KIARA PV1 FACILITY AND ASSOCIATED INFRASTRUCTURE

North West Province

Final Scoping Report

August 2022

savannah environmental

t +27 (0)11 656 3237
f +27 (0)86 684 0547
e info@savannahsa.com
w www.savannahsa.com

Prepared for:

Voltalia South Africa (Pty)Ltd
30th Floor, The Box
9 Riebeek Street
Cape Town,
8001

Prepared by:

t +27 (0)11 656 3237 f +27 (0)86 684 0547 e info@savannahsa.com w www.savannahsa.com
First Floor, Block 2, 5 Woodlands Drive Office Park, Cnr Woodlands Drive & Western Service Road, Woodmead, 2191

PROJECT DETAILS

DFFE Reference	:	**14/12/16/3/3/2/2171**
Title	:	Kiara PV1 Facility and Associated Infrastructure, North West Province
Authors	:	Savannah Environmental (Pty) Ltd Nkhensani Masondo Jo-Anne Thomas
Client	:	Voltalia South Africa (Pty) Ltd
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When used as a reference this report should be cited as: Savannah Environmental (2022) Final Scoping Report for the Kiara PV1 Facility and associated infrastructure, North West Province.

PURPOSE OF THE SCOPING REPORT AND INVITATION TO COMMENT

Voltalia South Africa (Pty) Ltd has appointed Savannah Environmental as the independent environmental consultant to undertake the Scoping and Environmental Impact Assessment Process for the Kiara PV1 Facility. 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 (NEMA; Act No. 107 of 1998). This Scoping report has been compiled in accordance with Appendix 2 of the EIA Regulations, 2014 (as amended) and consists of the following sections:

This Scoping Report describes and assesses this proposed project and consists of the following chapters:

- **Chapter 1** provides background to the Kiara PV1 Facility project and the environmental impact assessment process.
- **Chapter 2** provides a description of the Kiara PV1 Facility.
- **Chapter 3** provides the site selection information and identified project alternatives.
- **Chapter 4** provides the description of Solar as a power generation technology
- **Chapter 5** outlines strategic regulatory and legal context for energy planning in South Africa
- **Chapter 6** outlines the need and desirability of the Kiara PV1 Facility.
- **Chapter 7** outlines the process which was followed during the scoping phase of the EIA process.
- **Chapter 8** describes the existing biophysical and social environment within and surrounding the study and development area.
- **Chapter 9** provides an identification and evaluation of the potential issues associated with the proposed solar PV facility and associated infrastructure.
- **Chapter 10** presents the conclusions of the scoping evaluation for the Kiara PV1 Facility.
- **Chapter 11** describes the Plan of Study (PoS) for the EIA phase.
- **Chapter 12** provides references used to compile the Scoping Report.

The Scoping Report was made available for review from **Friday 24 June 2022 to Monday 25 July 2022** at(https://savannahsa.com/public-documents/energy-generation/kiara-pv-cluster-associated-infrastructure/). 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 the consideration of the National Department of Forestry, Fisheries and the Environment (DFFE). All changes made to this report have been underlined for ease of reference.

EXECUTIVE SUMMARY

Voltalia South Africa (Pty) Ltd, is proposing the development of Kiara PV1 Facility on portion 2 of the Farm Hollaagte No. 8, which is located approximately 16km north-east of the town of Lichtenburg, within the Ditsobotla Local Municipality and the Ngaka Modiri Molema District Municipality in the North West Province. The facility will have a contracted capacity of up to 120MW and will be known as the Kiara PV1 Facility. The project is planned as part of a larger cluster of renewable energy projects, which include six (6) additional PV facilities, each up to 130MW (known as the Kiara PV2, Kiara PV3, Kiara PV4, Kiara PV5 and Kiara PV6 and Kiara PV7) and grid connection infrastructure connecting the facilities to the existing Watershed Substation. These projects are proposed by separate Specialist Purpose Vehicles (SPVs) and are assessed through separate Environmental Impact Assessment (EIA) processes.

The infrastructure associated with the solar PV facility, including all associated infrastructure will include:

- Solar PV array comprising PV modules and mounting structures
- Inverters and transformers
- Cabling between the panels
- 132kV onsite facility substation/ 132kV powerline from the onsite substation to the switching collector substation
- Cabling from the onsite substation to a collector substation (either underground or overhead).
- Electrical and auxiliary equipment required at the collector substation that serves the solar energy facility, including switchyard/bay, control building, fences, etc.
- Battery Energy Storage System (BESS)
- Site and internal access roads (up to 8m wide)
- Site offices and maintenance buildings, including workshop areas for maintenance and storage.
- Temporary and permanent laydown area

The majority of potential impacts identified to be associated with the construction and operation of the Kiara PV1 Facility and associated infrastructure are anticipated to be localised and restricted to the development area itself, while operation phase impacts/benefits range from local to regional. No environmental fatal flaws were identified to be associated with the development area.

The potentially significant issues related to the construction and operation of the Kiara PV1 Facility include:

- Disturbance/destruction to and loss of vegetation and fauna and associated habitats
- Introduction and/or spread of declared weeds and alien invasive plants.
- Disturbance / degradation / loss of agricultural soils.
- Increased erosion and sedimentation & contamination of soil and water resources.
- Mortality of priority bird species due to collision with PV arrays and electrocution and collisions with medium voltage power lines within the facility.
- Displacement of priority bird species.
- Loss of land with agricultural capability.
- Destruction of archaeological and palaeontological heritage.
- Visual impacts on the landscape and sense of place.
- Social impacts, both positive and negative (job creation and business opportunities, impacts associated with construction workers in the area, and economic benefits).

Overall Sensitivity Considerations

The potentially sensitive areas have been identified through an environmental scoping study. 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 Kiara PV1 Facility.

Ecological Sensitive Features

A number of potential areas of sensitivities have been observed within the development area for the Kiara PV1 Facility. The following preliminary ecological sensitivities have been identified:

Very High Sensitivity

» A central lower lying area is listed as an Aquatic CBA 1 as it forms a wetland system which is of high conservation value. This will be an important element which the development will have to avoid. CBA 1 areas should always be afforded a Very High level of sensitivity.
» The Marico Biosphere Reserve borders the study area to the north. The protected area should remain unaffected by the proposed development. However, the biosphere reserve should still be consulted during the application process. It should be regarded as a Very High level of sensitivity.
» The Lichtenburg Game Breeding Centre is located to the west of the study area but will be affected by the grid connection powerline. It is an informal protected area, i.e. it is not formally protected by the NEMPAA. Despite this, the area will still retain a high level of sensitivity.

Medium Sensitivity

» The vegetation type occurring in this area is fairly uniform and is not currently listed as a Threatened Ecosystem. Despite being fairly uniform the vegetation type in the area, Carletonville Dolomite Grassland, may still contain elements of conservation value and consequently, where natural portions of these vegetation types remain, they should be regarded as having a significant conservation value. Any remaining natural areas should therefore be afforded at least a Moderate level of sensitivity.

Freshwater Sensitive Features

The study area is quite extensive and includes large terrestrial plains while some wetlands also appear to be present, large watercourses are however absent. Two prominent wetland systems are indicated for the study area. A large lower lying wetland area transects the northern portion of the study area while another wetland system will be crossed by the grid connection powerline.

Avifaunal Sensitive Features

A number of habitat units comprising potential sensitive avifauna features have been observed within the development area for the Kiara PV1 Facility. The following preliminary avifauna sensitivities have been identified:

Areas of high sensitivity

This includes the artificial livestock watering points and short potentially moist grassland habitat. The artificial livestock watering points have the potential to attract large numbers of granivore passerine and non-passerine bird species, of which many need to drink water on a daily basis. The placement of electrical infrastructure in close proximity to these areas could increase potential avian collisions with the infrastructure. These features could also attract collision-prone bird species such as birds of prey. It is possible that the high number of birds at this habitat could attract birds of prey which could collide with the PV infrastructure during hunting bouts. These areas are therefore of artificial origin but could be relocated to other areas.

The short potentially moist grassland provides ephemeral foraging habitat for large terrestrial bird species, which could include the endangered Secretarybird (*Sagittarius serpentarius*).

Areas of medium sensitivity

This includes the extensive open grassland and bush clump mosaics. The extensive open grassland and bush clump mosaics provide potential suitable foraging habitat for some collision-prone bird species, including the Northern Black Korhaan (*Afrotis afraoides*) with the potential to interact (e.g. collide) with the proposed electrical infrastructure. However, reporting rates for threatened and near threatened bird species are anticipated to be relatively low, thereby suggesting a medium sensitivity rating instead of a high sensitivity even though the majority of the habitat is natural. In addition, the open grassland and bush clump mosaics are widespread in the region.

Areas of Low sensitivity

These habitat units are represented by transformed types and include a build-up land and exotic plantations. The preliminary sensitivity map shows a large surface area that is earmarked with medium sensitivity. There is a probability that some of these units or part thereof could have higher (or lower) sensitivity ratings. It is therefore expected that some of the units or part thereof could represent different sensitivity ratings to those displayed in Figure 12 pending the outcome of a detailed austral summer season survey.

Soils and Agricultural Potential Sensitive Features

While no no-go areas have been identified, it is recommended that areas with High sensitivity be avoided where possible during the final infrastructure layout planning. None of the proposed development areas overlap with delineated High Potential Agricultural Areas within the larger area where the projects will be located.

The entire projects site, have Low, Medium and High agricultural sensitivity to the proposed development. The sensitivity rating was assigned with the reasoning that areas with Moderate-High land capability will have Moderate-High to High agricultural potential and may be suitable for rainfed crop production. However, the absence of any crop field boundaries in the areas indicated that the sites are likely used for livestock grazing. Even though the area may be suitable for irrigated farming, there are no irrigation infrastructure or field crop boundaries associated with irrigated agriculture.

Heritage sensitive features, the cultural landscape (incl. archaeology and palaeontology)

Heritage sensitivity relates to archaeological resources, palaeontological resources, heritage resources, and the cultural landscape. According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments of very high paleontological sensitivity. According to the extract from the Council for GeoSciences Map 2626 for West Rand, the development area is underlain by by sediments of the Monte Christo Formation assigned to the Chuniespoort group, within the Malmani Subgroup (Vmm).

According to van Schalkwyk et al (1995, SAHRIS NID 6237) in their report completed for the Bakerville Diamond Fields, "land use in the area goes back to the Early Stone Age, as can be determined by the number of stone artifacts found near the old mining commissioner's office. This material seems to be disturbed from its primary context because of the mining activities. It is postulated that similar occurrences will be found in other parts of the diggings, but that this material would have been disturbed out of context." As a result of the dominant land use in the area, many of the heritage resources identified by van Schalkwyk et al (1995) are associated with past and present agriculture, and consist of farming implements, a few windmills, and dipping-troughs. One such trough, located at Elandsputte on the farm Uitgevonden 355JP, was the site where the first diamond was discovered. This structure is a proclaimed national monument (now Provincial Heritage Site). Van Schalkwyk et al (1995) identified a number of burial grounds within their surveyed area (Map 5 and 5a). Heritage resources known from this area include burial grounds and graves, archaeological artefacts and old structures, often associated with farming activities or diamond mining. In his assessment completed for an adjacent PV facility, Van Schalkwyk (2021) identified no significant archaeological heritage resources but did identify a number of informal burials. No resources are known to be located within any of the areas proposed for development.

Visual Sensitive Features

A preliminary viewshed analysis for the proposed Kiara PV1 Facility was undertaken in order to determine the general visual exposure of the area under investigation. The viewshed analyses was undertaken from preliminary vantage points within the proposed development area at offsets of 5m above average ground level.

The following is evident from the viewshed analysis:

» The development would be approximately 50% visible within a 1km radius of the site. This area of visual exposure (0 – 1km) is generally restricted to vacant farmland and agricultural fields but may contain some potential sensitive visual receptors. This pattern of exposure is generally attributed to the flat topography of the study area, with no hills or ridges influencing or interrupting the viewshed analysis. There are 3 residences located within this zone; Hollaagte 3 and Holaagte 4 are located

towards the north-west (where no visibility will be evident), and Witstinkhoutboom 2 (where visibility will be evident), located towards the south-east of the proposed development.

» Within a 1 – 3km radius, the visual exposure is more scattered and interrupted due to the undulating nature of the topography. Most of this zone falls within vacant open space and agricultural land, but does include some farm dwellings and residences. These include Hollaagte 1 and 2 towards the South (where no visibility will be evident) however, potential visibility will be evident for Welverdiend 1 north-west of the site, and Witstinkhoutboom 1 towards the eastern peripheries of the site. The Manana secondary road traverses a section of this zone towards the south, where the facility may be visible.
» Visibility between the 3 - 6km radii is somewhat similar to the index of the 1-3km radius, and it includes the southern portion of the Rall Broers Private Nature Reserve. Again, the Manana secondary road traverses a section of this zone towards the south, where the facility may be visible. Potential visibility is indicated from a total of five smallholdings within this zone, namely Witstinkhoutboom 3, Witstinkhoutboom 4 and Witstinkhoutboom 5 towards the east of the site, Rooipan 3 towards the south-east of the site, and Vlakpan 1 towards the south of the site.
» At distances exceeding 6km the intensity of visual exposure is expected to be very low and highly unlikely due to the distance between the object (development) and the observer.

Overall Conclusion and Fatal Flaw Analysis

The findings of the desktop Scoping Study indicate that no environmental fatal flaws are associated with the Kiara PV1 Facility project site (Portion 2 of the Farm Hollaagte 8). 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 area for the development of the facility be considered outside of the identified areas of high sensitivity 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 project site. Even with the appropriate avoidance of sensitive areas, there is an extensive area on the site which can accommodate the proposed facility with relatively low impacts on the environment.

With an understanding of which areas within the project site are considered sensitive to the development of the proposed facility, the Applicant can prepare the detailed infrastructure 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 layouts produced by the Applicant 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.

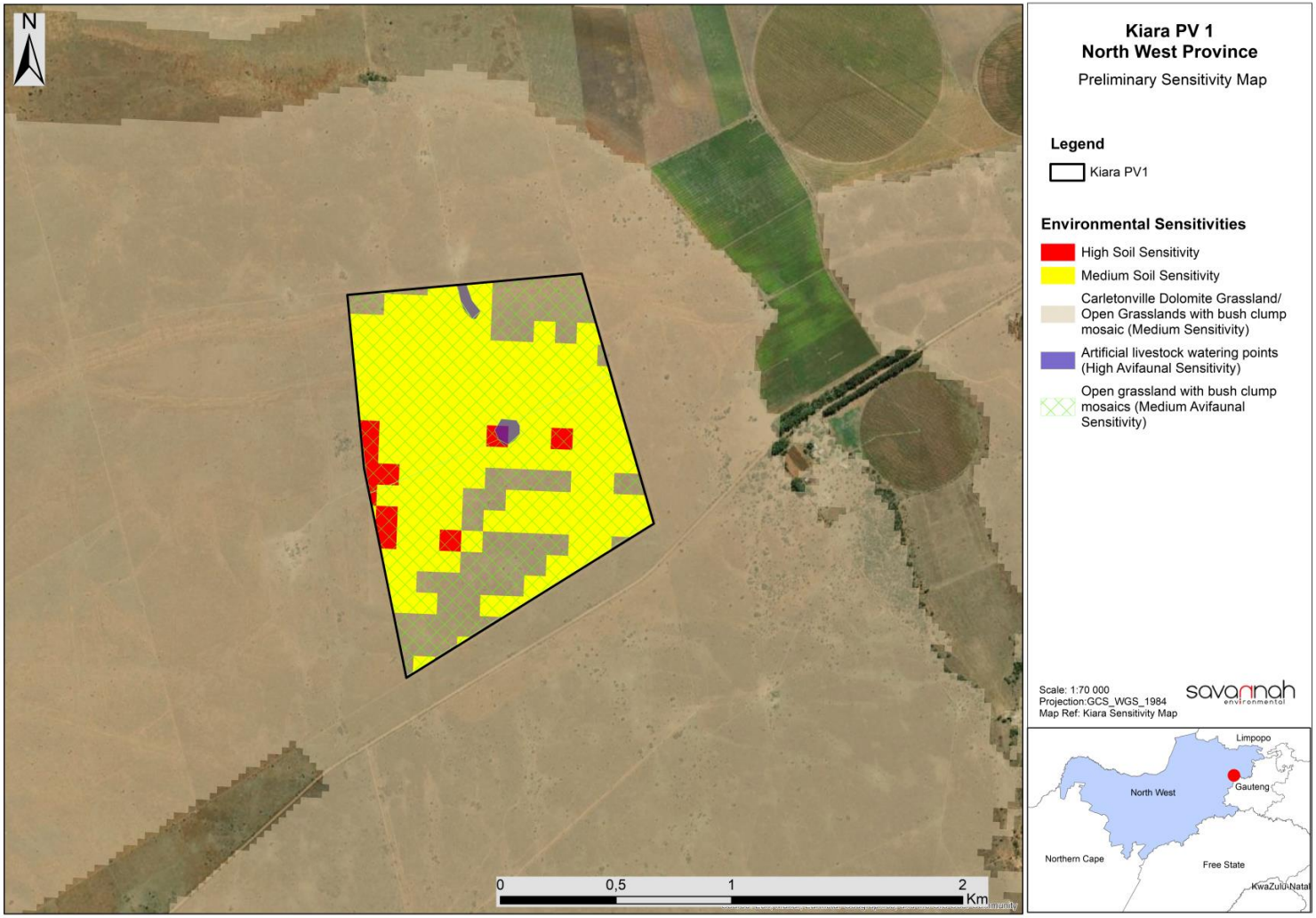

Figure 1: Environmental Sensitivity Map from the results of the scoping evaluation for the Kiara PV1 Facility and associated infrastructure.

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CHAPTER 1: INTRODUCTION

Voltalia South Africa (Pty) Ltd is proposing the development of a commercial photovoltaic (PV) solar energy facility and associated infrastructure on a site located approximately 16km north-east of the town of Lichtenburg, within the Ditsobotla Local Municipality and the Ngaka Modiri Molema District Municipality in the North West Province (refer to **Figure 1.1**). The facility will have a contracted capacity of up to 120MW and will be known as the Kiara PV1 Facility. The project is planned as part of a larger cluster of renewable energy projects, which include six (6) additional PV facilities, each up to 130MW (known as the Kiara PV2, Kiara PV3, Kiara PV4, Kiara PV5 and Kiara PV6 and Kiara PV7) and grid connection infrastructure connecting the facilities to the existing Watershed Substation (refer to **Figure 1.2**). These projects are proposed by separate Specialist Purpose Vehicles (SPVs)[1], and are assessed through separate Environmental Impact Assessment (EIA) processes.

The Kiara PV1 Facility is proposed in response to the identified objectives of the national and provincial government and local and district municipalities to develop renewable energy facilities for power generation purposes. It is the developer's intention to bid the Kiara PV1 Facility under the Department of Mineral Resources and Energy's (DMRE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme or 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 Kiara PV1 Facility set to inject up to 120MW into the national grid.

From a regional perspective, the North West Province, and particularly the area under investigation, is considered favourable for the development of a commercial solar 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 Department of Forestry, Fisheries and the Environment (DFFE), the CA for the project, 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, as amended (GNR 326).

[1] The development of the various projects under separate SPVs is in accordance with the DMRE's requirements under the REIPPPP.

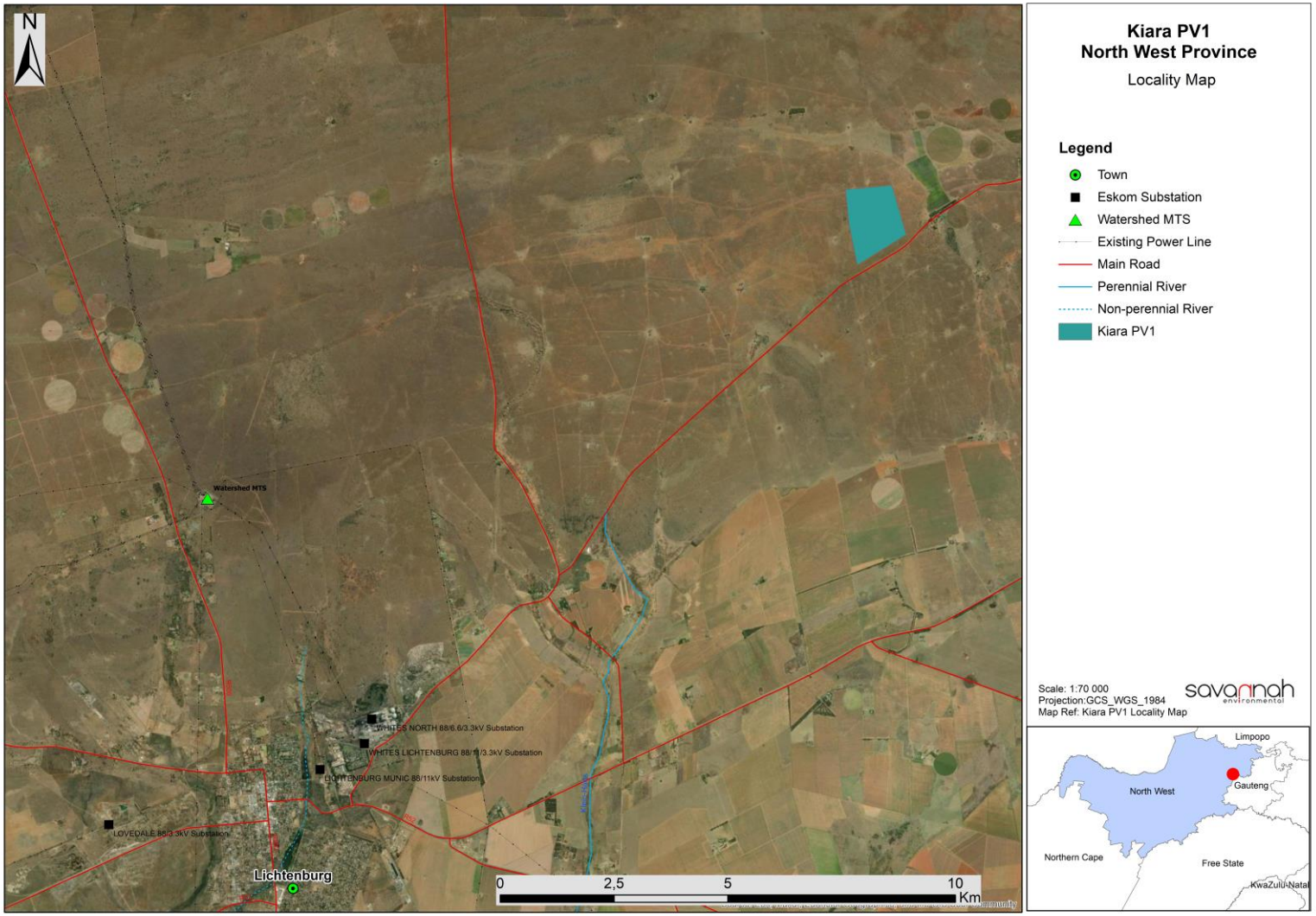


Figure 1.1: Locality map illustrating the location of the Kiara PV1 Facility project site in relation to the nearest town Lichtenburg

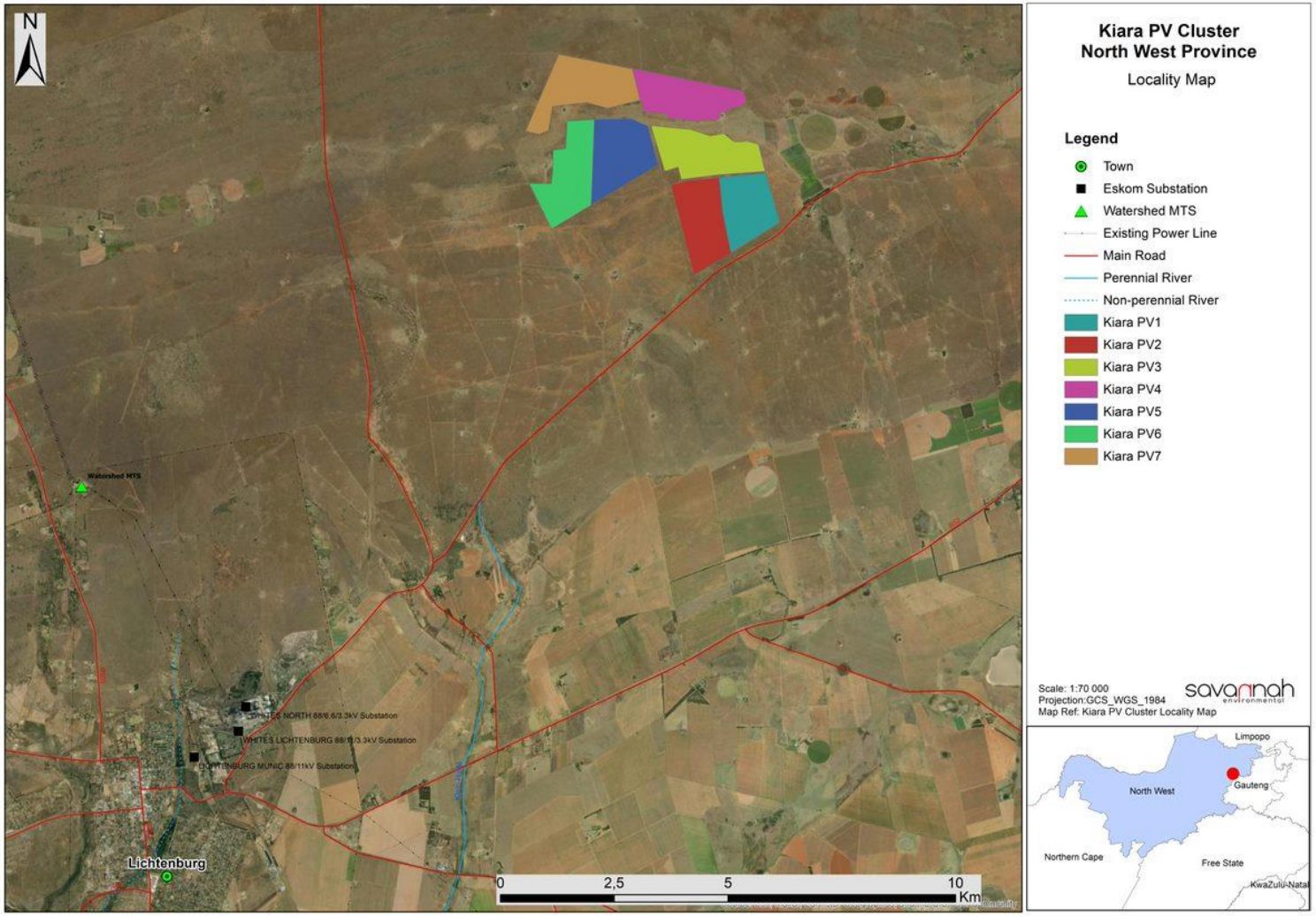


Figure 1.2: Locality map illustrating the cluster of proposed renewable energy facilities that the Kiara PV1 Facility forms part of.

The need for EA subject to the completion of a full S&EIA is triggered by the inclusion of, amongst others, Activity 1 of Listing Notice 2 (GNR 325)[2], namely:

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

1.2 Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of an Impact Assessment 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 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 Kiara PV1 Facility has been 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	A locality map illustrating the location of the Kiara PV1 Facility has been included in **Figure 1.1**. The centre point co-ordinates of the project site are included in **Table 1.1**.

This Scoping Report consists of nine chapters, which include:

- **Chapter 1** provides background to the Kiara PV1 Facility project and the environmental impact assessment process.
- **Chapter 2** provides a description of the Kiara PV1 Facility.
- **Chapter 3** provides the site selection information and identified project alternatives.
- **Chapter 4** provides the description of Solar as a power generation technology
- **Chapter 5** outlines strategic regulatory and legal context for energy planning in South Africa
- **Chapter 6** outlines the need and desirability of the Kiara PV1 Facility.
- **Chapter 7** outlines the process which was followed during the scoping phase of the EIA process.
- **Chapter 8** describes the existing biophysical and social environment within and surrounding the study and development area.

[2] Refer to **Chapter 6** for a full list of applicable listed activities.

» **Chapter 9** provides an identification and evaluation of the potential issues associated with the proposed solar PV facility and associated infrastructure.
» **Chapter 10** presents the conclusions of the scoping evaluation for the Kiara PV1 Facility.
» **Chapter 11** describes the Plan of Study (PoS) for the EIA phase.
» **Chapter 12** provides references used to compile the Scoping Report.

1.3 Project Overview

The project site has been identified by the applicant as a technically feasible site which has the potential for the development of the Kiara PV1 Facility, including a Battery Energy Storage System (BESS).

Table 1.1: Detailed description of the project site.

Province	**North West Province**		
District Municipality	Ngaka Modiri Molema District Municipality		
Local Municipality	Ditsobotla Local Municipality		
Ward Number (s)	Ward 16		
Nearest town(s)	Lichtenburg (~16km south-east)		
Farm name(s) and number(s) of properties affected by the Solar PV Facility	Farm Hollaagte No. 8		
Farm Portion(s), Name(s) and Number(s) associated with the PV Facility	Portion 2 of the Farm Hollaagte No. 8		
SG 21 Digit Code (s) for all properties	T0IP00000000000800002		
Current zoning	Agricultural (grazing of cattle)		
Current land use	Grazing (mainly cattle)		
Site Extent (Study Area)	~ 856.5 ha		
PV Development Area	~165ha		
Site Coordinates (project site)		**Latitude:**	**Longitude:**
	Centre point	26° 1'43.31"S	26°17'8.61"E

Infrastructure associated with the solar PV facility will include:

» Solar PV array comprising PV modules and mounting structures
» Inverters and transformers
» Cabling between the panels
» 132kV onsite facility substation/ 132kV powerline from the onsite substation to the switching collector substationCabling from the onsite substation to the collector substation (either underground or overhead).
» Electrical and auxiliary equipment required at the collector substation that serves the solar energy facility, including switchyard/bay, control building, fences, etc.
» Battery Energy Storage System (BESS)
» Site and internal access roads (up to 8m wide)
» Site offices and maintenance buildings, including workshop areas for maintenance and storage.
» Temporary and permanent laydown area

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

The overarching objective for the Kiara PV1 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. The exact location of the development area within the project site for the Kiara PV1 Facility is not defined at this stage of the process. In order to evaluate the project, the following is considered through this Scoping/EIA process:

Project site	Portion 2 of the Farm Hollaagte No. 8 (~856.5ha in extent).
Development area	The identified area (to be located within the project site) where the Kiara PV1 Facility is planned to be positioned. This area will be selected as a practicable location option for the facility, considering technical preference and environmental constraints. The development area is ~165ha in extent and will be demarcated as a result of the findings of the Scoping phase.
Development footprint (facility layout)	the defined area (located within the development area) where the PV panel array and other associated infrastructure for the Kiara PV1 Facility is planned to be constructed. This is the facility footprint, and the area which would be disturbed by project-related infrastructure. The development footprint will be confirmed in the EIA Phase.

The development footprint/facility layout for the 120MW PV facility, including a BESS, and all associated infrastructure, will be confirmed in the EIA Phase once the layout design is available. The development area is larger than the area needed for the development footprint of a 120MW PV facility, and therefore provides the opportunity for the optimal placement of the infrastructure, ensuring avoidance of environmental sensitivities or constraints identified through this Scoping and EIA process.

1.4 Overview of this Environmental Impact Assessment (EIA) Process

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

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

- The **Scoping Phase** includes the identification of potential issues associated with the project through a desktop study (considering existing information), limited field work, and consultation with interested and affected parties and key stakeholders. This phase considers the broader project site in order to identify and delineate any environmental fatal flaws, no-go and / or sensitive areas. Following a public review period of the Scoping report, this phase culminates in the submission of a final Scoping Report and Plan of Study for the EIA to the CA 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 CA 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), the applicant 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 nor any of its specialists 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 for this project includes:

- **Nkhensani Masondo,** the principle author of this report and EAP on this project is registered with the Environmental Assessment Practitioners Association of South Africa (EAPASA (2020/1385) and holds a BSocSci in Environmental Analysis and Management and is currently completing her MSc in Environmental Management. She has six (6) years of working experience in the environmental field and has gained extensive experience in conducting Environmental Impact Assessments, Stakeholder Engagements, Environmental Auditing and Environmental Management Plans Programmes for a wide range of projects. She is responsible for overall compilation of the report, this includes specialists' engagements, reviewing specialists reports and incorporating specialist studies into the Environmental Impact Assessment report and its associated Environmental Management.

- **Jo-Anne Thomas,** the project manager for the proposed project. She is a registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA - 2019/726). 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.

» **Nondumiso Bulunga** is the public participation consultant for the proposed project. She is a Social, GIS and Stakeholder Engagement Specialist at Savannah Environmental. Nondumiso has eight (8) years working experience in project management and facilitation in various industries such as environmental services field including but not limited to recycling, industrial, energy, mining, and agriculture. Working for small and large organisations, Nondumiso has gained exposure in research, collection of data, critical analysis, GIS, and environmental solutions. Nondumiso has worked on projects in South Africa and Malawi. Nondumiso is very well versed in the IFC Environmental and Social Performance Standards (including IFC PS 2012) and the associated Equator Principles, which have informed the approach and standard for projects regarding ESIA. Nondumiso is skilled at organising and driving effective project teams at a scale relevant to the project's requirements. She has technical experience and can quickly identify the most pertinent issues of a particular project whilst focussing on driving project success by rigorously implementing project management tools.

In order to adequately identify and assess potential environmental impacts associated with the proposed Kiara PV1 Facility, the following specialist consultants have provided input into this scoping report:

Company	Specialist Area of Expertise	Specialist Name
DPR Ecologists & Environmental Ecologists	Terrestrial Ecology	Darius van Rensburg
Pachnoda Consulting	Avifauna	Lukas Niemand
Terra Africa Environmental Consultants	Soils and Agricultural Potential	Mariné Pienaar
LOGIS	Visual	Lourens du Plessis
CTS Heritage	Heritage and Palaeontology	Jenna Lavin
Savannah Environmental & Dr Neville Bews & Associates.	Social environment	Nondumiso Bulunga and peer reviewed by Dr Neville Bews

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

CHATER 2: PROJECT DESCRIPTION

This Chapter provides an overview of the Kiara PV1 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 an Impact Assessment 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(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 Kiara PV1 Facility

In responding to the growing electricity demand within South Africa, the need to promote renewable energy and sustainability within the North West Province, as well as the country's targets for renewable energy, Voltalia South Africa (Pty) Ltd is proposing the development of a commercial solar farm and associated infrastructure to add new capacity to the national electricity grid. The Kiara PV1 Facility will be developed in a single phase and will have a contracted capacity of up to 120MW. 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 Kiara PV1 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.

2.3 Overview of the Project Site

The project is to be developed on a site located approximately 16km north-east of the town of Lichtenburg. The project site falls within Ward 16 of the Ditsobotla Local Municipality within the Ngaka Modiri Molema

District. The full extent of the development area (i.e., ~ 165ha), located within the project site (i.e., ~ 856.5ha) has been considered within the Scoping Phase of the EIA process, within which the Kiara PV1 Facility will be appropriately located from a technical and environmental sensitivity perspective. The development area includes the following affected property:

» Portion 2 of the Farm Hollaagte No. 8

The project site within which the PV facility is proposed is situated ~8km south-east to the R52 provincial road. Access to the project site is via the existing gravel road which branches off the R52 regional road on the southern side of the Kiara PV1 Facility development area (refer to **Figure 2.1**).

Figure 2.1: Location of the gravel road and the R52 regional road in relation to the Kiara PV1 Facility development area.

Once environmentally constraining factors have been identified through the EIA process, the layout of the PV facility and associated infrastructures will be determined. The layout will take into consideration any environmentally sensitive areas identified through the EIA process and the PV Panels and associated infrastructures 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 plan.

2.4 Components of the Kiara PV1 Facility

The project infrastructure will include:

» Solar PV array comprising PV modules and mounting structures
» Inverters and transformers

- Cabling between the panels
- 132kV onsite facility substation/ 132kV powerline from the onsite substation to the switching collector substationCabling from the onsite substation to the collector substation (either underground or overhead).
- Electrical and auxiliary equipment required at the collector substation that serves the solar energy facility, including switchyard/bay, control building, fences, etc.
- Battery Energy Storage System (BESS)
- Site and internal access roads (up to 8m wide)
- Site offices and maintenance buildings, including workshop areas for maintenance and storage.
- Temporary and permanent laydown area

A summary of the details and dimensions of the planned infrastructure associated with the project is provided in **Table 2.1**

Table 2.1: Details or infrastructures proposed as part of Kiara PV1 Facility. Specific details to be confirmed in the EIA phase.

Infrastructure	Footprint and dimensions
Number of Panels	~183 720
Panel Height	Up to 5m from ground level
Technology	Use of fixed-tilt, single-axis tracking, and/or double-axis tracking PV technology. Monofacial or bifacial panels are both considered.
Battery Energy Storage System (BESS)	BESS area: ~8m Maximum Volume: 1740 m^3
Other infrastructures	Operations building – 20m x 10m = 200m^2 Workshop – 15m x 10m = 150m^2 Stores - 15m x 10m = 150m^2
Area occupied by laydown area	Temporary Laydown Area: 220m x 100m
Contracted Capacity	Up to 120MW
Area occupied by the solar array	To be determined in the EIA phase
Area occupied by the substations	Facility substation: Up to 1ha Eskom switching station: Up to 3ha
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. Main access road to the project site will be via the existing R52 gravel road. Internal access roads (gravel) of up to 6m in width will be required to access the PV facility.
Grid connection	The 33/132kV on-site substation will be connected to the proposed central collector substation via overhead/underground cabling with a capacity of up to 132kV. A new 275kV single- or double-circuit power line will run from the central collector substation and tie into the existing Watershed MTS. The switching station forming part of the 132kV collector substation and the new 275kV single-or double circuit powerline 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.

Table 2.2 overleaf provides details regarding the requirements and the activities to be undertaken during the Kiara PV1 Facility development phases (i.e., construction phase, operation phase and decommissioning phase).

Table 2.2 provides the details of Kiara PV facility, including the main infrastructure components and services that will be required during the project life cycle.

Table 2.2: Details of the Kiara PV1 Facility project development phases (i.e., construction, operation, and decommissioning)

Construction Phase	
Requirements	» Project receives Environmental Authorisation from the DFFE, preferred bidder allocation granted by DMRE (or other offtaker), a generating license issued by NERSA, and a Power Purchase Agreement secured with Eskom (or private entity). » Expected to be 15-18 months for Kiara PV1 Facility. » Create direct construction employment opportunities. Approximately 200 employment opportunities will be created. » No on-site labour camps. Employees to be accommodated in the nearby towns such as Lichtenburg and transported to and from site on a daily basis. » Overnight on-site worker presence would be limited to security staff. » Waste removal and sanitation will be undertaken by a suitably qualified sub-contractor. 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. » Water required for the construction phase will be supplied by the municipality. In addition, where possible, borehole water will be used. 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	» Including, but not limited to: a geotechnical survey, site survey and confirmation of the panel micro-siting footprint, and survey of the on-site substation site to determine and confirm the locations of all associated infrastructure.
Establishment of access roads to the Site	» 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 for construction and/or maintenance activities within the development footprint. » Internal service road alignment will be approximately 8m wide. Location is to be determined by the final micro-siting or positioning of the PV panels.
Undertake site preparation	» Including the clearance of vegetation at the footprint of PV panel supports, establishment of the laydown areas, the establishment of internal access roads and excavations for foundations. » Stripping of topsoil to be stockpiled, for use during rehabilitation. » Vegetation clearance 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	» 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. » A temporary concrete batching plant of 50m x 50m in extent to facilitate the concrete requirements for foundations, if required.
Construct foundation	» 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	» The components for the solar PV facility and onsite substation will be transported to site by road. Transportation will take place via appropriate National and Provincial roads, and the dedicated access/haul road to the site. » 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.
Erect PV Panels and Construct Substation, Invertors and BESS	» 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 study 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 onsite substation	» 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	» 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 substation to the power grid	» A new 275kV single- or double-circuit power line will run from the central collector substation and tie into the existing Eskom Watershed Substation.
Undertake site rehabilitation	» Commence with rehabilitation efforts once construction completed in an area, and all construction equipment is removed. » On commissioning, access points to the site not required during the operation phase will be closed and prepared for rehabilitation.
Operation Phase	
Requirements	» Duration will be 20-25 years. » Requirements for security and maintenance of the project. » Employment opportunities relating mainly to operation activities and maintenance. Approximately 15 - 20 full-time employment opportunities will be available during the operation of the solar facility.
Activities to be undertaken	
Operation and Maintenance	» Full time security, maintenance, and control room staff. » All PV panels will be operational except under circumstances of mechanical breakdown, inclement weather conditions, or maintenance activities. » Solar PV to be subject to periodic maintenance and inspection. » It is anticipated that the PV panels will be washed twice a year during operation using clean water with no cleaning products or using non-hazardous biodegradable cleaning products. » Disposal of waste products (e.g., oil) 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.
Decommissioning Phase	
Requirements	» Decommissioning of the Kiara PV1 Facility infrastructure at the end of its economic life. » Potential for repowering of the facility, depending on the condition of the facility at the time. » Expected lifespan of approximately 20 - 25 years (with maintenance) before decommissioning is required. » Decommissioning activities to comply with the legislation relevant at the time.
Activities to be undertaken	
Site preparation	» Confirming the integrity of site access to the site to accommodate the required decommissioning equipment. » Preparation of the site (e.g., laydown areas and construction platform). » Mobilisation of construction equipment.
Disassemble and remove PV panels	» Components to be reused, recycled, or disposed of in accordance with regulatory requirements. » Much of the above ground wire, steel, and PV panels of which the system is comprised are recyclable materials and would be recycled to the extent feasible. » Concrete will be removed to a depth as defined by an agricultural specialist and the area rehabilitated. Cables will be excavated and removed, as may be required

Post-decommissioning land use	» Following decommissioning of the facility, the project site will be returned to the current land use (i.e. agriculture)

CHAPTER 3: CONSIDERATION OF ALTERNATIVES

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

3.1 Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of an Impact Assessment 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 Kiara PV1 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 investigation, the motivation for not considering such	Where no alternatives have been considered, motivation has been included. This is included in section 3.3.

