SOCIO-ECONOMIC IMPACT ASSESSMENT

LEEUDORINGSTAD SOLAR PV SITE

June 2022

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URBAN-ECON
Development Economists

DOCUMENT INFORMATION

Document Title:	Socio-Economic Impact Assessment for the Proposed Development of the Additional Proposed Solar PV Site in Leeudoringstad, North-West Province.
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DECLARATION OF INDEPENDENCE

I, Ruan Oberholzer, declare that:

- I act as the independent specialist in this application.
- I will perform the work relating to the application objectively, even if this results in views and findings that are not favourable to the applicant.
- I declare that there are no circumstances that may compromise my objectivity in performing such work.
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity.
- I will comply with the Act, regulations, and all other applicable legislation.
- I have no, and will not engage in, conflicting interests in the undertaking of the activity.
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan, or document to be prepared by myself for submission to the competent authority.
- All the particulars furnished by me in this form are true and correct.
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.

Signature:

Date: June 2022

DECLARATION OF INDEPENDENCE

I, Nthabiseng Makhoali, declare that:

- I act as the independent specialist in this application.
- I will perform the work relating to the application objectively, even if this results in views and findings that are not favourable to the applicant.
- I declare that there are no circumstances that may compromise my objectivity in performing such work.
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity.
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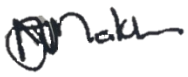

Signature:

Date: June 2022

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LIST OF ABBREVIATIONS

BA	Basic Assessment
BESS	Battery Energy Storage System
CSP	Concentrated solar power
DDM	District Development Model
DM	District Municipality
GDP	Gross Domestic Product
GVA	Gross Value-Added
LED	Local Economic Development
LM	Local Municipality
NDP	National Development Plan
NGPF	New Growth Path Framework
NEMA	National Environmental Management Act
PV	Photovoltaic
REDZ	Renewable Energy Development Zone
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme

1 INTRODUCTION

This document was prepared by Urban-Econ Development Economists, as per request from SiVEST Environmental Division on behalf of Leeuwbosch PV Generation (Pty) Ltd (hereafter referred to as "Leeuwbosch PV Generation"), to undertake a Socio-Economic Impact Assessment study for the additional proposed Solar PV Site in Leeudoringstad, North-West Province. This document in particular forms part of the deliverable for the scoping phase of the process and undertakes to determine the current socio-economic baseline characteristics of the preliminary delineated study area and identify the potential influence of the proposed project on the surrounding economic activities and communities. The socio-economic study is conducted as part of the Basic Assessment (BA) process managed by SiVEST Environmental Division and is undertaken in terms of the National Environmental Management Act (NEMA), as amended.

1.1 Scope of the Study

The purpose of the socio-economic basic assessment is to determine the potential socio-economic implications of the additional solar PV site and to compare its effects with the "no-go" alternative. The "no-go" alternative assumes that the proposed Solar PV site and associated infrastructure are not established at any of the sites, which means that it represents the status quo of the environment, including the socio-economic situation.

The current report is prepared as an input into the Basic Assessment report that is compiled SiVEST Environmental Division. The Basic Assessment report addresses the impacts as set out in the guidelines in terms of the Environmental Impact Assessment Regulations, as amended. The purpose of the socio-economic impact assessment is as follows:

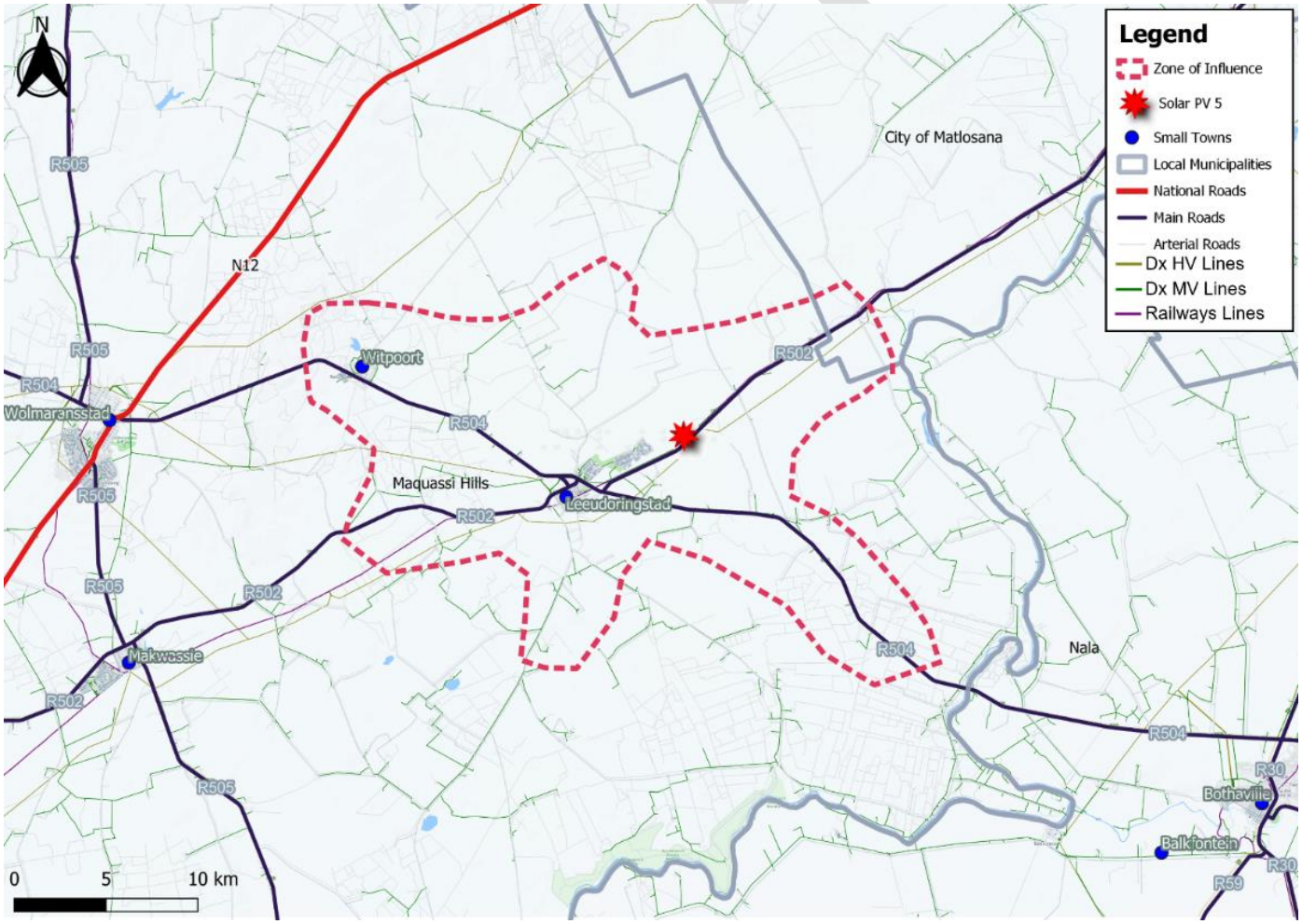
- Undertake a **policy review** and assess the alignment of the proposed project with the national, provincial and local socio-economic policies, with a focus on the compatibility of the project with the spatial planning, development objectives and land use management plans of the respective authorities.
- Create a **socio-economic profile** for the study area using secondary data. The guidelines for Basic Assessment specifically call for information on the level of unemployment and skills available in the local community, as well as the economic profile of the local municipality.
- Identify and analyse the potential **socio-economic value** of the proposed project and recommend the preferred site alternative considering the socio-economic characteristics of the nine proposed locations and their surrounding environments.
- **Assess the cumulative effects** of the project given the existing and planned developments in the area.
- **Evaluate** the potential positive impacts versus any negative socio-economic effects that may ensue as a result of the change in status quo of the affected and benefiting communities and economies.

