and importance, with a focus on mapping and assessing untransformed grassland vegetation and habitat. A key distinction will be made between primary and secondary vegetation communities, and the representatives of any remaining intact grassland vegetation communities by comparison with known reference state/composition. » Baseline vegetation surveys to include an assessment of faunal SCC which will need to be documented and GPS coordinates taken for species encountered in the field. » The focus of faunal surveys should be on assessing habitat condition and requirements for key mammal and herpetofaunal species and documenting the presence and location of any SCC in the field. » Identification and assessment of the estimated significance of key ecological impacts to vegetation, plant species and fauna. » Confirm any fatal flaws from a terrestrial ecological perspective to inform planning and layout of development proposed. » Assess the need and desirability for terrestrial biodiversity offsets (where necessary) and provide preliminary recommendations. » Recommendations in terms of impact mitigation and management aimed at reducing impacts significant in line with the principles of the 'mitigation hierarchy', including possible biodiversity buffer zones, development realignments, onsite controls (Best Management Practices: BMPs) and initial post-development rehabilitation requirements (i.e. conceptual terrestrial habitat rehabilitation strategy). <p><u>Assessment of Impacts for the EIA</u></p> <p>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</p>	<p>Gerhard Botha of Nkurenkuru Ecology and Biodiversity (Pty) Ltd</p>

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	<p>environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive).</p> <p>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.</p> <p><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.</p>	
<p>Freshwater resources (including all waterbodies and wetlands)</p>	<p>The Aquatic Biodiversity Assessment will be conducted in accordance with the protocols and procedures (3(a-d)) as set out in Section 24(5)(a) and (h) of the National Environmental Act, 1998, which has been gazetted on 10 January 2020.</p> <p><u>The EIA Phase will include the following activities:</u></p> <ul style="list-style-type: none"> » A detailed baseline field survey to delineate and classify all freshwater resource features within the project site has already been completed. However, the field survey for the EIA will focus on the assessment on freshwater resource condition, functioning and importance/sensitivity. » Identification and assessment of the estimated significance of key ecological impacts to wetlands/watercourses. » Assess the need and desirability for wetland/watercourse offsets (if necessary) and provide preliminary recommendations. » Recommendations in terms of impact mitigation and management aimed at reducing impacts significant in line with the principles of the 'mitigation hierarchy', including relevant wetland buffer zones, development realignments, onsite controls (Best Management Practices: BMPs) and initial post-development rehabilitation requirements (i.e. conceptual wetland rehabilitation strategy). <p><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).</p> <p>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.</p>	<p>Gerhard Botha of Nkurenkuru Ecology and Biodiversity (Pty) Ltd</p>

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	<p><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.</p>	
Bats	<p><u>The EIA Phase will include the following activities:</u> Nine of the 12 months of pre-construction bat monitoring were completed for the project as part of the scoping study. No changes will be made to the methodology described in this Bats Scoping Study (Section 4) since this currently meets best practise standards for obtaining sufficient baseline bat data with which to assess impacts of the project. The monitoring will be completed in May 2022 at which time the final EIA will be undertaken, and the significance of impacts to bats determined for each impact identified in the Scoping Study.</p> <p><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).</p> <p>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.</p> <p><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.</p>	Jonathan Aronson of Camissa
Avifauna	<p><u>The EIA Phase will include the following activities:</u> An avifauna impact assessment report will be compiled and be informed by the results of 12-month pre-construction monitoring programme. The following activities will be undertaken during the EIA Phase:</p> <ul style="list-style-type: none"> » Spatio-temporal utilisation of the site by target species and species of special concern including levels of flight activity. » Mapping of all target species and species of special concern within the development footprint. » Mapping of known and potential habitats used in breeding, foraging and roosting. » Describing the current land use and indicating these on a sensitivity map. » Providing an indication of the potential of target species to occur on the proposed development site. 	Owen Davies of Arcus Consulting

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	<p>» Providing an indication of the nesting locations of target species to occur on the proposed development site.</p> <p><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).</p> <p>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.</p> <p><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.</p>	
<p>Soils and Agricultural Potential</p>	<p><u>The EIA Phase will include the following activities:</u> The soils impact assessment will include the consideration of aspects related to agricultural aspects in accordance with the protocols and procedures of GN 320 of 2020. The assessment will also include:</p> <ul style="list-style-type: none"> » Identification and delineation of soil forms. » Determination of soil sensitivity. » Undertake a field survey that will prioritise the development area. <p><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).</p> <p>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.</p> <p><u>Environmental Management Programme:</u></p>	<p>Ivan Baker/Andrew Husted of the Biodiversity Company</p>

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
<p>Heritage (including Cultural Landscape, Archaeology and Palaeontology)</p>	<p>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.</p> <p><u>The EIA Phase will include the following activities:</u></p> <p>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:</p> <ul style="list-style-type: none"> » 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. <p><u>Assessment of Impacts for the EIA:</u></p> <p>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).</p> <p>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.</p> <p><u>Environmental Management Programme:</u></p> <p>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.</p>	<p>Jenna Lavin of CTS Heritage</p>
<p>Visual</p>	<p><u>The EIA Phase will include the following activities:</u></p> <ul style="list-style-type: none"> » A visual impact assessment will be undertaken during the EIA Phase. Confirmation of the following is required in order to investigate and finalise the issues and impacts highlighted by the Visual Scoping Study: <ul style="list-style-type: none"> o Confirmation of the facility layout. o Undertake a site visit to assess the proposed developments. » The following methodology will be used in preparation of the visual impact assessment for the EIA Phase: 	<p>Jon Marshall of Environmental Planning & Design CC</p>