3.2 Alternatives Considered during the BA Process

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:

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

In this instance, 'the project' refers to Kiara PV1 Facility, a solar energy facility with capacity of up to 120MW 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 another 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)[3], and will continue to be addressed as part of future revisions. In this regard, the need for renewable energy power generation from solar PV facilities has been identified as part of the technology mix for power generation in the country for the next 20 years. Of particular relevance to the proposed project is the allocation of 6000MW of new capacity to large scale PV included in the IRP 2019.

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 as part of the country's energy mix has been defined. Therefore, fundamentally different alternatives to the proposed project are not considered within this S&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 property 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 Kiara PV1 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 Kiara PV1 Facility

3.3.1. Property or Location Alternatives

The proposed site for the Kiara PV1 Facility is located north-east of the town Lichtenburg. The preferred project site for the development of the Kiara PV1 Facility was identified through an investigation of prospective sites and properties in the area within the North West Province. The investigation involved the consideration of specific characteristics within the province and specifically within the areas near Lichtenburg including:

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

» Solar resource characteristics (including Global Horizontal Irradiation (GHI));
» Land availability;
» Land use and geographical and topographical considerations;
» Access to the national grid, including distance and capacity to connect the proposed project to the network;
» Site accessibility; and

The characteristics considered were identified by the developer as the main aspects that play a role in the opportunities and limitations for the development of a Solar PV facility. The characteristics considered, and the results thereof, 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 in an area. 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 2143 kWh/m^2/annum (refer to **Figure 3.1**). The North West Province is considered to have high solar irradiation values which therefore enables the development of solar energy projects and the successful operation thereof. Voltalia South Africa (Pty) Ltd has also confirmed the solar resource of the site through projections. Based on the solar resource available, no alternative locations are considered.

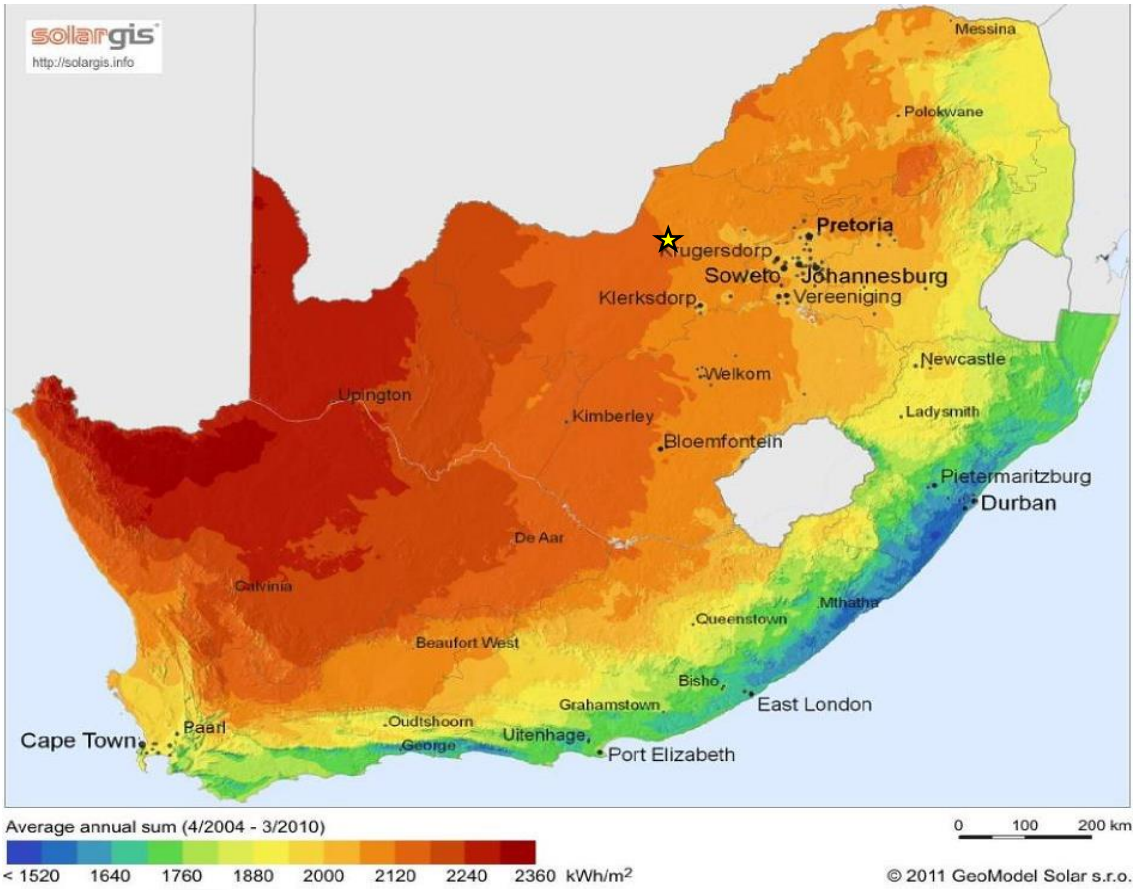


Figure 3.1: Solar irradiation map for South Africa; the proposed Kiara PV1 Facility position is shown by the yellow star on the map. (Source: adapted from GeoModel Solar, 2011).

- **Land availability**: In order to develop the Kiara PV1 Facility with a contracted capacity of up to 120MW, sufficient space is required. The properties included in the project site are privately-owned parcels available in the area, are available 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 ~856.5ha, which was considered by the developer as sufficient for the development of the Kiara PV1 Facility. A preferred development area of ~165ha within this larger project site has been identified for the location of the PV facility. An exact development footprint within the development area for the placement of infrastructure will be identified and assessed as part of the EIA Phase considering environmental constraints and sensitivities.

- **Landowner Support:** The selection of a site where the landowner is supportive of the development of renewable energy, and specifically solar PV, is essential for ensuring the success of the project. The landowner affected by the proposed Kiara PV1 Facility does not view the development as a conflict with their current land use practices. The support from the landowner for the development to be undertaken on the affected properties has been solidified by the provision of consent for the project to proceed on the property through the signing of consent forms and conclusion of a preliminary lease agreement with the developer.

- **Land suitability and land use activities**: The current land use of the development area is an important consideration in site selection in terms of limiting disruption to existing land use practices. The project site is currently used for grazing, which is generally preferred for developments of this nature as the grazing activities can continue on the project site in tandem with the operation of the solar PV facility. There is no cultivated agricultural land on the project site or directly adjacent to it which could be impacted upon by the proposed development. The proposed development is therefore considered to be compatible with the surrounding land uses and does not present a conflicting land use.

- **Geographical and Topographical Considerations:** Sites that facilitate easy construction conditions, (i.e. relatively flat topography, lack of major rock outcrops, limited watercourse crossings, etc.) are favoured by developers during the site selection process. As a result, the topography of the project area considered for the Kiara PV1 Facility is described as plains and pans or slightly undulating plains of no more than 5m in the central interior plain and it is characterised by an extremely even (flat) slope. These characteristics are preferred for the development of a solar PV facility as construction efforts and costs are minimised, and therefore the study area is considered to be preferable and acceptable for the development of the PV facility.

- **Access to the National Electricity Grid**: A key factor in the siting of any power generation project is a viable grid connection. The anticipated grid connection solution (subject to a separate environmental assessment and authorisation process) is a 132/275kV central collector substation and a power line up to 275kV to enable connection to the existing Watershed Substation. The existing Watershed Substation, located to the south-west of the site was identified as the preferred grid connection point for the project.

- **Site access**: Access to the project site is ample with the presence of existing roads mainly consisting of regional roads. The project site is situated ~8km south east to the R52 provincial road. Access to the project site is via the existing gravel road which branches off the R52 regional road on the southern side of the Kiara PV1 Facility development area.

Based on the above considerations, the Kiara PV1 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 within the larger development area considered.

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 (refer to Chapter 8). 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

Voltalia South Africa (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 as identified within the IRP. The only activity considered for implementation on the identified site is therefore power generation using renewable energy resources.

Considering the available natural energy resources within the area (i.e., solar irradiation) 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 preferred project site.

The project site is located near the town of Lichtenburg in the North West Province which has the Global Horizon Irradiation (GHI) of approximately 2130 kWh/m^2/annum. Based on available information, it is concluded that the project site is considered best suited for the development of a solar PV facility. Considering the suitability of the project site for the development of a solar PV facility, the current land-use activities being undertaken within the project site which relate to livestock farming and compatibility thereof, the activity (i.e., the development of a solar PV facility) is considered to be appropriate. Therefore, no activity alternatives are considered within this Scoping Report.

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, Voltalia South Africa (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 200-600 MW to 200-800 MWh.

3.3.5. The 'Do-Nothing' Alternative

The 'Do-Nothing' alternative is the option of not constructing Kiara PV1 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 PV facility. The 'do-nothing' alternative will therefore likely result in minimising the cumulative impact on the land, although it is expected that pressure to develop the site for renewable energy purposes will be actively pursued due to the same factors which make the site a viable

option for renewable energy development. This alternative will be assessed within the EIA Phase of the process

CHAPTER 4: SOLAR AS A POWER GENERATION TECHNOLOGY

Environmental pollution and the emission of CO_2 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 the 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.

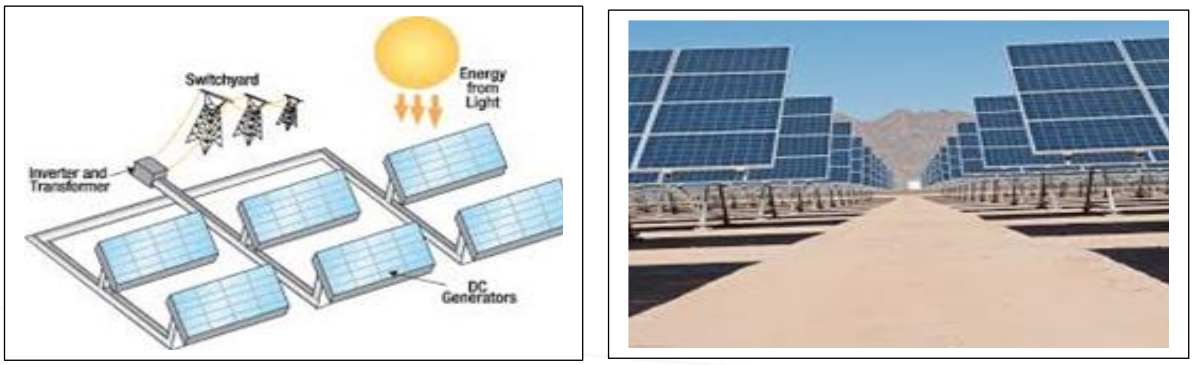


Figure 4.1: Overview of a PV cell, module and array / panel (Source: pveducation.com).

Inverters

Inverters are used to convert electricity produced by the PV panels from DC into AC, to enable the facility to be connected to the national electricity grid. In order to connect a large solar facility such as the one being proposed to the national electricity grid, 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.

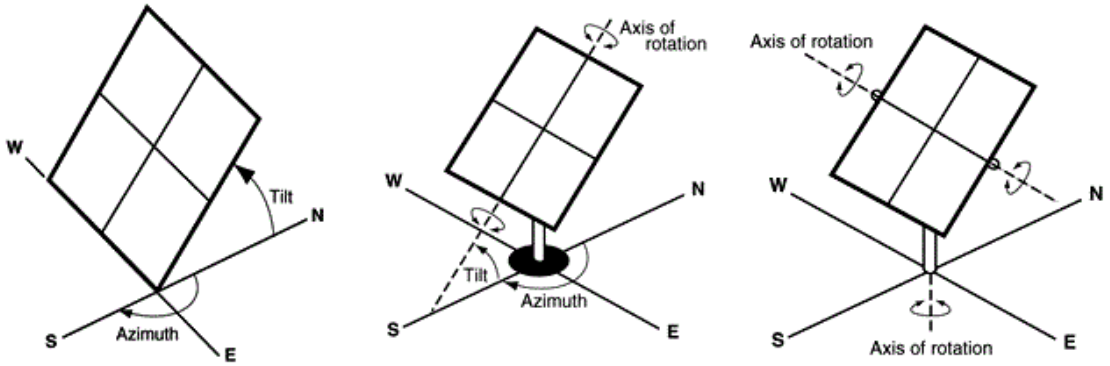


Figure 4.2: Overview of different PV tracking systems (from left to right: fixed-tilt, single-axis tracking, and double-axis tracking (Source: pveducation.com).

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

4.1.1. Bifacial Solar Panel Technology

Bifacial ("two-faced") modules produce solar power from both sides of the panel. Traditional solar panels capture sunlight on one light-absorbing side. The light energy that cannot be captured is simply reflected away. Bifacial solar panels have solar cells on both sides, which enables the panels to absorb light from the back and the front (refer to Figure 4.3). Practically speaking, this means that a bifacial solar panel can absorb light reflected off the ground or another material. In general, more power can be generated from bifacial modules for the same area, without having to increase the development footprint.

The optimum tilt for a bifacial module has to be designed so as to capture a big fraction of the reflected irradiation. Use of trackers is recommended so the modules can track the sun's movement across the sky, enabling them to stay directed to receive the maximum possible sunlight to generate power.

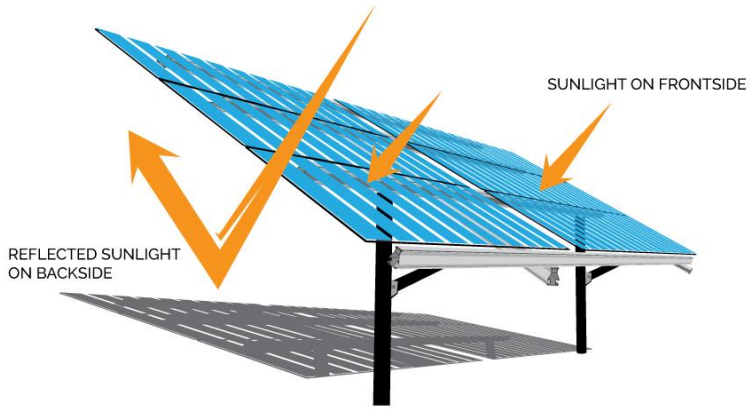


Figure 4.3: Diagram showing how bifacial Solar PV panels work (Source: https://sinovoltaics.com/learning-center/solar-cells/bifacial-solar-modules/)

Battery Energy Storage System (BESS)

The need for a BESS stem from the fact that electricity is only produced by the Renewable Energy Facility while the sun is shining, while the peak demand may not necessarily occur during the daytime. Therefore, the storage of electricity and supply thereof during peak-demand will mean that the facility is more efficient, reliable and electricity supply more constant.

The BESS will:

- Store and integrate a greater amount of renewable energy from the Solar PV Facilities 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 Renewable Energy Independent Power Producer Procurement Program (REIPPPP), other government run procurement Programmes or for sale to private entities if required.
- Proposed preferred technology to be used: Three main technologies to be considered, either separately or in combination:
  - Lithium-ion batteries (LFP/NMC or others) (Li-Ion)
  - Lithium capacitors/Electrochemical capacitors (LiC)
  - Redox-flow batteries (RFB)

Figure 4.4: Photographs of the construction phase of a solar facility similar to those proposed

CHAPTER 5: POLICY AND LEGISLATIVE CONTEXT

This Chapter provides an overview of the policy and legislative context within which the development of a solar PV facility, such as Kiara PV1 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 an Impact Assessment Report

This chapter of the Scoping Report includes the following information required in terms of Appendix 3: Scope of Assessment and Content of Environmental Impact Assessment 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 4, as a whole, provides an overview of the policy and legislative context which is considered to be associated with the development of the solar energy facility. The regulatory and planning context has been considered at national, provincial and local levels. A description of the policy and legislative context within which Kiara PV1 Facility is proposed is included in **sections 5.3, 5.4, 5.5** and **5.6.**

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 a 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 Kiara PV1 Facility.

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 energy 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 energy project and the related statutory environmental assessment process.

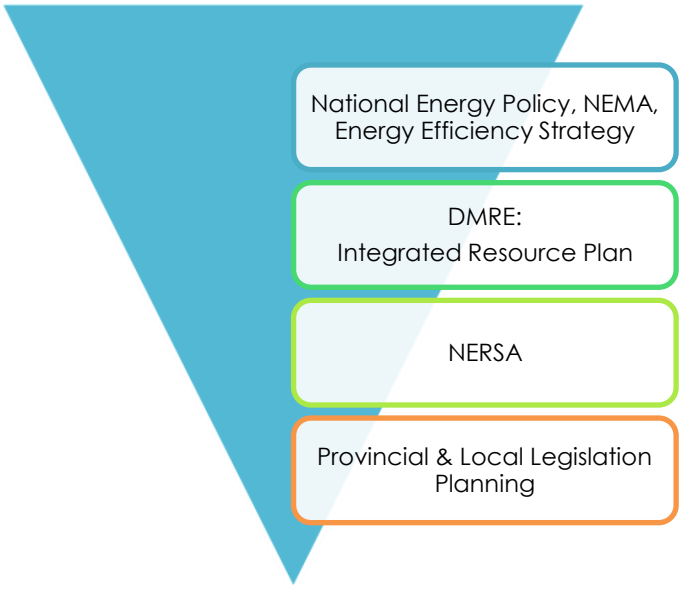


Figure 5.1: Hierarchy of electricity and planning documents

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 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. DEA 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 resources 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 Licenses (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 the North West – North West Department of Economic Development, Environment, Conservation and Tourism (NW DEDECT):** This Department is the commenting authority for the EIA process for the project and is responsible for issuing of biodiversity and conservation-related permits. DEDECT's involvement relates specifically to sustainable resource management, conservation of protected species and land care.
- **North West Department of Public Works and Roads (NW DPWR):** NW DPWR is responsible for roads and the granting of exemption permits for the conveyance of abnormal loads on public roads.
- **North West Provincial Heritage Resources Agency (NW PHRA):** NW PHRA, the North West Provincial Heritage Resources Authority is responsible for the identification, conservation and management of heritage resources, as well as commenting on heritage related issues within the province.
- **North West Department of Community Safety and Transport Management (NW DCSTM):** This Department provides effective co-ordination of crime prevention initiatives, provincial police oversight, traffic management and road safety towards a more secure environment.

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 North West Province, both the local and district municipalities play a role. The local municipality includes the **Ditsobotla Local Municipality** which forms part of the **Ngaka Modiri Molema District Municipality**. In terms of the Municipal Systems Act (No. 32 of 2000), it is compulsory for all municipalities to go through an Integrated Development Planning (IDP) process to prepare a five-year strategic development plan for the area under their control.

5.3 International Policy and Planning Context

A brief review of the most relevant international policies relevant to the establishment of the Kiara PV1 Facility are provided below in **Table 5.1**. The Kiara PV1 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 Kiara PV1 Facility

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

Relevant policy	Relevance to the Kiara PV1 Facility
	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, COP26 concluded in Glasgow with all countries agreeing the Glasgow Climate Pact to keep 1.5˚C alive and finalise the outstanding elements of the Paris Agreement. South Africa's National Climate Change Response Policy (NCCRP) establishes South Africa's approach to addressing climate change, including adaptation and mitigation responses. The NCCRP formalises Government's vision for a transition to a low carbon economy, through the adoption of the 'Peak, Plateau and Decline' (PPD) GHG emissions trajectory whereby South Africa's emissions should peak between 2020 and 2025, plateau for approximately a decade, and then decline in absolute terms thereafter, and based on this the country has pledged to reduce emissions by 34% and 42% below Business As Usual (BAU) emissions in 2020 and 2025, respectively. The policy provides support for the Kiara PV1 Facility which will contribute to managing climate change impacts, supporting the emergency response capacity, as well as assist in reducing GHG emissions in a sustainable manner.
The Equator Principles IV (October 2020)	The Equator Principles (EPs) IV constitute a financial industry benchmark used for determining, assessing, and managing project's environmental and social risks. 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 Kiara PV1 Facility) and apply globally to all industry sectors. Such an assessment should propose measures to minimise, mitigate, and offset adverse impacts in a manner relevant and appropriate to the nature and scale of the Kiara PV1 Facility. In terms of the EPs, South Africa is a non-designated country, and as such the assessment process for projects located in South Africa evaluates compliance with the applicable IFC Performance Standards on Environmental and Social Sustainability, and Environmental Health and Safety (EHS) Guidelines. The Kiara PV1 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.

Relevant policy	Relevance to the Kiara PV1 Facility
International Finance Corporation (IFC) Performance Standards and Environmental and Social Sustainability (January 2012)	The International Finance Corporation's (IFC) Performance Standards (PSs) on Environmental and Social Sustainability were developed by the IFC and were last updated on 1 January 2012. Performance Standard 1 requires that a process of environmental and social assessment be conducted, and an Environmental and Social Management System (ESMS) appropriate to the nature and scale of the project, and commensurate with the level of its environmental and social risks and impacts, be established and maintained. The above-mentioned standard is the overarching standard to which all the other standards relate. Performance Standards 2 through to 8 establish specific requirements to avoid, reduce, mitigate, or compensate for impacts on people and the environment, and to improve conditions where appropriate. While all relevant social and environmental risks and potential impacts should be considered as part of the assessment, the standards 2 and 8 describe potential social and environmental impacts that require particular attention specifically within emerging markets. Where social or environmental impacts are anticipated, the developer is required to manage them through its ESMS consistent with Performance Standard 1. Given the nature of the Kiara PV1 Facility, it is anticipated (at this stage of the process) that Performance Standards 1, 2, 3, 4, 6, and 8 may be applicable to the project.

5.4 National Policy and Planning Context

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 of March 2021, 6 422MW of renewable energy capacity from 112 independent power producers (IPPs) have been procured in seven bid rounds[4], with 5 078MW from 79 IPP projects operational and made available to the grid[5]. National policies have to be considered for the construction and operation of the solar PV facility to ensure that the development is in line with the planning of the country.

A brief review of the most relevant national policies is provided below in **Table 5.2**. The development of Kiara PV1 Facility is considered to align with the aims of these policies, even where contributions to achieving the goals therein are only minor.

4 Bid windows1, 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.

[5]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

Table 5.2: Relevant national legislation and policies for Kiara PV1 Facility

Relevant legislation or policy	Relevance to Kiara PV1 Facility
Constitution of the Republic of South Africa, 1996	Section 24 of the Constitution pertains specifically to the environment. It states that everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. The Constitution outlines the need to promote social and economic development. Section 24 of the Constitution therefore requires that development be conducted in such a manner that it does not infringe on an individual's environmental rights, health, or well-being. This is especially significant for previously disadvantaged individuals who are most at risk to environmental impacts. The undertaking of an EIA process for the proposed project in terms of the requirements of the EIA Regulations, 2014 (as amended) aims to minimise any impacts on the natural and social environment.
National Environmental Management Act (No. 107 of 1998) (NEMA)	This piece of legislation is South Africa's key piece of environmental legislation and sets the framework for environmental management in South Africa. 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. The national environmental management principles state that the social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment. The need for responsible and informed decision-making by government on the acceptability of environmental impacts is therefore enshrined within NEMA.
National Energy Act (No. 34 of 2008)	The purpose of the National Energy Act (No. 34 of 2008) is to ensure that diverse energy resources are available, in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, while taking 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. The Act provides the legal framework which supports the development of power generation facilities. The Act also provides for licences and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated. The development of the Kiara PV1 Facility will have to ensure compliance with this Act as a license for the generation of electricity will be required.
White Paper on the Energy Policy of the Republic of South Africa (1998)	The White Paper on Energy Policy places emphasis on the expansion of energy supply options to enhance South Africa's energy security. This can be achieved through increased use of RE and encouraging new entries into the generation market.

Relevant legislation or policy	Relevance to Kiara PV1 Facility
	The policy states that the advantages of RE include, minimal environmental impacts during operation in comparison with traditional supply technologies, generally lower running costs, and high labour intensities. Disadvantages include higher capital costs in some cases, lower energy densities, and lower levels of availability, depending on specific conditions, especially with sun and wind-based systems. Nonetheless, renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future.
White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)	The White Paper on Renewable Energy Policy Supplements Government's predominant policy on energy as set out in the White Paper on the Energy Policy of the Republic of South Africa (DME, 1998). The policy recognises the potential of RE and aims to create the necessary conditions for the development and commercial implementation of RE technologies. The White Paper on RE sets out Government's vision, policy principles, strategic goals, and objectives for promoting and implementing RE in South Africa. The country relies heavily on coal to meet its energy needs due to its abundant, and accessible and affordable coal resources. However, massive RE resources that can be sustainable alternatives to fossil fuels, have so far remained largely untapped. The development of additional renewable energy projects will promote the use of the abundant South African renewable energy resources and contribute to long-term energy security and diversification of the energy mix.
The Electricity Regulation Act (No. of 2006)	The Electricity Regulation Act of 2006, replaced the Electricity Act (No. 41 of 1987), as amended, except for 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. Projects developed by IPPs which exceed 100MW in capacity are required to obtain a Generation License from the National Energy Regulator of South Africa (NERSA).
Integrated Energy Plan (IEP), 2016	The purpose and objectives of the Integrated Energy Plan (IEP) are derived from the National Energy Act (No. 34 of 2008). The IEP takes into consideration the crucial role that energy plays in the entire economy of the country and is informed by the output of analyses founded on a solid fact base. It is a multi-faceted, long-term energy framework which has multiple aims, some of which include: » To guide the development of energy policies and, where relevant, set the framework for regulations in the energy sector. » To guide the selection of appropriate technologies to meet energy demand (i.e., the types and sizes of new power plants and refineries to be built and the prices that should be charged for fuels). » To guide investment in and the development of energy infrastructure in South Africa. » To propose alternative energy strategies which are informed by testing the potential impacts of various factors such as proposed policies, introduction of new technologies, and effects of exogenous macro-economic factors.

Relevant legislation or policy	Relevance to Kiara PV1 Facility
	A draft version of the IEP was released for comment on 25 November 2016. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development. The development of the IEP is an ongoing continuous process. It is reviewed periodically to take into account changes in the macroeconomic environment, developments in new technologies and changes in national priorities and imperatives, amongst others. The 8 key objectives of the integrated energy planning process are as follows: » Objective 1: Ensure security of supply. » Objective 2: Minimise the cost of energy. » Objective 3: Promote the creation of jobs and localisation. » Objective 4: Minimise negative environmental impacts from the energy sector. » Objective 5: Promote the conservation of water. » Objective 6: Diversify supply sources and primary sources of energy. » Objective 7: Promote energy efficiency in the economy. » Objective 8: Increase access to modern energy.
Integrated Resource Plan for Electricity (IRP) 2010-2030	The Integrated Resource Plan (IRP) for Electricity 2010 – 2030 is a subset of the IEP and constitutes South Africa's National electricity plan. The primary objective of the IRP is to determine the long-term electricity demand and detail how this demand should be met in terms of generating capacity, type, timing and cost. The IRP also serves as input to other planning functions, including amongst others, economic development and funding, and environmental and social policy formulation. The promulgated IRP 2010–2030 identified the preferred generation technology required to meet expected demand growth up to 2030. It incorporated government objectives such as affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources, localisation and regional development. Since the promulgated IRP 2010–2030, the following capacity developments have taken place: » A total 6 422 MW under the Renewable Energy Independent Power Producers Programme (REIPPP) has been procured, with 3 876 MW operational and made available to the grid as of 31 March 2021[6] with 5 078MW from 79 IPP projects operational and made available to the grid[7]. » 2 000MW of generating capacity (comprising various technologies) has been awarded to 8 Independent Power Producers under the RMIPPPP in March 2021. » 2 583MW of electricity in bid window 5 of the REIPPPP, announced on 28 October 2021 (DMRE, 2021). » IPPs have commissioned 1 005 MW from two Open Cycle Gas Turbine (OCGT) peaking plants. » Under the Eskom build programme, the following capacity has been commissioned:

6 Bid windows1, 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.

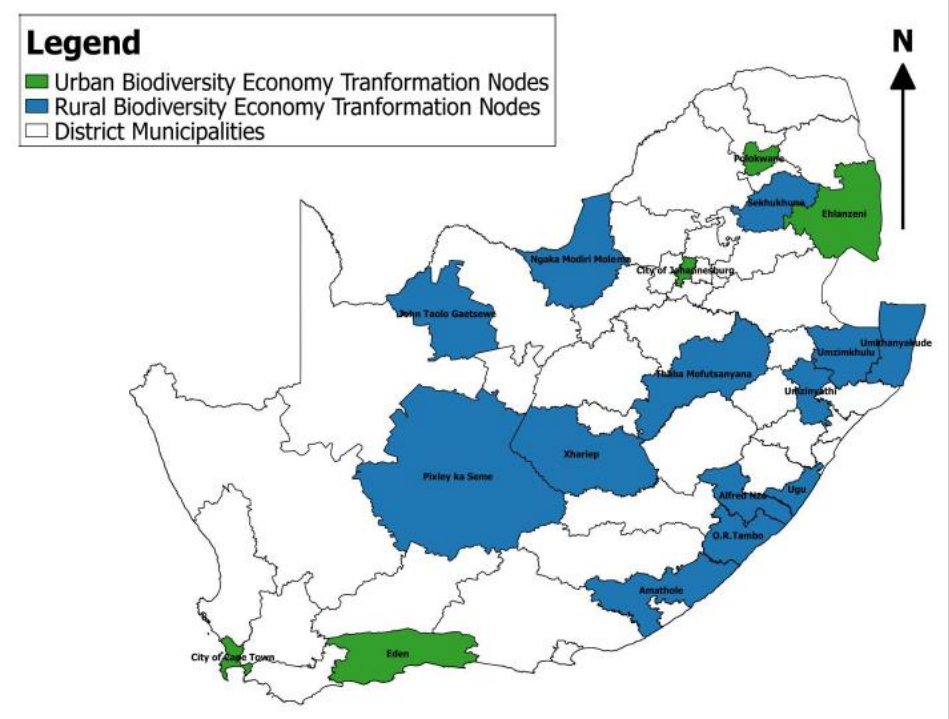
[7]https://www.cliffedekkerhofmeyr.com/en/news/publications/2019/Corporate/energy-alert-22-october-The-Integrated-Resource-Plan-2019-A-promising-future-roadmap-for-generation-capacity-in-South-Africa.html

Relevant legislation or policy	Relevance to Kiara PV1 Facility
	∗ 1 332 MW of Ingula pumped storage, 1 588 MW of Medupi, 800 MW of Kusile and ∗ 100 MW of Sere Wind Farm. » 18 000MW of new generation capacity has been committed to. Besides capacity additions, a number of assumptions have changed since the promulgation of IRP 2010–2030. Key assumptions that changed include the electricity demand projection, Eskom's existing plant performance, as well as new technology costs. In addition, environmental considerations such as South Africa's contribution to Greenhouse gases which contribute to climate change, local air quality and water availability have come to the fore. These considerations necessitated the review and update of the IRP and ultimately the promulgation of a revised plan in October 2019. In terms of the IRP 2019, South Africa continues to pursue a diversified energy mix that reduces reliance on a single or a few primary energy sources. In the period prior to 2030, the system requirements are largely for incremental capacity addition (modular) and flexible technology, to complement the existing installed inflexible capacity. South Africa is a signatory to the Paris Agreement on Climate Change and has ratified the agreement. In line with INDCs (submitted to the UNFCCC in November 2016), South Africa's emissions are expected to peak, plateau and from year 2025 decline. Following consideration of all these factors, the following provision has been made for the following new capacity by 2030: » 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; and » 4 000MW from other distributed generation, co-generation, biomass and landfill technologies. Development of the Kiara PV1 Facility project would contribute towards the allocation for solar energy development.
New Growth Path (NGP) Framework, 23 November 2010	The purpose of the New Growth Path (NGP) Framework is to provide effective strategies towards accelerated job-creation through the development of an equitable economy and sustained growth. The target of the NGP is to create 5 million jobs by 2020; with economic growth and employment creation as the key indicators identified in the NGP. The framework seeks to identify key structural changes in the economy that can improve performance in terms of labour absorption and the composition and rate of growth. To achieve this, government will seek to, amongst other things, identify key areas for large-scale employment creation, as a result of changes in conditions in South Africa and globally, and to develop a policy package to facilitate employment creation in these areas.

Relevant legislation or policy	Relevance to Kiara PV1 Facility
National Development Plan 2030 (2012)	The National Development Plan (NDP) 2030 is a plan prepared by the National Planning Commission in consultation with the South African public which is aimed at eliminating poverty and reducing inequality by 2030. In terms of the Energy Sectors role in empowering South Africa, the NDP envisages that, by 2030, South Africa will have an energy sector that promotes: » Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation. » Social equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households. » Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change. In formulating its vision for the energy sector, the NDP took the IRP 2010 as its point of departure. Therefore, although electricity generation from coal is still seen as part of the energy mix within the NDP, the plan sets out steps that aim to ensure that, by 2030, South Africa's energy system will look very different to the current situation: coal will contribute proportionately less to primary-energy needs, while gas and renewable energy resources – especially wind, solar, and imported hydroelectricity – will play a much larger role. The NDP aims to provide a supportive environment for growth and development, while promoting a more labour-absorbing economy. The development of Kiara PV1 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.
Strategic Integrated Projects (SIPs)	The Presidential Infrastructure Coordinating Commission (PICC) is integrating and phasing investment plans across 18 Strategic Integrated Projects (SIPs) which have 5 core functions, including to unlock opportunity, transform the economic landscape, create new jobs, strengthen the delivery of basic services and support the integration of African economies. SIP 8 of the energy SIPs supports the development of RE projects as follows: 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) and supports bio-fuel production facilities. The development of Kiara PV1 Facility is aligned with SIP 8 as it constitutes a green energy initiative that would contribute clean energy in accordance with the IRP 2010 – 2030.
National Climate Change Response Policy, 2011	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. This Agreement is open for signature and subject to ratification, acceptance or approval by States and regional economic integration organisations that are Parties to the Convention from 22 April 2016 to 21 April 2017. Thereafter, this Agreement shall be open for accession from the day following the date

Relevant legislation or policy	Relevance to Kiara PV1 Facility
	on which it is closed for signature. The agreement can only be sanctioned once it has been ratified by 55 countries, representing at least 55% of emissions. South Africa signed the Agreement in April 2016 and ratified the agreement on 01 November 2016. The Agreement was assented to by the National Council of Provinces on 27 October 2016, and the National Assembly on 1 November 2016. The Agreement was promulgated on 04 November 2016, thirty days after the date on which at least 55 Parties to the Convention, which account for at least 55% of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession with the Depositary. South Africa's National Climate Change Response Policy (NCCRP) establishes South Africa's approach to addressing climate change, including adaptation and mitigation responses. The NCCRP formalises Government's vision for a transition to a low carbon economy, through the adoption of the 'Peak, Plateau and Decline' (PPD) GHG emissions trajectory whereby South Africa's emissions should peak between 2020 and 2025, plateau for approximately a decade, and then decline in absolute terms thereafter, and based on this the country has pledged to reduce emissions by 34% and 42% below Business As Usual (BAU) emissions in 2020 and 2025, respectively. The policy provides support for Kiara PV1 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.
Climate Change Bill, 2018	On 08 June 2018, the Minister of Environmental Affairs published the 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. Kiara PV1 Facility comprises a renewable energy generation facility and would not result in the generation or release of emissions during its operation.
National Biodiversity Economy Strategy (NBES) (March 2016)	The biodiversity economy of South Africa encompasses the businesses and economic activities that either directly depend on biodiversity for their core business or that contribute to conservation of biodiversity through their activities. The commercial wildlife and the bioprospecting industries of South Africa provide cornerstones for the biodiversity economy and are the focus of this strategy. Both the wildlife and bioprospecting sub-sectors of the biodiversity economy have already demonstrated the potential for significant future development and growth. In the study commissioned on the situational analysis of the biodiversity economy, the contribution of the biodiversity economy to the national economy can be measured in terms of Gross Domestic Product (GDP), with the wildlife and bioprospecting industries contributing approximately R3 billion to GDP in 2013. Growth in the wildlife and bioprospecting industries can make a significant impact on the national economy, while contributing to national imperatives such as job creation, rural development and conservation of our natural resources. The Wildlife Industry value chain is centred on game and wildlife farming/ranching activities that relate to the stocking, trading, breeding, and hunting of game, and all the services and goods required to support this value chain. The key drivers of this value chain include domestic hunters, international hunters and a growing retail

Relevant legislation or policy	Relevance to Kiara PV1 Facility
	market demand for wildlife products such as game meat and taxidermy products. This sector is therefore characterised by an interesting combination of agriculture, eco-tourism and conservation characteristics. Over the period 2008-2013, the total Wildlife Industry market grew by more than 14% per year. This growth comprised an average annual growth exceeding 6% in domestic hunting, a decrease in international hunting, and an exponential growth in live auction sales. It is considered likely that the consolidated Wildlife Industry has the potential to experience a weighted average annual growth rate of between 4 %-14 % per year up to 2030. In order for the wildlife and bioprospecting sub-sectors of the biodiversity economy to achieve its full potential, a strategic partnership between the state, private sector and communities is required. To this end, a National Biodiversity Economy Strategy (NBES) is required to guide the sustainable growth of the wildlife and bioprospecting industries and to provide a basis for addressing constraints to growth, ensuring sustainability, identifying clear stakeholder's responsibilities and monitoring progress of the Enabling Actions. The Vision of NBES is to optimise the total economic benefits of the wildlife and bioprospecting industries through its sustainable use, in line with the Vision of the Department of Environmental Affairs. The purpose of NBES is to provide a 14-year national coordination, leadership and guidance to the development and growth of the biodiversity economy. NBES has set an industry growth goal stating that by 2030, the South African biodiversity economy will achieve an average annualised GDP growth rate of 10% per annum. This envisioned growth curve extends into the year 2030 and is aligned to the efforts of the country's National Development Plan, Vision 2030. The NBES seeks to contribute to the transformation of the biodiversity economy in South Africa through inclusive economic opportunities, reflected by a sector which is equitable - equitable access to resources, equitable and fair processes and procedures and equitable in distribution of resources (i.e. business, human, financial, indigenous species, land, water) in the market. To address these transformation NBES imperatives, NBES has the principles of: » Conservation of biodiversity and ecological infrastructure » Sustainable use of indigenous resources » Fair and equitable beneficiation » Socio-economic sustainability » Incentive driven compliance to regulation » Ethical practices » Improving quality and standards of products. The NBES provides the opportunity to redistribute South Africa's indigenous biological/ genetic resources in an equitable manner, across various income categories and settlement areas of the country. The NBES has prioritised nodes in the country for biodiversity economy transformation, referred to as BET nodes. NBES prioritises 18 BET nodes, 13 rural and 5 urban districts across the nine provinces of the country, with communities having been prioritised for development of small and medium size

Relevant legislation or policy	Relevance to Kiara PV1 Facility
	enterprises and community-based initiatives which sustainably use of indigenous biological and/or genetic resources. The Ngaka Modiri Molema District Municipality within which the Kiara PV1 Facility is proposed is identified as a Rural Biodiversity Economy Transformation Node. 

5.5 Provincial Planning and 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 Kiara PV1 Facility

Relevant policy	Relevance to Kiara PV1 Facility
North West Provincial Development Plan (PDP), 2013 (updated 2017/2022)	The North West Provincial Development Plan (PDP) 2013 (updated 2017/2022) states that the overarching objective, is to overcome certain obstacles relating to the current infrastructure by introducing renewable energy together with energy conservation and efficiency strategies. Furthermore, this will craft a better tomorrow and ensure that underdevelopment, poverty, and inequality is fully addressed in the North West Province. The overall energy objective for the province also includes promoting the development of renewable energy supply schemes which are considered to be strategically important for increasing the diversity of domestic energy supply and avoiding energy imports, while also minimising the detrimental environmental impacts. The implementation of sustainable renewable energy is also to be promoted within the province through appropriate financial and fiscal instruments. With the developed and proposed independent power producer capacity (including the Kiara PV1 facility), the province will produce its own electrical power needs from renewable energy resources (although this energy will be fed into the national grid).