1.2 Project Content and Location

This subsection aims to provide an overview of the proposed development as well as describe where it will be located. It is important to understand the project contents and where it will be based to perform a socio-economic impact analysis as this will provide an understanding as to what possible impacts the proposed project would have and who will these impacts potentially affect.

The proposed development is a 10 MWac plant Solar PV which will be on Farm Leeuwbosch No. 44, portion 37 (hereafter referred to as "Leeuwbosch Solar PV 5"). It falls under the jurisdiction of Leeudoringstad in North-West Province as illustrated by Map 1-1 below.

Map 1-1: Location of Leeuwbosch Solar PV 5



Source: Mapable adapted by Urban-Econ

The proposed development is approximately 6km north-east of the town of Leeudoringstad in the Maquassi Hills Local Municipality, which falls within the Dr Kenneth Kaunda District Municipality in the North West Province of South Africa.

It is one of five 10 MWac proposed plants which will together generate an estimated amount of 147GWh of electricity per year. Of the proposed five Solar PV plants, Urban-Econ has performed a similar Socio-Economic Impact Assessment for 2 of the proposed plants, i.e., Leeuwbosch 1 Solar PV 1 and Leeuwbosch Solar PV 2. Similarly to the Leeuwbosch 1 Solar PV 1 and Leeuwbosch Solar PV 2, the proposed Solar PV plant will make use of photovoltaic (PV) technology and will include the following infrastructure:

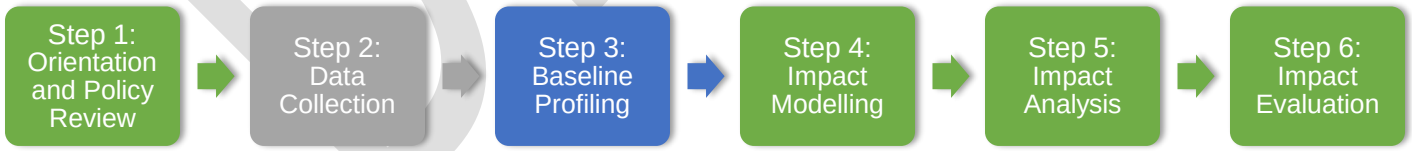
- Arrays of PV panels and respective inverter stations
- Appropriate mounting structures
- Cabling between the project components (to be laid underground where practical)
- An on-site substation including a building for control and storage
- Permanent laydown areas
- Laydown areas for the construction phase
- Internal access roads, and fencing.
- Training facilities

According to the project description, the proposed facilities are expected to be connected to the Eskom distribution network via a nearby substation, allowing the "green power" to be sold through power purchase agreements. Therefore, the overall objective of the proposed developments is to generate electricity (by capturing solar energy) to feed into the national electricity grid and “wheel” the power to customers based on a power purchase agreement.

1.3 Methodology

This subsection aims to highlight the methodology which will be used to compile this report. The purpose of a research methodology is to explain the steps which will be taken when compiling the report as well as describe the activities which will be taken during each step. The methodology employed in conducting the study comprised the steps illustrated in Figure 1-1.

Figure 1-1: Methodology



Source: Urban Econ

The following paragraphs briefly describe each step:

Step 1 - Orientation and Policy Review: The purpose of this activity was to obtain all background information on the study area and the proposed project. Discussions with the project team were held to understand the potential zone of influence associated with each component of the project, which are defined by the extent of visual, noise and other envisaged environmental, social, and economic impacts. Relevant government policies and other

strategic documents were also gathered and reviewed and the implications thereof on the project were documented; potential sensitive receptors and beneficiaries in the zones of influence were identified.

Step 2 - Data Collection: The purpose of this step was to collect primary and secondary data to describe the interests and needs of the local communities as well as the socio-economic environment related to the zones of influence, within which the proposed project is to be established. Secondary data was collected by making use of Stats SA Census 2011, StatsSA Labour Force Survey, Quantec Research database, Integrated Development Plans (IDP), Spatial Development Frameworks, and Provincial strategic documents.

Step 3 - Baseline Profiling: Upon the collection of primary and secondary information, the study area's socio-economic profile was developed. It comprises the description of the study area's composition, demographic profile and income levels, economy and labour force, access to services, and land uses surrounding the project site.

Step 4 – Impact Modelling: The purpose of this step was to collect data related to the project and specifically its economic and job creation parameters. An economic modelling exercise can also be undertaken to determine the potential economic benefit of the project throughout the local and national economies using the economic model developed based on the SAM. For this purpose, through a discussion with the client, information on the expenditure during various project stages was collected, which would include inter alia:

- Construction Costs (CAPEX) and operational expenditure
- Intermediate inputs required and per cent of imports of the total project spending
- Distribution of procurement of intermediate inputs among local areas, provinces, and South Africa
- Skills requirements
- Number of people to be employed during construction and operation
- Etc.

Following the data gathering process, potential economic impacts derived from these potential costs and benefits of the project were identified. These were then quantified in monetary terms to be used in the modelling exercises. Using quantified potential cost and benefits of the project, a modelling exercise determining the indirect and induced effects of the activities, either positive or negative, will be undertaken. Modelling of impacts was done using economic models developed based on the provincial and national Social Accounting Matrices (SAMs). Impacts determined through the modelling exercise included production, value-added, employment, household income, and government revenue. Differentiation was made between impacts that are expected to take place within the local municipality, province, and rest of the country.

Step 5 – Impact Analysis: During this step, the potential impacts to be exerted by the proposed project were identified and assessed. The assessed impacts covered the effects of the project on numerous capitals, such as natural capital, human capital, social capital, cultural and spiritual capital, physical capital, financial capital, and institutional and political capital. The analysis also focused on determining the demographic impacts, economic impacts as well as social impacts of the proposed project.

Step 6 - Impact Evaluation: All socio-economic impacts identified were assessed and categorised in line with the rating provided by the environmental specialist. Special attention was paid to the identification and analysis of cumulative effects of the project, as required by the EIA Regulations. Possible mitigations were formulated whereby recommendations to reduce or eliminate the potential negative effects on the affected parties and enhance positive impacts were provided.

1.5 Data Gathering and Consultation Process

The purpose of this subsection is to provide an overview of the research done when compiling this report. The assessment made use of only secondary furthermore, the sources used are listed below.