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	<ul style="list-style-type: none"> o Identification of issues raised in the Scoping Phase and a site visit. o Description of the receiving environment and the proposed project. o Establishment of view catchment area, view corridors, viewpoints and receptors. o Indication of potential visual impacts using established criteria. o Inclusion of potential lighting impacts at night. o Description of alternatives, mitigation measures and monitoring programme. o Complete 3D modelling and simulations with and without mitigation. <p><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).</p> <p>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.</p> <p><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.</p>	
Traffic	<p><u>The EIA Phase will include the following activities:</u></p> <ul style="list-style-type: none"> » Confirmation of trip generation based on the activities related to traffic movement for the construction and operation (maintenance) phases of the facility. » Confirmation of preferred access routes and access points to the site, depending on site layout. » Confirmation of existing traffic volumes on the N17, R35 and R39, depending on the main access road selected. » Impact assessment and mitigation measures. » Cumulative impact assessment. <p><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</p>	Iris Wink of JG Afrika

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	<p>environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive).</p> <p>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.</p> <p><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.</p>	
Socio-Economic	<p><u>The EIA Phase will include the following activities:</u></p> <p>A full EIA level Socio-Economic Impact Assessment will be conducted as part of the EIA Phase. The following activities will be undertaken as part of the process:</p> <ul style="list-style-type: none"> » Review comments pertaining to social impacts received from members of the key stakeholders, and any organ of state during the public review of the Scoping Report. Where applicable, comments received from DEA on the Final Scoping Report, which may pertain to socio-economic impact assessment, will also be reviewed. » Collect primary data. Interview key stakeholders to obtain primary information related to the project site, socio-economic environment, and to gain their inputs on the proposed project and its perceived impact (positive and /or negative). » Update the baseline information with information received during the data collection, as well as any additional information received from the client, or updates to the project description. » Assess impacts identified for the project in terms of their nature, extent, duration, magnitude, probability, status, and significance; as well as the degree to which the impact can be reversed, may cause irreplaceable loss of resources, and can be mitigated. » Identify mitigation measures with which to reduce negative impacts and enhance positive impacts for inclusion in the Environmental Management Programme (EMPr). » Provide a reasoned opinion regarding the acceptability of the project, and whether the proposed project should be authorised. » Prepare a Socio-Economic Impact Assessment Report for inclusion in the EIA Report to be prepared for the project. <p><u>Assessment of Impacts for the EIA:</u></p>	<p>Pierre van Jaarsveld of Urban-Econ Development Economist (Pty) Ltd</p>

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	<p>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).</p> <p>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.</p> <p><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.</p>	
<p>Cumulative Assessment</p>	<p>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, bats, avifaunal, social, traffic, visual and noise impacts of the area.</p> <p><u>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:</u></p> <ul style="list-style-type: none"> » 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). » Unacceptable increase in ambient noise conditions. » Complete or whole-scale change in the sense of place and character of an area and unacceptable visual intrusion. » Unacceptable impact on traffic and road conditions. » Unacceptable impact to socio-economic factors and components. 	<p>Savannah Environmental</p>

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 Emoyeni Renewable Energy Farm (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 Mpumalanga DARDL&EA) 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 (Ridge Times Newspaper).
- » 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
Make the Scoping Report available to the public, stakeholders, and authorities for 30 days	12 May 2022 – 13 June 2022
Finalisation of Scoping Report, and submission of the Final Scoping Report to DFFE	<u>21</u> June 2022

Key Milestone Activities	Proposed timeframe
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	May 2022 – June 2022
Make Draft EIA Report and EMPr available to the public, stakeholders, and authorities for 30 days	July 2022
Finalisation of EIA Report, and submission of the Final EIA Report to DFFE	August 2022
Authority review period and decision-making (107 calendar days)	August 2022 – January 2023

CHAPTER 12: REFERENCES

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157393	Heritage Statement	Shahzaadee Karodia Khan, Johan Nel	01/02/2014	HERITAGE STATEMENT FOR THE BASIC ASSESSMENT UNDERTAKEN FOR A POWERLINE UPGRADE, SYFERFONTEIN MINE, SECUNDA, MPUMALANGA PROVINCE
358403	HIA Phase 1	Anton van Vollenhoven	10/08/2015	A report on a Cultural Heritage Impact Assessment for the Development of a De-stoning Plan at the New Denmark Colliery, close to Standerton, Mpumalanga Province
5014	AIA Phase 1	Julius CC Pistorius	01/06/2007	A Phase 1 Heritage Impact Assessment Study for the Proposed New 88 kV Power Line Running from the Majuba Power Station near Amersfoort to the Camden Power Station near Ermelo in the Mpumalanga Province
5059	AIA Phase 1	Johnny Van Schalkwyk	01/05/2003	Archaeological Survey of a Section of the Secunda-Mozambique Gas Pipeline Bethal and Highveld Ridge
5700	AIA Phase 1	Johnny Van Schalkwyk	01/10/2002	A Survey of Cultural Resources for the Proposed New Tutuka-Alpha Standerton Power Transmission Line, Standerton District
7920	AIA Phase 1	Johnny Van Schalkwyk	01/02/2004	Heritage Impact Assessment for the Planned Sivukile Extension 4 Township Lekwa Municipality

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