Relevant policy	Relevance to Kiara PV1 Facility
North West Province Spatial Development Framework (SDF) (2016) – Published 2017	The Spatial Development Framework (SDF) addresses the need for spatial planning, socio-economic development, infrastructure and conservation of natural resources. Key socio-economic issues which would require strategic planning provision include: employment (including youth and women); poverty eradication; attracting investment; economic growth; HIV / AIDS and other diseases; food security; physical infrastructure (including availability of industrial land); illiteracy; tourism development; population growth, urbanization and migration. Natural resource issues include inadequate water resources for future development; bush encroachment and alien invasive species; land and soil degradation; and overgrazing. With regard to spatial planning, the legacies of Apartheid-era policy is identified as a key issue and residents of the North West are consequently extremely underdeveloped. As per the North West Provincial Spatial Development Framework (PSDF) (2017) electricity within the province is primarily provided by Eskom to re-distributors – mainly municipalities (10%), commercial (5%), agriculture (5%), mining (30%), industrial (30%) and Residential (20%). According to the North West PSDF the proposed project site is located within the Mahikeng Distribution Area, which is characterised by minor developments, including Commercial, Industrial, and Major Electrification; and has a projected growth of 125MW (Eskom, 2015). Eskom's Transmission Development Plan 2015 – 2024 represents the transmission network infrastructure investment requirements over the 10 year period between 2015 and 2024. Projects proposed for the North West Province for the next 10 years include the introduction of 400kV power lines and transformation to support or relieve the existing networks. Five transmission power corridors have been identified as critical to providing a flexible and robust network that could respond to meet the needs of future IPPs and IRP requirements. The development of the proposed PV facility and its associated grid connection infrastructure will contribute to economic growth and development, which will in turn help eradicate poverty through job creation and skills development in the region which will be in line with the North West SDF.
Renewable Energy Strategy for the North West Province (2012)	In 2012 the North West Province's then Department of Economic Development, Environment, Conservation and Tourism (DEDECT) developed the Renewable Energy Strategy for the North West Province. The strategy was developed in response to the need of the North West Province to participate meaningfully within South Africa's RE sector. The RE strategy aims to improve the North West Province's environment, reduce its contribution to climate change, and alleviate energy poverty, while promoting economic development and job creation whilst developing its green economy. According to the strategy the North West Province consumes approximately 12% of South Africa's available electricity, and is rated as the country's fourth largest electricity consuming province. This is mainly due to the high demand of the electrical energy-intensive mining and related industrial sector, with approximately 63% of the electricity supplied to the province being consumed in its mining sector. While the strategy recognises that South Africa has an abundance of RE resources available, it is cognisant of the fact that the applicability of these RE resources depend on a number of factors and as a result are not equally viable for the North West Province.

Relevant policy	Relevance to Kiara PV1 Facility
	The RE sources that were identified to hold the most potential and a competitive strength for the North West Province are Solar Energy (photovoltaic as well as solar water heaters), Municipal Solid Waste, hydrogen and fuel cell technologies, bio-mass, and energy efficiency. The advantages and benefits for the North West Province associated with the implementation and use of RE technologies include: » Provision of energy for rural communities, schools and clinics that are far from the national electricity grid. » Creation of an environment where access to electricity provides rural communities with the opportunity to create an economic base via agricultural and home-based industries and Small, Medium and Micro Enterprises (SMMEs) in order to grow their income-generating potential. » The supply of water within rural communities. » It would result in less time taken for the collection of wood and water, thus improving the quality of life within communities and specifically for women. » Improved health through the reduced use of fuelwood as energy source for cooking and heating that causes respiratory and other hazards. » Solar water heating for households in urban and rural settings, reducing the need for either electricity (in urban settings) and fuelwood (in rural settings) to heat water, thus lowering our National peak demand and conservation of woodlands in a sustainable manner. » Large-scale utilisation of renewable energy will also reduce the emissions of carbon dioxide, thus contributing to an improved environment. » The fact that RE go hand-in-hand with energy efficiency, it will result in additional financial benefit and the need for smaller RE systems. » The development of a strong localised RE industry within the NWP holds substantial potential for Black Economic Empowerment (BEE) and job creation within the Province. » The establishment of a strong RE base in the North West Province, especially in the manufacturing of fuel cells could stimulate the market for Platinum Group Metals (PGM), which would in turn help the local mining sector. This is due to RE sources having considerable potential for increasing security of supply by diversifying the energy supply portfolio and increasingly contributes towards a long-term sustainable energy future. In terms of environmental impacts, RE results in the emission of less GHGs than fossil fuels, as well as fewer airborne particulates, and other pollutants. Furthermore, RE generation technologies save on water consumption in comparison with coal-fired power plants.
North West Provincial Growth and Development Strategy (PGDS) 2004-2014	Goals and objectives of the North West Provincial Growth Development Strategy are to fight poverty and unemployment, improve the low level of expertise and skills which are classified as both immediate and long-term goals and require primary goals for sustained growth and economic development. The proposed facility will contribute to employment creation and skills development which is in line with the goals and objectives of the North West PGDS. The North West Provincial Growth Development Strategy aims at building a sustainable economy to eradicate poverty and improve social development. The proposed Grid infrastructure will contribute to growth and development of the local area by expanding the economic base and creating employment opportunities.

5.6 Local Policy and Planning Context

The local tiers of government relevant to the Kiara PV1 Facility project are the Ditsobotla Local Municipality and the Ngaka Modiri Molema District Municipality. Instruments and/or policies at both the district and local level contain objectives which align with the development of Kiara PV1 Facility. These include, economic growth, job creation, community upliftment and poverty alleviation.

Table 5.4: Relevant district and local legislation and policies for Kiara PV1 Facility

Relevant policy	Relevance to Kiara PV1 Facility
Ngaka Modiri Molema District Municipality Integrated Development Plan (IDP), 2017-2022	The vision of the Ngaka Modiri Molema District Municipality as contained within its IDP 2017 – 2022 can be summarised as follows: "*Leaders in integrated municipal governance*". The vision of the Ngaka Modiri Molema District Municipality is: "*To provide a developmental municipal governance system for a better life for all*". In recognition of its vision and mission, the Ngaka Modiri Molema District Municipality has adopted the following strategic development goals for the District: » Institutional Transformation and Organisational Development. » Provision of Infrastructure for Basic Service Delivery. » Economic Development. » Financial Viability. » Good Governance. With regards to "Economic Development", the following additional strategic objectives have been identified: » To facilitate economic development by creating a conducive environment for business development. » Unlock opportunities to increase participation amongst all sectors of society in the mainstream economy to ultimately create decent job opportunities. » To promote Local Economic Development » To enhance rural development and agriculture » To Expand Public Works Programme The implementation of Kiara PV1 facility would therefore contribute positively towards local economic development, as well as the creation of new job opportunities within the Ngaka Modiri Molema District Municipality.
Ditsobotla Local Municipality Integrated Development Plan (IDP), 2017 – 2018 and draft reviewed 2020-2021	The vision statement for the Ditsobotla LM as contained within the IDP 2017 – 2018 is as follows: "*A developmental municipality dedicated to the social and economic upliftment of its communities*." The Mission Statement of the Ditsobotla LM is as follows:

<table>
<tr><th>Relevant policy</th><th>Relevance to Kiara PV1 Facility</th></tr>
<tr><td></td><td>"Sustainable service delivery through: transparent administration, dedicated staff, implementation of municipal programmes, and consultation with communities."

The following key issues and objectives have been identified for the Ditsobotla LM:

<table>
<tr><th>Key issues</th><th>Key objectives</th></tr>
<tr><td>The municipality's financial position is poor due to inadequate capacity as well as poor finance management controls / systems.</td><td>A fully capacitated municipal administration capable of developing and implementing effective financial controls.</td></tr>
<tr><td>The organisational design does not respond to service delivery challenges. There is no adequate capacity in technical functions of the municipality.</td><td>Capacitated institution structured in a way that enables efficient and effective service delivery.</td></tr>
<tr><td>High levels of poverty and unemployment, skills shortage, and inequalities within the Ditsobotla LM.</td><td>Create an environment conducive for economic growth, sustainable employment opportunities and growth in personal income levels of communities.</td></tr>
<tr><td>Backlogs in the provision of social services, infrastructure, service delivery and economic opportunities.</td><td>A well-structured Ditsobotla LM able to support sustainable human settlement and enable residents meets their social and economic needs.</td></tr>
</table>

The implementation of Kiara PV1 facility would contribute towards addressing the Ditsobotla Local Municipality key issue regarding high levels of poverty and unemployment, skills shortage, and inequalities, through the creation of employment opportunities, the provision of skills training opportunities, and local economic growth, including growth in personal income levels of those community members who would be employed on the project. In addition, the REIPPP Programme requires preferred bidders to make minimum contributions towards local economic development and social upliftment, to be focused on benefitting local communities within the vicinity of the project site.</td></tr>
</table>

5.7. Conclusion

From a review of the relevant policy and planning framework, it was concluded that the project is well aligned with the policy framework, and a clear need for the project is seen from a policy perspective at a local, provincial and National level.

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 the question such as, but not limited to, what the most sustainable use of the land may be.

This Chapter of the scoping report 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 an Impact Assessment Report

This chapter of the EIA Report 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 Kiara PV1 Facility is included and discussed as a whole within this chapter. The need and desirability for the development of the solar PV facility has been considered from an international, national, regional and site-specific perspective.

6.2 Need and Desirability from an Energy Perspective

Electricity is essential for most human activities and for South Africa's social and economic development. The development of large-scale electricity generation projects contributes towards security of supply and assists in minimising the costs of energy. In order for the benefits associated with electricity to be realised, it needs to be readily available, easily accessible, and affordable. It should also be generated in a sustainable manner, while minimising adverse social and environmental impacts. In addition to energy provision, large-scale electricity generation projects, such as solar facilities, have the ability to contribute positively to the creation of skilled, unskilled, and semi-skilled employment opportunities and mitigate climate change.

An increased supply of electricity within or to an area is also considered beneficial from a development perspective as the availability of electricity and other services can act as a pull factor attracting new development and industry.

6.3 Need and Desirability from an International Perspective

The need and desirability of Kiara PV1 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 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 7.1.2	Proportion of population with access to electricity. 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.
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 Kiara PV1 Facility would contribute positively towards Goal 7 of the SDGs through the following:

- By generating up to 120MW (contracted capacity) of affordable and clean energy. 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 Kiara PV1 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 Kiara PV1 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.

6.4 Need and Desirability from a National Perspective

Following the energy crisis in 2008, South African Government started to introduce renewable energy developments on a large scale and further enhanced the promotion of energy efficiency in all sectors to meet the demand of energy while reducing CO_2 emissions and creating jobs8. Consequently, significant investment in renewable energy and energy efficient technologies is required. Increasing the diversity of South Africa's electricity mix is important, not only for enhancing the crucially important security of supply of the country, but also to support job creation and mitigate climate change.

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.

South Africa needs to build about 40 000MW of new generation capacity by 2025 to meet demand requirements. According to the IRP, 17742MW should be provided by renewable energy projects. To achieve this, the government plans to install a total of 17GW of wind energy, 8288MWof solar photovoltaic energy, and 600 MW of concentrated solar power by 2030.

Kiara PV1 Facility is proposed in specific response to the requirement for diversification of the country's energy mix to include renewable energy such as solar PV as detailed in the IRP 2019. As a result, the need and desirability of Kiara PV1 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 4**). 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 considers the three pillars of sustainable development, and lists the following as the eight key energy planning objectives:

[8] https://energypedia.info/wiki/South_Africa_Energy_Situation

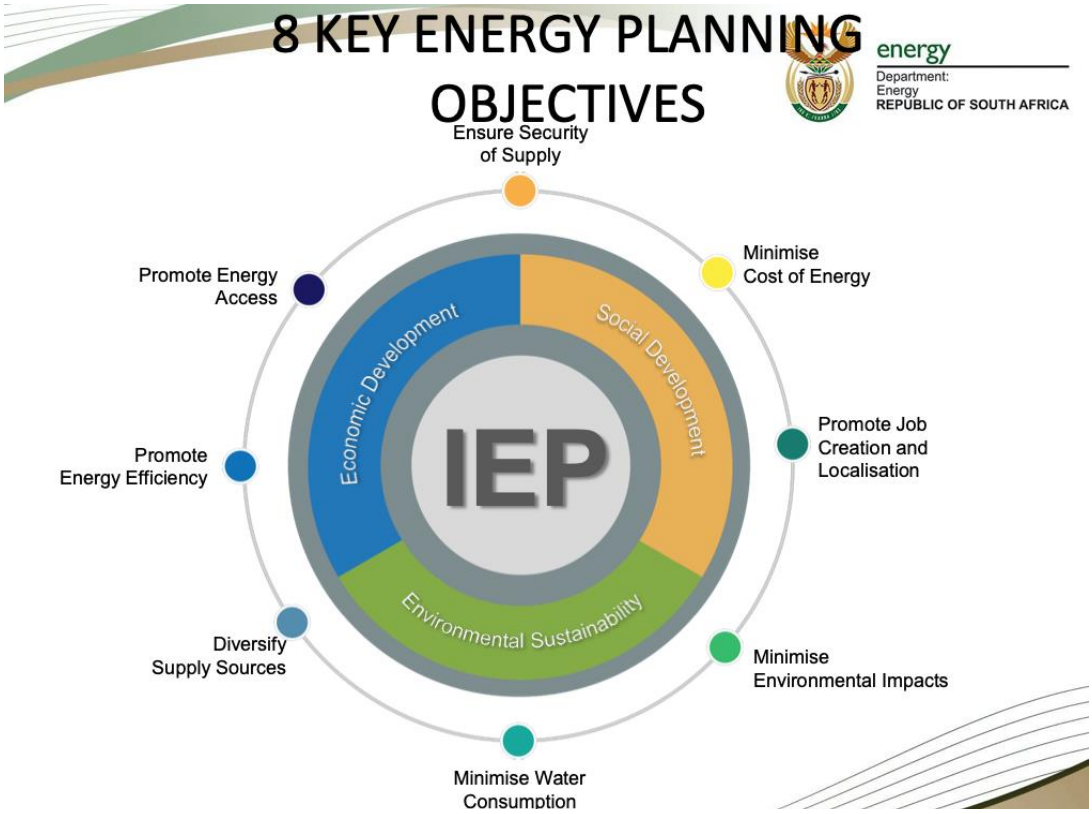


Figure 6.1: Eight key energy objectives as listed in the IEP, 2016 (extract from DOE presentation, December 2016)

The latest iteration of the IEP (25 November 2016) contained the following statement regarding solar power in South Africa:

"*South Africa experiences some of the highest levels of solar radiation in the world and this renewable resource holds great potential for the country. The daily solar radiation in South Africa varies between 4.5 and 6.5 kilowatt hours per square meter (kWh/m²) (16 and 23 megajoules per square meter [MJ/m²]) (Stassen, 1996), compared to about 3.6kWh/m² in parts of the United States and about 2.5kWh/m² in Europe and the United Kingdom. The total area of high radiation in South Africa amounts to approximately 194 000km², including the Northern Cape, which is one of the best solar resource areas in the world. With electricity production per square kilometre of mirror surface in a solar thermal power station being 30.2MW, and just 1% of the high radiation area in the country being made available for solar power generation, the generation potential is approximately 64GW. Solar energy has the potential to contribute quite substantially to South Africa's future energy needs. This would, however, require large investments in transmission lines from the areas of high radiation to the main electricity consumer centres*."

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.

Provision has been made for new additional capacities in the IRP 2019 (refer to **Table 6.1**).

Table 6.1: Overview of the total installed capacity expected by 2030

IPP Procurement Programme	Technology	MW	Total
Renewables	Wind	17 742MW	31 320MW
	Solar CSP	600MW	
	Solar Photovoltaic	8 288MW	
	Hydro	4 600MW	
Coal	Coal	33 364MW	33 364MW
Nuclear	Nuclear	1 860MW	1 860MW
Gas & Diesel	Gas & Diesel	3 000MW	3 000MW
Other (Distributed Generation, CoGen, Biomass, Landfill)	Other (Distributed Generation, CoGen, Biomass, Landfill)	4 000MW	4 000MW

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. 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.

Between 2011 and 2021, the South African Government, through its IRP 2010 - 2020, have successfully launched and completed five bidding windows under the REIPPPP[9] (refer to Table **Figure 6.2**[10]).

REIPPPP Bid Windows	1	2	3	3.5	4	4 (additional)	4.5 (expedited)	5	[...13] (up to 2030)	Total
Bid Date	04-Nov-11	05-Mar-12	19-Aug-13	03-Mar-14	17-Aug-14	17-Aug-14	11-Nov-15	16-Aug-21	TBD	-
Pref. Bidders ("PB") announced	07-Dec-11	21-May-12	31-Dec-13	14-Dec-14	16-Apr-15	07-Jun-15		TBD	TBD	-
Financial Close ("FC") - from	19-Jun-12	13-Dec-12	30-Jul-14	01-May-21	30-Apr-18	30-Apr-18		TBD	TBD	-
Years betwen PB annoucement & FC	0.54	0.57	0.58	6.39	3.05	2.90		TBD	TBD	-
Projects Bid	53	79	93	3	74	-	CANCELLED	102	TBD	**404.0**
Projects awarded	28	19	17	2	13	13		TBD	TBD	**92.0**
Capacity offered (MW)	3,625	1,275	1,473	300	1,105	1,170		2,600	[29,000*]	**11,548.0**
Capacity awarded (MW)	1,426	1,040	1,457	200	1,121	1,084		TBD	TBD	**6,327.9**
Total investment ($bn)	6.2	4.2	4.5	1.8	2.0	1.9		TBD	TBD	**20.5**
Avg. Real IRR (ZAR)	17.0%	15.5%	11.0%	13.75%	9.5%	9.5%		[3%-7%*]	TBD	-

*Estimation; TBD – To be Determined

Source: Finergreen

Figure 6.2: Overview of bid windows 1 to 5

Figure 6.2 shows that between 2011 and 2015 (excluding bid window 5), 302 bids were submitted, with around 30% (92) of the projects receiving approval. From those 92 projects, close to 70% (4.41GW) are already in operation, with wind and solar PV projects compromising most of the projects awarded (roughly 86%). In addition, of the 11.5GW of total capacity offered, 6.3GW (roughly 71%) was allocated, with wind and solar PV projects comprising the majority of projects.

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.

The need for new power generation from solar PV 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 PV power generation capacity in South Africa's energy mix. The implementation of Kiara PV1 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).

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,

[9]https://www.pv-magazine.com/2021/09/30/reippp-one-of-the-worlds-best-renewable-energy-tenders-but-theres-room-for-improvement/

[10] At the time of publication of this data, Bid Window 5 had been launched, but not completed. 2 583 MW of renewable energy capacity was awarded to IPPs in the REIPPPP bid window 5 in October 2021.

» Diversifying the national economy,
» 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.

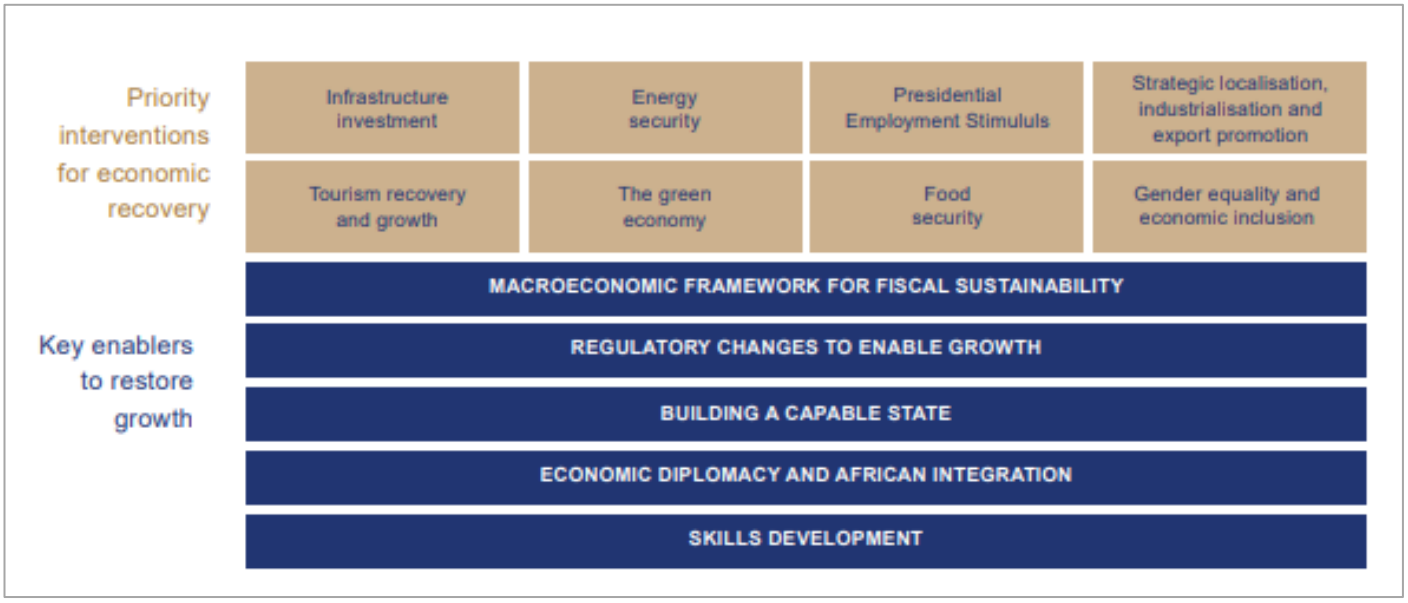


Figure 6.3: Core elements of the Economic Reconstruction and Recovery Plan (source: Building a new economy - Highlights of the Reconstruction and Recovery Plan, Presidency of the Republic of South Africa)

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 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 has therefore been identified and assessed by Government at a national scale considering the national energy requirements as well as international commitments to address climate change under the Paris Agreement and reaffirmed at COP26, and provision has been made for the inclusion of new solar power generation capacity in South Africa's energy mix. The implementation of the Kiara PV1 Facility, therefore, has the potential to contribute positively towards the identified national need, while simultaneously contributing to job creation and socio-economic development, which is identified as a need for the country within the National Development Plan. The PV facility will make use of renewable energy technology and would contribute positively towards reducing South Africa's GHG emissions and the Just Energy Transition of the country. In addition, by making use of solar power technology, the project would have reduced water requirements, when compared with some other generation technologies such as coal and gas, in alignment with one of the vision 2030 themes of DWS's National Water Resource Strategy 2 (2013) (i.e. transitioning to a low carbon economy through stimulating renewable energy and retrofitting buildings).

6.5 Need and Desirability of the project from a Regional Perspective

South Africa's electricity generation mix has historically been dominated by coal. However, up to 2030, a new capacity demand will be driven by the decommissioning of existing coal-fired power stations. A further 24 100MW (**Figure 6.4**) of coal power is expected to be decommissioned in the period 2030 to 2050. Therefore, additional capacity will be required from renewable energy sources, with the solar PVs being allocated 1000MW for the period up to 2030.

	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 6.4: A snapshot of the Energy Mix as per the IRP 2019

Although 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, the North West Province has been identified as an area where electricity generation from solar energy facilities is highly feasible and a viable option. The location of the study area and project site within the North west Province is therefore considered to support the Province/Region's generation targets.

The overarching objective for the Kiara PV1 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 preferred for solar energy development by virtue of its abundant solar resource.

The North West Provincial Spatial Development Framework 2017 states that the overarching goal for the province is to enable sustainable development, and that the province considers social and economic development as imperative in order to address the most significant challenge facing the North West, which is poverty. The Provincial Spatial Development Framework identified five transmission power corridors have been identified as critical to providing a flexible and robust network that could respond to meet the needs of future IPPs and IRP requirements.

The development of the Kiara PV1 would contribute positively towards increased electricity provision in the North West Province, which could be used in the development of socio-economic infrastructure within the province, as well as to increase employment opportunities.

The North West Provincial Growth and Development Strategy identifies poverty reduction as the most significant challenge facing the government and its partners. All other societal challenges that the province faces emanate predominantly from the effects of poverty. The development of the Kiara PV1 has the potential to create employment opportunities, promote skills development, create opportunities to promote private sector investment and the development of SMMEs in the North west Province.

According to the Ngaka Modiri Molema District Municipality Integrated Development Plan (2017 – 2022), the vision of the District Municipality is "To provide a developmental municipal governance system for a better life for all". The Strategic Objectives to address the vision that are relevant to the project include the promotion of economic growth in the district and enhancement of service delivery. The development of the Kiara PV1 will promote economic development in the Ngaka Modiri Molema area, thereby assisting in addressing some the challenges faced by the district municipality as detailed in the IDP.

The Ditsobotla Local Municipality IDP (2020 – 2021) identified the following as some of the challenges facing the area in terms of economic development and growth.

- The municipality's financial position is poor due to inadequate capacity as well as poor finance management controls / systems.
- The organisational design does not respond to service delivery challenges. There is no adequate capacity in technical functions of the municipality.
- High levels of poverty and unemployment, skills shortage, and inequalities within the Ditsobotla LM.
- Backlogs in the provision of social services, infrastructure, service delivery and economic opportunities

These issues can be addressed by supplier and enterprise development and enterprise development spend linked to the Kiara PV1 Facility.

6.5.1. Benefits of Renewable Energy and the Need and Desirability in the South Africa 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: Kiara PV1 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 of economic development, sustainable employment opportunities and growth in personal income levels.

Since inception of the REIPPPP in 2011, approximately 59 071 job years for South African citizens to date have been created.

Kiara PV1 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 REIPPP, 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 (2021), 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[11]. 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 rounds[12].
- 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 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.

[11] https://www.csir.co.za/csir-releases-power-sector-statistics-first-half-2021

[12] Bid windows1, 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.

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 CO_2 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. According to the Climate Transparency Report (2020), total GHG emissions in South Africa (excluding land use) have increased by 41% since 1990, but emissions in recent years have been almost constant, owing largely to low economic growth and a sharp rise in electricity prices. South Africa is ranked 12th worldwide in terms of per capita carbon dioxide emissions as of 2021[18]. Since its inception, the REIPPPP has achieved carbon emission reductions[19] of 60.7 Mton of CO_2. The development of Kiara PV1 Facility, and the associated electricity generated as a result of the facility, will result in considerable savings on tons of CO_2 emissions.

Support for international agreements: The effective deployment of renewable energy provides a tangible means for South Africa to demonstrate its commitment to its international agreements under the Kyoto Protocol and the Paris Agreement, and for cementing its status as a leading player within the international community.

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.

6.6 Need and Desirability of the project from a District and Local Perspective

The Strategic Objectives to address Ngaka Modiri Molema District Municipality and Ditsobotla Local Municipality vision that are relevant to the project include the promotion of economic growth in the district and enhancement of service delivery. The potential in the area for Renewable Energy developments including the development of the Kiara PV1 Facility will promote economic development in the Ngaka Modiri Molema District and the Ditsobotla Local Municipality area, thereby assisting in addressing some of the challenges faced locally such as.

- High levels of poverty and low levels of education.
- Low levels of development despite the strategic location in terms of the national transport corridors.
- High rate of unemployment, poverty, and social grant dependence.
- Prone to significant environmental changes owing to long-term structural changes (such as climate change, energy crises and other shifts).

These issues can be addressed by supplier and enterprise development and enterprise development spend linked to the Kiara PV1 Facility.

6.7 Receptiveness of the proposed development area for the establishment of Kiara PV1 Facility

The placement of a solar PV facility is strongly dependent on several factors including climatic conditions (solar irradiation levels), topography, the location of the site, and in particular the location in a node for renewable projects, availability of grid connection, the extent of the site and the need and desirability for the project as detailed in chapter 3. 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 PV facility.

6.8 Conclusion

From the above, it is clear that the need and desirability for the project is supported from a planning and policy perspective on a national, provincial, district, and local level, as well as from a technical perspective when considering solar resource. It is however important to also consider the potential impacts and benefits that the proposed solar facility may have for the affected site and surrounding area from both a biodiversity sustainability perspective and a socio-economic perspective. Therefore, it is imperative for the assessment being undertaken for the project to consider this project not only from a policy (national, provincial, and

local level) perspective, but also from a biodiversity and socio-economic perspective. The aim of the EIA process is to ensure a balance between these three spheres and to ensure that conclusions made regarding the proposed project draw on both the positive and negative consequences of the proposed development, as well as the potential for impacts to be compounded through the development of the solar facility and its associated infrastructure in proximity to other similar developments (i.e. cumulative impact). The potential impacts associated with the project are identified within this Scoping Report and will be assessed in the EIA Phase.

CHAPTER 7: APPROACH TO UNDERTAKING THE SCOPING PHASE

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 Kiara PV1 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 120MW and Activity 1 of Listing Notice 2 (GNR 325).

An EIA process refers to the process undertaken in accordance with the requirements of the relevant EIA Regulations (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**.

A comprehensive consultation process has been designed and implemented to cater for the undertaking of a full-scale, innovative public participation process which includes I&APs, the competent authority, directly impacted landowners/occupiers, adjacent landowners/occupiers, relevant Organs of State departments, ward councillors and other key stakeholders, while remaining within the limits as stipulated by the National Government. This chapter outlines the process that was followed during the Scoping Phase of the EIA process.

The EIA process is illustrated in **Figure 7.1**.

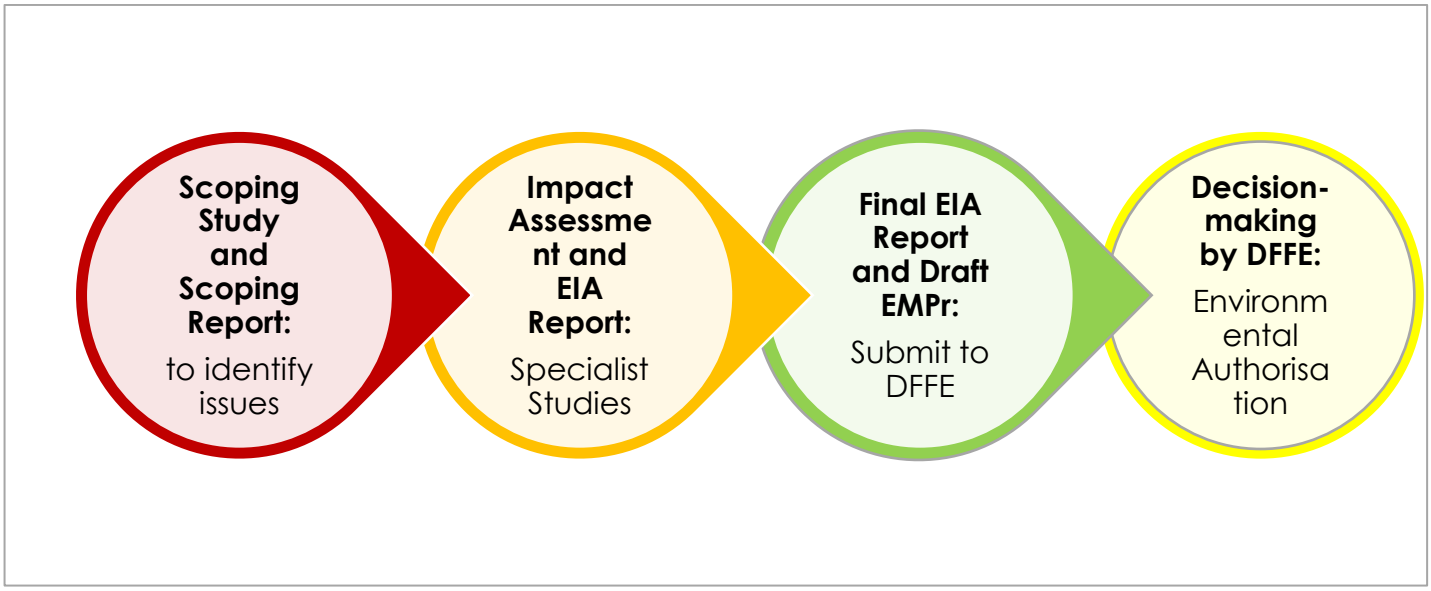


Figure 7.1: The Phases of an Environmental Impact Assessment (EIA) Process

7.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of an Impact Assessment 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 of Kiara PV1 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 issues were incorporated, or the reasons for not including them.	The main issues raised through the undertaking of the public participation process including consultation with I&APs are included in the Comments and Responses Report in **Appendix C**.
(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**.

7.2 Relevant legislative permitting requirements

The legislative permitting requirements applicable to Kiara PV1 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. Relevant permitting requirements are detailed within **Table 7.5**.

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

NEMA (No. 107 of 1998) 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 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). Due to the fact that Kiara PV1 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 Provincial authority, the North West Department of Economic Development, Environment, Conservation and Tourism (DEDECT) is a 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 Kiara PV1 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 7.2 contains all the listed activities identified in terms of NEMA, the 2014 EIA Regulations (GNR 326), and Listing Notice 1 (GNR 327), Listing Notice 2 (GNR 325), and Listing Notice 3 (GNR 324) which may be triggered by the proposed development of the Kiara PV1 Facility and associated infrastructure, and for which an application for EA has been made:

Table 7.2: Listed activities identified in terms of the Listing Notices (GNR 327, 325 and 324)

Notice Number	Activity Number	Description of listed activity
Listing Notice 1 (GNR 327) 08 December 2014 (as amended)	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 or more. ***Facility substation and a 132kV power line from the on-site substation are proposed to connect the PV facility to the switching collector substation.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended)	12(ii)(a)(c)	The development of – (ii) Infrastructure or structures with a physical footprint of 100 square metres or more Where such development occurs- (a) within a watercourse; or (c) within 32 metres of a watercourse. ***The construction and operation of the PV facility and associated infrastructure will occur within watercourses, or within 32m of watercourses. The infrastructure will have a physical footprint of more than 100 square metres.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended)	14	The development and related operation of facilities and infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres. ***The development of Kiara PV1 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 on-site substation where such storage will occur inside containers with a combined capacity exceeding 80 cubic meters but not exceeding 500 cubic meters.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended)	24 (ii)	The development of a road – (ii) with a reserve wider than 13.5m, or where no reserve exists where the road is wider than 8m. ***Access roads will be developed during the construction phase of the project. These are likely to exceed 8m in width.***

Notice Number	Activity Number	Description of listed activity
Listing Notice 1 (GNR 327) 08 December 2014 (as amended)	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 for the PV facility and associated infrastructure 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)	56 (ii)	The widening of a road by more than 6 m, or lengthening of a road by more than 1 km – (ii) where no reserve exists, where the existing road is wider than 8 metres ***Existing roads may require widening of up to 6m and/or lengthening by more than 1km, to accommodate the movement of heavy vehicles and cable trenching activities.***
Listing Notice 2 (GNR 325) 08 December 2014 (as amended)	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 proposed PV facility will have a capacity that exceeds 20MW. The Kiara PV1 Facility will have a contracted capacity of 120MW.***
Listing Notice 2 (GNR 325) 08 December 2014 (as amended)	15	The clearance of an area of 20ha or more of indigenous vegetation[13]. ***Kiara PV1 Facility will require the clearance of an area in excess of 20ha for the development of the PV facility and associated infrastructure.***
Listing Notice 3 (GNR 324) 08 December 2014 (as amended)	**4 (h)(iv)**	The development of a road wider than 4 metres with a reserve less than 13,5 metres. **h. North West** (iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; ***The development of the PV facility and associated infrastructures will require the development of roads wider than 4m within ESA areas.***
Listing Notice 3 (GNR 324) 08 December 2014 (as amended)	**10 (h)(iv)**	The development and related operation of facilities for 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 **h. North West** (iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;

[13] "Indigenous vegetation" as defined by the 2014 EIA Regulations (GNR 326) refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.

Notice Number	Activity Number	Description of listed activity
		The development of the PV facility and associated infrastructure will require the storage and handling of a dangerous good with a capacity of 80 cubic meters within ESA areas.
Listing Notice 3 (GNR 324) 08 December 2014 (as amended)	**12 (h)(iv)**	The clearance of an area of 300 square metres or more of indigenous vegetation **h. North West** iv. Within critical biodiversity areas identified in systematic biodiversity plan adopted by the competent authority ***The development of the renewable energy facility and associated infrastructures will require the clearance of more than 300 square meters of indigenous vegetation within areas classified as ESA.***
Listing Notice 3 (GNR 324) 08 December 2014 (as amended)	**14(ii)(a)(c)(h)(iv)**	The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; or (c) within 32 metres of a watercourse, measured from the edge of a watercourse. h. North West (iv) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority. ***The development of the PV facility will require the establishment of infrastructure with a physical footprint exceeding 10m² within 32m of the watercourses and within areas classified as ESAs.***
Listing Notice 3 (GNR 324) 08 December 2014 (as amended)	**18 (h)(v)**	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. **h. North West** (v) Within critical biodiversity areas identified in systematic biodiversity plan adopted by the competent authority ***The development of the renewable energy facility and associated infrastructures may require the widening of a road by more than 4 metres, outside urban areas and within areas classified as ESA.***

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.

Two prominent wetland systems are indicated for the study area. A large lower lying wetland area transects the northern portion of the area.

Error! Reference source not found. contains Water Uses associated with the proposed project and identified i n 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 3.1: 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 development area considered for the establishment of the Kiara PV1 Facility has two prominent wetland systems located within the extent of the project area. This will be confirmed during the EIA phase.***
NWA (No. 36 of 1998)	Section 21 (i)	Altering the bed, banks, course or characteristics of a watercourse. ***The development area considered for the establishment of the Kiara PV1 Facility has two prominent wetland systems located within the extent of the project area. This will be confirmed during the EIA phase.***

In the event that the flow of water in the watercourses 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 (GN R267), or a GA registered in accordance with the requirements of 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. 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 Scoping and EIA (S&EIA) Process being undertaken for Kiara PV1 Facility

In terms of NEMA, the 2014 EIA Regulations (GNR 326), and Listing Notices (Listing Notice 1 (GNR 327), Listing Notice 2 (GNR 325) and Listing Notice 3 (GNR 324) the development of Kiara PV1 Facility requires EA from 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). 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).

The S&EIA process is to be undertaken in two phases as follows:

» The **Scoping Phase** includes the identification and description of potential issues associated with the project through desktop studies, field surveys, as well as consultation with I&APs and key stakeholders through a Public Participation process. The entire development area are considered within this process. Through this study, areas of sensitivity within the broader 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) this Scoping Report prepared for the project will be subject 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 the completion of this review period, a Final Scoping Report which

incorporates all comments received during the 30-day public review and comment period, will be prepared and submitted to DFFE for its consideration. Following its receipt of the Final Scoping Report 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 legislation, or the Scoping Report does not substantially comply with Appendix 2 of the 2014 EIA Regulations (GNR 326).

» 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) the EIA Report and EMPr prepared for the project will also be subject 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 the conclusion of this review period a Final EIA Report and EMPr which incorporates all comments received during the 30-day review and comments period, will be prepared and submitted to DFFE for its consideration. Following its receipt of the Final EIA Report and EMPr, DFFE has 107 days within which to either grant or refuse the EA.

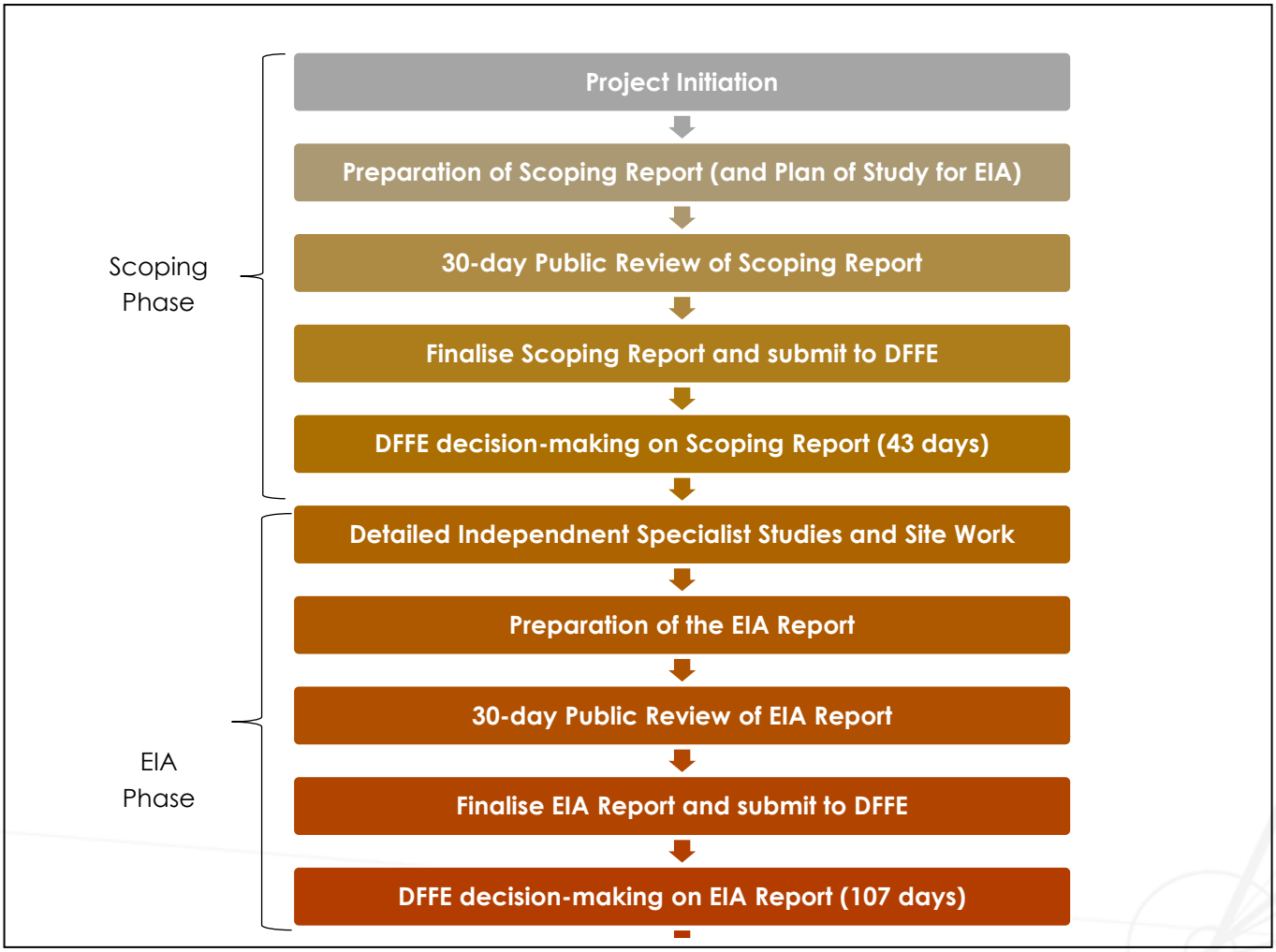


Figure 7.2: Regulated timeframe of an Environmental Impact Assessment (EIA) Process

7.4 Objectives of the Scoping Phase

This Scoping Report documents the evaluation of potential environmental impacts of the Kiara PV1 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), 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 and development area 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 and development area 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)) have been met, through the undertaking of a consultative process.