Secondary Data Gathering

Secondary data was sourced from the following databases and documents:

- Stats SA Census, 2011
- Quantec Research Standardised Regional Data, 1993–2020
- Stats SA Quarterly Labour Force Survey, Q1 2021
- Community Survey, 2019
- Provincial Strategic Documents:
    - North-West Provincial Development Plan 2030
- District and Local Strategic Documents:
    - Dr Kenneth Kaunda District Municipality Integrated Development Plan 2017/18 – 2021/22
    - Maquassi Hills Local Municipality Third Generation Integrated Development Plan 2013- 2016 (Amendments based on the 2016 Annual Report
- Other national, provincial, and local government strategic documents and policies

Primary Data Gathering

The main purpose of the primary data collection exercise was to gain insight into the socio-economic characteristics of the zone of influence. Primary data was not sourced for this report as it is assumed that primary data was gathered for Leeuwbosch 1 and Leeuwbosch 2 (both reports were compiled on behalf of Sivest Environmental Division by Urban-Econ) remain relevant for this project.

1.6 Assumptions, Limitations and Gaps in Knowledge

This section highlights the key assumptions that form the basis of the assessment and discussions of the study. These assumptions are in line with known gaps in the knowledge as well as limitations present within the study and are as follows:

- Project-related information supplied by the environmental practitioner and the client for the analysis is assumed to be reasonably accurate.

- The secondary data sources used to compile the socio-economic baseline (demographics, dynamics of the economy), although not exhaustive, can be viewed as being indicative of broad trends within the study area.
- The identification of possible impacts was based on the project team's experience with similar studies in the past and the existing desktop-level knowledge of the socio-economic environment.
- Secondary data that will be used are sourced from Stats SA and Quantec, which may include data from the 2011 Census that may not have been updated since.
- Primary data sourced for Leeuwbosch 1 and Leeuwbosch 2 (both reports were compiled on behalf of Sivest Environmental Division by Urban-Econ) remain relevant for this project.
- Specialist studies were originally undertaken in 2016 for the layout and positioning. All specialist studies which were undertaken in 2016 were updated in 2020, and again in 2022 (including ground-truthing, where required).

1.7 Report Outline

The remainder of the report is structured into the following chapters:

- **Chapter 2: Policy Review –** This chapter reviews all relevant national, provincial, and regional policy documents and aims to ascertain whether the proposed developments align with the objectives of these policies.
- **Chapter 3**: **Profile of Zone of Influence -** This chapter provides a profile of the zone of influence and reviews the numerous dynamics of the proposed project location.
- **Chapter 4: Baseline Information -** This chapter provides a baseline analysis which includes a status quo analysis of the study area's local economic development climate as well as the study area's composition and site-related information.
- **Chapter 6: Socio-Economic impacts evaluation –** This chapter provides the socio-economic basic impact assessment portion of the study. The impact methodology used was provided by Sivest Environmental Division and has been used in previous reports.
- **Chapter 7: Conclusion –** This chapter summarises and consolidates the key findings of the study, as well as relevant concluding remarks and recommendations.
- **Annexure 1: Impact Assessment Rating Methodology –** Annexure 1 provides a detailed explanation of the impact assessment rating methodology used for reference.
- **Annexure 2**: **EIA Regulations checklist –** Annexure 2 is a checklist followed to ensure that the report was compiled in accordance with the EIA Regulations, 2014 (Government Notice (GN) R982).

2 POLICY REVIEW

A policy review plays an integral role in the early stages of a project. The review provides a high-level indication of whether a project is aligned with the goals and aspirations of the developmental policy within a country and at a local level. This chapter provides a policy review to highlight any concerns that could jeopardise the development of the project in accordance with the relevant policies.

The following policies and strategic documents were identified as applying to the study areas and are listed as follows:

- National (South Africa):
  - National Development Plan (NDP) 2030 (2011 - 2030)
  - National Spatial Development Framework 2018
  - New Growth Path Framework (NGPF), 2010
  - Integrated Resource Plan (IRP) for Electricity 2010-2030: Update Report 2019
  - A Summary of the South African National Infrastructure Plan (Presidential Infrastructure Coordinating Commission report 2012)
  - Industrial Policy Action Plan (IPAP) 2018/2019 – 2020/2021
- Regional:
  - North-West Provincial Development Plan (2013)
  - Renewable Energy Strategy for the North-West Province 2012
- Local:
  - Dr Kenneth Kaunda District Municipality Integrated Development Plan 2017/18 -2021/22
  - Maquassi Local Municipality Integrated Development Plan (IDP) 2013-2016 (Amendments based on the 2016 Annual Report)

A summary of each document is provided in the Policy Analysis table below, indicating the objectives of each policy as well as which objectives align with the Additional Solar PV Site Project.

2.1 Policy Analysis

Table 2-1: Policy Analysis

Policy	Key Policy Objectives
NATIONAL POLICIES	
National Development Plan (NDP) 2030, 2012	The National Development Plan (NDP) 2030 aims to address South Africa's developmental challenges of poverty and inequality by 2030. The NDP 2030 seeks to ensure that half of all electricity generation capacity is provided by renewable resources. Key aspects deemed necessary to enhance social cohesion, reduce poverty and raise living standards to include: ✓ Creating jobs and livelihoods ✓ Expanding infrastructure

Policy	Key Policy Objectives
	✓ Transitioning to a low-carbon economy • Transforming urban and rural spaces • Improving education and training • Providing quality health care • Building a capable state • Fighting corruption and enhancing accountability • Transforming society and uniting the nation The proposed development is somewhat in alignment with the National Development Plan through its potential to create employment and its plans to develop infrastructure. (National Planning Commission, 2012)
National Spatial Development Framework 2018	The National Spatial Development Framework, 2018 (NSDP) is a government document that seeks to make a bold and decisive contribution to bringing about peaceful, prosperous, and truly transformed South Africa, as articulated in the Freedom Charter, the Reconstruction and Development Programme (RDP) and the National Development Plan (Department of Planning, 2018). The Key focuses of the NSDP include: ✓ Technology, Innovation, Resilience and Disruptions in the Space Economy. ✓ Energy Infrastructure Network to Ensure a Shared, Inclusive and Sustainable Economy. • Urbanisation, the Pursuit of a Better Life and a Desire for Quality Urban Living and Spaces • Move Away from Ecosystem Destruction, Pollution and a National Water Security Crisis. Based on the above key focuses, the proposed development is somewhat in alignment with the National Spatial Development Framework through its intention of increasing technological innovation and energy infrastructure networks. (National Spatial Development Framework 2018)
New Growth Path Framework (NGPF), 2010	The New Growth Path Framework (NGPF) aims to ensure that jobs and decent work are at the centre of economic policy. The NGPF has identified several job drivers and priority sectors that should be focused on over the coming years. These include: ✓ Infrastructure investment.