- The identification of relevant policies and legislation regarding the activities to be undertaken have been identified and considered within this Scoping Report.
- Activities to be undertaken for the development of Kiara PV1 Facility have been identified and motivated in terms of the need and desirability for the activities to take place.
- Potential impacts associated with the undertaking of the identified activities and technology have been identified and described.
- Identification of areas of high sensitivity to be avoided by the development area.
- Key issues associated with the project to be addressed during the EIA Phase for further detailed study and ground-truthing have been identified and listed within this Scoping Report.
- The level of assessment, expertise 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.

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 (DFFE) in terms of Regulations 5 and 16 of the 2014 EIA Regulations (GNR 326).
- Undertaking a public participation process in accordance with Chapter 6 of GNR326, and the Department of Environmental Affairs (2017) Public Participation guidelines in order to identify issues and concerns associated with the proposed project.

- Preparation of a Scoping Report and Plan of Study for EIA in accordance with the requirements of Appendix 2 of the 2014 EIA Regulations (GNR 326).
- 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 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 has been determined as the competent authority for all projects which relate to the IRP and any updates thereto. As the project is proposed within North West Province, the North West DEDECT is the provincial commenting authority for the project. Consultation with these authorities is being undertaken throughout the Scoping Phase. To date, this consultation has included the following:

- Submission of a Pre-Application Meeting request to DFFE on 28 April 2022 and the proposed Public Participation Plan. Following submission of the PP Plan, the DFFE advised that the public participation plan has been cancelled as of the 01st of May 2022, via email on 05 May 2022, and that no pre-application meeting was considered necessary.
- Submission of the Application for Environmental Authorisation to the DFFE via the use of 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, are all undertaken electronically, as required by the DFFE. A record of all authority correspondence undertaken during the Scoping Phase is included in **Appendix B** and **Appendix C**.

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 (GN R326) (as amended). The purpose of public participation is clearly outlined in Regulation 40 of the EIA Regulations 2014 (GN R326) (as amended) and is being followed for this proposed project.

The Public Participation Process for Kiara PV1 Facility has been undertaken concurrently with that for Kiara PV2, Kiara PV3, Kiara PV4, Kiara PV5, Kiara PV6 and Kiara PV7, located in close proximity to each other. The benefit to the stakeholder is that all information relevant to all related applications has been made available for review together, and not only for comments to be raised across the seven applications at one time, but also provided a complete picture of the potential for impacts and/or benefits related to the suite of projects located in close proximity to one another.

A consultation process has been designed and implemented by Savannah Environmental to ensure that I&APs are afforded sufficient opportunity to access project information and raise comments on the project through an interactive web-based platform (i.e. online stakeholder engagement platform) readily available and accessible to any person registering their interest in the project, and ensures that the public participation process is undertaken in line with Regulations 41 to 44 of the EIA Regulations, 2014 as amended. 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;
  - identify potential issues of concern and suggestions for mitigation measures
  - 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; and
  - 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; and
  - 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); and
- 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 a local newspaper.
» Open and maintain a register of I&APs and Organs of State.
» Release of a Scoping Report for a 30-day review and comment period.
» Prepare a Comments and Responses (C&R) report which documents the comments received on the EIA process and during the 30-day review and comment period of the Scoping Report and the responses provided by the project team.

i. Stakeholder identification and Register of Interested and Affected Parties

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

I&APs have been identified through a process of networking and referral, obtaining information from Savannah Environmental's existing stakeholder database, liaison with potentially affected parties in the greater surrounding area and a registration process involving the completion of a reply form. Key stakeholders and affected and surrounding landowners have been identified and registered on the project database. Other stakeholders are required to formally register their interest in the project through either directly contacting the Savannah Environmental Public Participation team via phone, text message (SMS and WhatsApp), email or fax, or registering their interest via the online stakeholder engagement platform. An initial list of key stakeholders identified and registered is listed in **Table 7.2**.

Table 7.2: Initial list of Stakeholders identified for the inclusion in the project database during the public participation process for Kiara PV1 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, Rural Development and Land Reform (DARDLR):
Department of Water and Sanitation (DWS)
Government Bodies and State-Owned Companies
Eskom Holdings SOC Limited
National Energy Regulator of South Africa (NERSA)
South African Civil Aviation Authority (CAA)
South African Heritage Resources Agency (SAHRA)
South African National Roads Agency Limited (SANRAL)
Provincial Government Departments
North West Department of Economic Development, Environment, Conservation and Tourism (NW DEDECT)
North West Department of Public Works and Roads (NW DPWR)
North West Provincial Heritage Resources Agency (NW PHRA) – provincial Heritage Authority
North West Department of Community Safety and Transport Management (NW DCSTM)
Local Government Departments
Ngaka Modiri Molema District Municipality
Ditsobotla 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)
Wildlife and Environment Society of South Africa (WESSA)
Landowners
Affected landowners, tenants and occupiers
Neighbouring landowners, tenants and occupiers

As per Regulation 42 of the EIA Regulations, 2014 (as amended), all relevant stakeholder and I&AP information has been recorded within a register of I&APs (refer to **Appendix C1** for a listing of the recorded parties). In addition to the above-mentioned EIA Regulations, point 4.1 of the Public Participation Guidelines has also been followed. The register of I&APs contains the names[14] 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; and
- all persons who submitted written comments or attended virtual meetings (or in-person consultation where sanitary conditions can be maintained) and viewed the narrated presentations on the Savannah Environmental online platform during the public participation process.

[14] 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&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 – (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 neighbouring landowners 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 Kiara PV1 Facility (and the other projects proposed as part of the larger cluster), and providing background information of the project and inviting I&APs to register on the project's database were distributed via email on **24 June 2022**. The evidence of the 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 development area (i.e. the boundaries of the affected property), in accordance with the requirements of the EIA Regulations on **14 June 2022**. Photographs and the GPS co-ordinates of the site notices are contained in **Appendix C** of the Scoping Report.
» Placement of an advertisement in 'Die Noordwester' Newspaper on **24 June 2022** (**Appendix C**). This advert:
    - announced the project and the associated EIA process,
    - announced the availability of the Scoping report, the review period, and where it is accessible for review,
    - invited comment on the Scoping Report, and
    - provided all relevant details to access the Savannah Environmental online stakeholder engagement platform.
» A copy of the newspaper advert as sent to the newspaper is included in **Appendix C** of the Scoping Report.
» The Scoping Report was made available for review by I&APs for a 30-day review and comment period from **24 June 2022** to **25 July 2022**. The full Scoping Report was made available on the Savannah Environmental website, and all registered I&APs were notified on the availability 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.

Focus group meetings were held with key stakeholders on Wednesday, 20 July 2022 at 09h00, 11h00 and 15h00 via a virtual platform, where relevant.

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 7.3: Public involvement for Kiara PV1 Facility

Activity	Date
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 Savannah Environmental's website.	**24 June 2022**
Placement of site notices.	**14 June 2022**
Advertising of the availability of the Scoping Report for a 30-day review and comment period in Noordwester Newspaper, including details on how to access the Scoping Report via Savannah Environmental's website	**24 June 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) and key stakeholder groups.	**24 June 2022**
30-day review and comment period of the Scoping Report.	**24 June 2022 to 25 July 2022**

Activity	Date
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). » Interested & Affected Parties (I&APs)	Focus group meetings were held with key stakeholders on Wednesday, 20 July 2022 at 09h00, 11h00 and 15h00 via a virtual platform, where relevant.
On-going consultation (i.e. telephone liaison; e-mail communication) with all I&APs.	Throughout 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 report was made available in soft copies to I&APs. No hard copies of the report were made available for review and comment, and none were requested.

The Scoping Report was made available on the Savannah Environmental website (i.e. online stakeholder engagement platform https://savannahsa.com/public-documents/energy-generation/. The notification was distributed prior to commencement of the 30-day review and comment period, on **24 June 2022**. Where I&APs were not able to provide written comments (including SMS and WhatsApp), other means of consultation, such as telephonic discussions are 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 this final Scoping Report.

v. Identification and Recording of Comments

Comments raised by I&APs over the duration of the Scoping Phase will be synthesised into a Comments and Responses (C&R) Report which will be included in **Appendix C** of the Final Scoping Report. These will include written comments received. The C&R Report will include detailed responses from members of the EIA project team and/or the project proponent to the issues and comments raised during the public participation process.

The C&R Report has been updated with all comments received during the 30-day review and comment period and has been included as **Appendix C8** in the Final Scoping Report that will be submitted to the DFFE for approval.

7.5.3 Finalisation of the Scoping Report

This final stage of the Scoping Phase entails the recording and capturing of comments received from stakeholders and I&APs on the Scoping Report to refine the report and ensure that the comments have been addressed, where required. All written comments received will be addressed within the C&R Report (**Appendix C8**).

7.6 Evaluation of Issues Identified through the Scoping Process

In terms of GN R960 (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 J** of the Scoping Report) for the Kiara PV1 Facility is applicable as it triggers Regulation 19 of the EIA Regulations, 2014 (as amended). **Table 7.4** 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 7.4: Sensitivity ratings from the DFFE's web-based online Screening Tool associated with the development of the Kiara PV1 Facility

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
Agricultural Impact Assessment	High	The Soils and Agricultural scoping study is included in this Scoping Report as **Appendix F**. Based on the outcome of the desktop analysis of available data, it has been concluded that the project site has mostly Low and Medium sensitivity with only small to very small areas of High sensitivity to the development from the perspective of soil and agricultural potential conservation. The impacts to soils and agriculture will be further assessed during the EIA phase.
Landscape/Visual Impact Assessment	Very high	A Visual scoping study is included as **Appendix H** in this Scoping Report. The fact that some components of the proposed Kiara PV1 Facility and Associated Infrastructure may be visible which implies a Very high visual impact. Sensitive visual receptors

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
		within (but not restricted to) a 3km buffer zone from the facility needs to be confirmed and the severity of the visual impact assessed within the EIA phase.
Archaeological and Cultural Heritage Impact Assessment	Very High	A Heritage Screening (which covers both archaeological and cultural aspects of the project site) is included in this Scoping Report as **Appendix G**. There is the potential for the project to impact on heritage resources and, therefore, heritage impacts will be further assessed during the EIA phase.
Palaeontology Impact Assessment	Very High	A Heritage Screening (which covers palaeontological aspects of the project site) is included in this Scoping Report as **Appendix G.** There is the potential for the project to impact on palaeontological resources and, therefore, paleontological impacts will be further assessed during the EIA phase.
Terrestrial Biodiversity Impact Assessment	Very high	An Ecological scoping study (including flora and fauna) has been undertaken for the PV facility and is included as **Appendix D** of the Scoping Report. Based on the outcomes of the desktop study and available data, it has been indicated that the development area falls within the areas identified as Very High Sensitivity. The sensitivity will be confirmed and the impacts will be further assessed during the EIA phase.
Aquatic Biodiversity Impact Assessment	Very high	An Ecological scoping study (including freshwater) has been undertaken for the PV facility and is included as **Appendix D** of the Scoping Report. Two prominent wetland systems have been identified for the study area. A large lower lying wetland area transects the northern portion of the study area. It is however not possible from a desktop assessment perspective to determine if wetland conditions are present in these and therefore, further assessments are required in the EIA phase.
Avian Impact Assessment	High	An Avifauna scoping study (including winter season monitoring as per the BirdLife SA Best Practice Guidelines) has been undertaken for the PV facility and included as **Appendix E** of the Scoping Report. Based on the outcome of the desktop study and available data, it has been concluded that the development area has a High Sensitivity. The sensitivity will be confirmed, and the impacts will be further assessed during the EIA phase.
Civil Aviation Assessment	Low	The Civil Aviation Authority will be consulted throughout the Scoping/EIA process to obtain any relevant comments regarding the proposed project.
Defence Assessment	Low	A defence or military base is not located within close proximity to the PV facility.
RFI Assessment	Low	The project site under consideration is not located near a telecommunications tower.
Plant Species Assessment	Medium	An Ecological scoping study (including flora and fauna) has been undertaken for the PV facility and is included as **Appendix D** of the Scoping Report. Based on the outcomes of the desktop study and available data, it has been indicated that the development area falls within the areas identified as Low
Animal Species Assessment	Low	

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
		Sensitivity. The sensitivity will be confirmed, and the impacts will be further assessed during the EIA phase.

Issues (both direct and indirect environmental impacts) associated with the Kiara PV1 Facility identified within the scoping process have been evaluated through specialist studies by specialist consultants. These specialists include:

Specialist	Area of Expertise	Refer Appendix
Darius van Rensburg – DPR Ecologists and Environmental Services	Ecology (Terrestrial and Freshwater)	Appendix D
Lukas Niemand – Pachnoda Consulting	Avifauna	Appendix E
Marine Pienaar – TerraAfrica	Soils & Agricultural Potential	Appendix F
Jenna Lavin – CTS Heritage	Heritage (including archaeology, cultural landscape and palaeontology)	Appendix G
Lourens du Plessis - LOGIS	Visual	Appendix H
Nondumiso Bulunga – Savannah Environmental	Social	Appendix I

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 for each of the proposed project components:

- Identify the **nature** of the potential impact, which includes a description of what causes the effect, what will be affected and how it will be affected.
- Identify the **extent** of the potential impact, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development) or regional.
- Identify **sensitive receptors** that may be impacted on by the Kiara PV1 Facility and the **types of impacts** that are most likely to occur.
- Evaluate the **significance** of potential impacts in terms of the requirements of the 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.

7.7 Assumptions and Limitations of the EIA Process

The following assumptions and limitations are applicable to the EIA process of Kiara PV1 Facility:

- All information provided by the developer and I&APs to the environmental team was correct and valid at the time it was provided.
- It is assumed that the development area for the solar PV facility identified by the developer represents a technically suitable site for the establishment of Kiara PV1 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 PV facility and associated infrastructure (i.e. internal access roads, BESS 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 Kiara PV1 Facility.

7.8 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 is provided in **Table 7.5**.

Table 7.5: Relevant legislative permitting requirements applicable to Kiara PV1 Facility

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Legislation			
Constitution of the Republic of South Africa (No. 108 of 1996)	In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that: "*Everyone has the right –* » *To an environment that is not harmful to their health or well-being, and* » *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:* ∗ *Prevent pollution and ecological degradation,* ∗ *Promote conservation, and* ∗ *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development*."	Applicable to all authorities	There are no permitting requirements associated with this Act. The application of the Environmental Right however implies that environmental impacts associated with proposed developments are considered separately and cumulatively. It is also important to note that the "right to an environment clause" includes the notion that justifiable economic and social development should be promoted, through the use of natural resources and ecologically sustainable development.
National Environmental Management Act (No 107 of 1998) (NEMA)	The 2014 EIA Regulations have been promulgated in terms of Chapter 5 of NEMA. Listed activities which may not commence without EA are identified within the Listing Notices (GNR 327, GNR 325 and GNR 324) which form part of these Regulations (GNR 326). In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation.	DFFE – Competent Authority North West DEDECT – Commenting Authority	The listed activities triggered by the proposed project have been identified and are being assessed as part of the EIA process currently underway for the project. The EIA process will culminate in the submission of a Final Scoping Report and a Plan of Study for EIA to DFFE for approval. Considering the capacity of the proposed Kiara PV1 Facility project (i.e. contracted capacity of 120MW) and the triggering of Activity 1 of Listing Notice 2 (GNR 325) a full Scoping and EIA process is required in support of the Application for EA.

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

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	Water use is defined broadly, and includes consumptive and non-consumptive water uses, taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation. Consumptive water uses may include taking water from a water resource (Section 21(a)) and storing water (Section 21(b)). Non-consumptive water uses may include impeding or diverting of flow in a water course (Section 21(c)), and altering of bed, banks or characteristics of a watercourse (Section 21(i)).		The Kiara PV1 Facility development area has two prominent wetland systems. It is however not possible from a desktop assessment perspective to determine if wetland conditions are present in these and therefore, further assessments are required in the EIA phase. Should these resources be impacted by the project, a Water Use Authorisation would be required.
Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA)	In accordance with the provisions of the MPRDA a mining permit is required in accordance with Section 27(6) of the Act where a mineral in question is to be mined, including the mining of materials from a borrow pit.	Department of Mineral Resources and Energy (DMRE)	Any person who wishes to apply for a mining permit in accordance with Section 27(6) must simultaneously apply for an Environmental Authorisation in terms of NEMA. No borrow pits are expected to be required for the construction of the project, and as a result a mining permit or EA in this regard is not required to be obtained.
	Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary to any object of the Act, or which is likely to impede any such object must apply to the Minister for approval in the prescribed manner.		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.

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

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	it with details regarding the location, nature, and extent of the proposed development. Section 44 of the NHRA requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction.		
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Section 53 of NEM:BA provides for the MEC / Minister to identify any process or activity in such a listed ecosystem as a threatening process. Three government notices have been published in terms of Section 56(1) of NEM:BA as follows: » Commencement of TOPS Regulations, 2007 (GNR 150). » Lists of critically endangered, vulnerable and protected species (GNR 151). » TOPS Regulations (GNR 152). It provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (NEM:BA: National list of ecosystems that are threatened and in need of protection, (Government Gazette 37596, GNR 324), 29 April 2014).	DFFE North West DEDECT	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. During the survey no plant SCC was recorded. There is a high likelihood that many of these species as listed will occur within the study area. It is important to note that only two Red Listed species occur here and these are currently Vulnerable and Near Threatened. The area therefore contains a moderate likelihood of protected plant species occurring but is not known to contain a high abundance of Red Listed species. The table below lists the protected and Red Listed species which are likely to occur within the project area. Aloe jeppeae | Ceropegia circinata Asclepias aurea | Ceropegia incana Asclepias brevipes | Cleome conrathii Asclepias fallax | Eulophia hereroensis Asclepias fulva | Euphorbia davy

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			Aspidoglossum restioides / Gladiolus elliottii Bonatea polypodantha / Gladiolus permeabilis Pachycarpus schinzianus / Pelargonium dolomiticum Raphionacme hirsuta / Raphionacme velutina
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	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 permit issued in terms of Chapter 7 of NEM:BA, and that a permit may only be issued after a prescribed assessment of risks and potential impacts on biodiversity is carried out. Applicable, and exempted alien and invasive species are contained within the Alien and Invasive Species List (GNR 864).	DFFE North West DEDECT	An Ecological scoping study (including freshwater) has been undertaken for the PV facility and is included as **Appendix D** of the Scoping Report. The presence of any alien plant species will be determined during the detailed EIA phase of the process. Any such species would require appropriate management throughout the life cycle of the project.
Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA)	Section 05 of CARA provides for the prohibition of the spreading of weeds. Regulation 15 of GN R1048 published under CARA provides for the classification of categories of weeds and invader plants, and restrictions in terms of where these species may occur. Regulation 15E of GN R1048 published under CARA provides requirement and methods to implement control measures for different categories of alien and invasive plant species.	Department of Agriculture, Rural Development, and Land Reform (DARDLR)	CARA will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies need to be developed and implemented. In addition, a weed control and management plan must be implemented. In terms of Regulation 15E (GN R1048) where Category 1, 2 or 3 plants occur a land user is required to control such plants by means of one or more of the following methods: » Uprooting, felling, cutting or burning.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			» 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 concerned, subject to the provisions of sub-regulation 4. » A combination of one or more of the methods prescribed, save that biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods to the extent that the agents are destroyed or become ineffective.
National Forests Act (No. 84 of 1998) (NFA)	According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. Notice of the List of Protected Tree Species under the National Forests Act (No. 84 of 1998) was published in GNR 734. The prohibitions provide that "no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister".	DFFE	A licence is required for the removal of protected trees. It is therefore necessary to conduct a survey that will determine the number and relevant details pertaining to protected tree species present in the development footprint for the submission of relevant permits to authorities prior to the disturbance of these individuals. An Ecological Impact Assessment will be undertaken as part of the EIA Phase to identify

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			the presence of any protected trees present on site which will require a permit.
National Veld and Forest Fire Act (No. 101 of 1998) (NVFFA)	Chapter 4 of the NVFFA places a duty on owners to prepare and maintain firebreaks, the procedure in this regard, and the role of adjoining owners and the fire protection association. Provision is also made for the making of firebreaks on the international boundary of the Republic of South Africa. The applicant must ensure that firebreaks are wide and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land, it does not cause soil erosion, and it is reasonably free of inflammable material capable of carrying a veldfire across it. 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.	DFFE	While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of Kiara PV1 Facility, in terms of the preparation and maintenance of firebreaks, and the need to provide appropriate equipment and trained personnel for firefighting purposes.
Hazardous Substances Act (No. 15 of 1973) (HAS)	This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger, to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.	Department of Health (DoH)	It is necessary to identify and list all Group I, II, III, and IV hazardous substances that may be on site and in what operational context they are used, stored or handled. If applicable, a license would be required to be obtained from the DoH.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	» Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance » Group IV: any electronic product, and » Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.		
National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA)	The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by – » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. In terms of the Regulations published in terms of NEM:WA (GNR 912), a BA or EIA is required to be undertaken for identified listed activities. Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that: » The containers in which any waste is stored, are intact and not corroded or in	DFFE – Hazardous Waste North West DEDECT – General Waste	No waste listed activities are triggered by Kiara PV1 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.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	» Any other way rendered unlit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise, and » Pollution of the environment and harm to health are prevented.		
National Road Traffic Act (No. 93 of 1996) (NRTA)	The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.	South African National Roads Agency (SANRAL) – national roads North West Department of Public Works and Roads (NWDPWR)	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 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.
Provincial Policies / Legislation			
Bophuthatswana Nature Conservation Act. No. 3 of 1973.	This Act provides for the sustainable utilisation of wild animals, aquatic biota and plants; provides for the implementation of	North West DEDECT	A collection/destruction permit must be obtained from North West Department of

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	the Convention on International Trade in Endangered Species of Wild Fauna and Flora; provides for offences and penalties for contravention of the Act; provides for the appointment of nature conservators to implement the provisions of the Act; and provides for the issuing of permits and other authorisations. Amongst other regulations, the following may apply to the current project: » Boundary fences may not be altered in such a way as to prevent wild animals from freely moving onto or off of a property; » Aquatic habitats may not be destroyed or damaged; » The owner of land upon which an invasive species is found (plant or animal) must take the necessary steps to eradicate or destroy such species; The Act provides lists of protected species for the Province.		Rural, Environment and Agricultural Development for the removal of any protected plant or animal species found on site. During the survey no plant SCC were recorded. Refer to the Ecological Scoping Study (**Appendix D**). The impacts will be further assessed during the EIA phase.

7.8.1 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 7.6: Recommended avian assessment regimes in relation to proposed solar energy technology, project size, and known impact risks.

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

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

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

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

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

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

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

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

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

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

Bird distribution patterns fluctuate widely in response to environmental conditions (e.g. local rainfall patterns, nomadism, migration patterns, seasonality), meaning that a composition noted at a particular moment in time will differ during another time period at the same locality. For this reason, an austral winter season and an austral summer season bird monitoring survey will be conducted in line with Regime 2 for the Kiara PV1 Facility. The austral winter season survey has already been conducted; the findings has been used to inform the avifauna scoping report completed for the Scoping phase. The result from the austral summer season survey will be used to inform both the development footprint as well as Avifauna Impact Assessment report, to be completed for the EIA Report.

7.8.2 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 EHS Guidelines for Electric Power Transmission and Distribution

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

7.7.3 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. consultating 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 RECEIVING ENVIRONMENT

This chapter provides a description of the local environment. This information is provided in order to assist the reader in understanding the possible effects of the 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, Kiara PV1 Facility have been described. This information has been sourced from both existing information available for the area as well as collected field data 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 an Impact Assessment Report

This chapter includes the following information required in terms of Appendix 2: Content of a 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.	The environmental attributes associated with the proposed development is included as a whole within this chapter. The environmental attributes that are assessed within this chapter includes the following:
	» The regional setting of the broader study area indicates the geographical aspects associated with the proposed project. This is included in **Section 8.2**.
	» The climatic conditions for the Lichtenburg area have been included in **Section 8.3**.
	» The biophysical characteristics of the project site and the surrounding areas are included in **Section 8.4**. The characteristics considered are topography and terrain, geology, soils and agricultural potential and the ecological profile which includes the vegetation patterns, listed plant species, critical biodiversity areas and broad-scale processes, freshwater resources, terrestrial fauna and avifauna.
	» The heritage and cultural aspects (including archaeology, cultural landscape and palaeontology) has been included in **Section 8.5**.
	» The social and socio-economic characteristics associated with the broader study area and the project site has been included in **Section 8.6**
	» The visual quality, land-use and settlement patterns of the affected environment has been included in **Section 7.7**
	» The current traffic conditions for the area surrounding the project 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 - I**.

8.2. Regional Setting

The Kiara PV1 Facility development area is located approximately 16km north-east of the town of Lichtenburg within the Ditsobotla Local Municipality and the Ngaka Modiri Molema District Municipality in the North West Province.

The North West Province is situated in the central-northern extent of South Africa. The province is bordered by Northern Cape Province to the west, and south-west; Free State Province to the south; Gauteng Province

to the east; Limpopo Province to the north-east; and Botswana to the north. It occupies an area of land approximately 104 882km² in extent, making it South Africa's 6th largest in terms of area; and has a population of 3 509 953 (2011) and population density of 33/km² (2011), making it South Africa's 7th most densely populated Province.

The North West Province is characterised by altitudes ranging from 920 - 1782m amsl, which makes it one of the provinces with the most uniform terrain. The central and western extents of the province are characterised by gently undulating plains, while the eastern extent is characterised as mountainous, and includes the Magaliesberg mountain range. Ancient igneous rock formations dominate the north-eastern and north-central extent of the province; and the Gatsrand between Potchefstroom and Carletonville is considered to be one of the most ancient, preserved landscapes in the world. The geology of the province is significant given its mineral resources which are rich in platinum, gold, uranium, iron, chrome, manganese, and diamonds.

In terms of land use patterns, approximately 69% of the North West Province is in a natural, or near-natural state; while 31% of the province is irreversibly modified as a result of croplands (25.6%), urban (3.5%), and mining (0.7%) activities. The province is predominantly rural with the main economic activities comprising mining and agriculture. The North West Province comprises 4 Districts, namely Bojanala Platinum, Ngaka Modiri Molema, Dr Ruth Segomotsi Mompati, and Dr Kenneth Kaunda (**refer to Figure 8.1**)

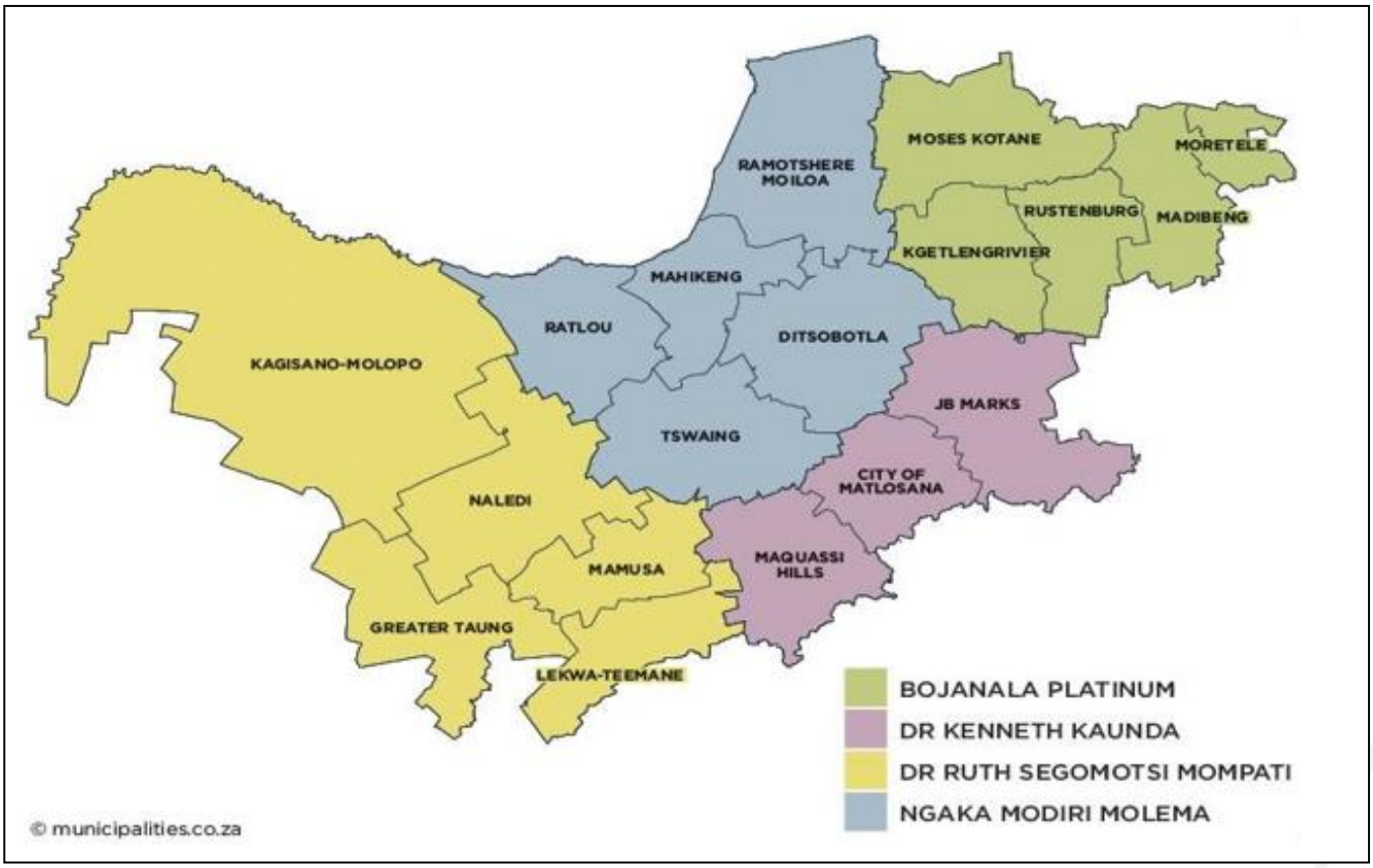


Figure 8.1: Map showing the municipalities of the North West (Source: www.municipalities.co.za).

The Ngaka Modiri Molema District Municipality is a Category C municipality and one of four district municipalities in the North West Province. It is situated centrally within the province and shares an international border with Botswana. It is comprised of five local municipalities: Mahikeng, Ratlou, Ramotshere Moiloa, Ditsobotla and Tswaing. The district is home to Mahikeng (previously Mafikeng), the capital of the province. Aptly named, the capital is nicknamed 'The City of Goodwill', which is also the city's slogan. It is a rapidly growing, modern, residential, administrative and commercial town, which contrasts with its fascinating history. The main economic sectors of the district include agriculture, tourism and mining. **Figure 8.2** below illustrates the local municipalities that make up the district.

Figure 8.2: Map showing the Ngaka Modiri Molema District Municipality and local municipalities including the Ditsobotla local municipality (Source: www.municipalities.co.za).

The Ditsobotla Local Municipality is a category B local municipality. It is one of the five municipalities in the district, making up almost a quarter of its geographical area. The seat of the local municipality is Lichtenburg. The municipality was established through the amalgamation of the former Lichtenburg, Coligny and Biesiesvlei Transitional Councils. Its main attractions are cultural, heritage and agricultural museums; the burning vlei – a unique vlei consisting of the thick layers of subterranean peat that burnt for years, creating a rare natural phenomenon; the Lichtenburg Game Breeding Centre; Eufees and Duch Roode Dams, situated between the CBD and Burgersdorp; and Molopo Oog/Wondergat.

8.3. Climatic Conditions

The Lichtenburg area is typically characterised as having a moderate to cold semi-arid climate with wide variations in daily and seasonal temperatures. The area is typically hot in summer and mild-to-cold in winter. The area receives a mean annual average rainfall of approximately 601mm. Precipitation is highest in January with an average of 110mm; and lowest in July and August with an average of 5mm. Minimal rain occurs between May to September. The average annual temperature in Lichtenburg is 16.9°C. January is the hottest month of the year with an average temperature of 21.7°C, while June is the coldest month of the year with an average temperature of 9.9°C (refer to **Figure 8.3** and Error! Reference source not found.**8.1**). F rost is frequent to very frequent during winter, with up to 37 mean frost days per year. Droughts and floods are a regular occurrence at both provincial and local scales and play a significant role in almost every aspect of the social, economic, and ecological environment within the province.

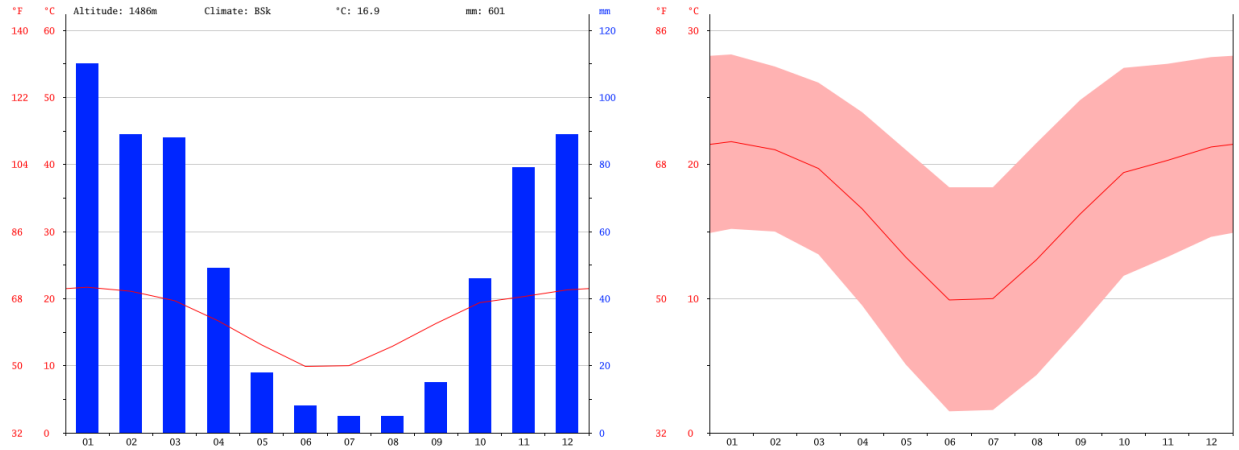


Figure 8.3: Climate and Temperature graphs for Lichtenburg, North West Province (Source: en.climate-data.org).

Table 8.1: Climate data for Lichtenburg, North West Province (Source: en.climate-data.org).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Temp. (˚C)	21.7	21.1	19.7	16.7	13.1	9.9	10	12.9	16.3	19.4	20.3	21.3
Minimum Temp. (˚C)	15.2	15	13.3	9.5	5.1	1.6	1.7	4.3	7.9	11.7	13.1	14.6
Maximum Temp. (˚C)	28.2	27.3	26.1	23.9	21.1	18.3	18.3	21.6	24.8	27.2	27.5	28
Precipitation (mm)	110	89	88	49	18	8	5	5	15	46	79	89

8.4. Biophysical Characteristics of the Study Area and Development Area

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-I**) undertaken for this Scoping Report.

8.4.1. Topographical profile

The topography or terrain morphology of the region is broadly described as Plains and Pans or Slightly Undulating Plains of the Central Interior Plain. The slope of the entire study area is extremely even (flat) with slight undulations of no more than 5m. The altitude of the study area varies from 1520 m AMSL on the slightly higher lying areas to 1511 m AMSL in the lower lying in the northern portion of the site. This represents a difference of 8 m which indicates and confirms a fairly flat area.

8.4.2. Geology, Soils and Agricultural Potential

Geology Setting of the Project area

According to the extract from the Council of Geoscience Map for the West Rand, the proposed development is located on geological deposits belonging to the Monte Christo Formation of the Chuniespoort Group (refer to **Figure 8.4**). Bamford (2018) noted that the study site is in the Malmani Subgroup which contains a number of stromatolitic dolomites. These were formed in warm shallow sea and are the accumulation of layer upon layer of minerals deposited by blue-green algae (also known as cyanobacteria) and rarely some filamentous algae. Minerals deposited by the algae include calcium carbonate, calcium sulphate and magnesium carbonate. Very rarely are the algal cells preserved in the stromatolites and these are microscopic. Stromatolites are essentially trace fossils and these ones are 2750 to 2650 million years old and very abundant. Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are much too old to contain fossils other than blue-green algae.

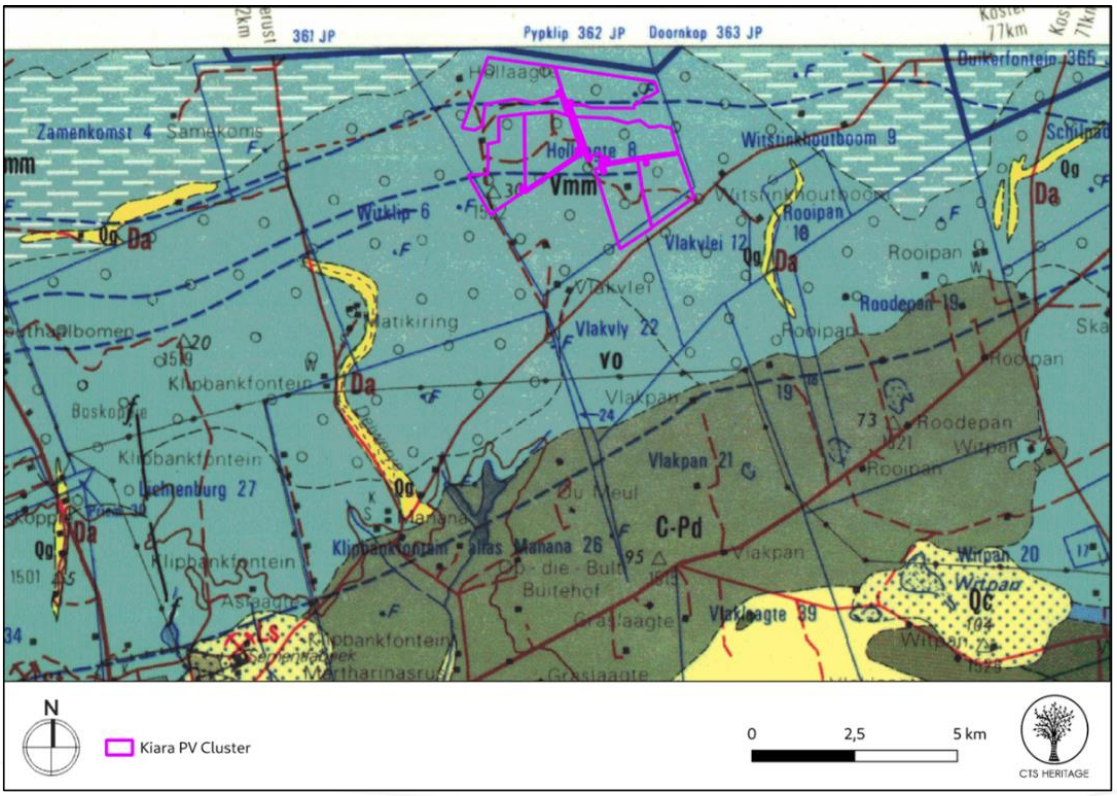


Figure 8.4: Geology Map. Extract from the CGS 2626 West Rand Map indicating that the development area for the Kiara Cluster PV Facilities is underlain by sediments of the Monte Christo Formation assigned to the Chuniespoort group, within the Malmani Subgroup (Vmm)

Soils forms, Land type, Land Capability, and agricultural potential of the project site

The project site consists of Land Type Fa 11 (refer to **Figure 8.5 and Figure 8.6**). The crests and mid-slopes (Terrain units 1 and 3) are dominated by soil of the Glenrosa and Mispah forms. The rest of this land type consists of yellow-brown and red apedal (structureless) soil either underlain by unspecified material or by plinthic material (either soft or hard plinthite) along the toe-slopes and valley bottoms (Terrain units 4 and 5, respectively). According to the land type charts, 40 to 50% of foot slope and valley bottom positions consist of these deeper soil forms. The valley bottoms might potentially consist of a hydromorphic soil form that may have wetland potential. The slope of the terrain is very flat with Terrain unit 3 having the steepest slope (between 2% and 5%). The clay content of the topsoil horizons is estimated to range between 10% and 25% while subsoil clay content is estimated to range between 13% and 40%.