Policy	Key Policy Objectives
	✓ Prioritising efforts to support employment in the main economic sectors, including the Green Economy • Seizing the potential of new economies • Investing in social capital and public services • Spatial development • Fostering rural development and regional integration The proposed development shows alignment to the New Growth Path regarding its aim to invest in infrastructure and the potential to increase employment within the Green Economy. (Department of Economic Development, 2011)
Integrated Resource Plan (IRP), for Electricity (2010 – 2030)	The IRP provides for the disaggregation of RE technologies to differentiate and display solar photovoltaic (PV), concentrated solar power (CSP), and wind options. Moreover, a review of the IRP, relevant to the RE sector, is that the accelerated roll-out of RE technologies must be allowed and promoted to derive the benefits of localisation in these RE technologies. Moreover, it emphasizes the establishment of a Solar PV programme. The following policy considerations assisted in arriving at this version of the IRP which entail: ✓ The installation of RE technologies brought forward to accelerate a local industry • To provide for the uncertainties associated with the cost of renewables and fuels, a nuclear fleet was included • The emissions constraint of 275 million tons of carbon dioxide per year after 2024 was maintained • Energy efficiency demand-side management measures were maintained The proposed development is in alignment with the IRP for electricity strategy through its role in accelerating renewable energy in South Africa. (Department of Mineral Resources and Energy, 2011)
South African National Infrastructure Plan 2012	The South African National Infrastructure Plan, 2012 speaks of 'greening the economy. In terms of electricity generation, transmission, and distribution, three Strategic Integrated Projects (SIP) are relevant: ✓ SIP 4: Unlocking the economic opportunities in the North-West Province ✓ SIP 9: Accelerate the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy ✓ SIP 10: Expanding the transmission and distribution network to address historical imbalances, provide access to electricity for all and support

Policy	Key Policy Objectives
	economic development (Presidential Infrastructure Coordinating Commission, 2012) The proposed development is strongly aligned with South Africa's National Infrastructure plan through its potential to contribute to the three mentioned Strategic Integrated Projects aimed at increasing economic opportunities, accelerating electricity generation, and increasing access to electricity. (Presidential Infrastructure Coordinating Commission, 2012).
Industrial Policy Action Plan (IPAP) 2018/2019 – 2020/2021	The Industrial Policy Action Plan, 2018/2019 – 2020/2021 provides an economic analysis of prevailing global and domestic economic conditions relevant to industrial policy; time-bound action plans and programmes across a range of sectors and lists the key constraints to an optimal industrial strategy (DTI, 2018). The South African electrotechnical sector is largely dependent on imported content. As a result, South Africa needs to increase its design and production capabilities through the following: ✓ Attract and maintain investments in certain areas of production. ✓ Localise production of inputs where local capacity and capability exist. ✓ Focus on potentially highly lucrative export markets across the African continent. All of these are aimed at addressing historical imbalances and the proposed project is evidently in line with this plan. (Department of Trade and Industry, 2018)
PROVINCIAL POLICIES	
North-West Provincial Development Plan (2013)	North-West is a province that significantly depends on non-renewable sources and experiences pollution and environmental degradation. The North-West Provincial Development Plan (2013) therefore acknowledges that energy provision is a concern in some areas, given that the mining sector consumes a great portion of the available electricity. The specific targets for the development plan regarding renewable energy are to: ✓ Increase the population with access to electricity from 84% in 2011 to 95% by 2030, with non-grid options available for the rest ✓ Increase renewable energy consumption to 37% by 2030 • Ensure that 67% of households have a solar water heater installed The actions set out to achieve this are: ✓ Develop energy infrastructure and service provision

Policy	Key Policy Objectives
	✓ Expand renewable energy with special reference to solar power ✓ Increase energy efficiency (reduce demand) The proposed project fulfils the operation and maintenance of the PV plant's aims and is fully aligned with the NW Provincial Development Plan. (North West Planning Commission, 2013)
Renewable Energy Strategy for the North-West Province 2012	The Renewable Energy Strategy for the North-West Province 2012 argues that the generation of clean energy is one of the responses to climate change and it is a way to meet the commitments of the Kyoto Protocol. The objectives of the strategy are to: ✓ Improve the NWP's environment ✓ Reduce the NWP's contribution to adverse climate change, ✓ Alleviate energy poverty ✓ Promoting economic development and job creation in the province ✓ Developing its green economy. The proposed development is strongly aligned with Renewable Energy Strategy for the North-West Province through its potential to contribute to the mentioned strategic objectives. (Department of Economic Development, Environment, Conservation and Tourism, 2012)
DISTRICT AND LOCAL POLICIES	
Dr Kenneth Kaunda District Municipality Integrated Development Plan 2017/18 -2021/22	The Dr Kenneth Kaunda District Municipality Integrated Development Plan 2017/18 - 2021/22 identifies the comparative advantage of electricity provision and production that the region has in the provincial context. The integrated development plan aims to support the constitutional obligations of local government through the following strategic objectives: ✓ To promote physical infrastructure development ✓ To promote socio-economic development ✓ To provide environmental health services • To ensure disaster risk management • To ensure municipal excellence • To provide integrated Public Transport within the District • To provide integrated waste management facilities The proposed project is somewhat aligned with the **Dr Kenneth Kaunda District Municipality** Integrated Development Plan. The proposed project will develop

Policy	Key Policy Objectives
	infrastructure, and contribute to the social and economic development of the community by producing sustainable energy for the community (Dr. Kenneth Kaunda District Municipality, 2017)
Maquassi Local Municipality Integrated Development Plan (IDP) 2013-2016 (Amendments based on the 2016 Annual Report)	The Maquassi Hills Local Municipality (LM) Integrated Development Plan, 2013 - 2016 (latest available IDP) recognises that the municipality's electricity network has aged. The integrated development plan aims to support the constitutional obligations of local government through the following strategic objectives: ✓ Provision of basic services and infrastructure development ✓ Local economic development • Municipal transformation and institutional development • Municipal financial viability • Good governance and public participation. The proposed project is therefore somewhat aligned with the **Maquassi Local Municipality** Integrated Development Plan. The proposed project will contribute to providing electricity, which is considered a basic service, as well as contribute to the local economic development of Maquassi LM. (Maquassi Hills Local Municipality, 2013)

2.2 Concluding Remarks

The policy environment plays an integral role in the initial stages of a project and provides an overview of the government's main objectives, and whether the project is aligned with the objectives of the policy and legislation of the country. The above-mentioned national, provincial, and local municipality policies and strategies focus on promoting decent work and economic development, improving, and expanding infrastructure, as well as prioritising sustainable renewable energy and how the proposed development is aligned with them.

The objectives from a national level mainly include the promotion of economic development and job creation through developing a green economy, poverty reduction, upskilling, educating its citizens, and advancing rural and spatial integration. Based on the above, the proposed Leeudoringstad Solar PV 5 is aligned with the core of these objectives. The Leeudoringstad Solar PV 5 plant will make use of solar PV technology to generate electricity from the sun's energy. This will contribute to the reduction of the province's (and hence national) contribution to climate change and job creation through the development of the green economy.

At a provincial level, the North-West provincial government strives to increase economic development, alleviate energy poverty, and improve the environment by reducing the effects of climate change. As a result, the planned project aligns with provincial policies in that the Solar PV Plant will create employment and increase renewable energy initiatives within the province.

Both District and Local municipality strategic documents outline the need for increased job opportunities and local economic development as well as diversification of the economy. The proposed plant is aligned with the IDP's, which aim to increase infrastructure development and increase overall local economic and socio-economic development within the municipalities. This is applicable as the proposed project will increase infrastructure in the area as well as general jobs which will in turn increase local economic and socio-economic development.