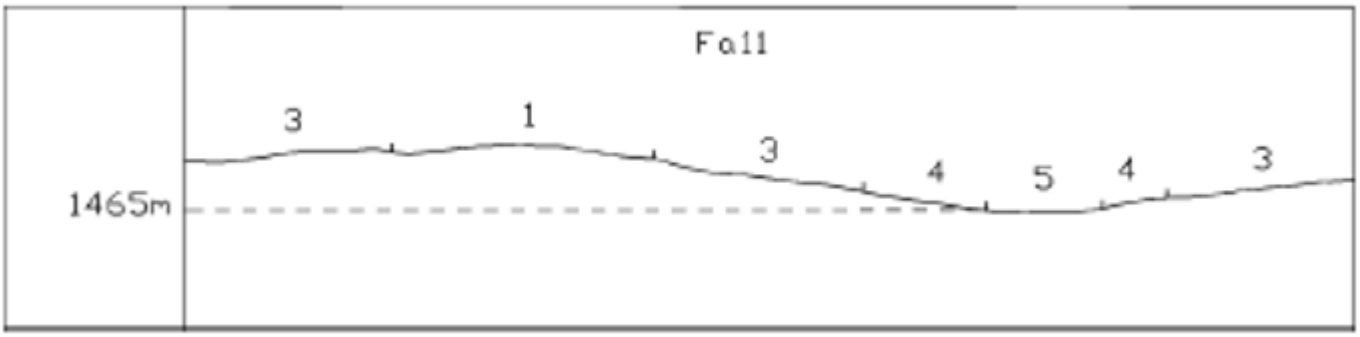


Figure 8.5: Terrain form sketch of Land Type Fa11

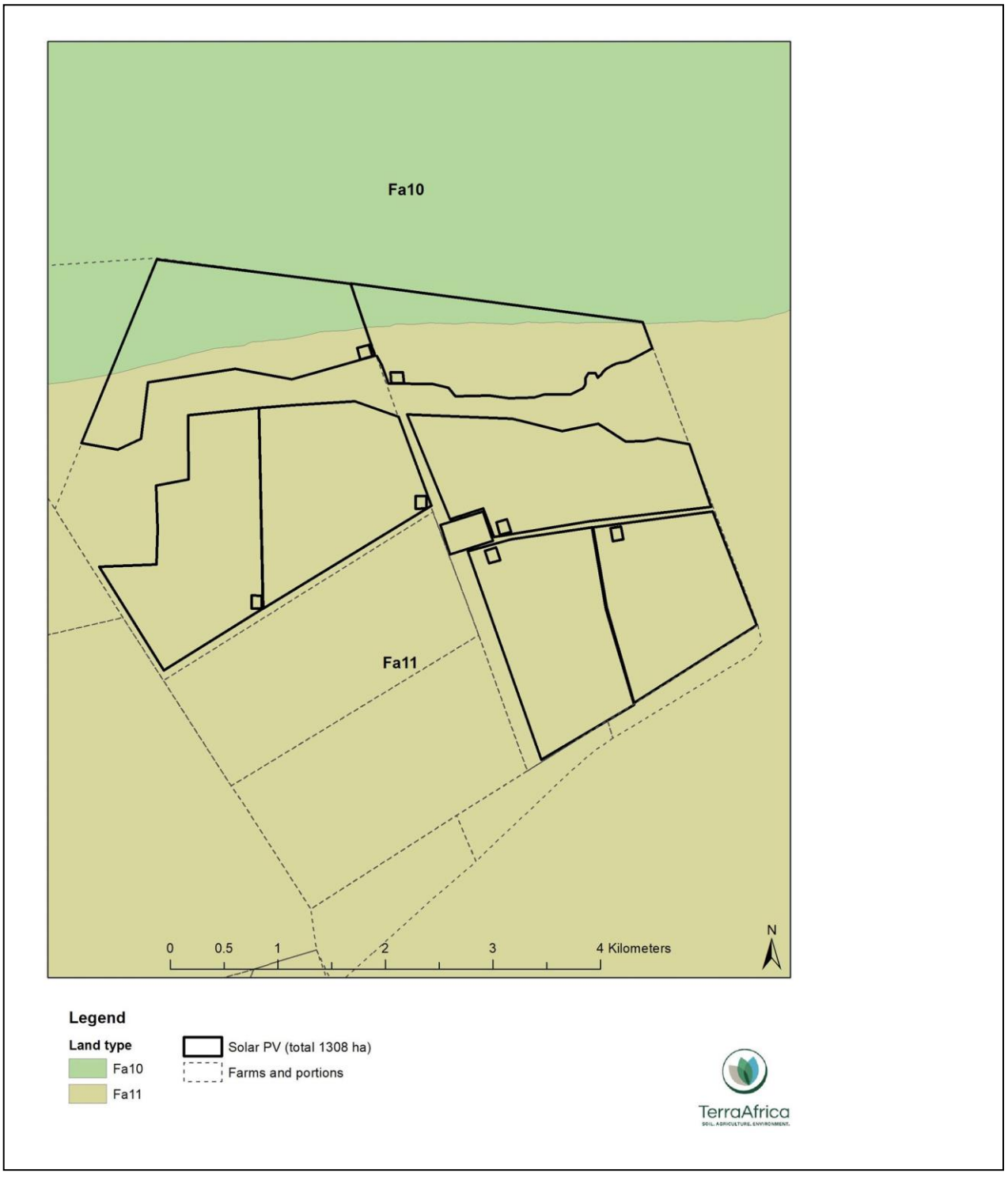


Figure 8.6: Land type map of the proposed Kiara PV Cluster (shown in Blue) Including
The land capability classification of the PV site according to the DALRR raster data (DALRRD, 2016), is shown in **Figure 8.7.**

The PV area consists of land with Class 06 and Class 07 (Low-Moderate) land capability. The PV area has few small areas of Moderate (Class 08) and Moderate-High (Class 09) land capability scattered through the middle of the development area. The land capability classification of the project area is dominated by land

that have limited to no suitability for rainfed crop production that is better suited to livestock production or natural areas.

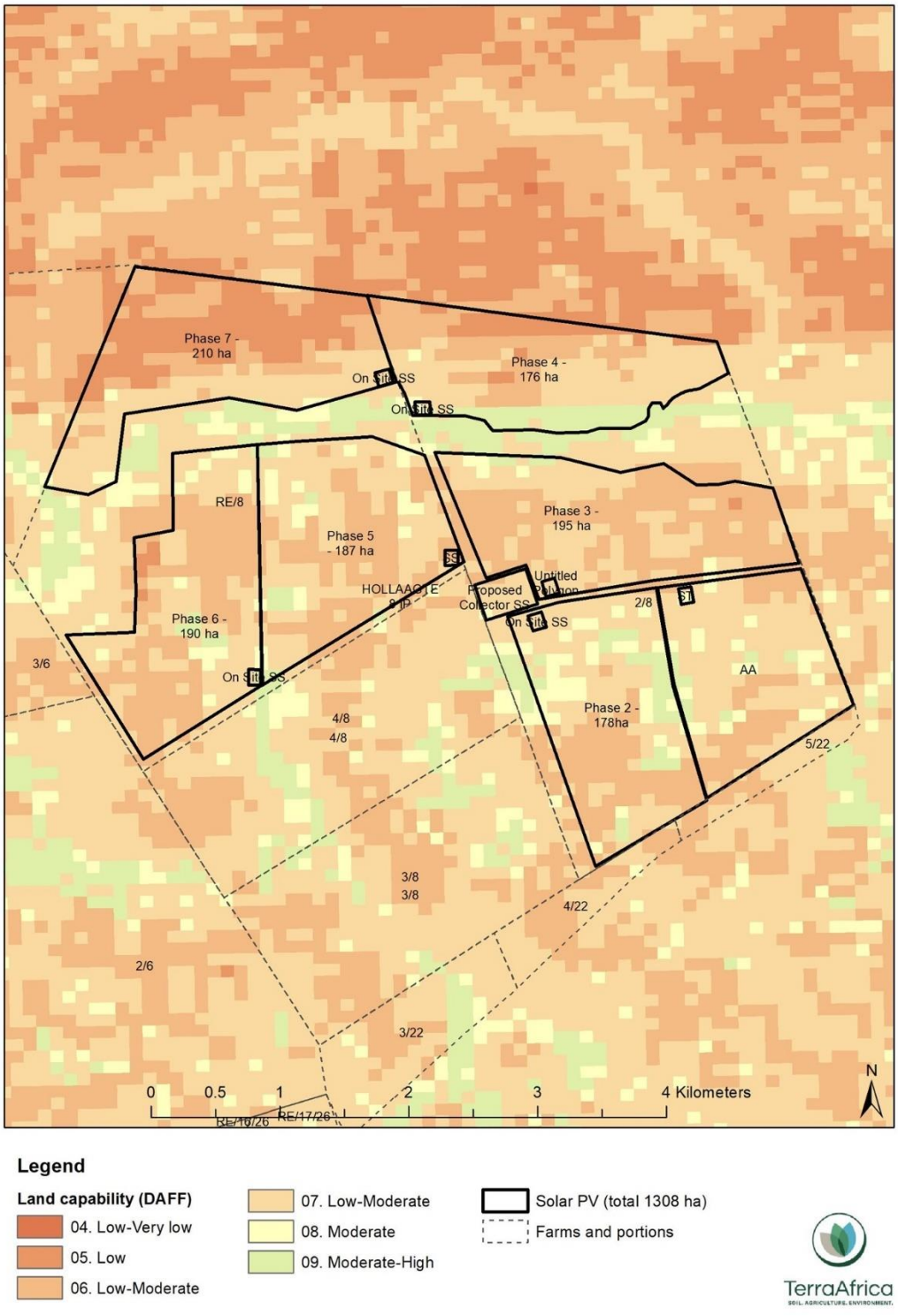


Figure 8.7: Land capability map of the proposed Kiara Cluster PV facilities (data source: DALRRD, 2016)

The grazing capacity of the project areas is homogeneous and indicated as 8 ha/LSU (refer to **Figure 8.8**), which is moderate grazing potential. It is lower than the wetter, eastern parts of the country such as Mpumalanga where the grazing capacity ranges from 4 to 6 ha/LSU. However, it is higher than drier areas in the western parts of South Africa, such as the Kalahari. Grazing capacity in the Kalahari ranges between

11 and 17 ha/LSU. The grazing capacity of the Karoo is much lower than that, with some areas having grazing capacity as low as 70ha/LSU.

The crop field boundaries raster data shows that there are no crop fields within the project site (refer to **Figure 8.9**). The nearest crop fields are located just east of the eastern boundaries of the PV area. These crop fields consist of rainfed annual crop production and/or planted pastures. Four centre pivot irrigation areas are also located between 1.5 and 3 km east of the eastern boundaries of the PV. More crop fields with rainfed annual crops and a few centre pivot irrigation areas, are located 6km or further directly south of the site.

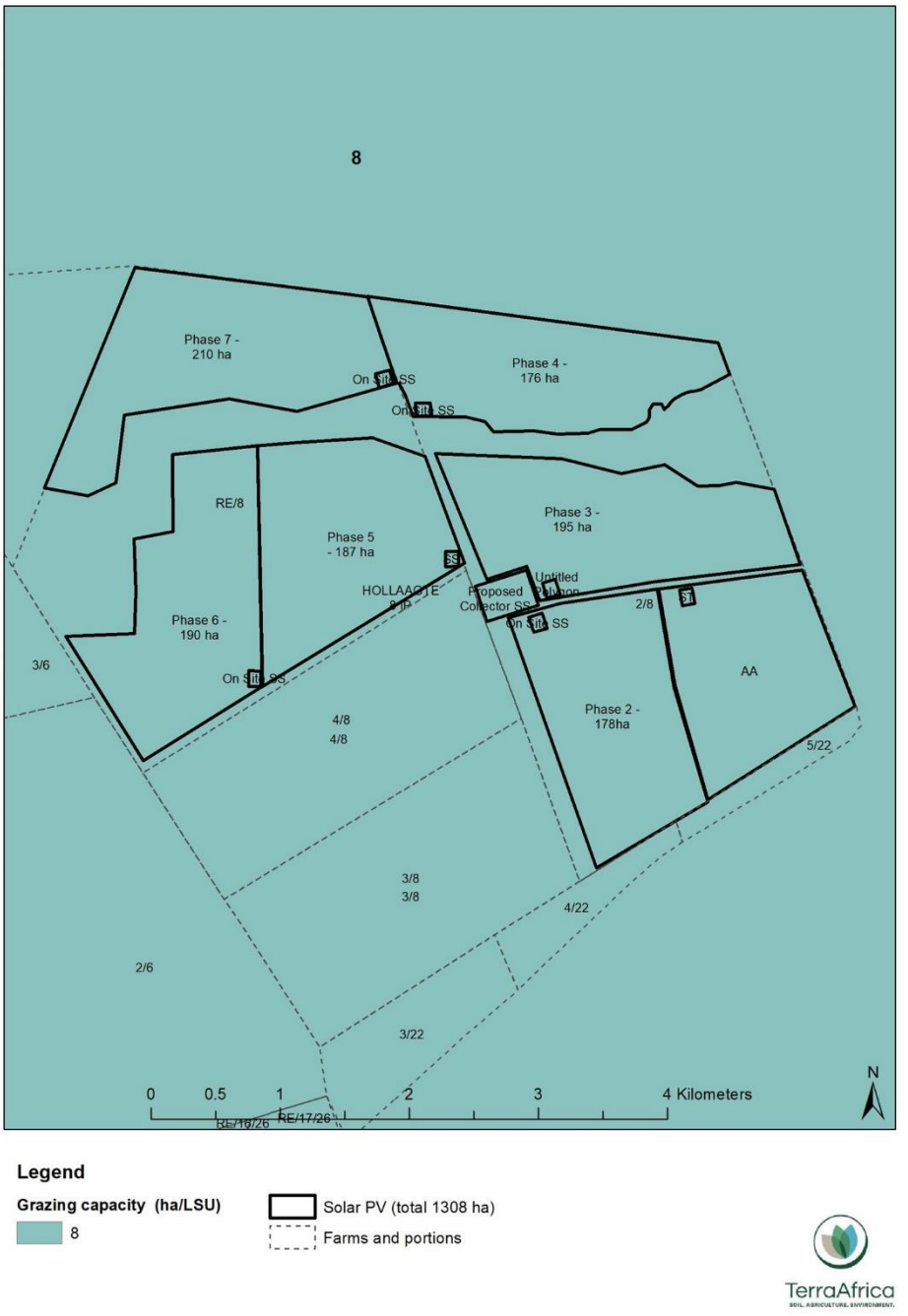


Figure 8.8: Grazing capacity of the proposed Kiara Cluster PV facilities (data source: South Africa, 2018)

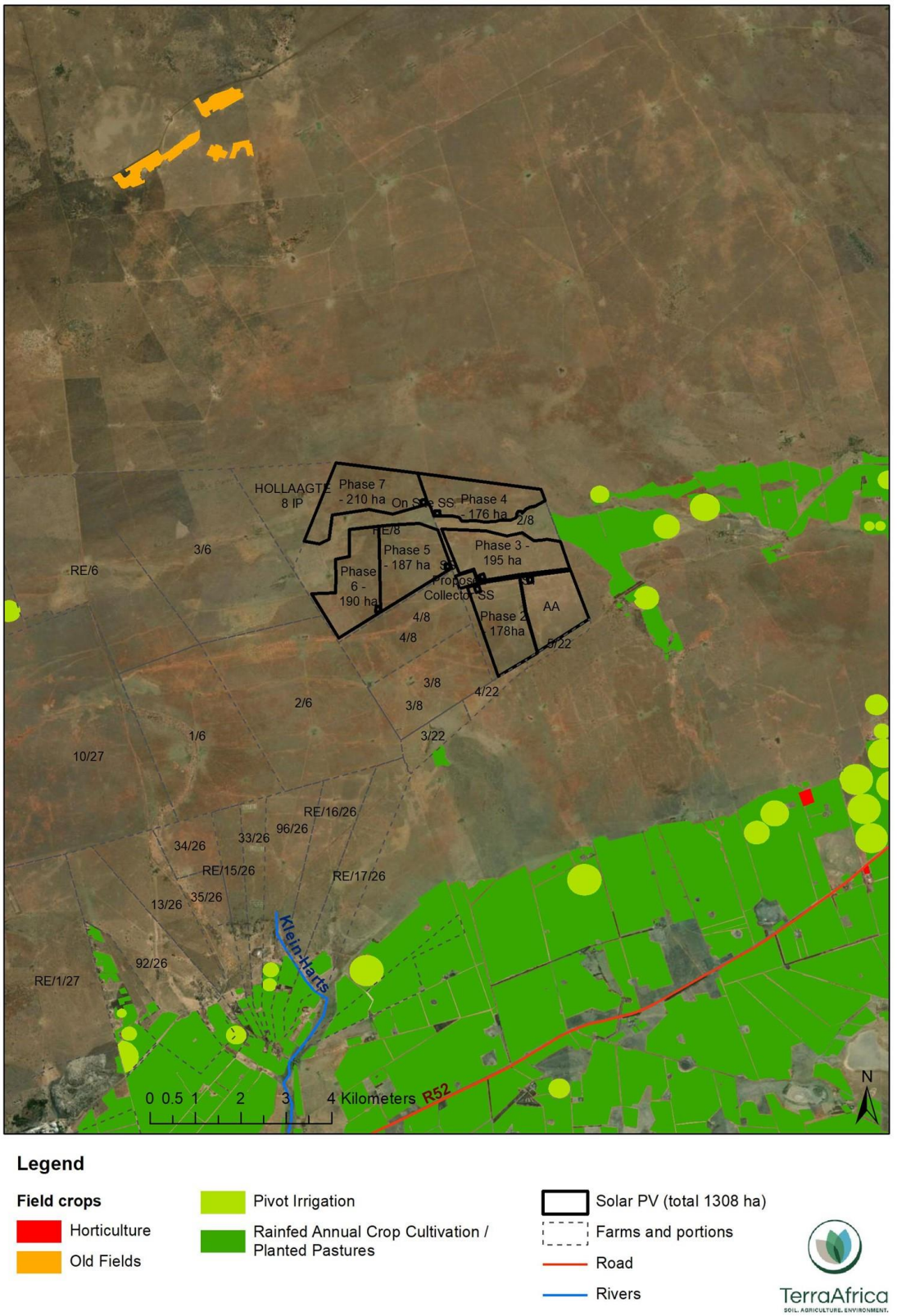


Figure 8.9: Field crop boundaries of the proposed Kiara Cluster PV facilities (data source: Crop Estimates Consortium, 2019)

8.4.3. Land Use

The main land use of the study area is grazing for domestic livestock. The area seems to be largely natural and still consists of grassland with scattered trees. Some areas seem to have been previously ploughed and cultivated and will likely represent transformed areas.

8.4.4. Ecological Profile of the Study Area and the project site

i. Broad-Scale Vegetation Patterns

According to Mucina & Rutherford (2006), the study area consists exclusively of Carletonville Dolomite Grassland (Gh 15).

Carletonville Dolomite Grassland (Gh 15)

According to the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) this vegetation type is currently listed as being of Least Concern (LC). Although it is in some instances heavily affected by crop cultivation and mining this is not yet considered to be to such an extent as to warrant it being considered a Threatened Ecosystem.

This vegetation type also corresponds well to the topography and geology of the site. It is adapted to a mosaic pattern of shallow soils over dolomite. It consists of a well-developed grass layer but with scattered trees and shrubs, especially where surface rock occurs.

Important Taxa in Carletonville Dolomite Grassland:
Based on Mucina and Rutherford's (2006) vegetation classification, important plant taxa are those species that have a high abundance, a frequent occurrence (not being particularly abundant) or are prominent in the landscape within a particular vegetation type.

Important Taxa:

- **Graminoids:** *Aristida congesta, Brachiaria serrata, Cynodon dactylon, Digitaria tricholaenoides, Diheteropogon amplectens, Eragrostis chloromelas, E. racemosa, Heteropogon contortus, Loudetia simplex, Schizachyrium sanguineum, Setaria sphacelata, Themeda triandra, Alloteropsis semialata subsp. eckloniana, Andropogon schirensis, Aristida canescens, A. diffusa, Bewsia biflora, Bulbostylis burchellii, Cymbopogon caesius, C. pospischilii, Elionurus muticus, Eragrostis curvula, E. gummiflua, E. plana, Eustachys paspaloides, Hyparrhenia hirta, Melinis nerviglumis, M. repens subsp. repens, Monocymbium ceresiiforme, Panicum coloratum, Pogonarthria squarrosa, Trichoneura grandiglumis, Triraphis andropogonoides, Tristachya leucothrix, T. rehmannii.*
- **Herbs:** *Acalypha angustata, Barleria macrostegia, Chamaecrista mimosoides, Chamaesyce inaequilatera, Crabbea angustifolia, Dianthus mooiensis, Dicoma anomala, Helichrysum caespititium, H. miconiifolium, H. nudifolium var. nudifolium, Ipomoea ommaneyi, Justicia anagalloides, Kohautia amatymbica, Kyphocarpa angustifolia, Ophrestia oblongifolia, Pollichia campestris, Senecio coronatus, Vernonia oligocephala.*
- **Geophytic Herbs***: Boophone disticha, Habenaria mossii.*
- **Low Shrubs***: Anthospermum rigidum subsp. pumilum, Indigofera comosa, Pygmaeothamnus zeyheri var. rogersii, Rhus magalismontana, Tylosema esculentum, Ziziphus zeyheriana.*
- **Geoxylic S***uffrutices: Elephantorrhiza elephantina, Parinari capensis subsp. capensis.*

» **Endemic Taxon Succulent Shrub***: Delosperma davyi.*

ii. Protected Species

The vegetation type around the Lichtenburg area contains some protected and Red Listed species . These are also of significant conservation value and will therefore increase the sensitivity of the study area where they occur. Furthermore, when utilising the Plants of South Africa (http://posa.sanbi.org) an analysis of plant species previously recorded in the region includes the following protected and Red Listed species recorded.

Table 8.2: Protected and Red Listed species recorded for the quarter degree squares (2626).

FAMILY	Scientific name	Status	Protected	Gh15
Asphodelaceae	*Aloe jeppeae*	LC	Y	X
Apocynaceae	*Asclepias aurea*	LC	Y	X
Apocynaceae	*Asclepias brevipes*	LC	Y	X
Apocynaceae	*Asclepias fallax*	LC	Y	X
Apocynaceae	*Asclepias fulva*	LC	Y	X
Apocynaceae	*Aspidoglossum restioides*	LC	Y	X
Orchidaceae	*Bonatea polypodantha*	LC	Y	X
Apocynaceae	*Ceropegia circinata*	LC	Y	X
Apocynaceae	*Ceropegia incana*	VU	Y	X
Cleomaceae	*Cleome conrathii*	NT	Y	X
Orchidaceae	*Eulophia hereroensis*	LC	Y	X
Euphorbiaceae	*Euphorbia davyi*	LC	Y	X
Iridaceae	*Gladiolus elliottii*	LC	Y	X
Iridaceae	*Gladiolus permeabilis*	LC	Y	X
Apocynaceae	*Pachycarpus schinzianus*	LC	Y	X
Geraniaceae	*Pelargonium dolomiticum*	LC	Y	X
Apocynaceae	*Raphionacme hirsuta*	LC	Y	X
Apocynaceae	*Raphionacme velutina*	LC	Y	X

There is a high likelihood that many of these species will occur within the study area. Note that only two Red Listed species occur here, and these are currently Vulnerable and Near Threatened. The area therefore contains a moderate likelihood of protected plant species occurring but is not known to contain a high abundance of Red Listed species. These species are all adapted to a grassland habitat with some being more dependent on surface rock. Both of these requirements are present on the site and therefore there is a high likelihood that any of these would occur on the site.

iii. National Biodiversity Assessment (NBA) 2018

Remnants of the natural vegetation types in the area indicates that the study area is largely still natural. The natural vegetation type in this area, Carletonville Dolomite Grassland, does contain elements of significant conservation value.

Carletonville Dolomite Grass	Western Highveld Sandy Grass

Figure 8.10: View of the areas of remaining natural vegetation in the study area. The study area is notably still dominated by natural vegetation though note transformation in lower lying areas.

iv. Critical Biodiversity Areas

The key output of a systematic biodiversity plan is a map of biodiversity priority areas. The map delineates Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), Other Natural Areas (ONAs), Protected Areas (PAs), and areas that have been irreversibly modified from their natural state. The provincial CBA spatial data for the North West Province indicates that a large portion of the study area consists of an Ecological Support Area 1 (ESA) and marginal portion of the proposed grid connection corridor encroach into a CBA 2 area. **Figure 8.11** shows the development area superimposed on the Terrestrial CBA map.

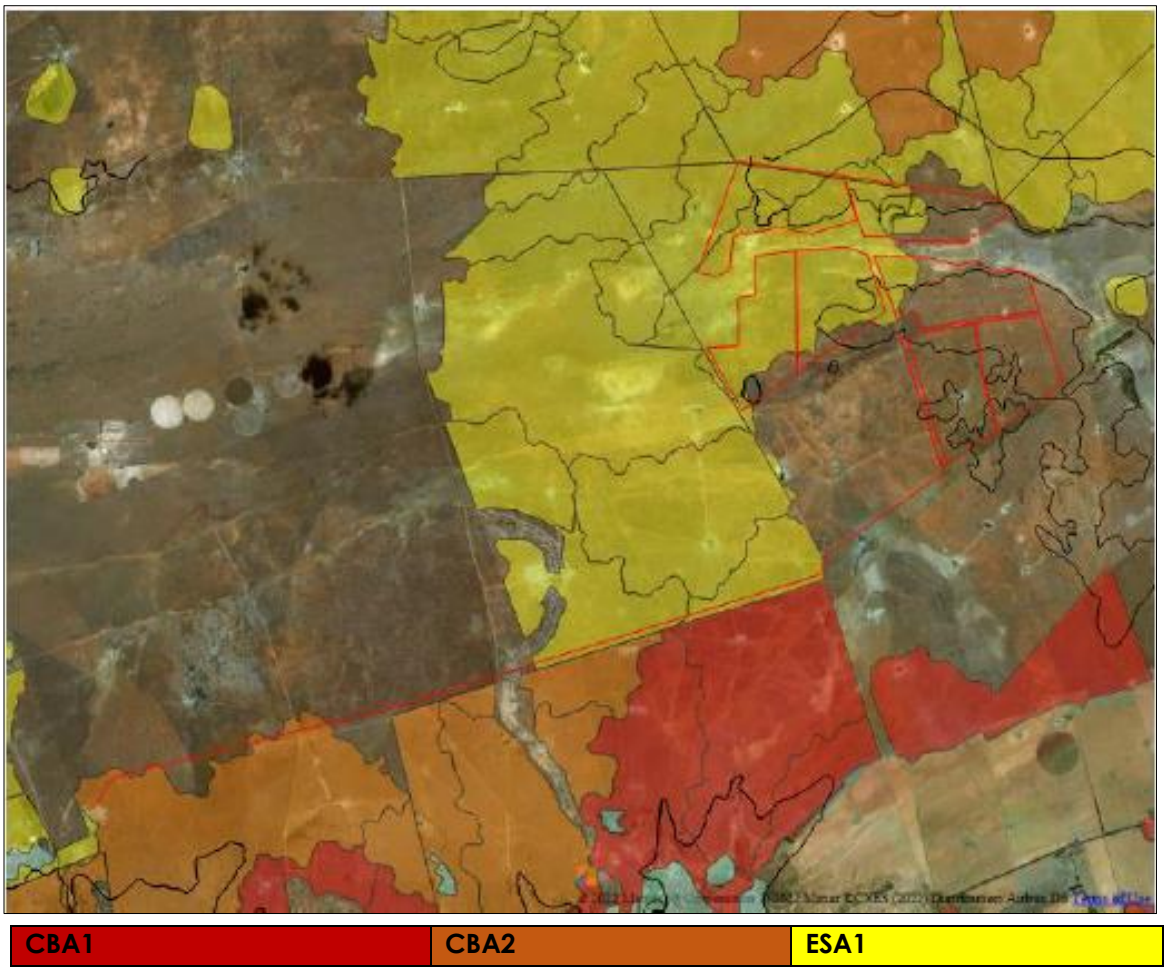


Figure 8.11: Critical Biodiversity Areas (CBAs), as per the North West CBA spatial data, located within the Kiara PV1 project site

v. National Protected Areas Expansion Strategy (NPAES)

As development increases through time, the expansion of protected areas should also be increased. The NPAES has been developed to identify areas which represent areas of natural vegetation in good condition, with significant diversity and in need of increased conservation. These NPAES Focus Areas therefore represent areas with a significant sensitivity. The study area being considered for development does not contain any NPAES Focus Areas which would otherwise increase the conservation value of the area.

vi. Protected Areas

Formally and informally protected areas function in the preservation of natural areas and these areas are normally regarded as having a very high conservation value. The National Environmental Management Protected Areas Act (NEMPAA of 2003) allows for the proclamation of an area as a protected area. The following conservation areas have been identified in this area:

- Lichtenburg Game Breeding Centre – This protected area is located to the west of the study area. It is an informal protected area, i.e. it is not formally protected by the NEMPAA. Despite this, the area will still retain a high conservation value.
- Marico Biosphere Reserve – This protected area borders the study area to the north. A biosphere reserve is a large parcel of land within which the land use is determined by the local society. The protected area

should remain unaffected by the proposed development. However, the biosphere reserve should still be consulted during the application process.

» Rall Broers Private Nature Reserve – A private nature reserve is a conservation area governed by the NEMPAA, but which is under private ownership. The protected area is located to the north east of the site and will be irrelevant to the development.

Figure 8.12: View of additional datasets which are relevant to the development. This includes Threatened Ecosystems, NPAES Focus Areas and protected areas.

vii. Ecosystem Threat Status

The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) has identified ecosystem which area considered Threatened Ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. Such endangered ecosystems are normally vegetation types which are subjected to severe development pressures, and which will require protected in some form in order to meet conservation targets.

The study area and vegetation type in this area, Carletonville Dolomite Grassland (Gh 15), is not currently subjected to high development pressures, is currently listed as being of Least Concern and therefore not regarded as a Threatened Ecosystem. Western Highveld Sandy Grassland (Gh 14) is currently being subjected to extensive transformation for agricultural crop production and is therefore currently listed as a

Critically Endangered system. There are however no remnants of this vegetation type located near the site and is therefore irrelevant for the development.

viii. Wetlands and Freshwater Resources

The project site does not seem to contain a large number of watercourses and wetlands. However, a few do seem to be present and will be most likely to be affected by the development. Two prominent wetland systems are found within the project site. A large lower lying wetland area transects the northern portion of the project site (refer to **Figure 8.13**).

The wetland system transecting the northern portion of the development site would possibly be categorized as a valley bottom wetland without a channel (SANBI 2009). A mostly flat valley-bottom wetland area without a major channel running through it, characterised by an absence of distinct channel banks and the prevalence of diffuse flows, even during and after high rainfall events. Water inputs are typically from an upstream channel, as the flow becomes dispersed, and from adjacent slopes (if present) or groundwater. Water generally moves through the wetland in the form of diffuse surface flow and/or interflow (with some temporary containment of water in depressional areas), but the outflow can be in the form of diffuse or concentrated surface flow. Infiltration and evaporation from unchanneled valley-bottom wetlands can be significant, particularly if there are a number of small depressions within the wetland area. Horizontal, unidirectional diffuse surface-flow tends to dominate in terms of the hydrodynamics.

This northern wetland system may also be associated with depression wetland areas (SANBI 2009). A depression wetland is a basin shaped area with a closed elevation contour with an increase in depth from the perimeter to the central areas that allows for the accumulation of surface water (i.e. it is inward draining). It may also receive sub-surface water. An outlet is usually absent. Dominant water sources are precipitation, ground water discharge, interflow and (diffuse or concentrated) overland flow. For 'depressions with channeled inflow', concentrated overland flow is typically a major source of water for the wetland, whereas this is not the case for 'depressions without channeled inflow'. Dominant hydrodynamics are (primarily seasonal) vertical fluctuations. Depressions may be flatbottomed (in which case they are often referred to as 'pans') or round-bottomed (in which case they are often referred to as 'basins') and may have any combination of inlets and outlets or lack them completely. For 'exoreic depressions', water exits as concentrated surface flow while, for 'endorheic depressions', water exits by means of evaporation and infiltration.

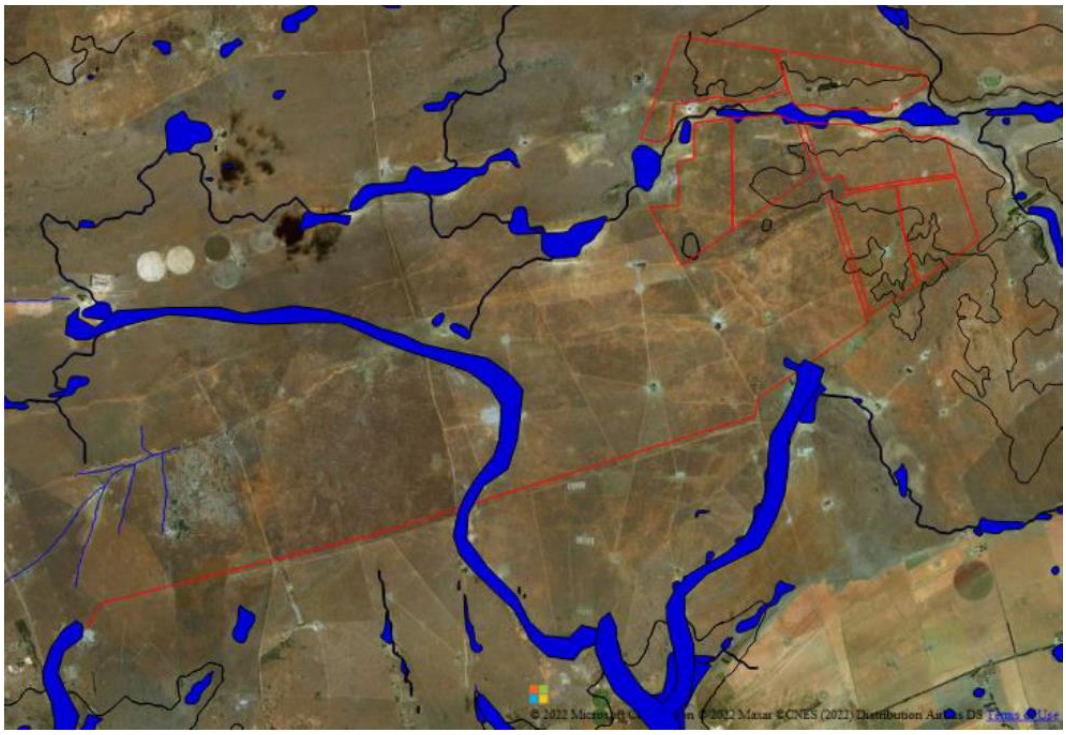


Figure 8.13: View of the wetlands which will be affected by the development. This consists of a wetland system in the northern portion of the development site.

ix. Terrestrial Fauna Communities

From desktop assessment the actual occurrence of fauna in the study area cannot be determined but species likely to occur in the region can be determined. Given the remaining natural vegetation in the area, which is largely intact, with corridors also being retained and, at least from a desktop perspective, regarded to be in a fairly good condition it is anticipated likely that species of conservation significance will still occur in the area. The habitat is however fairly uniform, and the area is also not known to harbour a large number of species being of high conservation value. However, given the large extent of the development, it also remains possible that fauna of conservation importance may occur.

Table 8.3: Red Listed mammals likely to occur in the study area (Child et al 2016).

Scientific name	Common name	Status
Damaliscus lunatus lunatus	(Southern African) Tsessebe	Vulnerable
Damaliscus pygargus pygargus	Bontebok	Vulnerable
Hippotragus equinus	Roan Antelope	Endangered
Hippotragus niger niger	Sable Antelope	Vulnerable
Pelea capreolus	Vaal Rhebok	Near Threatened
Atelerix frontalis	Southern African Hedgehog	Near Threatened
Felis nigripes	Black-footed Cat	Vulnerable
Leptailurus serval	Serval	Near Threatened
Hyaena brunnea	Brown Hyena	Near Threatened
Otomys auratus	Southern African Vlei Rat (Grassland type)	Near Threatened
Aonyx capensis	African Clawless Otter	Near Threatened

Scientific name	Common name	Status
Mystromys albicaudatus	African White-tailed Rat	Vulnerable
Crocidura mariquensis	Swamp Musk Shrew	Near Threatened

It is clear that the area may contain numerous species of conservation importance. However, many of these, especially the larger antelope will only be present in conservation or game breeding areas and will not be relevant for the development. These include Tsessebe, Bontebok, Roan Antelope and Sable Antelope. The remaining smaller species are however quite likely to still occur in this area. They will however be dependent on habitat in good condition. Should such a species be present on the site the focus should be the preservation of the habitat of fauna instead of trying to preserve the animal itself. If habitat is adequately preserved and maintained the animals themselves will by default also be adequately preserved.

8.4.5 . Avifauna profile for the area

Conservation Areas, Protected Areas and Important Bird and Biodiversity Areas (IBA)

The study site is located approximately 8km east of the Lichtenburg Game Breeding Centre. This conservation area contains a variety of game species, and the facility used to operate a vulture restaurant which attracts foraging vultures (c. three species) to the region. This area is currently under private management (by lease agreement with the municipality). There are no other formal protected areas or any Important Bird and Biodiversity Areas in close proximity to the study site (refer to **Figure 8.14**).

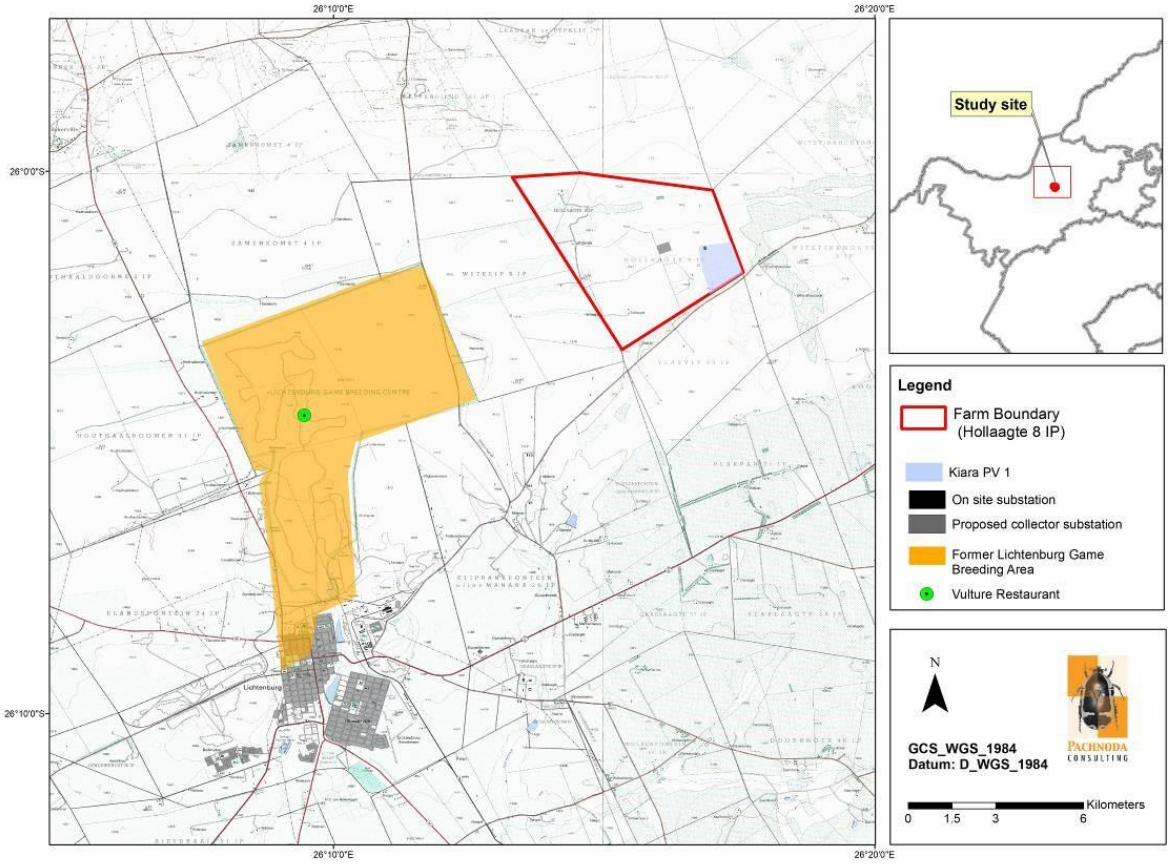


Figure 8.14: A map illustrating the locality of conservation areas in close proximity to the proposed study site.

Apart from the regional vegetation type, the local composition and distribution of the vegetation associations on the study site and immediate surroundings are a consequence of a combination of factors simulated by soil type, geology, moisture regimes, grazing intensity (presence of livestock) and past land use practice which have culminated in a number of habitat types that deserve further discussion:

» ***Open mixed grassland with bush clump mosaics:***
This unit is prominent on the study site and immediate surroundings and covers a significant extent in surface area of the proposed PV facility. It is represented by two discrete floristic variations which also provide habitat for two discrete avifaunal associations. The first floristic variation consists of open untransformed to semi-transformed mixed grassland. The grassland variation is represented by untransformed and grazed Carletonville Dolomite Grassland, depending on grazing intensity, and dominated by "late-successional" graminoids such a *Themeda triandra, Cymbopogon caesius, C. pospischilii, Trachypogon spicatus, Elionurus muticus* and *Andropogon schirensis.* It provides habitat for a typical grassland bird composition dominated by insectivorous and granivore passerine bird species such as *Desert Cisticola, (Cisticola aridulus), Eastern Clapper Lark (Mirafra fasciolata), Spike-heeled Lark (Chersomanes albofasciata), Cape Longclaw (Macronyx capense), Ant-eating Chat (Myrmecocichla formicivora) and African Pipit (Anthus cinnamomeus). Prominent non-passerine species expected to be present are Orange River Francolin (Scleroptila gutturalis), Swainson's Spurfowl (Pternistis swainsonii), Northern Black Korhaan (Afrotis afraoides), Crowned Lapwing (Vanellus coronatus) and Black-winged Kite (Elanus caeruleus*

The bush clumps form a prominent mosaic characterised by the dominance of a woody layer of *Searsia lancea, S. pyroides, Ziziphus mucronata, Gymnosporia buxifolia and Asparagus laricinus. Celtis africana and Olea europaea subsp. africana.* The eminent increase in vertical heterogeneity provided by the woody layer which provides habitat for a "Bushveld" bird association consisting of insectivorous passerines such as Black-chested Prinia *(Prinia flavicans),* Chestnut-vented Warbler *(Curruca subcoerulea),* Kalahari Scrub Robin *(Cercotrichas paena),* Fiscal Flycatcher *(Melaenornis silens),* African Red-eyed Bulbul *(Pycnonotus nigricans)* as well as granivores such as Yellow Canary *(Crithagra flaviventris)* and Southern Masked Weaver *(Ploceus velatus)*. Non-passerine bird taxa are expected to include Laughing Dove *(Spilopelia senegalensis),* Ring-necked Dove *(Streptopelia capicola),* Acacia Pied Barbet *(Tricholaema leucomelas)* and White-backed Mousebird *(Colius colius)*.

» ***Short potentially moist grassland:***
This habitat is expected to receive infiltration from run-off water during precipitation events which is colonised by palatable grass species. Due to the high palatability of the graminoid cover, the structure of this habitat remains short owing to persistent grazing. It provides ephemeral foraging habitat for granivores such as Long-tailed Widowbird *(Euplectes progne),* Southern Red Bishop *(E. orix)* but also insectivorous species such as Zitting Cisticola *(Cisticola juncidis)*. It also provides potential foraging habitat for the endangered Secretarybird *(Sagittarius serpentarius)*.

Some parts of this unit were historically transformed due to agricultural activities and subsequently covered by secondary graminoid species.

» ***Artificial livestock watering points:***
These are represented by artificial water troughs and reservoirs with the purpose to provide drinking water to livestock. However, they act as focal congregation areas for many granivore passerine and non-passerine species*, i*ncluding Cape Sparrow *(Passer melanurus),* Laughing Dove *(Spilopelia senegalensis),* Namaqua dove *(Oena capensis),* Scaly-feathered Weaver *(Sporopipes squamifrons)* and Wattled Starling *(Creatophora cinerea)*. Due to the congregation of passerine species at these features, they could invariably attract small to medium sized bird of prey species (members of the genera Falco, Micronisus and Accipiter).

» ***Transformed areas:***
These areas are represented by build-up land (houses) and exotic blue gum *(Eucalyptus spp.)* plantations. These features are an unimportant habitat for bird species, although the plantations often provide ephemeral roosting and nesting habitat for non-passerine species such as Pied Crow (*Corvus albus*), Black-headed Heron (*Ardea melanocephala*) and Hadeda Ibis (*Bostrychia hagedash*).

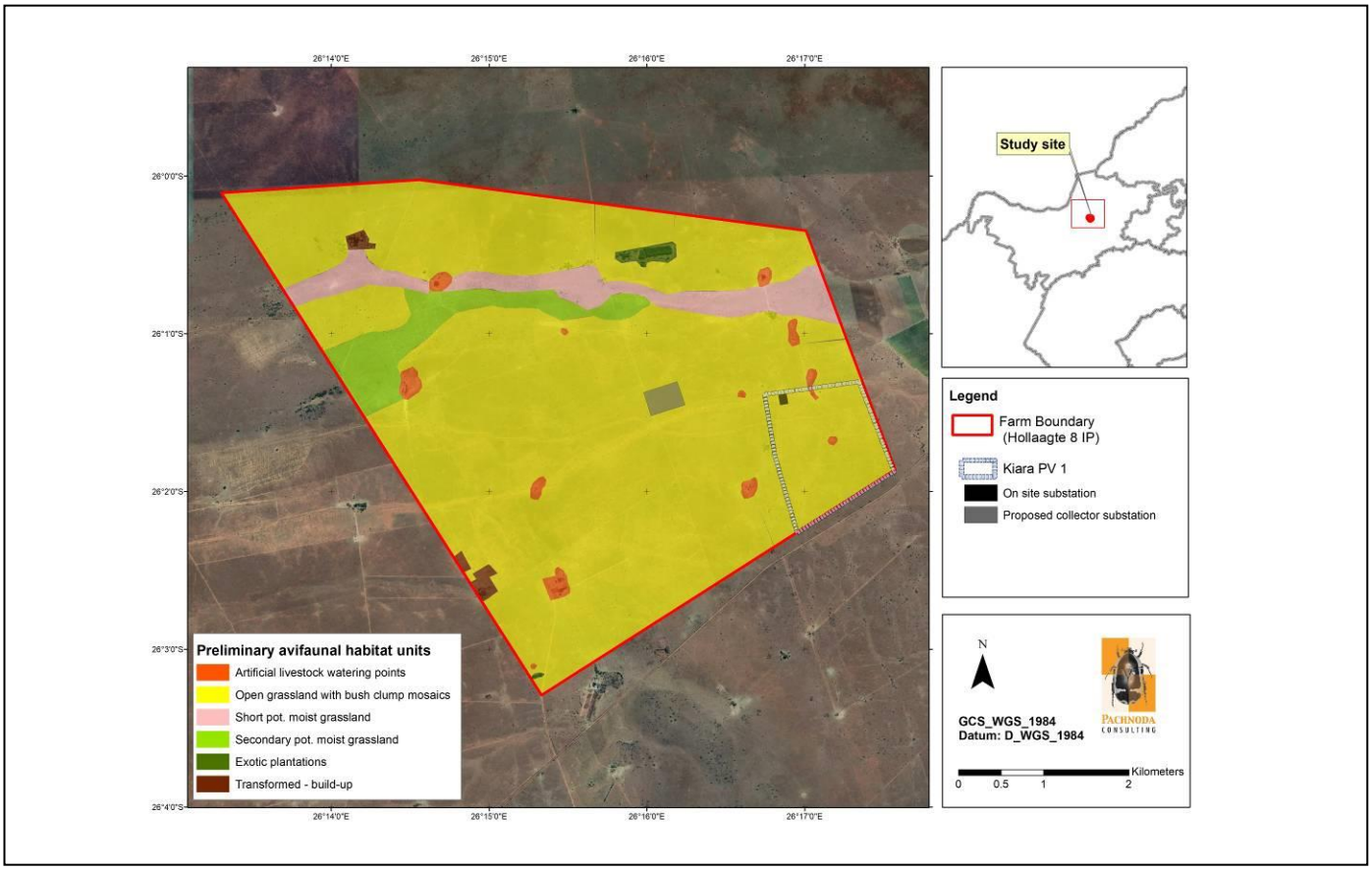


Figure 8.15: A preliminary habitat map illustrating the avifaunal habitat types on the study site and immediate surroundings (the habitat types are subject to change pending the outcome of a detailed baseline surveys).

Avian species richness and predicted summary statistics

Approximately ~174 bird species are expected to occur on the study site and immediate surroundings. The expected richness was inferred from the South African Bird Atlas Project (SABAP2) (Harrison et al., 1997; www.sabap2.birdmap.africa) and the presence of suitable habitat in the study area. This equates to 18 % of the approximate 987 species listed for the southern African subregion (and approximately 20 % of the 871 species recorded within South Africa). However, the species richness obtained from the pentad grids corresponding to the study area (c. 2600_2610 and 2600_2615) range between 32 and 40 species, with an average number of 36 species for each full protocol card submitted (for observation of two hours or more). The low number of observed species clearly illustrates that the study area has not been properly surveyed or atlased.

As indicated in **Table 8.4**, the study area is poorly represented by biome-restricted (see **Table 8.4**) and local endemic bird species. It does support ca. 31 % of the near -endemic species present in the subregion. Prominent wetland features and waterbodies are absent from the study site, thereby explaining the absence and low richness of waterfowl, wading birds and shorebird taxa.

Table 8.4: A summary table of the total number of species, Red listed species (according to Taylor et al., 2015 and the IUCN, 2022), endemics and biome-restricted species (Marnewick et al., 2015) expected (sensu SABAP2) to occur in the study site and immediate surroundings.

Description	Expected Richness Value***
Total number of species*	174 (20 %)
Number of Red Listed species*	9 (6 %)
Number of biome-restricted species – Zambezian and Kalahari-Highveld Biomes) *	3 (21 %)
Number of local endemics (BirdLife SA, 2022) *	2 (5 %)
Number of local near endemics (BirdLife SA, 2022) *	5 (17 %)
Number of regional endemics (Hockey *et al.,* 2005) **	11 (10 %)
Number of regional near endemics (Hockey *et al.,* 2005) **	19 (31 %)

* Only species in the geographic boundaries of South Africa (including Lesotho and eSwatini) were considered.
** only species in the geographic boundaries of southern Africa (including Namibia, Botswana, Zimbabwe and Mozambique south of the Zambezi River) were considered
*** Percentage values in brackets refer to totals compared against the South African avifauna (*sensu* BirdLife SA, 2022).

Table 8.5: Expected biome-restricted species (Marnewick *et al*, 2015) likely to occur on the study site and immediate surroundings.

Species	Kalahari-Highveld	Zambezian	Expected Frequency of occurrence
Kalahari Scrub-robin (*Cercotrichas paena)*	X		Common
White-throated Robin-chat (*Cossypha humeralis*)		X	Fairly common
White-bellied Sunbird (*Cinnyris talatala*)		X	Common

Bird species of conservation concern

Table 8.6 provides an overview of bird species of conservation concern that could occur on the study site based on their historical distribution ranges and the presence of suitable habitat. According to this Table, a total of nine species could occur on the study site which includes six globally threatened species, one globally near threatened species, one regionally threatened species and one regionally near-threatened species.

It is evident from **Table 8.6** that the highest reporting rates (>10%) were observed for the globally endangered Cape Vulture (*Gyps coprotheres*) and the globally critically endangered White-backed Vulture (*Gyps africanus*). These species have a high likelihood of occurrence pending the presence of suitable food (livestock carcasses).

The regionally vulnerable Lanner Falcon (Falco biarmicus), globally endangered Lappet-faced Vulture (*Torgos tracheliotos*), globally vulnerable Red-footed Falcon (*Falco vespertinus*) and globally near threatened Black-winged Pratincole (*Glareola nordmanni*) show reporting rates between 2% and 5.3 %. These species have a moderate probability of occurrence and are regarded as occasional foraging visitors to the area.

The remaining species have low reporting rates (<2%) and are regarded as irregular foraging visitors with low probabilities of occurrence. It is possible that the low reporting rates reflect the poor coverage of the study

area by citizen scientists (e.g. birdwatchers), and some of these species could occur in higher numbers due to being overlooked. As an example, Red-footed Falcons (*F. vespertinus*) often occur in flocks of the similar-looking Amur Falcon (*F. amurensis*), which based on reporting rates appear to be a common summer visitor to the area. Therefore, it is highly possible that Red-footed Falcons were previously overlooked or misidentified.

Table 8.6: Bird species of conservation concern that could utilise the study site based on their historical distribution range and the presence of suitable habitat. Red list categories according to the IUCN (2022)* and Taylor et al. (2015)**.

Species	Global Conservation Status*	National Conservation Status**	Mean Reporting rate: SABAP2	Preferred Habitat	Potential Likelihood of Occurrence
Falco vespertinus (Red-footed Falcon)	Vulnerable	Near threatened	2.67	Varied, prefers to hunt open arid grassland and savannoid woodland, often in company with Amur Falcons (*F. amurensis*).	An occasional summer foraging visitor to the area.
***Falco biarmicus* (Lanner Falcon)**	**-**	**Vulnerable**	**4.00**	**Varied, but prefers to breed in mountainous areas.**	**An occasional foraging visitor to the study area.**
Glareola nordmanni (Black-winged Pratincole)	Near threatened	Near threatened	2.67	Varied, but forages over open short grassland, pastures and agricultural lands (especially when being tilled)	A potential regular foraging visitor to the study area.
Gyps coprotheres (Cape Vulture)	Endangered	Endangered	12.00	Mainly confined to mountain ranges, especially near breeding site. Ventures far afield in search of food.	A regular foraging/scavenging visitor to the study site pending the presence of food (e.g. livestock carcasses).
Gyps africanus (White-backed Vulture)	Critically Endangered	Critically Endangered	13.33	Breed on tall, flat-topped trees. Mainly restricted to large rural or	A regular foraging/scavenging visitor to the study site pending the presence

Species	Global Conservation Status*	National Conservation Status**	Mean Reporting rate: SABAP2	Preferred Habitat	Potential Likelihood of Occurrence
				game farming areas.	of food (e.g. livestock carcasses).
Leptoptilos crumeniferus (Marabou Stork	-	Near threatened	1.33	Varied, from savanna to wetlands, pans and floodplains – dependant of game farming areas	An irregular scavenging visitor to the area.
Polemaetus bellicosus (Martial Eagle)	Endangered	Endangered	1.33	Varied, from open karroid shrub to lowland savanna.	An irregular foraging visitor. It was last recorded from pentad 2605_2605 on 28 Jan 2012.
Sagittarius serpentarius (Secretarybird)	Endangered	Endangered	1.33	Prefers open grassland or lightly wooded habitat.	**Regarded as an irregular foraging visitor to the study site despite the widespread presence of suitable foraging habitat.**
Torgos tracheliotos (Lapped-faced Vulture)	Endangered	Endangered	5.33	Lowveld and Kalahari savanna; mainly on game farms and reserves	**A regular foraging/scavenging visitor to the study site pending the presence of food (e.g. livestock carcasses).**

8.5. Heritage including Archaeology and Palaeontology

8.5.1. Archaeology

Lichtenburg town was established in 1873 and named "Town of Light". General Del la Rey was buried in Lichtenburg after a fatal shooting incident at Langlaagte. During the 1800's, additional farmers settled in the area. During the Second Boer War, the strategically important town of Lichtenburg was occupied by both Boer and Briton for short spells. In November 1900, a large British force under Col. Robert Baden-Powell was transferred to Lichtenburg and secured the town, and much of the territory with it. In addition, the town is known from Rudyard Kipling's poem, Lichtenberg, which relays the story of a foreign combatant in the second South African War. In 1926, Lichtenburg experienced a gold rush that lasted approximately 10 years. Lichtenburg district is now mostly a farming area, combining cattle and crop-farming and large areas of former diamond mine diggings are now used as grazing.

According to van Schalkwyk et al (1995, SAHRIS NID 6237) in their report completed for the Bakerville Diamond Fields, "land use in the area goes back to the Early Stone Age, as can be determined by the number of stone artifacts found near the old mining commissioner's office. This material seems to be disturbed from its primary context because of the mining activities. It is postulated that similar occurrences

will be found in other parts of the diggings, but that this material would have been disturbed out of context. As a result of the dominant land use in the area, many of the heritage resources identified by van Schalkwyk et al (1995) are associated with past and present agriculture, and consist of farming implements, a few windmills, and dipping-troughs. One such trough, located at Elandsputte on the farm Uitgevonden 355JP, was the site where the first diamond was discovered. This structure is a proclaimed national monument (now Provincial Heritage Site). Van Schalkwyk et al (1995) identified a number of burial grounds within their surveyed area. Heritage resources known from this area include burial grounds and graves, archaeological artefacts and old structures, often associated with farming activities or diamond mining (refer to **Figure 8.16**). In his assessment completed for an adjacent PV facility, Van Schalkwyk (2021) identified no significant archaeological heritage resources but did identify a number of informal burials.

An archaeological field assessment was conducted for the Lichtenburg PV facilities, located approximately 15km west of the proposed development area in 2019. The field assessment conducted noted that, similar to this proposed development area, the area had been disturbed and transformed by agricultural activities. Furthermore, throughout the farming areas several heaps of rocks that were removed from the agricultural fields were identified. During the field assessment conducted in 2019, no archaeological resources, graves or burial grounds were identified in the project area. Another field assessment for the Houthaalbomen PV Facility located 20km from the proposed development area was completed in 2014 by Van der Walt and 2021 by CTS Heritage. Van der Walt (2014) notes that the site lies on a featureless flat plain. The entire development footprint was extensively utilised for crop farming and ploughing through the years resulted in a lateral and downward migration of artefacts making it virtually impossible to identify knapping or manufacture sites and site extent of artefact concentrations. In some areas, borrowing animals brought MSA artefacts to the surface where the sand cover is more than a metre and a half thick and the possibility of finding subsurface material cannot be excluded. Most of the Stone Age archaeology in the study area consists of low densities of scattered (and possibly mixed) MSA and LSA artefacts. The findings of the 2021 field assessment report suggests that the area was occupied or traversed intermittently by Stone Age groups potentially through periods in both the Middle Stone Age (MSA – 300ka: ~40ka) and the Later Stone Age (LSA: 40ka: ~2ka), although artefacts that could be clearly linked with chrono-cultural periods were scarce, which is likely a function of the proximity to primary sources of raw-material. The abundance of high-quality chert rocks in the project area was likely the resource that attracted groups there and resulted in them leaving behavioural traces in the form of stone artefacts.

Indeed, the majority of the stone artefacts identified look to be the result of expedient 'testing' of rocks for quality, and the so-called products in many of the scatters were likely transported away. In this sense, no evidence of substantial densities of finds or occupational debris were identified, and the stone artefacts present are evidenced to have been produced by mobile groups moving through the area. The raw materials exploited for stone artefact manufacture were exclusively local cherts. The presence of primary and secondary sources of chert in association with stone artefacts, are suggestive of the landscape resources that probably drew Stone Age groups to the region over an extended expanse of human evolutionary history. It is likely that a similar archaeological signature will be present within the area proposed for this development and as such, a field survey to assess impacts to archaeological heritage resources is recommended.

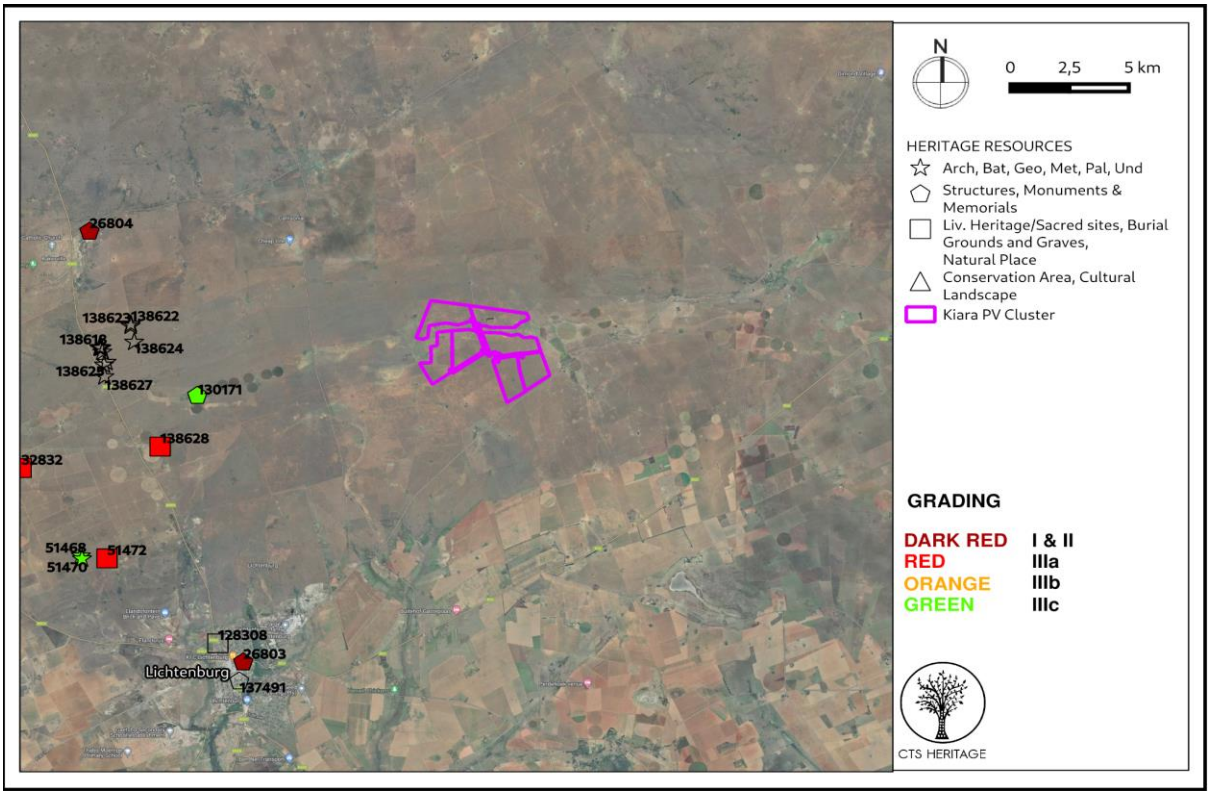


Figure 8.16: Heritage resources previously identified within the study area

8.5.2. Palaeontology

According to the SAHRIS Palaeosensitivity Map (**Figure 8.17**), the area proposed for development is underlain by sediments of very high paleontological sensitivity. According to Bamford (2019), the project area lies on rocks of the Malmani Subgroup, Chuniespoort Group. The Malmani Subgroup is up to 2000m thick and comprises five formations distinguished by the amount of chert, stromatolite morphology, intercalated shales and erosion surfaces (Eriksson et al., 2006). The basal Oaktree Formation overlies the Black Reef Formation, and is made up of carbonaceous shales, stromatolitic dolomites and locally developed quartzites. Above this is the Monte Christo Formation comprising erosive breccia, overlain by stromatolitic and oolitic platformal dolomites. Next is the Lyttleton Formation of shales quartzites and stromatolitic dolomites. The Eccles Formation comprises a series of erosional breccias, and the overlying Frisco Formation is made up mostly of stromatolitic dolomites.

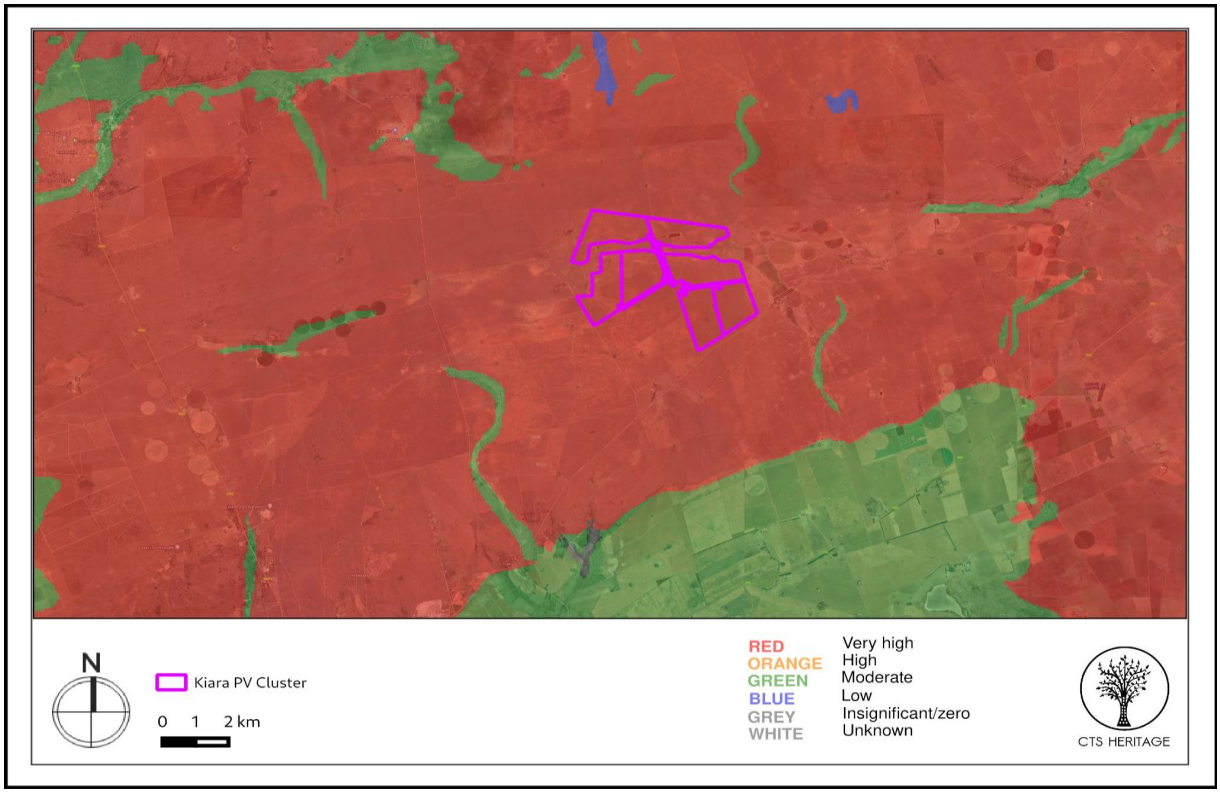


Figure 8.17: Palaeosensitivity map indicating fossil sensitivity underlying the study area.

8.6 Visual Quality

The visual quality of the project site and the broader study area is defined by the following characteristics:

- The project site is in an area that has a distinct rural and agricultural character, with some mining/quarrying mining/quarrying activity evident towards the north-west (diamond mining) and informal digging south-west of the proposed site.
- The natural vegetation or land cover types of the region are described as Grassland, with large tracts of agricultural fields (altered vegetation) comprised of mostly dryland agriculture towards the east and south of the site. Some irrigated agricultural land is found towards the west of the site
- The majority of the remaining natural vegetation within the study area is indicated as Carltonville Dolomite Grassland. Limited sections of Western Highveld Sandy Grassland, which in turn envelop small portions of Highveld Salt Pans within Vaal-Vet Sandy Grassland lie further south beyond the site boundaries.
- Exotic plantations are limited and are dotted towards the east, south, and north-west of the study area.
- Bushland (fallow land, including old fields) is very limited and is dotted towards the south-east, south-west and north-west of the study area.
- Wetlands are scarce- but have been located in small areas towards the east and south-west of the site.
- The Watershed MTS substation is located at a distance of 15.8km south-west of the proposed site. A great number of power lines, associated with this substation, are located south and west of the site.
- The dominating terrain morphology of the study area is described as Plains and Pans or Slightly Undulating Plains of the Central Interior Plain. The slope of the entire study area is extremely even (flat) with slight undulations of no more than 5m.
- The Rall Broers Private Nature Reserve is located north-west of the site at a distance of approximately 18.4km at the closest.

» Undeveloped (vacant open space or farmland), with mining/quarrying activity evident towards the north-west (diamond mining) and informal digging south-west of the proposed site.
» A great number of power lines, associated with this substation, are located south and north of the site.

The photographs below aid in describing the general environment within the study area and surrounding the proposed project infrastructure.

The Watershed Substation viewed from the R505 Arterial Road.

Power lines near the Watershed Substation.

Irrigated (pivot) agriculture in the study area.

The general environment surrounding the proposed development site.

Figure 8.18: Photographs showing the general environment within the area

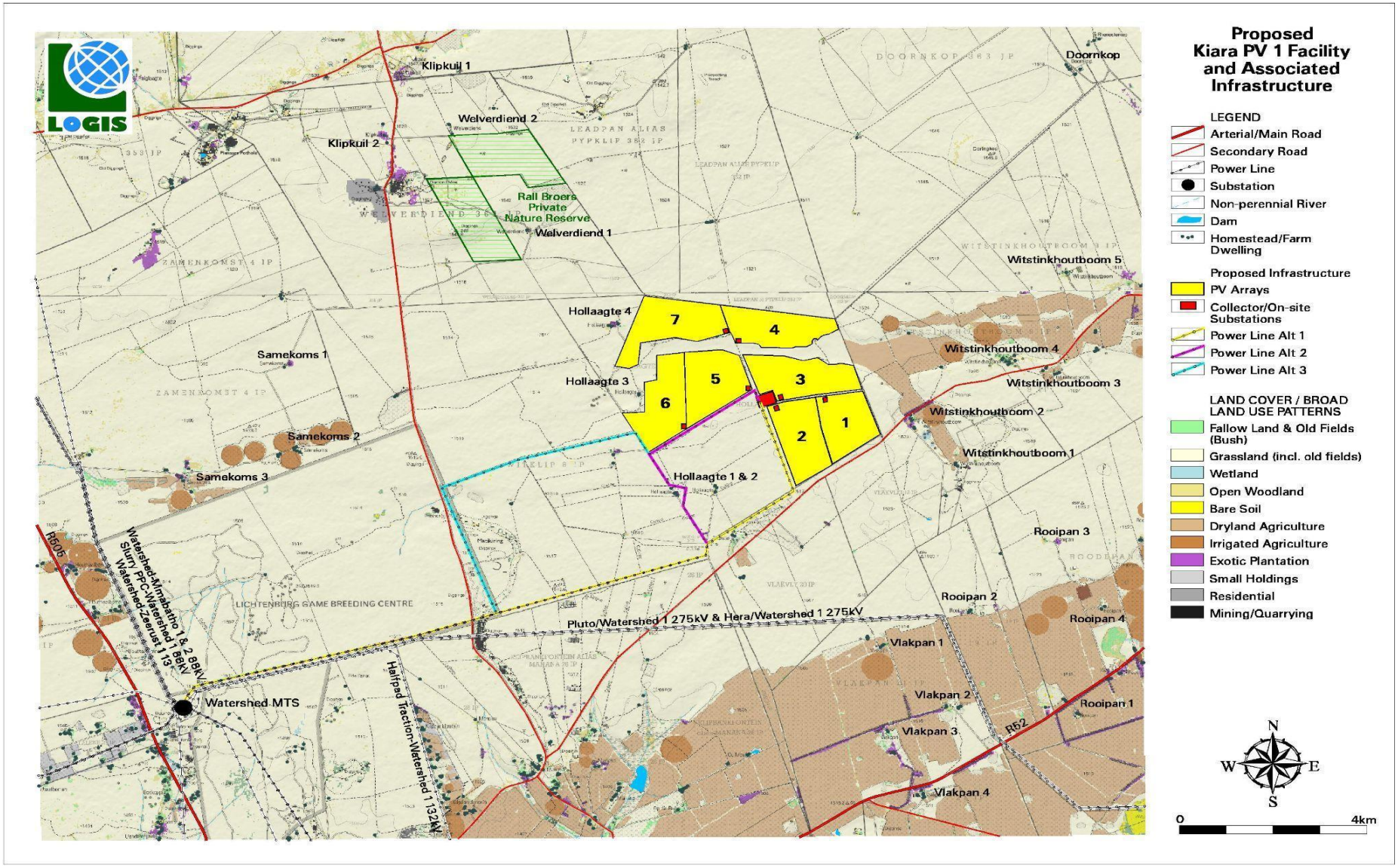


Figure 8.19: Land cover and broad land use patterns of the proposed Kiara PV1 Facility

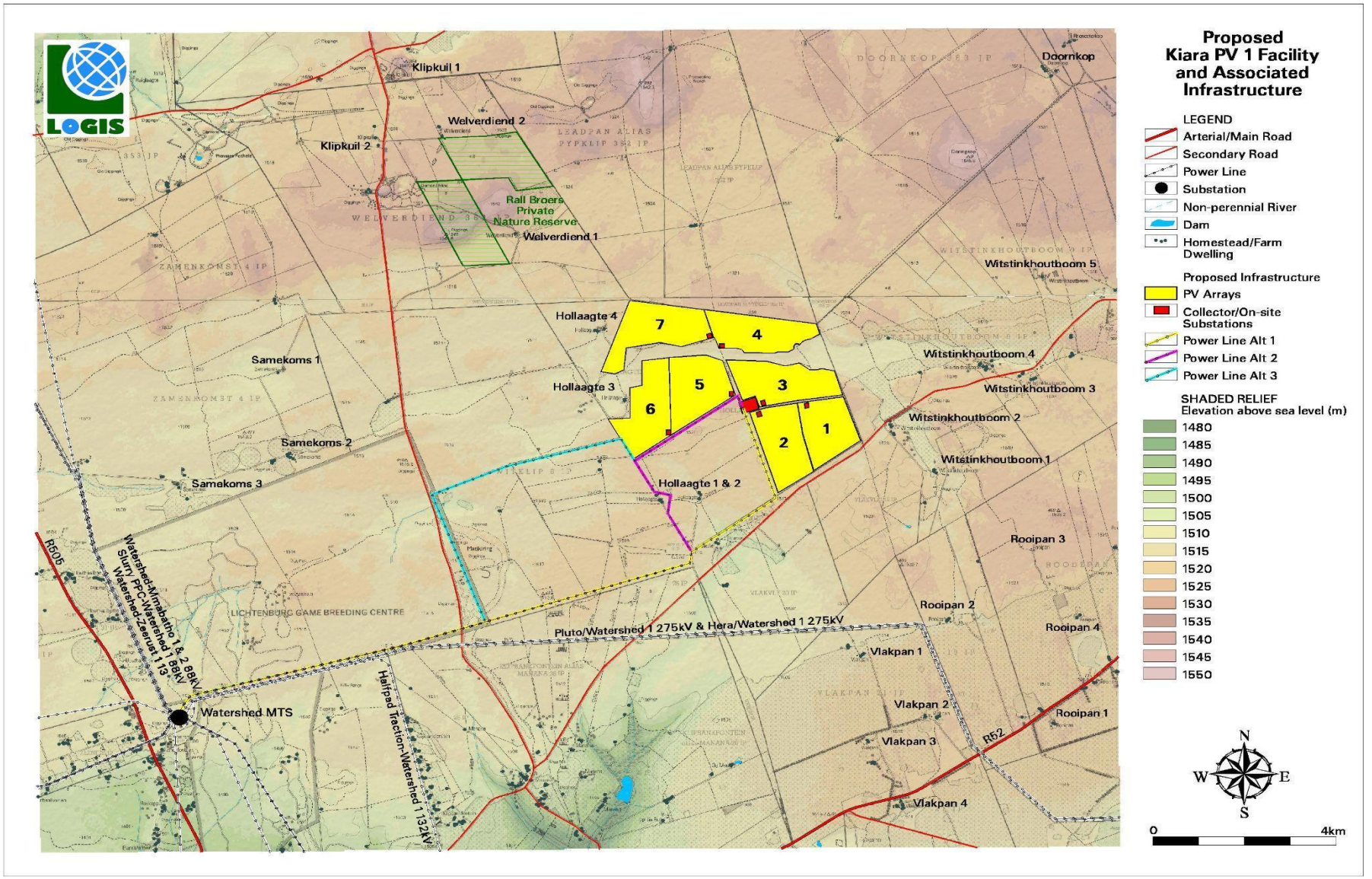


Figure 8.20: Shaded relief map of the study area

8.7 Social Context

Table 8.7 provides a baseline summary of the socio-economic profile of the Ditsobotla Local Municipality within which Kiara PV1 is proposed. The data presented in this section have been derived from the 2011 Census, the North West Provincial Spatial Development Framework (PSDF), and the Ngaka Modiri Molema District Municipality and Ditsobotla Local Municipality IDPs.

Table 8.7: Baseline description of the socio-economic characteristics of the area proposed for Kiara PV1 Facility.

Location characteristics
» The project is proposed within the North West Province, the province located to the west of the major population centre of Gauteng Province. » The project is proposed within the Ditsobotla LM of the Ngaka Modiri Molema DM. » The Ditsobotla LM is approximately 6 398.7km² in extent.
Population characteristics
» Ditsobotla LM has a population of 181 866 which is about one-fifth of the figure in Ngaka Modiri Molema 889,108. » The LM occupies an area of land approximately 6 465km² in extent and has a population density of 26/7km². » Between 2001 and 2011 the LM experience a positive population growth of 1.3% per year. This is higher than the DM population growth of 1.0% between 2001 and 2011. » According to Census 2011, the significant majority of 89.1% of the Ditsobotla LM population are Black African, followed secondly by 8.2% which are White, 1.9% which are Coloured, and 0.6% which are Indian / Asian. This population structure corresponds to that of the Ngaka Modiri Molema DM, and North West Province. » The Ditsobotla LM is slightly male dominated with males making up just over half (50.5%) of the municipal population, and females the remaining 49.5% of the population. This correlates with the Provincial population which is also slightly female dominated (comprising 50.7% males, and 49.3% females), but differs from the District and National populations which are both females dominated. » When assessing five-year age groups, the largest proportion of the population are between the ages of 0 to 4 years old, with the proportion decreasing uniformly as age increases. There are no significant outliers within any one age group. The age structure of the North West Province and South African national populations are similar to one another, but differ somewhat from that of the Ditsobotla LM and Ngaka Modiri Molema DM. » The dependent portion of the population typically comprises youth below 15 years of age which are yet to enter the workforce, and individuals 65 years and older which would typically already have retired from the workforce. » The Ditsobotla LM has a dependency ratio of 38.1; implying that for every 100 people within the Ditsobotla LM, over two thirds (i.e. 38.1) of them are considered dependent. This figure is slightly lower than the Ngaka Modiri Molema DM (39.2), but higher than the provincial (35.3) and national (34.5) dependency ratios
Economic, education and household characteristics
» Approximately 14.7% of the Ditsobotla LM population aged 20 years and older have received no formal form of schooling. » The majority of 29.9% of the LM population have received some secondary education (which correlates with the DM, Provincial, and national averages), followed closely by 22.6% which have received some primary schooling. Approximately one fifth (20%) of the LM population have completed Grade 12 / Matric, with 6.8% having received some form of higher / tertiary education. » Due to the fact that the majority of almost three quarters (73.2%) of the Ditsobotla LM population have not completed Grade 12 / Matric, it can be expected that a large proportion of the population will either be unskilled or have a low-skill level, and would therefore either require employment in non-skilled or low-skilled sectors; or alternatively would require skills development opportunities in order to improve the skills, and income levels of the area » The Ditsobotla LM has an unemployment rate of 28.3%. » Of the Ditsobotla LM's labour force (i.e. individuals ages between 15 and 64 years of age) the majority of 43.2% are not economically active.

- The economically inactive proportion of the Ditsobotla LM's labour force is slightly lower than the DM (47.9%), but higher than the Provincial (40.2%), and national (39.2%) averages.
- Approximately 14.3% of the Ditsobotla LM's labour force is unemployed.
- The unemployment rate for the LM is fractionally lower than the DM (14.8%), as well as the Provincial (17.1%), and national averages (16.5%).
- Over two thirds (68.4%) of households within the Ditsobotla LM fall within the low income (poverty level) bracket (i.e. below R38 400 per annum).
- Approximately one quarter (25.9%) of households within the LM fall within the medium income bracket, while the remaining 5.7% fall within the high income bracket.
- According to the Ditsobotla LM IDP 2017 – 2018 the LM contributes 22.7% to the DM economy.
- The finance and business services sector represent the largest contributing sector with a contribution of 24.7%, followed by the trade sector with a contribution of 19.1%, the manufacturing sector which contributes 11.8%, and the general government service which contributes 11.4%.
- The dominant economic sectors within the LM include finance and business services (25%); wholesale and retail trade, catering and accommodation (19%); manufacturing (12.2%); and general government services (11.5%).

Services

- Approximately two thirds (66%) of households within the Ditsobotla LM have access to piped water inside their yard / dwelling which is equivalent to the basic level of service provision.
- Approximately 23.2% of households receive piped water outside of their yard, while 10.9% have no access to water services
- The majority of 34.8% of the Ditsobotla LM households make use of the bucket system, followed by 33.7% which have access to and make use of flush or chemical toilets
- A quarter (25%) of households within the LM have access to pit latrines, and 6.5% of households have no access to sanitation services
- Approximately 32 933 (74%) of households within the LM are connected to the electricity grid. The LM has a total backlog of 11 567 (26%) of households without access to electricity.