Having determined the policy environment, the next section seeks to provide a detailed profile of the zone as per the delineation. The goal is to identify which areas the proposed project is most likely to affect (if any) to identify who will be affected by the socio-economic impacts that may arise from the development of the proposed project.

3 ZONE OF INFLUENCE

This chapter investigates the various dynamics of the proposed project site. This is important as it looks at the area in which the project will take place, giving a better understanding of who the project will directly affect due to proximity. To efficiently manage the scope of the study by identifying the best clusters of observations for the projected development. The footprint of the proposed development has been classified as follows:

- The primary study area is Leeudoringstad as it is the immediate zone of influence. This includes the site where the proposed development is to be located and the regions immediately adjacent.
- The secondary study area is North-West Province. The reason the province is the secondary study area is due to the wider range of impacts the Solar PV site could potentially have on the surrounding areas and the province.
- South Africa will be considered the tertiary study area due to the impacts the proposed development, if any, could have on the country's economy.

The above-mentioned zones are prioritised in this report, however, mentions of other areas will be included if necessary to support the document.

The proposed Leeuwbosch Solar PV 5 is proposed to be located on aapproximatley 20ha of land on a proportion of Leeuwbosh farm, in Leeudoringstad, North-West Province. Map 3-1 below demonstrates the farm in which the proposed Solar PV development will be located.

Map 3-1: Overview of Farm Portions in Zone of Influence

Source: Google Earth map observations and spatial data from Chief Surveyor-General website (https://csggis.drdlr.gov.za/psv/)

As can be seen in the map above the proposed project site on Farm Leeuwbosch No. 44, portion 37. It is near the boundary separating the Free State Province from the North West Province and may be accessed from the R502. Although most of the land is underutilised, there are scattered commercial farms within the zone. In total, 11 farm

portions are identified to be located within the zone of influence. The table below is used to represent the different farms within the zones, along with the size and whether or not there are residents in the area.

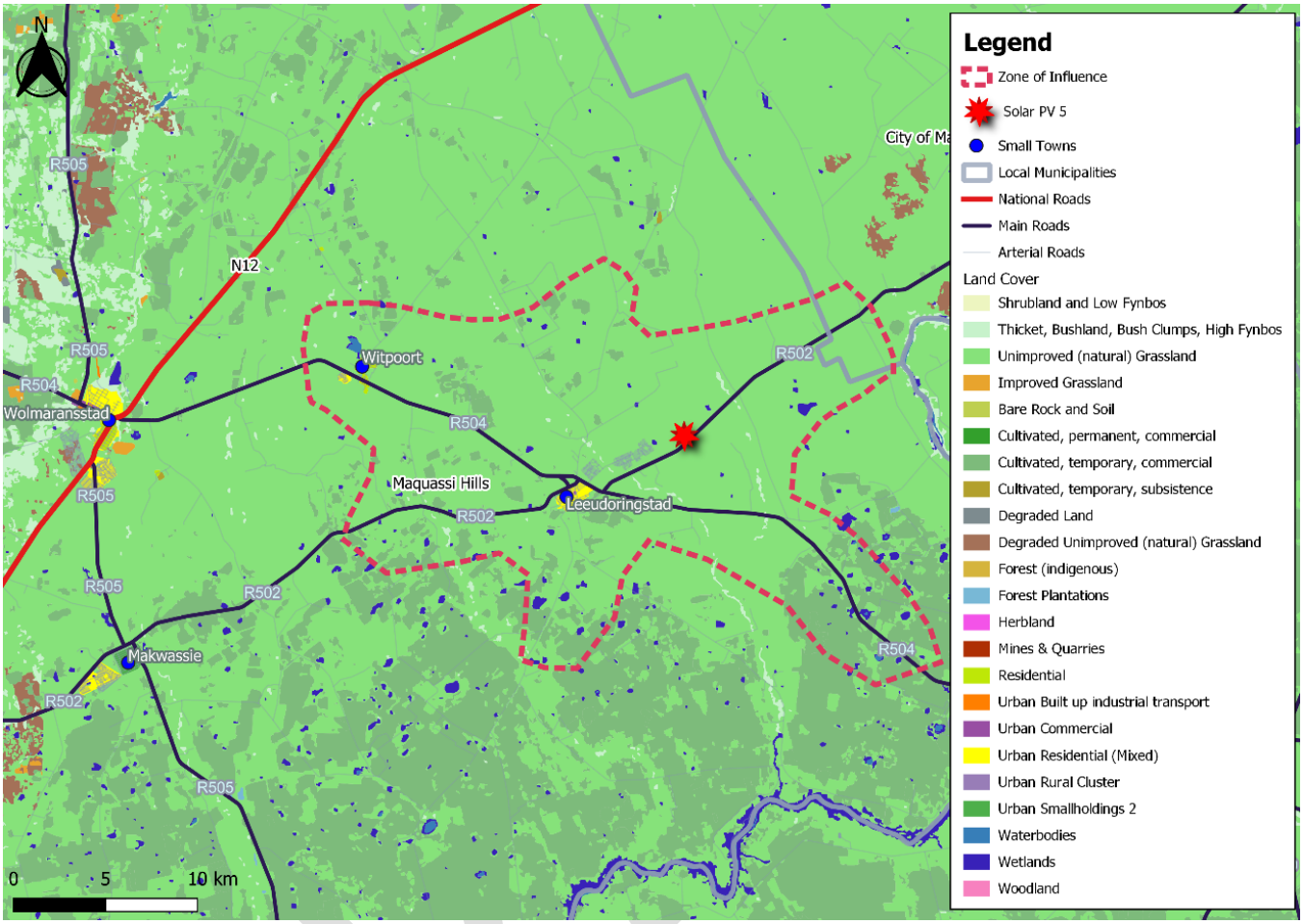
Table 3-1: Zones which will likely be influenced

Farm Portions	Area(Ha)	Presence of residences
Portion 37 Farm Leeuwbosch 44	120	**4 farm structures and residences**
Adjacent farm portions		
Portion 35 Farm Leeuwbosch 44	173	**None**
Portion 38 Farm Leeuwbosch 44	130	**None**
Remainder of Portion 6 Leeuwbosch 44	533	**None**
Remainder of Portion 7 Farm Leeuwbosch 44	131	**1 farmhouse**
Farm portions located further away from the project site		
Portion 47 Farm Leeuwbosch 44	642	**None**
Remainder of Portion 5 Farm Leeuwbosch 44	333	**None**
Portion 21 Leeuwbosch 44	924	**None**
Portion 36 Farm Leeuwbosch 44	200	**None**
Remainder of Portion 29 Farm Leeuwbosch 44	618	**None**
Portion 13 Farm Leeuwbosch 44	644	**None**
Portion 14 Farm 59	172	**None**
Remainder of Portion 5 Farm 59	109	**None**
Portion 51 Farm 43	913	**None**
Portion 4 Farm 24	782	**7 farm structures and residences**
Portion 21 Farm Leeuwbosch 44	924	**6 farm structures and residences**
Portion 13 Farm Leeuwbosch 44	219	**None**
Portion 26 Farm Leeuwbosch 44	128	**None**
Portion 27 Farm Leeuwbosch 44	128	**None**
Kgakala	**200**	**2369 households**

Source: Google Earth map observations and spatial data from Chief Surveyor-General website (https://csggis.drdlr.gov.za/psv/)

As can be seen above, the proposed site is well located in a highly agricultural zone and will likely affect surrounding farming businesses and Kgakala township which is about 2km away from the proposed site. In terms of the land-use profile, Map 3-2 provides a more detailed description of the land uses that have been primarily identified to be located within the proposed project site.