CHAPTER 9: SCOPING OF POTENTIAL ISSUES

Potential environmental impacts and risks associated with the development of PV solar energy generation facilities, as described in the IFC's Project Developer's Guide to Utility-Scale Solar Photovoltaic Power Plants (2015), include:

- Construction phase impacts, such as temporary air emissions (dust and vehicle emissions), noise, solid waste and wastewater generation, and Occupational Health and Safety (OHS) issues such as the risk of preventable accidents leading to injuries and/or fatalities.
- Land matters, such as land acquisition procedures and in particular involuntary land acquisition/resettlement.
- Landscape and visual impacts, such as the visibility of the project within the wider landscape and associated impacts on landscape designations, character types and surrounding communities.
- Ecology and natural resources, such as habitat loss / fragmentation, impacts on designated areas and disturbance or displacement of protected or vulnerable species.
- Cultural heritage, such as 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, such as impacts associated with the transportation of materials and personnel on project-affected communities.
- Water usage, such as the cumulative water use requirements in arid areas where local communities rely on scarce groundwater resources.

This chapter serves to describe and evaluate the identified potential environmental impacts relevant and specific with the construction and operation phases of the 120MW Kiara PV1 Facility as identified at this stage in the process, and to make recommendations for further studies required to be undertaken in the EIA phase.

The project site considered for the Kiara PV1 Facility includes Portion 2 of the Farm Hollaagte No. 8, an area of approximately 856.5ha in extent. Within the proposed project site, a development area of approximately 165ha has been investigated during this Scoping Phase to determine the environmental suitability of the site. The study will provide an indication of the areas of sensitivity that the developer would need to take into consideration in the planning of the layout of the Kiara PV1 Facility within the development area.

The majority of the environmental impacts are expected to occur during the construction phase. Environmental issues associated with construction and decommissioning activities of the PV facility and associated infrastructure are similar and include, among others:

- Impact on ecology, including flora and fauna.
- Impact on avifauna.
- Impact on soils, geology, agricultural potential and land use.
- Impact on heritage resources (including archaeology and palaeontology).
- Social impacts (positive and negative).
- Visual impacts.

Environmental issues specific to the operation of the PV facility and associated infrastructure could include, among others:

» Long-term loss of protected species (flora, fauna, avifauna) or conservation-worthy habitats.
» Change in land-use for the footprint of the facility.
» Visual impacts (negative viewer perceptions and visibility of the facility).
» Social impacts (positive and negative).

In order to appropriately identify, assess and, as far as possible, avoid or mitigate potential impacts and risks that may be associated with the development, construction, operation and decommissioning of the Kiara PV1 Facility, Savannah Environmental commissioned a team of independent specialists with relevant scientific knowledge and expertise in the biophysical (i.e. biotic and abiotic) and socio-economic environments. Copies of the specialists' Scoping level assessments are included in **Appendices D – I** of this Scoping Report.

Section 9.3 provides the findings of the scoping study undertaken for the construction and operation phases of the Kiara PV1 Facility. Those impacts associated with construction can also be expected to be associated with the decommissioning phase (however, to a lesser extent as the project site would have previously undergone transformation and disturbance during construction). The findings must be read in conjunction with the specialist reports attached as **Appendices D – I** of this Scoping Report. Potential impacts associated with the project are evaluated, and recommendations are made regarding further studies required within the EIA Phase.

A summary of the potential cumulative impacts that may be associated with the project are provided in **Section** Error! Reference source not found.. These impacts are associated with the scale of the project when c onsidered together with other similar developments within the region and will be confirmed and assessed within the EIA Phase of the process.

9.1 Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of an Impact Assessment Report

This chapter identifies the potential environmental impacts associated with the development of the proposed project. 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)(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 phase of Kiara PV1 Facility have been included in **Section 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, management 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 Kiara PV1 Facility have been included in **Section 9.3.**
(g)(viii) the possible mitigation measures that could be applied and level of residual risk	Possible mitigation (specifically relating to the avoidance of sensitive areas) has been included in **Section 9.3.**

9.2 Assumptions made during the Evaluation of Potential Impacts

While evaluating potential impacts associated with the proposed project, the Scoping evaluation assumed the following:

- All information provided by the developer and I&APs to the environmental team was correct and valid at the time it was provided.
- It is assumed that the development area for the solar PV facility identified by the developer represents a technically suitable site for the establishment of Kiara PV1 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 PV 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 and available data within the proposed area. 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 Kiara PV1 Facility.

9.3 Evaluation of Potential Impacts associated with the Proposed Project

9.3.1 Impacts on ecology (including flora and fauna)

The vegetation type around the Lichtenburg area contains some protected and Red Listed species. Note that only two Red Listed species occur in the broader area, and these are currently Vulnerable and Near Threatened. The area therefore contains a moderate likelihood of protected plant species occurring but is not known to contain a high abundance of Red Listed species.

The most significant potential impact of any PV facility on faunal communities is the loss of habitat and transformation of natural areas this will decrease the available habitat for mammals. The infrastructure associated with PV facility (including the access roads, laydown areas, on-site substation and power line) also impact on faunal habitat loss through destruction and disturbance during construction and maintenance of substations, servitudes and roadways.

Sensitivity Analysis of the Site

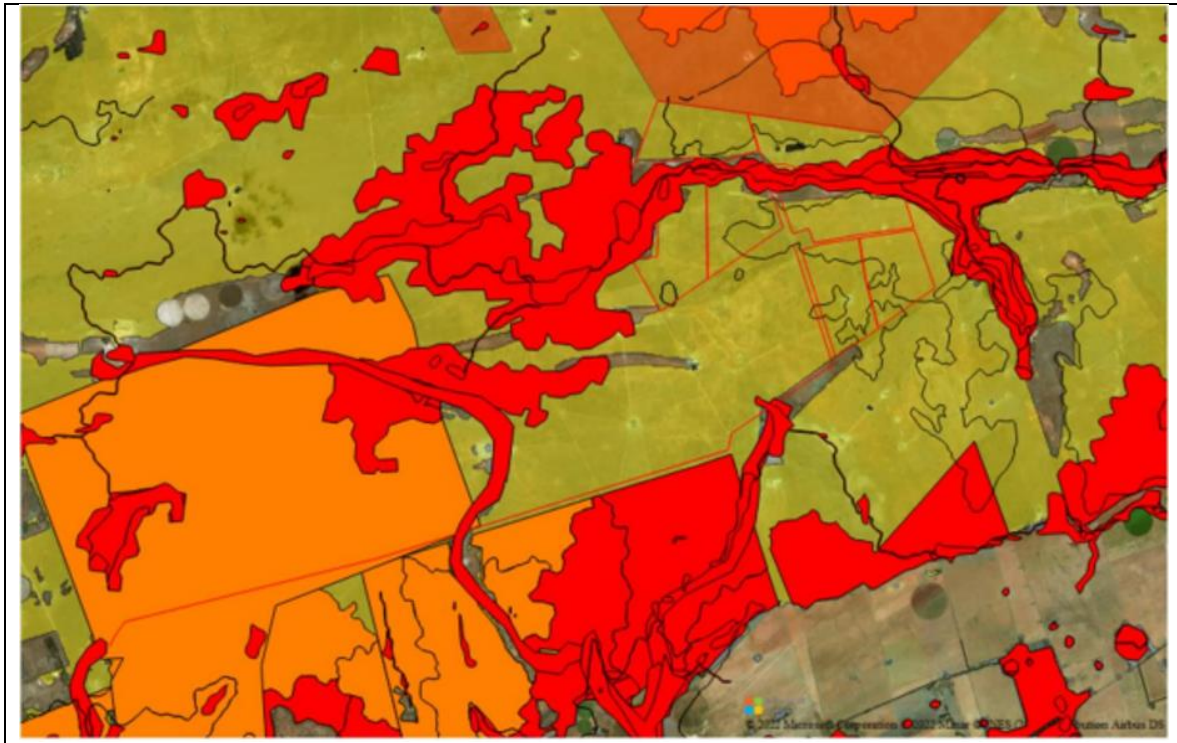
An ecological sensitivity map has been compiled using existing information for the province (**Figure 9.1**). This ecological sensitivity map is preliminary in nature and has been informed by desktop resources and will be revised during in the EIA phase as required following detailed field investigations. The following preliminary sensitivities were identified:

» **Very High Sensitivity**

A central lower lying area is listed as an Aquatic CBA 1 as it forms a wetland system which is of high conservation value. This will be an important element which the development will have to avoid. CBA 1 areas should always be afforded a Very High level of sensitivity. The Marico Biosphere Reserve borders the study area to the north. The protected area should remain unaffected by the proposed development. However, the biosphere reserve should still be consulted during the application process. It should be regarded as a Very High level of sensitivity. The Lichtenburg Game Breeding Centre is located to the west of the study area but will be affected by the grid connection powerline. It is an informal protected area, i.e. it is not formally protected by the NEMPAA. Despite this, the area will still retain a high level of sensitivity.

» **Medium Sensitivity**

The vegetation type occurring in this area is fairly uniform and is not currently listed as a Threatened Ecosystem. Despite being fairly uniform the vegetation type in the area, Carletonville Dolomite Grassland, may still contain elements of conservation value and consequently, where natural portions of these vegetation types remain, they should be regarded as having a significant conservation value. Any remaining natural areas should therefore be afforded at least a Moderate level of sensitivity.



Very High sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity

Figure 9.1. Preliminary ecological sensitivity map of the full extent of the Kiara PV1 Facility development area

The potential impacts to ecology will include:

- Loss of vegetation and consequently habitat and species diversity as a result. The study area still consists largely of natural vegetation which may contain elements of high conservation value. The development will require the removal of vegetation and altering the surface topography and will lead to the loss of habitat and species diversity.
- Loss of protected, rare or threatened plant species. Desktop information indicates the area may contain numerous protected species of which several are also Red Listed species. The development will require the removal of vegetation and the subsequent loss of any species of conservation importance.
- Impacts on watercourses, wetlands or the general catchment. Desktop information indicate the presence of at least two wetland systems in the study area. The development and grid connection powerline will certainly have an effect on these systems.
- The development will have an impact on exotic weeds and invasive species, for both current and anticipated conditions. Disturbance caused by the development will result in the increased establishment of exotic and invasive plant species.

» The development may cause an increase in erosion. The development will require the removal of the natural vegetation which in turn will result in increased runoff. In combination with the rain shadow effect caused by solar panels and concentrated flowpaths, it is highly likely that erosion will increase. » Fragmentation of habitat, disruption of ecological connectivity and -functioning in terms of the surrounding areas. The development will transform a large portion of natural land and which will then alter the current ecological corridors and will result in a disruption of migration routes. » Impacts on the mammal population on the site are expected. As the development will result in the loss of habitat and transformation of natural areas, this will decrease the available habitat for mammals. » Any significant cumulative impacts that the development will contribute towards. The development will entail seven separate development areas as well as a grid connection powerline. Although separately they may still entail a significant impact, cumulatively they will also further increase the initial impact. The region is also being considered for several other solar developments and cumulatively the impact would therefore be significant.			
Issues	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Loss of vegetation and consequently habitat and species diversity as a result.	The study area still consists largely of natural vegetation which may contain elements of high conservation value. The development will require the removal of vegetation and altering the surface topography and will lead to the loss of habitat and species diversity.	National - Loss of vegetation and habitat may have an impact on meeting national conservation targets for specific habitats and vegetation types	Likely, but not possible to determine at a desktop level.
Loss of protected, rare or threatened plant species.	Desktop information indicates the area may contain numerous protected species of which several are also Red Listed species. The development will require the removal of vegetation and the subsequent loss of any species of conservation importance.	Regional – Impacts on watercourses and wetlands may be propagated to downstream systems in which case the broader system will also be affected by the development.	Likely but not possible to determine at a desktop level. Should any Red Listed species occur, this may require exclusion of the population or part of it.
Impacts on watercourses, wetlands or the general catchment.	Desktop information indicate the presence of at least two wetland systems in the study area. The development and grid connection powerline will certainly have an effect on these systems.	Local	Highly likely but not possible to determine at a desktop level. Should wetland systems be confirmed to be present they will be regarded as no-go areas and should be excluded from development.

Issues	Nature of Impact	Extent of Impact	No-Go Areas
The impact that the development will have on exotic weeds and invasive species, both current and anticipated conditions.	Disturbance caused by the development will result in the increased establishment of exotic and invasive plant species.	Regional – Increased establishment of weeds will form a dispersion node from where weeds will most likely spread into the surrounding areas.	Unlikely.
Any increased erosion that the development may cause.	The development will require the removal of the natural vegetation which in turn will result in increased runoff. In combination with the rain shadow effect caused by solar panels and concentrated flow paths it is highly likely that erosion will increase.	Regional – Erosion induced by developments entails the unnatural removal of topsoil which results in high sediment loads in watercourses which when transported to downstream systems will also affect the broader system.	Unlikely
Fragmentation of habitat, disruption of ecological connectivity and -functioning in terms of the surrounding areas.	The development will transform a large portion of natural land, and which will then alter the current ecological corridors and will result in a disruption of migration routes.	Regional – Where corridors are affected, and loss of habitat occurs this will affect the surrounding population dynamics and may also affect the regional mammal population.	Highly likely but not possible to determine at a desktop level. Should critical corridors be present this may require exclusion of at least a portion of these areas.
Impacts that will result on the mammal population on and around the site	As the development will result in the loss of habitat and transformation of natural areas this will decrease the available habitat for mammals. This may in turn affect the population size of endangered species.	National – Should any populations of conservation concern be present on the site; the resulting development will reduce the overall population size which may then affect its national status.	Likely but not possible to determine at a desktop level. Should any Red Listed species occur, this may require exclusion of the population or part of it.

Any significant cumulative impacts that the development will contribute towards.	The development will entail seven separate development areas as well as a grid connection powerline. Although separately they may still entail a significant impact, cumulatively they will also further increase the initial impact. The region is also being considered for several other solar developments and cumulatively the impact would therefore be significant.	Regional – Increasing transformation for solar developments in this region will increase the regional impact.	Likely but not possible to determine at a desktop level. Should the cumulative impact of transformation be considered too high, a decrease in the transformation area may be required.

Description of expected significance of impact

In the absence of on-site data, areas that are still perceived to be in a natural condition, should always be regarded as having a significant conservation value. The anticipated impacts should therefore likewise be regarded as significant. In addition, the extent of a development should always be considered when anticipating the desktop impacts. In this instance the extent of the development area is fairly large (approximately 1600 hectares) and as a result this will also increase the significance of anticipated impacts.

Gaps in knowledge & recommendations for further study

From the information obtained during the desktop assessment, it should be clear that only scant and vague descriptions of the area are provided. The desktop assessment should therefore not be utilised in planning of the development since it is based on incomplete information. A comprehensive on-site survey should be conducted, and the following should be determined by the assessment:

- Survey and describe the vegetation composition on the site.
- Estimate the habitat and species diversity and delineate any unique habitats or areas with a significant species diversity.
- Determine the presence of protected, rare or endangered plant species in the area and delineate colonies where possible.
- Assess the overall condition of the vegetation type and habitat on the site in order to determine the overall conservation value of it.
- Assess current impacts on the site which will also inform the conservation value.
- Conduct a broad overview of the mammal population on the site and estimate the likelihood that species of conservation concern may occur.
- Survey and confirm the presence of watercourses and wetland areas on the site. Where such systems have been confirmed, they should be delineated and their Present Ecological State (PES) determined.

9.3.2 Impacts on avifauna

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, an austral winter season and an austral summer season bird monitoring survey will be conducted in line with Regime 2 for the Kiara PV1 Facility. The austral winter season survey has already been conducted; the findings have been used to inform the avifauna scoping report completed for the Scoping phase. The result from the austral summer season survey will be used to inform both the development footprint as well as Avifauna Impact Assessment report, to be completed for the EIA Report.

The potential impacts to avifauna from construction and/or operation activities include:

- The loss of habitat and subsequent displacement of bird species due to the ecological footprint required during construction.
- Direct interaction (collision trauma) by birds with the surface infrastructure (photovoltaic panels) caused by polarised light pollution and/or waterbirds colliding with the panels (as they are mistaken for waterbodies).
- Collision with associated infrastructure (mainly overhead powerlines and reticulation).

Sensitivity Analysis of the Site

An avifaunal sensitivity map has been compiled using existing information (**Figure 9.2**). This avifauna sensitivity map is preliminary in nature and will be revised during in the EIA phase as required. Artificial livestock watering points, open grassland and bush clump mosaics habitat units have been observed on the project site. The following preliminary avifauna sensitivities have been identified:

- **High Avifauna Sensitivity**
  This includes the artificial livestock watering points and short potentially moist grassland habitat. The artificial livestock watering points have the potential to attract large numbers of granivore passerine and non-passerine bird species, of which many need to drink water on a daily basis. The placement of electrical infrastructure in close proximity to these areas could increase potential avian collisions with the infrastructure. These features could also attract collision-prone bird species such as birds of prey. It is possible that the high number of birds at this habitat could attract birds of prey which could collide with the PV infrastructure during hunting bouts. These areas are therefore of artificial origin but could be relocated to other areas.

- **Medium Avifauna Sensitivity**
  This includes the extensive open grassland and bush clump mosaics. The extensive open grassland and bush clump mosaics provide potential suitable foraging habitat for some collision-prone bird species, including the Northern Black Korhaan (*Afrotis afraoides*) with the potential to interact (e.g. collide) with the proposed electrical infrastructure. However, reporting rates for threatened and near threatened bird species are anticipated to be relatively low, thereby suggesting a medium sensitivity rating instead of a high sensitivity even though the majority of the habitat is natural. In addition, the open grassland and bush clump mosaics are widespread in the region.

- **Low Avifauna Sensitivity**

These habitat units are represented by transformed types and include a build-up land and exotic plantations. The preliminary sensitivity map shows a large surface area that is earmarked with medium sensitivity. There is a probability that some of these units or part thereof could have higher (or lower) sensitivity ratings. It is therefore expected that some of the units or part thereof could represent different sensitivity ratings to those displayed in Figure 12 pending the outcome of a detailed austral summer season survey.

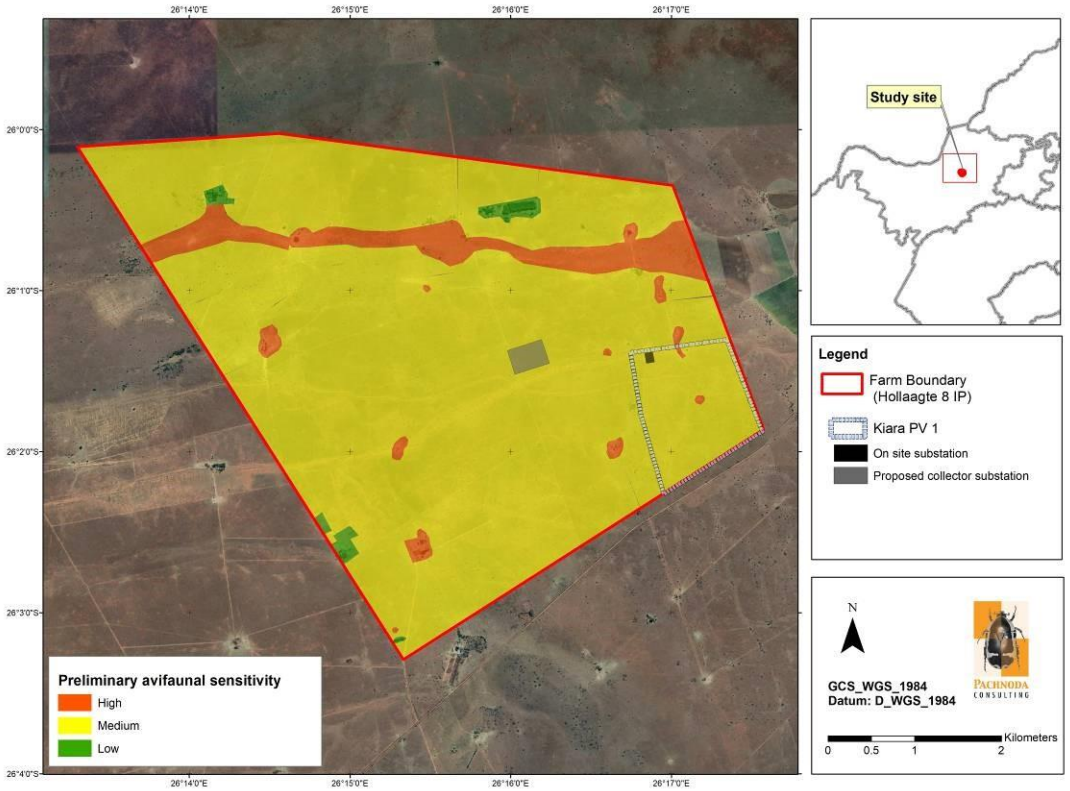


Figure 9.2. Preliminary avifauna sensitivity map of the full extent of the Kiara PV1 Facility development area

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Loss of intact habitat and subsequent displacement of bird species due to the footprint required for transformation for the facility and associated infrastructure.	Vegetation clearing will potentially lead to the loss of avifaunal species, habitats and ecosystems as birds are displaced from their habitat.	Local	None identified at this stage
Mortality of avifauna from collisions with plant infrastructure including overhead power lines and/or disturbance of avifauna due to general operation activities.	Mortality among the local avifauna may result due to direct collisions with solar panels, making use the facility infrastructure for nesting sites, or entrapment along the fenced boundaries of the facility.	Local	None identified at this stage
Description of expected significance of impact Since habitat loss is an unavoidable outcome of the development, this impact cannot be fully mitigated and the impacts on the local avifauna after mitigation are likely to be low negative for Kiara PV, but cumulative significance could be higher. Impacts restricted to the construction period, such as noise, are likely to be of low significance. With mitigation, the impact of the facility during operation on avifauna due to nesting, collision and other interaction is expected to be of low significance.			
Gaps in knowledge & recommendations for further study » The density and distribution of protected species of conservation concern across the project site will need to be characterised and quantified within the proposed development footprint to better inform the EIA Phase and the final sensitivity map. The design and position of the development footprint and facility should consider potential impacts on avifauna.			

9.3.3 Impacts on Soils, Geology, Agricultural Potential and Land-Use

It is anticipated that the proposed project will have limited impact on the soil properties and land capability while the land use will change from livestock farming to generation of renewable energy.

The following have been identified as potential impacts on agricultural resources and productivity, the significance of which will be determined during the EIA Phase. All these impacts are local in extent, confined to the site.

- Loss of areas where livestock can be produced
- Soil compaction due to construction vehicles traversing on site.
- Soil erosion due to alteration of the land surface run-off characteristics. Alteration of run-off characteristics may be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard standing surfaces and roads. Erosion will cause loss and deterioration of soil resources.
- Loss of soil fertility through disturbance of in situ horizon organisation.
- Soil chemical pollution due to oils and fuel spillages on site

While no no-go areas have been identified, it is recommended that areas with High sensitivity be avoided where possible during the final infrastructure layout planning. None of the proposed development areas overlap with delineated High Potential Agricultural Areas within the larger area where the projects will be located.

Sensitivity Analysis of the Site

A preliminary sensitivity map has been compiled using existing information (**Figure 9.3)**. In addition to the existing information, the author's knowledge of the area around the site where soil and classification surveys have been conducted since 2018, has also informed the sensitivity rating.

The entire projects site, have Low, Medium and High agricultural sensitivity to the proposed development. The sensitivity rating was assigned with the reasoning that areas with Moderate-High land capability will have Moderate-High to High agricultural potential and may be suitable for rainfed crop production. However, the absence of any crop field boundaries in the areas indicated that the sites are likely used for livestock grazing. Even though the area may be suitable for irrigated farming, there are no irrigation infrastructure or field crop boundaries associated with irrigated agriculture.

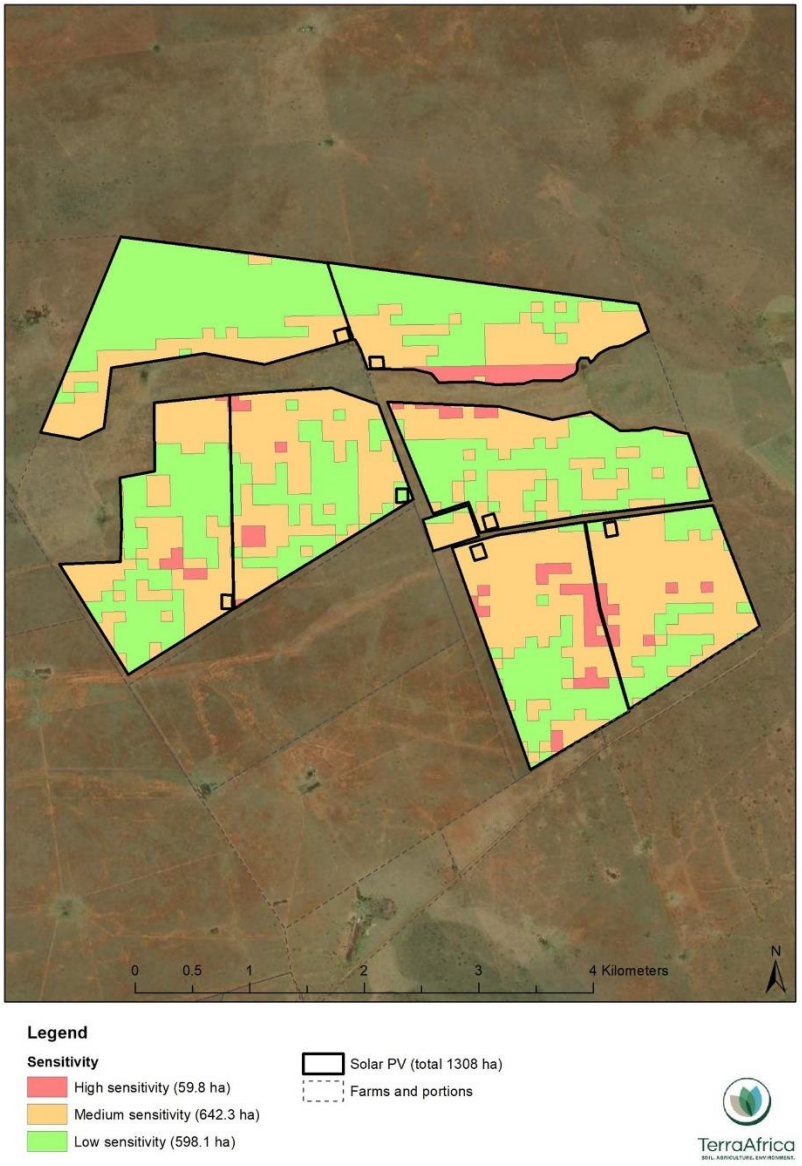


Figure 9.3: Agricultural sensitivity of the proposed Kiara Facility

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Areas where the PV modules and other infrastructure will be constructed, will no longer be available for livestock production.	Negative	Local	None
Soil compaction will occur wherever construction vehicles and equipment will traverse the site and where the PV modules and other long-term infrastructure will be erected.	Negative	Local	None
Wherever construction activities will result in bare soil surfaces, these surfaces prone to loss of soil particles as a result of wind and water movement	Negative	Local	None
In any area where topsoil will be stripped for construction purposes, the soil horizons will be mixed, and the mixture may have lower soil fertility than before it was stripped.	Negative	Local	None
Oil and fuel spillages as well as waste generation during the project cycle will result in soil chemical pollution.	Negative	Local	None
Description of expected significance of impact The sites have largely Low-Moderate land capability and is used for livestock production. The expected significance of the impacts will range from medium to High.			
Gaps in knowledge & recommendations for further study » The final layout of the infrastructure, especially the need for additional access roads, will determine the size of the areas to be lost. Once the final layout is available, the impacts can be assessed in detail. » The exact footprint will be determined for the EIA phase, and it is recommended that existing roads be used for the transport of equipment as far as possible to limit soil compaction. » Soil texture and soil organic carbon analysis results of the EIA phase will be used to calculate the erodibility of soils within the development footprint. » The final results of the EIA phase soil classification survey will be used to develop guidelines for topsoil stripping and stockpile management during the construction phase.			

9.3.4 Impacts on Heritage (Archaeology and Palaeontology)

Heritage and archaeological resources

An archaeological field assessment was conducted for the Lichtenburg PV facilities, located approximately 15km west of the proposed development area in 2019. The field assessment conducted noted that, similar to this proposed development area, the area had been disturbed and transformed by agricultural activities. Additionally, the entire development footprint was extensively utilised for crop farming and ploughing through the years resulted in a lateral and downward migration of artefacts making it virtually impossible to identify knapping or manufacture sites and site extent of artefact concentrations. Previous field assessments conducted for the project area indicate that no archaeological resources, graves or burial grounds were identified in the project area.

Palaeontology resources

The proposed development is located on geological deposits belonging to the Monte Christo Formation of the Chuniespoort Group. The Monte Christo Formation is within the Malmani Subgroup. These deposits have a very high sensitivity for impacts to palaeontological resources. Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are much too old to contain fossils other than blue-green algae. Taking account of the defined criteria, the potential impact to fossil heritage resources is negligible to extremely low.

Sensitivity Analysis of the Site

The Palaeosensitivity was identified as very high in terms of the SAHRIS Palaeontological Sensitivity Map (refer to **Figure 9.4**). Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. However, the geological structures underlying the site suggest that the rocks are much too old to contain fossils other than blue-green algae. Taking account of the defined criteria, the potential impact to fossil heritage resources is negligible to extremely low.

Issue	Nature of Impact	Extent of Impact	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 significant cultural landscapes	Direct and indirect impact to significant cultural landscapes and cultural landscape elements	Regional	None identified at this stage

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.

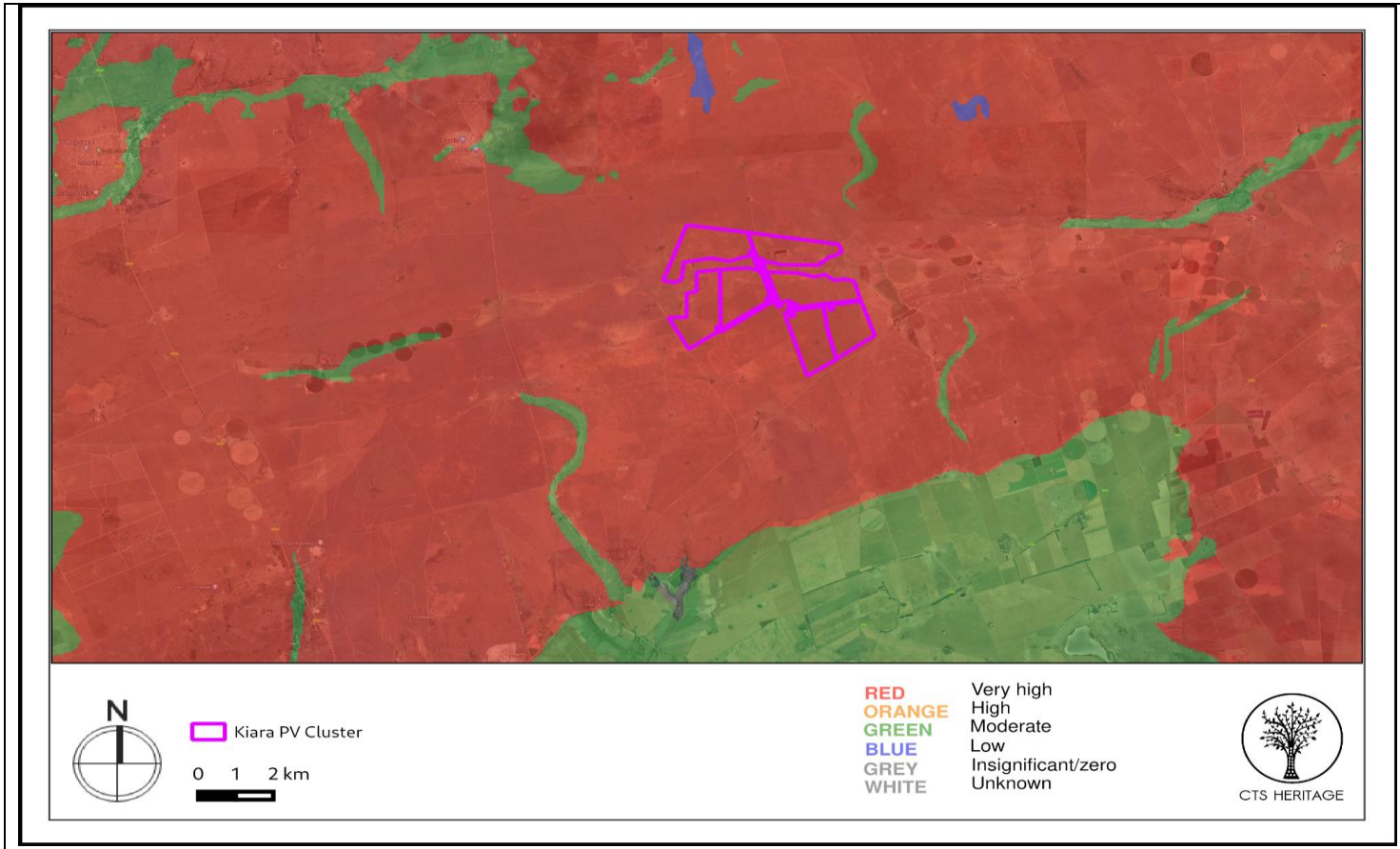


Figure 9.4: Palaeosensitivity map indicating fossil sensitivity underlying the study area

9.3.5 Visual Impacts

Existing Settlements and Infrastructure

This area of visual exposure (0 – 1km) is generally restricted to vacant farmland and agricultural fields but may contain some potential sensitive visual receptors. There are 3 residences located within this zone; Hollaagte 3 and Holaagte 4 are located towards the north-west (where no visibility will be evident), and Witstinkhoutboom 2 (where visibility will be evident), located towards the south-east of the proposed development.

Visual impact of the facility on observers in close proximity to the proposed PV plant infrastructure and activities. Potential sensitive visual receptors include:

» Residents of homesteads and farm dwellings (in close proximity to the facility)
» Observers traveling along the arterial and secondary roads
» The southern portion of the Rall Broers Private Nature Reserve (due to the nature of the topography).

Sensitivity Analysis of the Site

The result of the viewshed analysis for the proposed facility is shown on the map below (refer to **Figure 9.5**). The viewshed analysis was undertaken from a representative number of vantage points within the development footprint at an offset of 5m above ground level (i.e. the approximate maximum height of the PV structures). This was done in order to determine the general visual exposure (visibility) of the area under investigation, simulating the maximum height of the proposed structures (PV panels and inverters) associated with the facility.

The viewshed analysis will be further refined once a preliminary and/or final layout is completed and will be regenerated for the actual position of the infrastructure on the site and actual proposed infrastructure during the EIA phase of the project. The viewshed analysis includes the effect of vegetation cover and existing structures on the exposure of the proposed infrastructure.

The development would be approximately 50% visible within a 1km radius of the site. This area of visual exposure (0 – 1km) is generally restricted to vacant farmland and agricultural fields but may contain some potential sensitive visual receptors. This pattern of exposure is generally attributed to the flat topography of the study area, with no hills or ridges influencing or interrupting the viewshed analysis. There are 3 residences located within this zone; Hollaagte 3 and Holaagte 4 are located towards the north-west (where no visibility will be evident), and Witstinkhoutboom 2 (where visibility will be evident), located towards the south-east of the proposed development.

Within a 1 – 3km radius, the visual exposure is more scattered and interrupted due to the undulating nature of the topography. Most of this zone falls within vacant open space and agricultural land but does include some farm dwellings and residences. These include Hollaagte 1 and 2 towards the South (where no visibility will be evident) however, potential visibility will be evident for Welverdiend 1 north-west of the site, and Witstinkhoutboom 1 towards the eastern peripheries of the site. The Manana secondary road traverses a section of this zone towards the south, where the facility may be visible.

Visibility between the 3 - 6km radii is somewhat similar to the index of the 1-3km radius, and it includes the southern portion of the Rall Broers Private Nature Reserve. Again, the Manana secondary road traverses a section of this zone towards the south, where the facility may be visible. Potential visibility is indicated from a total of five smallholdings within this zone, namely Witstinkhoutboom 3, Witstinkhoutboom 4 and Witstinkhoutboom 5 towards the east of the site, Rooipan 3 towards the south-east of the site, and Vlakpan 1 towards the south of the site.

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

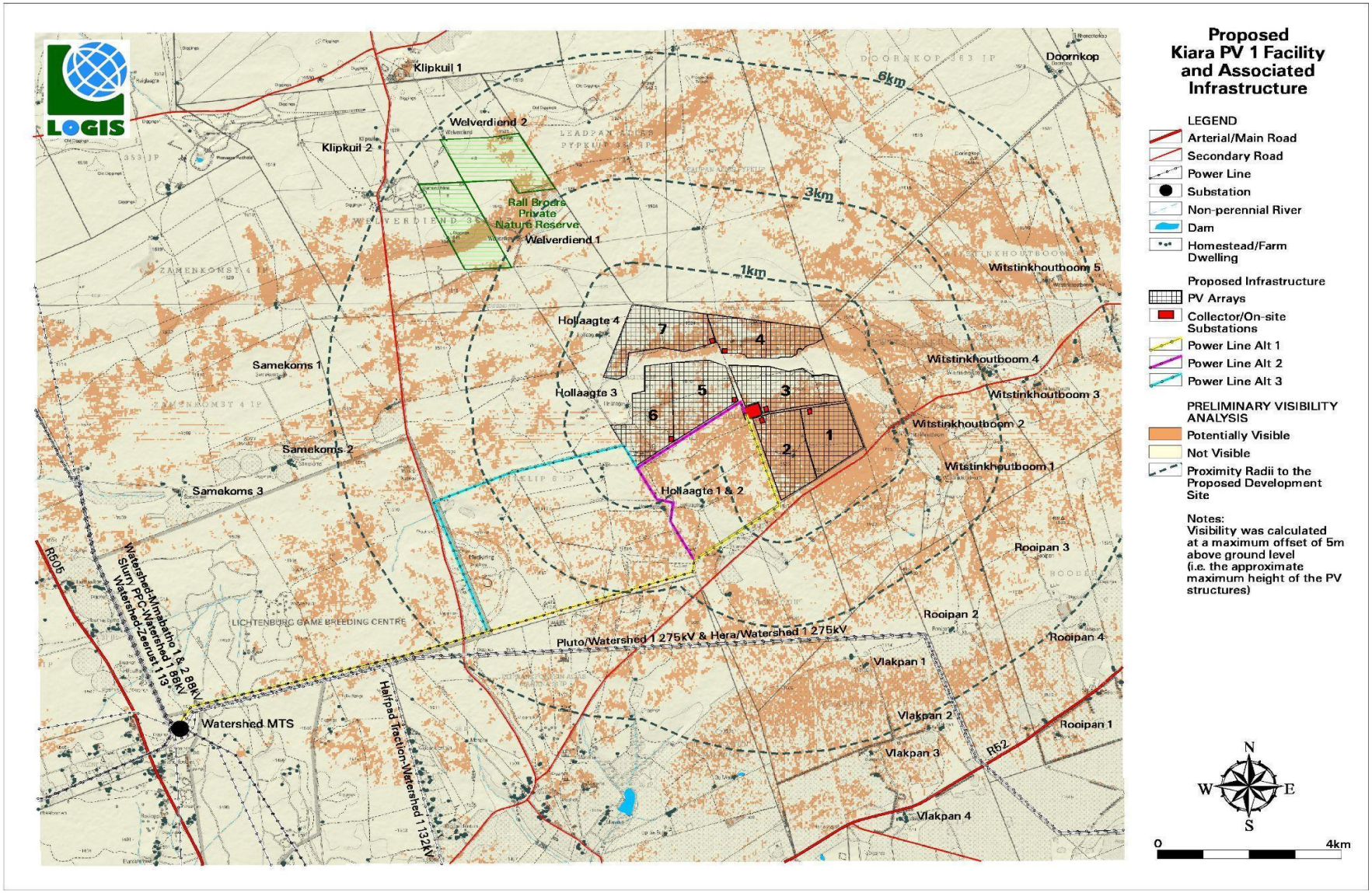


Figure 9.5: Preliminary visual exposure of the Kiara PV1 Facility

Issues	Nature of Impact	Extent of Impact	No-Go Areas
The viewing of the PV plant infrastructure and activities	The potential negative experience of viewing the infrastructure and activities within a predominantly undeveloped setting.	Primarily observers situated within a 3km radius of the facility.	Not Applicable
Description of expected significance of impact Extent: Local Duration: Long term Magnitude: Moderate to High Probability: Probable Significance: Moderate Status (positive, neutral or negative): Negative Reversibility: Recoverable Irreplaceable loss of resources: No Can impacts be mitigated: Yes			
Gaps in knowledge & recommendations for further study A finalised layout of the PV plant and ancillary infrastructure are required for further analysis. This includes the provision of the dimensions of the proposed structures and ancillary equipment. Additional spatial analyses are required in order to create a visual impact index that will include the following criteria: » Visual exposure » Visual distance/observer proximity to the structures/activities » Viewer incidence/viewer perception (sensitive visual receptors) » Visual absorption capacity of the environment surrounding the infrastructure and activities Additional activities: » Identify potential cumulative visual impacts » Undertake a site visit » Recommend mitigation measures and/or infrastructure placement alternatives			

9.3.6 Social Impacts

The proposed development supports the social and economic development through enabling skills development and training in order to empower individuals and promote employment creation within the area. The development would mainly focus on economic benefits to the area and other dimensions of impacts such as influx of jobseekers into the local area will need to be weighed.

The findings of a previous study which considered the development of renewable energy projects in this area indicated that the development of such projects would make a notable positive economic impact on the local economies of the Ditsobotla Local Municipality due to the increase in construction activities in the area and the demand created for various services. It is anticipated that the local unemployment rates would notably decline during the construction period. The Project could create much needed employment opportunities in the area and will contribute to the overall objective of national government of diversifying energy sources in the country and improving energy security. The positive socio-economic impacts that are associated with the Project include skills development in the respective industries, increase in government revenue, improved livings standards of households who will benefit from created employment, as well as long-term injections into the local economies through SED and ED commitments during operations.

Issues	Nature of Impact	Extent of Impact	No-Go Areas
Creation of several direct and indirect employment opportunities, which will assist in addressing unemployment levels within the area and aid in skills development of communities in the area.	Positive – The creation of employment opportunities and skills development will assist to an extent in alleviating unemployment levels within the area.	The impact will occur at local, regional, and national levels.	None identified at this stage
Economic multiplier effects from the use of local good and services during the construction phase.	Positive – There are likely to be opportunities for local businesses to provide goods and services during the construction phase of development.	The impact will occur at a local level.	None identified at this stage
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 level.	None identified at this stage
Temporary increase in safety and security concerns associated with the influx of people during the construction phase.	Negative – The in-migration of job seekers to the area could be perceived to result in increased criminal activity.	The impact will occur at local, level	None identified at this stage
Temporary increase in traffic disruptions and movement patterns during construction	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.	None identified at this stage

Nuisance impacts in terms of temporary increase in noise and dust, and wear and tear on access roads to the site.	Negative – The impact will negatively impact sensitive receptors and could cause disruptions for neighbouring properties.	The impact will occur at a local level.	None identified at this stage
Creation of direct and indirect employment and skills development opportunities and skills development as a result of the operation of the project.	Positive – The creation of employment opportunities and skills development will assist to an extent in alleviating unemployment levels within the area.	The impact will occur at a local, regional and national level.	None identified at this stage
Development of non- polluting, renewable energy infrastructure.	Positive – Increasing the contribution of the RE sector to the local economy would contribute to the diversification of the local economy and provide greater economic stability.	The impact will occur at local, regional, and national levels	None identified at this stage
Benefits to the local area from Socio-Economic Development (SED)/ Enterprise Development (ED) programmes and community trust from REIPPP Programme social responsibilities.	Positive – The creation of employment opportunities, skills development, and the proposed projects contributions to local economic development will assist to an extent in both alleviating unemployment levels within the area and improving the quality of life.	The impact will occur at local, regional, and national levels	None identified at this stage

Description of expected significance of impact

At its peak, the construction is likely to result in the creation of approximately 300 – 400 employment opportunities. Of those employment opportunities available, approximately 60% will comprise opportunities for low skilled workers, 25% for semi-skilled workers, and 15% for skilled workers. Skills developed through experience in the construction of the facility will be retained by the community members involved. The impact is likely to be positive, local to national in extent, short-term, and of medium significance.

Economic multiplier effects from the use of local goods and services opportunities include but are not limited to, the provision of construction materials and equipment, and workforce essentials such as services, safety equipment, ablution, accommodation, transportation and other goods. The increase in demand for goods and services may stimulate local business and local economic development (however locally sourced materials and services may be limited due to availability). There is likely to be a direct increase in industry and indirect increase in secondary businesses. The impact is likely to be positive, local to regional in extent, short-term, and of medium significance.

An influx of jobseekers into an area, could lead to a temporary increase in the level of crime, cause social disruption and put pressure on basic services. It could also potentially create conflict between locals and outsiders due to potential differences in racial, cultural and ethnic composition. A further negative impact that could result due to an influx of jobseekers into an area is an increase in unemployment levels due to an oversupply of available workforce, particularly with respect to semi- and unskilled workers.

The commencement of construction activities can be associated with an increase in crime within an area. The perceived loss of security during the construction phase of a project due to an influx of workers and / or outsiders to the area (as in-migration of newcomers, construction workers or jobseekers are usually associated with an increase in crime), may have indirect effects such as increased safety and security concerns for neighbouring properties, damage to property, increased risk of veld fire, stock theft, poaching, crime and so forth.

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 low significance given the proximity of the project to existing mining operations within the area

Nuisance impacts associated with construction related activities include noise, dust, and possible disruption 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 movement of heavy construction vehicles and construction activities and equipment also have the potential to create noise, as well as impacts on travellers travelling along the R505 national road, and gravel access roads. The primary sources of noise during construction would be from construction equipment, vehicle and truck traffic. Noise levels can be audible over a large distance although are generally short in duration. Dust would be generated from construction activities as well as trucks / vehicles driving on gravel access roads. This impact will negatively impact sensitive receptors. The impact of noise and dust on sensitive receptors can be reduced through the application of appropriate mitigation measures.

Intrusion impacts such as aesthetic pollution (i.e. building materials, construction vehicles, etc.), noise and light pollution will impact the "sense of place" for the local community. Construction related activities have the potential to negatively impact a local area's "sense of place". Such an impact is likely to be present during the construction phase. It is however expected that the power line will only affect areas and receptors that have already been exposed to other existing grid connection infrastructure (i.e. power lines and substations) and other industrial infrastructure, specifically mining related infrastructure (i.e. for which the sense of place has already been altered).

Under the REIPPP Programme renewable energy projects are required to contribute to local economic development in the area. Awarded projects are required to spend a certain amount of their generated revenue (as defined in the agreement with DoE) on Socio-Economic Development (SED) and Enterprise Development (ED) and share ownership in the project company with local communities. The impact is likely to be positive, local to national in extent, long-term, and of high significance.

Gaps in knowledge & recommendations for further study

» The PV facility will require further assessment during the EIA phase. This will involve obtaining an understanding of how the facility will directly affect the local communities by conducting interview and collecting information on the environmental and historical trends.

» Information on exact direct and indirect employment opportunities and skills development programmes likely to be created during operation are needed.

Mitigation measures for the Environmental Management Programme are required at the EIA phase.

9.4 Evaluation of Potential Cumulative Impacts Associated with the project

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 Kiara PV1 Facility are described below and will be assessed in detail as part of the subsequent EIA phase to be conducted for the project.

Impact

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 facility developments throughout South Africa, while the significance of the cumulative impact on the visual amenity may only be influenced by solar PV facility 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 PV facilities.

The cumulative impacts associated with Kiara PV1 Facility have been viewed from two perspectives within this Scoping Report:

» Cumulative impacts associated with the scale of the project (one 120MW PV Facility on the project site); and

» Cumulative impacts associated with other relevant planned, approved or existing solar developments within a 30km radius of the project site (multiple PV facilities 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; or
» 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; and
Classification of resultant cumulative changes

The site for the proposed development (Portion 2 of the Farm Hollaagte No. 8) is located within 30km from several other authorised solar PV facilities as listed in **Table 9.1** below:

Table 9.1: Solar PV Facilities within a 30km radius of the proposed Kiara PV1 Facility

Project Name	Distance from the proposed site	Project Status
Barleria PV Facility	28 km south-west	In process
Setaria PV Facility	22 km south-west	In process
Dicoma PV Facility	25 km south-west	In process
Hibernia PV Facility	30 km north-west	Authorised
Tlisitseng PV Facility	16 km south-west	Authorised
Lichtenburg 2 PV Facility	15 km west	Authorised
Lichtenburg 1 PV Facility	7 km west	Authorised
Lichtenburg 3 PV Facility	7 km west	Authorised

In addition to the solar energy developments listed in **Error! Reference source not found.**, six (6) new PV solar energy facilities are proposed for development on t he same and adjacent property namely:

Project Name	Affected property	Contracted Capacity
Kiara PV2	Portion 2 of the Farm Hollaagte No. 8	120MW
Kiara PV3	Portion 2 of the Farm Hollaagte No. 8	120MW
Kiara PV4	Portion 2 of the Farm Hollaagte No. 8	120MW
Kiara PV5	Remaining Extent of the Farm Hollaagte No. 8	130MW
Kiara PV6	Portion 2 of the Farm Hollaagte No. 8	130MW
Kiara PV7	Remaining Extent of the Farm Hollaagte No. 8	130MW

The cumulative impacts that have the potential to be compounded through the development of the solar PV 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 Kiara PV1 Facility within the development area 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 PV panels.
- Unacceptable loss of high agricultural potential areas presenting a risk to food security and increased soil erosion.
- Unacceptable loss of heritage resources (including palaeontological and archaeological resources);
- Complete or whole-scale change in the sense of place and character of an area and unacceptable visual intrusion; and
- 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 to be 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 solar energy facilities within the surrounding areas is expected to be long-term (i.e. a mimumum 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.

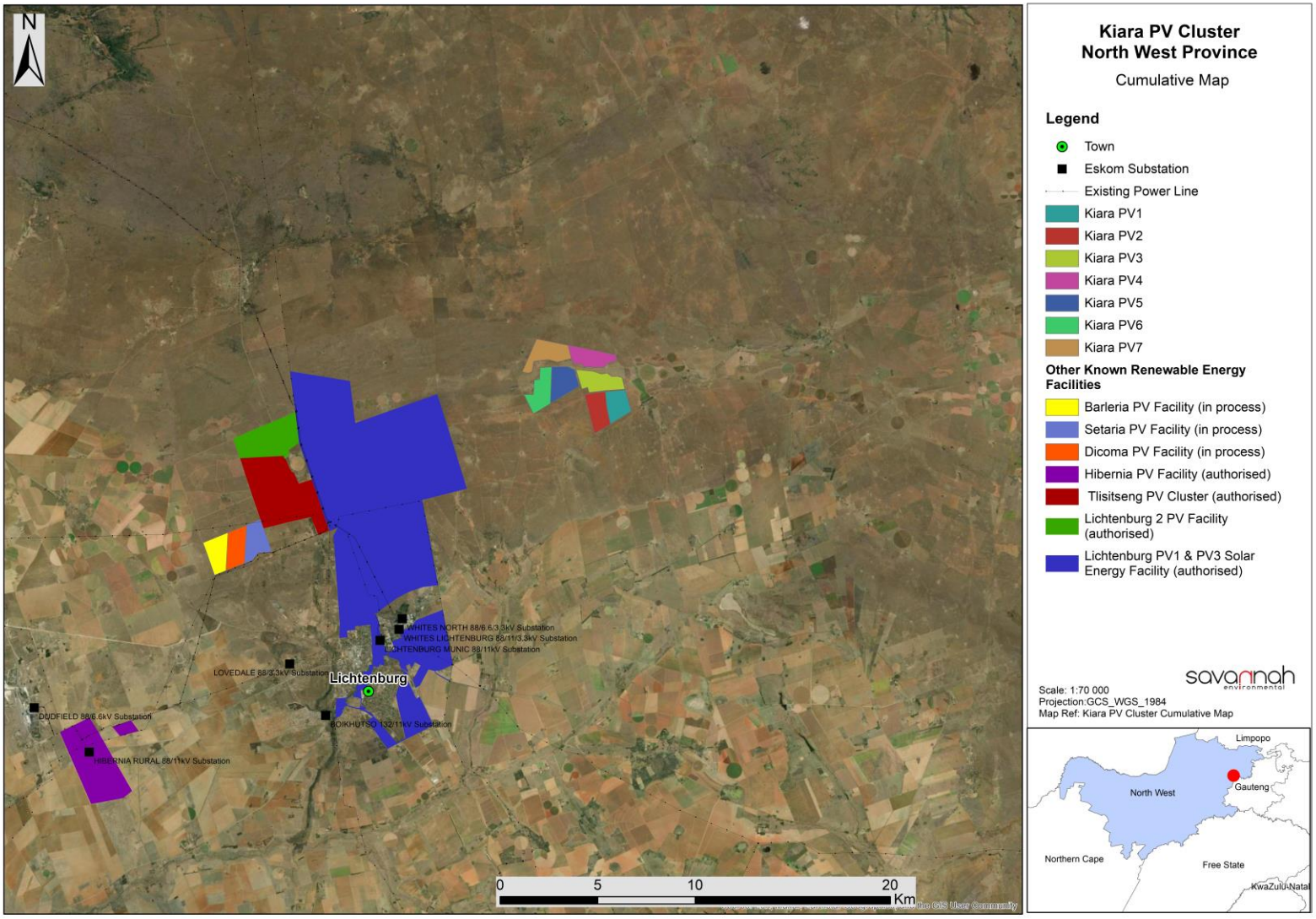


Figure 9.6: Cumulative map illustrating other approved and/or constructed PV facilities located within the vicinity of the Kiara PV1 Facility project site (refer to **Appendix K**)

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 Kiara PV1 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 10**).

10.1 Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of an Impact Assessment 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
(g)(xi) a concluding statement indicating the preferred alternatives, including the preferred location of the activity.	An overall conclusion and fatal flaw analysis regarding the Kiara PV1 Facility is included within this chapter as a whole.

10.2 Overview of the Kiara PV1 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 Kiara PV1 Facility is proposed on a site located approximately 16km south-east of the town of Lichtenburg. The project site falls within Ward 16 of the Ditsobotla Local Municipality and within Ngaka Modiri Molema District Municipality in the North West Province on Portion 2 of the Farm Hollaagte 8.

The Kiara PV1 Facility project site is proposed to accommodate the following infrastructure which will enable the PV facility to supply a contracted capacity of up to 120MW:

- Solar PV array comprising PV modules and mounting structures
- Inverters and transformers
- Cabling between the panels
- 132kV onsite facility substation/ 132kV powerline from the onsite substation to the switching collector substation.
- Cabling from the onsite substation to the collector substation (either underground or overhead).
- Electrical and auxiliary equipment required at the collector substation that serves the solar energy facility, including switchyard/bay, control building, fences, etc.
- Battery Energy Storage System (BESS)
- Site and internal access roads (up to 8m wide)
- Site offices and maintenance buildings, including workshop areas for maintenance and storage.
- Temporary and permanent laydown area

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 Kiara PV1 Facility have 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 development area to assist in focussing the location of the development footprint for the Kiara PV1 Facility to minimise the potential for environmental impact. The extent of the project site is ~856.5ha and has been considered in this Scoping Report. A development area of ~165ha was demarcated within this project site and allows an adequate footprint for the installation of a PV energy facility with a contracted capacity of up to 120MW, while allowing for the avoidance of environmental site sensitivities. 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 and operation of the Kiara PV1 Facility and associated infrastructure are anticipated to be localised and restricted to the development area itself, while operation phase impacts/benefits range from local to regional. No environmental fatal flaws were identified to be associated with the development area.

The potentially significant issues related to the construction and operation of the Kiara PV1 Facility include:

- Disturbance/destruction to and loss of vegetation and fauna and associated habitats
- Introduction and/or spread of declared weeds and alien invasive plants.
- Disturbance / degradation / loss of agricultural soils.
- Increased erosion and sedimentation & contamination of soil and water resources.
- Mortality of priority bird species due to collision with PV arrays and electrocution and collisions with medium voltage power lines within the facility.
- Displacement of priority bird species.
- Loss of land with agricultural capability.
- Destruction of archaeological and palaeontological heritage.
- Visual impacts on the landscape and sense of place.
- Social impacts, both positive and negative (job creation and business opportunities, impacts associated with construction workers in the area, and economic benefits).

10.3 Sensitivity Analysis for the Kiara PV1 Facility

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

The potentially sensitive areas which have been identified through the environmental scoping study are listed below and illustrated in **Figure 10.1**. The detail is based on the desktop review of available baseline information for the project site, as well as the 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 Kiara PV1 Facility.

10.3.1 Ecological Sensitive Features

A number of potential areas of sensitivities have been observed within the development area for the Kiara PV1 Facility. The following preliminary ecological sensitivities have been identified:

Very High Sensitivity

» A central lower lying area is listed as an Aquatic CBA 1 as it forms a wetland system which is of high conservation value. This will be an important element which the development will have to avoid. CBA 1 areas should always be afforded a Very High level of sensitivity.
» The Marico Biosphere Reserve borders the study area to the north. The protected area should remain unaffected by the proposed development. However, the biosphere reserve should still be consulted during the application process. It should be regarded as a Very High level of sensitivity.
» The Lichtenburg Game Breeding Centre is located to the west of the study area but will be affected by the grid connection powerline. It is an informal protected area, i.e. it is not formally protected by the NEMPAA. Despite this, the area will still retain a high level of sensitivity.

Medium Sensitivity

» The vegetation type occurring in this area is fairly uniform and is not currently listed as a Threatened Ecosystem. Despite being fairly uniform the vegetation type in the area, Carletonville Dolomite Grassland, may still contain elements of conservation value and consequently, where natural portions of these vegetation types remain, they should be regarded as having a significant conservation value. Any remaining natural areas should therefore be afforded at least a Moderate level of sensitivity.

10.3.2 Freshwater Sensitive Features

The study area is quite extensive and includes large terrestrial plains while some wetlands also appear to be present, large watercourses are however absent. Two prominent wetland systems are indicated for the study area. A large lower lying wetland area transects the northern portion of the study area while another wetland system will be crossed by the grid connection powerline.

10.3.3 Avifaunal Sensitive Features

A number of habitat units comprising potential sensitive avifauna features have been observed within the development area for the Kiara PV1 Facility. The following preliminary avifauna sensitivities have been identified:

Areas of high sensitivity
This includes the artificial livestock watering points and short potentially moist grassland habitat.

The artificial livestock watering points have the potential to attract large numbers of granivore passerine and non-passerine bird species, of which many need to drink water on a daily basis. The placement of electrical infrastructure in close proximity to these areas could increase potential avian collisions with the infrastructure. These features could also attract collision-prone bird species such as birds of prey. It is possible that the high number of birds at this habitat could attract birds of prey which could collide with the PV infrastructure during hunting bouts. These areas are therefore of artificial origin but could be relocated to other areas.

The short potentially moist grassland provides ephemeral foraging habitat for large terrestrial bird species, which could include the endangered Secretarybird (*Sagittarius serpentarius*).

Areas of medium sensitivity
This includes the extensive open grassland and bush clump mosaics. The extensive open grassland and bush clump mosaics provide potential suitable foraging habitat for some collision-prone bird species, including the Northern Black Korhaan (*Afrotis afraoides*) with the potential to interact (e.g. collide) with the proposed electrical infrastructure. However, reporting rates for threatened and near threatened bird species are anticipated to be relatively low, thereby suggesting a medium sensitivity rating instead of a high sensitivity even though the majority of the habitat is natural. In addition, the open grassland and bush clump mosaics are widespread in the region.

Areas of Low sensitivity
These habitat units are represented by transformed types and include a build-up land and exotic plantations.

The preliminary sensitivity map shows a large surface area that is earmarked with medium sensitivity. There is a probability that some of these units or part thereof could have higher (or lower) sensitivity ratings. It is therefore expected that some of the units or part thereof could represent different sensitivity ratings to those displayed in Figure 12 pending the outcome of a detailed austral summer season survey.

10.3.4 Soils and Agricultural Potential Sensitive Features

While no no-go areas have been identified, it is recommended that areas with High sensitivity be avoided where possible during the final infrastructure layout planning. None of the proposed development areas overlap with delineated High Potential Agricultural Areas within the larger area where the projects will be located.

The entire projects site, have Low, Medium and High agricultural sensitivity to the proposed development. The sensitivity rating was assigned with the reasoning that areas with Moderate-High land capability will have Moderate-High to High agricultural potential and may be suitable for rainfed crop production. However, the

absence of any crop field boundaries in the areas indicated that the sites are likely used for livestock grazing. Even though the area may be suitable for irrigated farming, there are no irrigation infrastructure or field crop boundaries associated with irrigated agriculture.

10.3.5 Heritage sensitive features, the cultural landscape (incl. archaeology and palaeontology)

Heritage sensitivity relates to archaeological resources, palaeontological resources, heritage resources, and the cultural landscape. According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments of very high paleontological sensitivity. According to the extract from the Council for GeoSciences Map 2626 for West Rand, the development area is underlain by by sediments of the Monte Christo Formation assigned to the Chuniespoort group, within the Malmani Subgroup (Vmm).

According to van Schalkwyk et al (1995, SAHRIS NID 6237) in their report completed for the Bakerville Diamond Fields, "land use in the area goes back to the Early Stone Age, as can be determined by the number of stone artifacts found near the old mining commissioner's office. This material seems to be disturbed from its primary context because of the mining activities. It is postulated that similar occurrences will be found in other parts of the diggings, but that this material would have been disturbed out of context." As a result of the dominant land use in the area, many of the heritage resources identified by van Schalkwyk et al (1995) are associated with past and present agriculture, and consist of farming implements, a few windmills, and dipping-troughs. One such trough, located at Elandsputte on the farm Uitgevonden 355JP, was the site where the first diamond was discovered. This structure is a proclaimed national monument (now Provincial Heritage Site). Van Schalkwyk et al (1995) identified a number of burial grounds within their surveyed area (Map 5 and 5a). Heritage resources known from this area include burial grounds and graves, archaeological artefacts and old structures, often associated with farming activities or diamond mining. In his assessment completed for an adjacent PV facility, Van Schalkwyk (2021) identified no significant archaeological heritage resources but did identify a number of informal burials. No resources are known to be located within any of the areas proposed for development.

10.3.6 Visual Sensitive Features

A preliminary viewshed analysis for the proposed Kiara PV1 Facility was undertaken in order to determine the general visual exposure of the area under investigation. The viewshed analyses was undertaken from preliminary vantage points within the proposed development area at offsets of 5m above average ground level.

The following is evident from the viewshed analysis:

- The development would be approximately 50% visible within a 1km radius of the site. This area of visual exposure (0 – 1km) is generally restricted to vacant farmland and agricultural fields but may contain some potential sensitive visual receptors. This pattern of exposure is generally attributed to the flat topography of the study area, with no hills or ridges influencing or interrupting the viewshed analysis. There are 3 residences located within this zone; Hollaagte 3 and Holaagte 4 are located towards the north-west (where no visibility will be evident), and Witstinkhoutboom 2 (where visibility will be evident), located towards the south-east of the proposed development.
- Within a 1 – 3km radius, the visual exposure is more scattered and interrupted due to the undulating nature of the topography. Most of this zone falls within vacant open space and agricultural land, but does include some farm dwellings and residences. These include Hollaagte 1 and 2 towards the South (where no visibility will be evident) however, potential visibility will be evident for Welverdiend 1 north-west of the site, and Witstinkhoutboom 1 towards the eastern peripheries of the site. The Manana secondary road traverses a section of this zone towards the south, where the facility may be visible.

- Visibility between the 3 - 6km radii is somewhat similar to the index of the 1-3km radius, and it includes the southern portion of the Rall Broers Private Nature Reserve. Again, the Manana secondary road traverses a section of this zone towards the south, where the facility may be visible. Potential visibility is indicated from a total of five smallholdings within this zone, namely Witstinkhoutboom 3, Witstinkhoutboom 4 and Witstinkhoutboom 5 towards the east of the site, Rooipan 3 towards the south-east of the site, and Vlakpan 1 towards the south of the site.
- At distances exceeding 6km the intensity of visual exposure is expected to be very low and highly unlikely due to the distance between the object (development) and the observer.

10.4 Overall Conclusion and Fatal Flaw Analysis

The findings of the desktop Scoping Study indicate that no environmental fatal flaws are associated with the Kiara PV1 Facility project site (Portion 2 of the Farm Hollaagte 8). 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 area for the development of the facility be considered outside of the identified areas of high sensitivity 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 project site. Even with the appropriate avoidance of sensitive areas, there is an extensive area on the site which can accommodate the proposed facility with relatively low impacts on the environment.

With an understanding of which areas within the project site are considered sensitive to the development of the proposed facility, the Applicant can prepare the detailed infrastructure 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 layouts produced by the Applicant 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 Kiara PV1 Facility

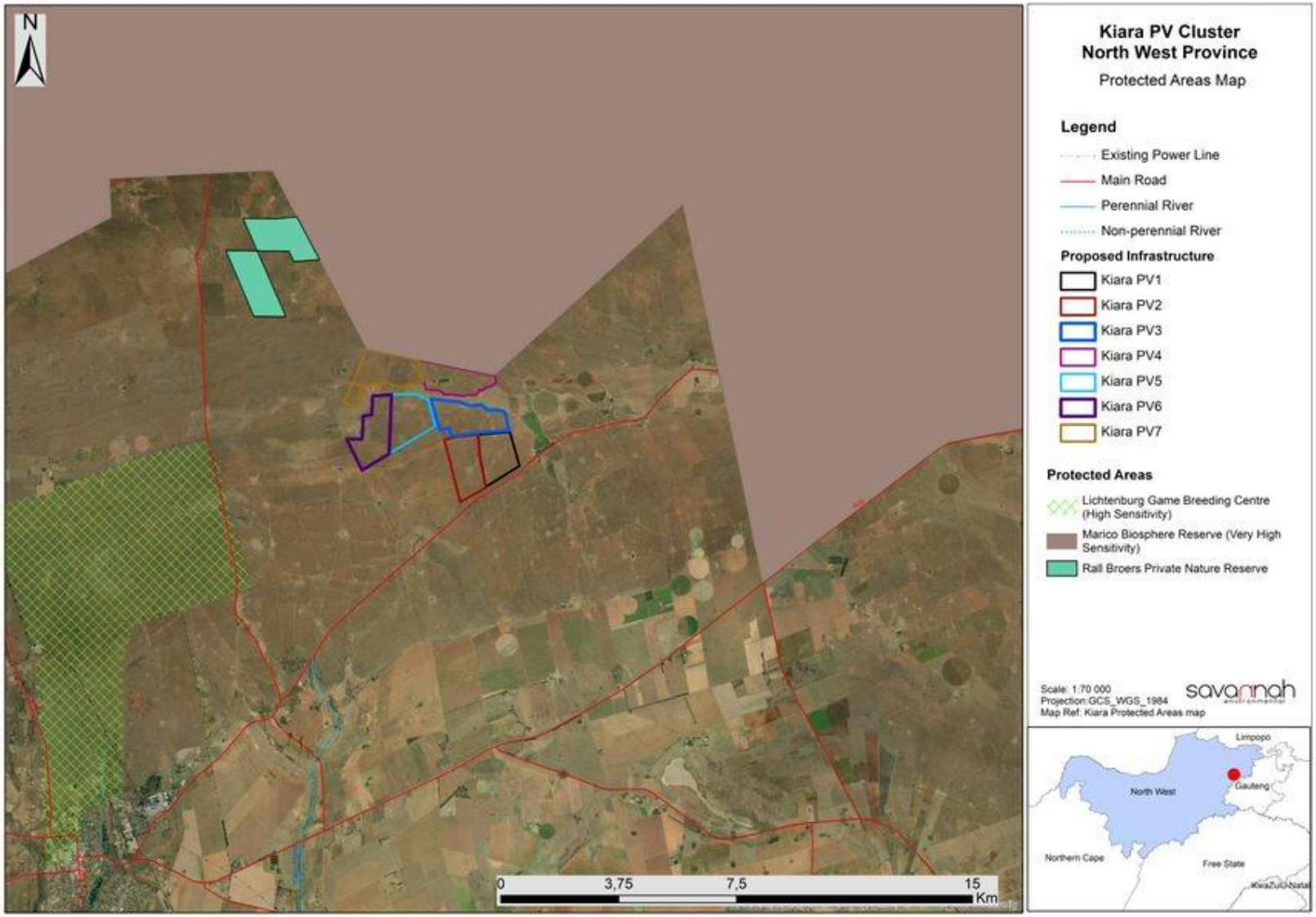


Figure 10.2: Protected Areas Map

CHAPTER 11: PLAN OF STUDY FOR THE EIA

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 Kiara PV1 Facility. The findings of the Scoping Phase include inputs from the project proponent, the public and the EIA specialist team. The findings are used to inform the Plan of Study for EIA together with the requirements of the 2014 EIA Regulations (GNR 326) and applicable guidelines. The Plan of Study for EIA 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 an Impact Assessment 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 - (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 Kiara PV1 Facility is included within this chapter.

11.2 Objectives of the EIA Phase

The EIA will assess the potential direct, indirect and cumulative environmental impacts and benefits associated with each phase of the development including design, construction, operation, and decommissioning. The EIA will aim to provide the CA with sufficient information to make an informed decision regarding the proposed development. The site layout being proposed by the Applicant, will be assessed by a range of independent specialist studies (as detailed in Section 11.5). Furthermore, as required in terms of the 2014 EIA Regulations (GNR 326), the assessment will also include an assessment of feasible and reasonable alternatives, including the "do nothing" (i.e. no-go) alternative.

The EIA Phase will aim to achieve the following:

- Provide an overall assessment of the social and biophysical environment affected by the Kiara PV1 Facility.
- Assess potentially significant impacts (direct, indirect and cumulative, where required) associated with Kiara PV1 Facility.
- Identify and recommend appropriate 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 issues and concerns are recorded.

11.3 Consideration of Alternatives

The following project alternatives will be investigated in the EIA:

Type of Alternatives Considered	Description of the Alternative relating to the Kiara PV1 Facility
Site-specific Alternatives	Privately owned farm portions have been identified for the development of the Kiara PV1 Facility, taking advantage of the site-specific characteristics such as the solar irradiation; as well as the largely transformed nature of the site. The study area which is ~ 856.5 ha in extent and in which a development area (165ha) has been identified, is considered to be large enough for the development of a PV facility with a contracted capacity of up to 120MW, while allowing for avoidance of environmental sensitivities, as may be required in line with the mitigation hierarchy.
Layout Footprint Design Alternatives	The layout for the development of the Kiara PV1 Facility will be designed in line with the environmental sensitivities identified during this scoping phase. The detailed facility layout will be made available as a layout alternative 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).
'Do-nothing' Alternative	The option to not construct the Kiara PV1 Facility. The 'do-nothing' alternative assumes that the site remains in its current state, that is status quo, and that the current land use practises only continue.

11.4 Exclusion of specialist studies during the EIA Phase for the Kiara PV1 Facility

All desktop studies undertaken during the scoping phase, recommended further detailed EIA studies (refer to **Appendix D to I**).

11.5 Specialist Tasks to be undertaken during EIA Phase

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

Table 11.1: Impacts requiring further investigation during the EIA Phase, and activities to be undertaken in order to assess the significance of these potential impacts relevant to Kiara PV1 Facility.

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
Ecology (Flora and Fauna & wetlands)	The Ecological and 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 was gazetted in March 2020. ***Sensitivity Analysis and EIA assessment*** The main aspects of an ecosystem that need to be incorporated in a sensitivity analysis include the following: » Describing the nature and number of species present, taking into consideration their conservation value as well as the probability of such species to survive or re-establish itself following disturbances of various magnitudes » Identifying the species or habitat features that are 'key ecosystem providers' and characterising their functional relationships » Determining the aspects of community structure that influence function, especially aspects influencing stability or rapid decline of communities » Assessing key environmental factors that influence the provision of services » Sensitivity mapping » Sensitivity ratings assigned and reasoning will be clearly defined. » All rivers, streams, pans and wetlands will be identified and surveyed where they occur in the study area. These systems will be determined by use of topography (land form and drainage pattern) and riparian vegetation with limited soil sampling. ***Assessment of Impacts for the EIA*** The methodology described in **Section 11.6** assists in the assessment of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts associated with an activity. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures.	Darius Van Rensburg (DPR Ecologists & Environmental Services)

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	Environmental Management Programme For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	
Avifauna	An avifauna impact assessment report will be compiled and will be informed by the results of two seasons of avifauna monitoring on site. ***Sensitivity Analysis and EIA assessment*** The following activities are proposed during the EIA Phase: » The following methods are proposed during an austral summer season survey: o Active searching and the compilation of a bird inventory while traversing much of the available habitat types; o The determination of the occurrence of Red Data species and collision-prone bird species; o The identification and mapping of suitable habitat for species of conservation concern while focussing on structural and topographical cues; o A landscape analysis of important flyways or daily flight paths corresponding to important landscape features; and o Density estimates will be collected by means of point counts to evaluate the dominant/typical species and their respective relative densities at each site. » Sensitivity ratings assigned and reasoning will be clearly defined. ***Assessment of Impacts for the EIA*** This methodology described in **Section 11.6** assists in the assessment of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. ***Environmental Management Programme*** For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	Lukas Niemand (Pachnoda Consulting)

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
Soils, Land Use, Land Capability and Agricultural Potential	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. Sensitivity Analysis and EIA assessment The following activities are proposed during the EIA Phase: » Soil and agricultural survey all proposed infrastructure. The survey will include soil classification according to the Soil Classification: A Natural and Anthropogenic System for South Africa (Soil Classification Working Group, 2018). It will also include the collection of soil samples for analysis of soil texture, organic carbon, pH and major cations. » The landowners and/or land users will be consulted individually for discussion of the productivity and employment data associated with the areas that will impacted by the proposed development. » The discussion will also address the limitations and risks of livestock production in the area in order to compare it to renewable energy production. » Assess the impacts identified in light of the site-specific findings and the final layout to be provided by the developer. » Appropriate mitigation measures as far as the disturbance of agricultural practices is concerned. Assessment of Impacts for the EIA The methodology described above 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 the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. Environmental Management Programme For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	Marine Pienaar (TerraAfrica)

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
Visual impact	***Sensitivity Analysis and EIA assessment*** The Visual Impact Assessment study to be undertaken in the EIA phase will include a level 3 assessment which includes: » Determine Visual Distance/Observer Proximity to the facility - The proximity radii (calculated from the boundary lines of the facility). » Any visual sensitive receptors in these protected areas will be confirmed and impacts assessed » Determine Viewer Incidence/Viewer Perception - Identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed facility and its related infrastructure. » Determine the Visual Absorption Capacity (VAC) of the landscape - The VAC is primarily a function of the vegetation, and will be low if the vegetation is, low growing sparse and patchy vegetation. » Determine the Visual Impact Index - The site-specific issues and potential sensitive visual receptors will be measured against this visual impact index and be addressed individually in terms of nature, extent, duration, probability, severity and significance of visual impact. » Identification and assessment of all potential impacts (direct, indirect and cumulative) identified in this scoping phase report and; » Recommendations will be made for the management of identified impacts. ***Assessment of Impacts for the EIA*** This methodology described in **Section 11.6** assists in the assessment 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 the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. ***Environmental Management Programme*** For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	Lourens du Plessis (LOGIS)

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
Heritage (Archaeology and Palaeontology)	The EIA Phase will include the following activities: As part of the EIA, it is necessary to undertake a Heritage and Archaeological Study to fulfil the SAHRA requirements in accordance with the National Heritage Resources Act (No. 25 of 1999). A Heritage Impact Assessment with specific focus on impacts to archaeological heritage will therefore be conducted, the primary objective of which is to determine the heritage features on the site as well as the significance of the cultural landscape. The following activities will be undertaken during the EIA Phase: » Undertake field assessments in order to fill the identified gaps in knowledge. The archaeological field surveys will provide sufficient ground-coverage of the areas to be developed to be able to determine the nature of the resources likely to be impacted. The palaeontological and cultural landscape field surveys will target sensitive geological and cultural landscape features. Assessment of Impacts for the EIA: The methodology described in **Section 11.6** assists in the assessment of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of criteria including extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. Environmental Management Programme: For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	Jenna Laving (CTS Heritage)
Social	***Sensitivity Analysis and EIA assessment*** The specialist study to be undertaken in the EIA phase will include: » Describing and obtaining an understanding of the proposed development (type, scale, location), the communities likely to be affected and determining the need and scope of the SIA » Collecting baseline data on the current social environment and historical social trends » Interview directly affected and adjacent landowners, and key stakeholders to obtain primary information related to the project site, social environment, and to gain their inputs on the proposed project and its perceived social impact (positive and /or negative).	Nondumiso Bulunga (Savannah Environmental)

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» 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). As far as possible, the mitigation hierarchy of "avoid, minimise, and reduce" will be followed in the mitigation of potential negative impacts. » Identify any conditions for inclusion in the Environmental Authorisation (EA). » Provide a reasoned opinion regarding the acceptability of the project. » Developing an Environmental Management Programme ***Assessment of Impacts for the EIA*** This methodology described in **Section 11.6** assists in the assessment 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 the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described. It will refer to the causes of the effect, what will be affected, and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. ***Environmental Management Programme*** For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	
Cumulative Assessment	Assess the cumulative impacts associated with the construction and operation of more than one development (i.e., renewable energy developments) within the immediate surrounding areas of the project site on the ecological, heritage, soil and agricultural potential, avifaunal, social, and visual impacts of the area. The objective is to identify and focus on potentially significant cumulative impacts so these may be taken into consideration in the decision-making process. The following will be considered: » Unacceptable loss of threatened or protected vegetation types, habitat or species through clearing, resulting in an impact on the conservation status of such flora, fauna or ecological functioning. » Unacceptable risk to freshwater features through disturbance associated with construction activities and increased runoff and erosion during the operation phase.	Savannah Environmental and specialists listed above

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Unacceptable risk to avifauna through habitat loss, displacement and collision with PV panels. » Unacceptable loss of high agricultural potential areas presenting a risk to food security and increased soil erosion. » Unacceptable loss of heritage resources (including palaeontological and archaeological resources); » Complete or whole-scale change in the sense of place and character of an area and unacceptable visual intrusion; and » Unacceptable impact to socio-economic factors and components.	

11.6 Assessment of Potential Impacts Associated with the Project

Direct, indirect and cumulative impacts of the above issues, as well as all other issues identified 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.
  - 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.
  - 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).
  - 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).
  - 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 Project will result in any unacceptable loss or impact considering all the projects proposed in the area is included in the respective specialist reports.

As the project applicant has the responsibility to avoid and / or minimise impacts as well as plan for their management (in terms of the 2014 EIA Regulations (GNR 326)), the mitigation of significant impacts will be discussed. Assessment of mitigated impacts will demonstrate the effectiveness of the proposed mitigation measures.

The results of the impact assessment studies and other available information will be integrated by the Savannah Environmental project team. The EIA Report will be compiled in terms of the requirements of the 2014 EIA Regulations (GNR 326) and will include:

- The details and expertise of the **EAP** who prepared the report.
- The **location** 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.
- 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 preferred alternative development location.
  - 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.
- **Recommendations** from specialist, the recording of proposed impact management **objectives** and the impact management **outcomes** for inclusion in the **EMPr** as well as inclusion as conditions of authorisation.
- 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.
- A 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 or **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 period. Comments received from I&APs will be captured within a Comments and Response Report, which will be included within the EIA Report, for submission to DFFE for decision-making.

11.7 Authority Consultation

Consultation with the regulating authorities (i.e. DFFE and North West DEDECT) will continue to be undertaken throughout the EIA process. On-going consultation will include the following:

» Submission of a Scoping Report following the 30-day public review period (and consideration of comments received).
» Submission of an EIA Report for review and comment.
» Submission of a Final EIA Report following a 30-day public review period (and consideration of comments received).
» Consultation and a site visit with DFFE in order to discuss the findings and conclusions of the EIA Report, if required

11.8 Public Participation Process

A public participation process will be undertaken by Savannah Environmental during the EIA phase. 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, and to identify additional issues of concern or highlight positive aspects of the proposed project, and to 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 (i.e. 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).
» Written, faxed or e-mail correspondence.

The EIA Report will be made available for a 30-day review period prior to finalisation and submission to the DFFE for decision-making. In order to provide an overview of the findings of the EIA process and facilitate comments, a virtual meeting will be held during this public review period. All comments received during the public review period will be included within the final report to be submitted to the DFFE for review and 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[22]
Make Scoping Report available to the public, stakeholders and authorities (30 days)	June 2022
Finalisation of Scoping Report, and submission of the Final Scoping Report to DFFE	July 2022
Authority acceptance of the Final Scoping Report and Plan of Study to undertake the EIA (44 days)	Within 43 days of receipt of the Final Scoping Report (i.e. August 2022/ September 2022)
Make EIA Report and EMPr available to the public, stakeholders and authorities (30 days)	October 2022 – November 2022
Finalisation of EIA Report, and submission of the Final EIA Report to DFFE	November 2022
Authority review period and decision-making (107 days)	Within 107 days of submission of the Final EIA Report to the DFFE

[22] Indicative dates.

CHAPTER 12: REFERENCES

Ecology

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8455	HIA Phase 1	Udo Kusel	25/07/2008	Cultural Heritage Resources Impact Assessment of Portion 151 of Lichtenburg Town and Townlands 27 IP (Lichtenburg Extension 10) North West Province
8531	HIA Phase 1	Johnny Van Schalkwyk	01/11/2008	Heritage Impact Report for the Proposed 88 kV Power Line from Watershed Substation, Lichtenburg, to the Mmabatho Substation, North West Gauteng Province
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