Map 3-2: Land-use Map of the Proposed Project Site and Surrounding Areas

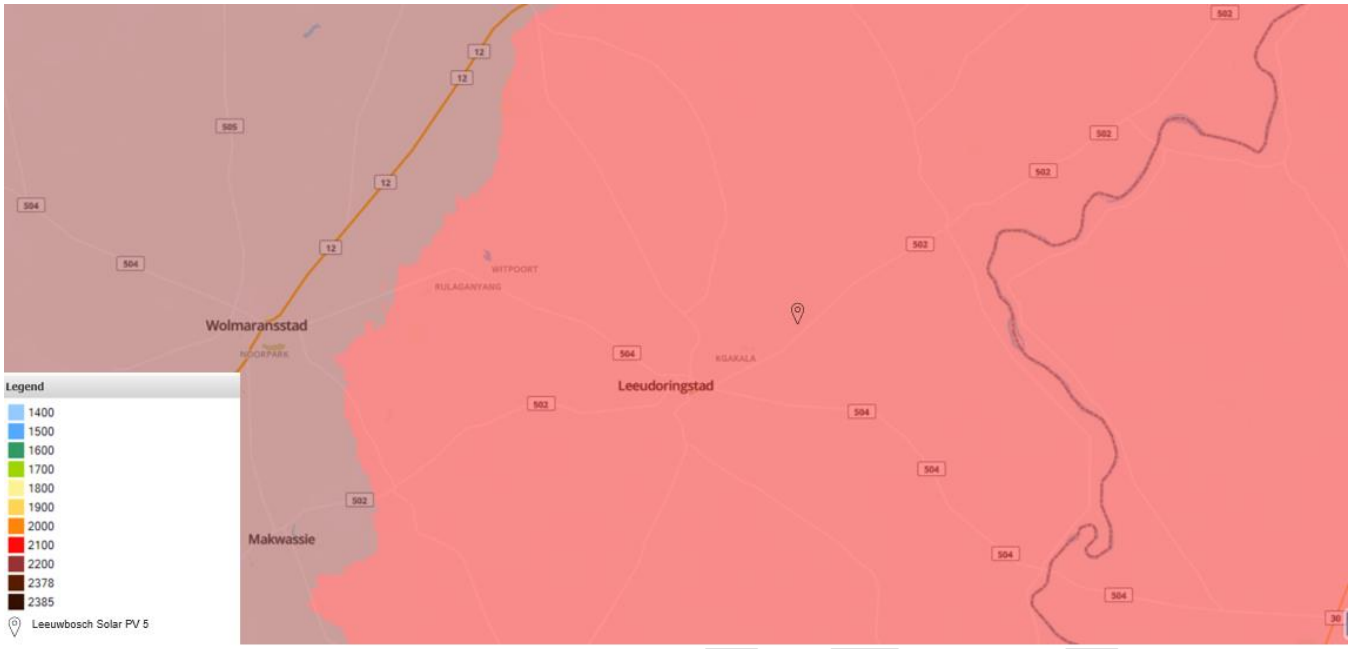


Source: Mapable adapted by Urban-Econ

Map 3-2 illustrates the different land uses such as urban residential areas, unimproved natural grasslands, as well as wetlands. As can be seen above, the zone of influence mostly comprises of unimproved natural grasslands and a few wetlands. The urban residential area identified is Leeurdoringstad which is close to Kgakala Township. In addition, about eight (8) built structures have been identified to be in the zone of influence, which are mainly farmhouses.

The proposed development, being a solar facility, requires that several factors are considered before the placement of the facility is confirmed. A location best suitable for a solar facility is one which is clear, stable, and flat, with little debris and no major obstructions. The location should be able to yield high solar photovoltaic to optimise the operations of the solar PV. Map 3-3 illustrates the photovoltaic yield in which the proposed development will be located.

Map 3-3: Photovoltaic Yield Tracking of Study Area



Source: Mapable adapted by Urban-Econ

Map 3-3 shows that the study area is in an area with a fairly high PV yield making it a suitable area for solar PV facilities. The area in which a solar facility will be place needs to be sterilied, meaning that the agricultural activites within the solar facility's footprint will be stopped. The map below demonstrates the extent in which the agricultural activities will be affected by sterilising the proposed 20ha of land.

Map 3-4: Overview of Grazing Capabilities on Study Area

Source: Mapable adapted by Urban-Econ

Map 3-4 illustrates the different levels of grazing capabilities within the area. Prime agricultural land that can graze more agricultural units per ha is represented by using dark green, and land that can graze less agricultural units per ha is represented in maroon. As can be seen above, the proposed location of Leeuwbosch solar PV 5 is on land with the grazing capability 18-21 ha/Au. This means one (1) agricultural unit needs about 18-21 hectares of land for adequate grazing. Therefore, the opportunity cost of the 20ha of land which will be sterilised for the proposed development will only be one (1) agricultural unit. The following chapter within the report aims to study the status quo of the primary and secondary study areas to further analyse the potential socio economic impacts that could arise from the proposed development.

4 BASELINE INFORMATION

This chapter examines key socio-economic characteristics of the study area, as per the delineation provided. This is essential as it provides both qualitative and quantitative data related to the communities and economies under observation, creating a baseline against which the impacts can be assessed.

This section will analyse the following key indicators:

- The study area's composition and locational factors
- Demographics profile
- Economy
- Labour Force and Employment Structure
- Income and education
- Access to Electricity
- Existing and Planned Developments in the Area

4.1 Study Area's Composition and Locational factors

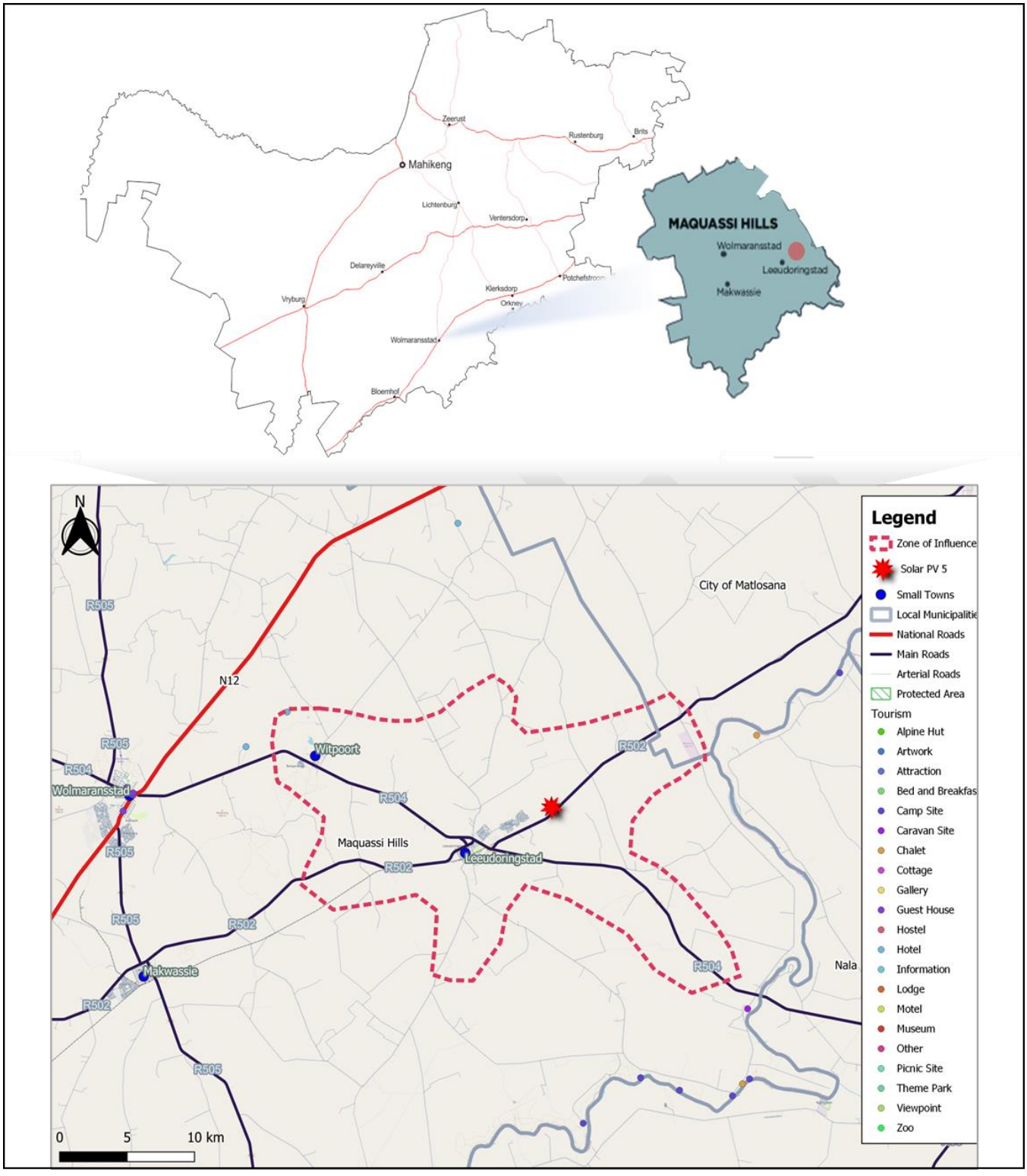
This sub-section aims to provide an overview of the study area's composition and locational factors. The proposed development is envisaged to be located in North West province, a province located along the northern border of central South Africa, bordering Botswana to the north. The province has 4 district municipalities, namely;

- Bojanala Platinum District,
- Dr Ruth Segomotsi Mompati District,
- Ngaka Modiri Molema District, and,
- Dr Kenneth Kaunda District

Map 4-1 below shows that the proposed Leeuwbosch Solar PV Plant is planned to be in the Maquassi Hills Local Municipality, a Category B municipality within the Dr Kenneth Kaunda DM. Maquassi Hills LM consists of 3 main towns namely, Wolmaransstad, Makwassi, and Leeudoringstad (proposed location). Leeudoringstad is a small farming town in which the most prominent spoken languages are Afrikaans, SeTswana, and Northern SeSeotho.

According to the ward councillor, the main socio-economic issues in the area are unemployment and crime which will be discussed further in the subsections to follow. The following sub-sections will also briefly unpack the history and cultural aspects of the municipality; the demographics, health, and cultural aspects; the economy of the municipality; the income and education levels of the people living in the municipality; the current labour force and employment structures; the areas access to basic services; as well as highlight any planned developments within the areas besides the proposed development.

Map 4-1: Representation of study area



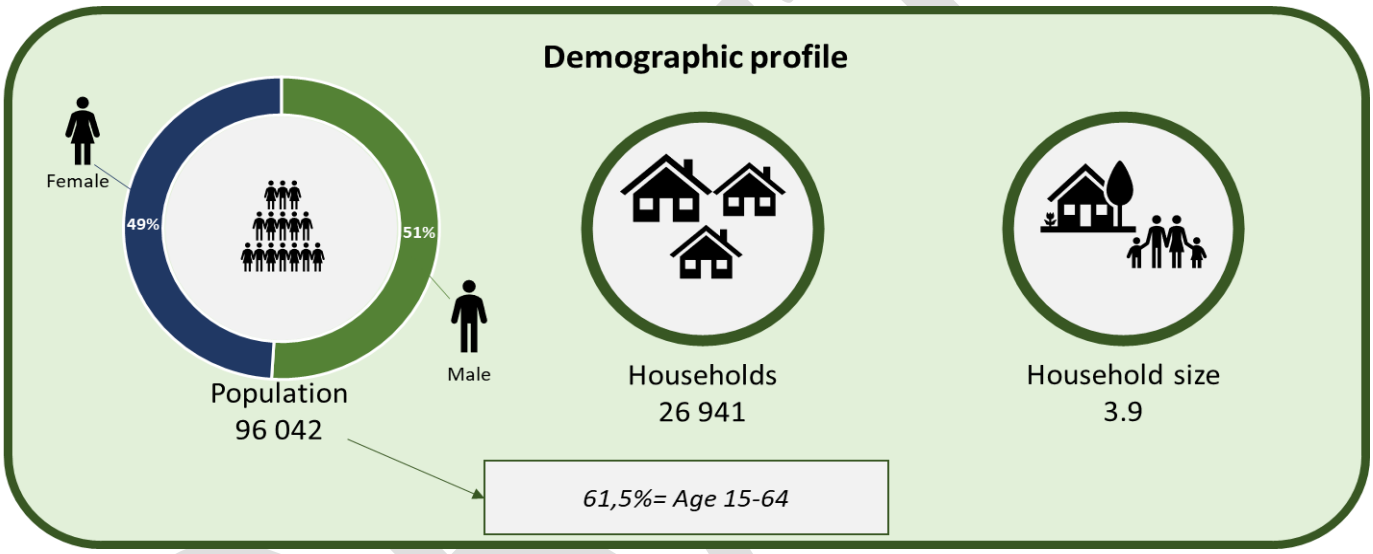
Source: Municipalities of South Africa adapted by Urban Econ

4.2 Demographic Profile

It is important to understand the profiles of the area to understand the extent, if any, to which the communities will be impacted by the project at hand. This sub-section, therefore, aims to provide an overview of Maquassi Hills Local Municipality's demographic profile to gain an accurate perspective of those who are likely to be affected by any prospective development or project.

As shown in Figure 4-1 the population of Maquassi Hills Local Municipality was estimated to be 96 042 in 2020 which constitutes 11.6% of the Dr Kenneth Kaunda District Municipality and only 2.4% of the North West Province's population (Urban-Econ calculations based on Quantec 2020).

Figure 4-1: Population Information, 2020



Source: (Quantec, 2021)

The Maquassi Hills LM, from a provincial and district context, houses a relatively small population. The average growth rate over the past ten years has been 2.3%, which is slightly above the national and provincial growth rates by 1.4% and 1.6%, respectively (Urban-Econ calculations based on Quantec 2020). A recorded 26 941 households resided in the Maquassi Hills LM in 2020 and thus comprise 2% of all households in the province. This indicates a significantly small residential footprint from a provincial level. The average household size in the LM is 3.9 whereas the average provincial household size is 3.4 (Quantec, 2020). Therefore, indicating that the household size in Maquassi LM is higher than that of the province.

Approximately 61.5% (59 065 residents) of the Maquassi Hills LM's population are between the ages of 15 and 64 and therefore comprise the working-age population (Quantec, 2020). In addition, there is a 1% difference between males and females in terms of gender distribution, with males dominating.

In terms of crime profiles, high population growth rates are usually in correlation to increasing crime rates in an area. The table below is used to show the crime rate of Maquassi Hills LM in comparison to North West Province and South Africa.

Table 4-1: Crime Rate Statistics Trend

	2017	2018	2019	2020
South Africa	2178779	2145664	2064835	1961916
North West	120906	121183	122271	112937
Maquassi Hills LM	2645	2649	3678	2497

Source: (Quantec, 2021)

The statistics related to crime suggest a general downwards trend across South Africa, however, both North West Province and Maquassi Hills LM have seen an increase in reported serious crimes between the period 2017-2019. Although the number of reported crimes decreased in 2020, the ward councillor's concern for the crime rate remains valid. High crime rates can be linked to the high growth rate of Maquassi Hills LM as discussed above. The number of reported crimes can also be linked with the quality of life of the communities, it can therefore be assumed that the quality of life of the communities decreased as crime rates have seen an increase over the period 2017-2019. The below sub-sections within this report can be used as indicators to assess the quality of life further.

4.3 Economy

The structure of the economy and the composition of its employment provides valuable insight into the dependency of an area on specific sectors and its sensitivity to fluctuations in global and regional markets. Knowledge of the structure and the size of each sector is also important for the economic impact results' interpretation, as it allows the assessment of the extent to which the proposed activity would change the economy, its structure, and the trends of specific sectors.

In 2020, the economy of Maquassi Hills LM was valued at R3 515,9 million at current prices. The tertiary sector contributes 65% of the LM's Gross Domestic Product (GDP), followed by the primary and secondary sectors, which each contribute 21% and 14% respectively (Quantec, 2020). The general government sector accounts for nearly a fifth (19.06%) of the local economy's output. The wholesale and retail trade, with a contribution of R549 million in current prices, is the second greatest contributor.

Based on constant 2005 prices, the Maquassi Hills LM grew at a relatively small rate of 0.51% CAGR over the ten-year period spanning 2010-2020. The growth was driven by the increasing performance of the trade sector which grew by 7.2% over the same period. Other sectors that contributed to the growth over the same ten-year period included the agriculture sector at 7.1% and the community, social and personal services with 6.6% (Quantec, 2020). However, the growth of the above-mentioned sectors was offset by the decline observed in the other industries, resulting in a notably lower performance of the economy over the years.

4.4 Labour Force and Employment Structure

Employment is the most common way for people of working age to generate money that will allow them to meet their basic necessities and enhance their standard of living. As a result, employment and unemployment rates are important measures of socio-economic status.

While the majority (61.5%) of the Maquassi Hills LMs population is of working age, only approximately one-third of this population is employed (Quantec, 2020). The Maquassi Hills LM employment figure represents only 2% of the provincial employment figure due to its low population size, namely 2.4% of the province's population (Quantec, 2020). The community's 66.1% unemployment rate further validates the ward councillor's unemployment concerns for Maquassi Hills LM, indicating that the community needs employment opportunities.

In terms of employment structures, about 16 113 people are absorbed in the formal sector and 4 588 work in the informal sector. The formal sector thus, has over three times the number of employees than the informal sector. In the formal sector, semi-skilled workers dominate with 7 235, followed by unskilled workers with 6 268 and lastly, there are 2 610 skilled workers (Stats SA, 2020). The skill levels are, therefore, low in the Local Municipality.

On a local scale, the agricultural sector has the biggest proportion of employment, accounting for a quarter of all employed individuals. This is followed by the Community, Social and Personal Services sector with 3 722 employees and the Wholesale and Trade sector with 3 334 employees. This indicates the importance of agricultural activities within the area with the sector being the main employer for the community. The labour force and employment structures are likely to arise from the education levels which are discussed further in the sub-section below.

4.5 Income and Education

The average income of an economy is used to assess the economy's standard of living as well as its developmental state. Education levels are also a key indicator of an economy's social welfare and access to education. This sub-section, therefore, aims to briefly analyse the income and education levels of the primary study area to give an understanding of the developmental state and social welfare of the area.

According to the 2011 National Census, the weighted average household income in the Maquassi Hills LM was R4 836 in basic prices. About 2 973 or 14.5% of the LM's households had no regular income in 2011 (Stats SA, 2020). In total 77.2% of LM's households are surviving on an income of less than R3 200 per month at current prices (Stats SA, 2020). One fifth (20.6%) of the population is in the middle-income category. In this light, the LM can be considered as dominantly relatively poor. This status can be attributed to the education levels of the LM.

Just over a fifth of the population aged over 20 in the LM have no schooling, 18.5% have acquired a matric qualification, and 4.8% have acquired a higher education qualification. On the provincial level, 11.6% of the population aged over 20 do not have schooling, whilst a quarter have acquired a matric and 7.5% have acquired a higher education qualification (Quantec, 2020). From this, it can be deduced that the education levels are low and less than a quarter of the population over 20 have completed formal schooling. Therefore, for the community to make a living, an increase in unskilled-low skill employment opportunities is required.

4.6 Access to Electricity

The purpose of this subsection is to provide an overview of Maquassi Hill LM's access to electricity, therefore briefly unpacking how the proposed Solar PV site will impact the area's access to electricity. The household access to electricity can be seen in Table 4-2 below.

Table 4-2: Maquassi Hills LM Access to Electricity (2020)

Access to Electricity	Households (Number)	Proportion %
In-house conventional meter	1 408	4,9%
In-house prepaid meter	24 326	84,7%
Connected to other source which household pays for (e.g., connected to neighbour's line and paying neighbour, paying land lord)	681	2,4%
Connected to other source which household is not paying for (e.g., connected to neighbour's line and not paying neighbour)	141	0,5%
Generator	0	0,0%
Solar home system	0	0,0%
Battery	0	0,0%
Other	32	0,1%
No access to electricity	2 141	7,5%
Total	**28 730**	**100%**

Source: (Quantec, 2021)

An estimated 26 557 households had access to the electricity grid in 2020, while 2 141 households had no access to electricity. The Maquassi Hills LM falls short of the North West Provincial Development Plan's (2013) aim of 95% of homes having connected to the energy grid by about 2,6%.

To reach the goals of the North-West Provincial Development Plan, additional energy generators are required to increase the electricity supply, which would therefore improve the affordability in the long run. Introducing new PV equipment in the Maquassi Hills LM area will impact access to local household electricity if the community purchases electricity directly from the SPV.

4.7 Existing and Planned Developments in the Area

The area has seen a notable interest from developers of various renewable energy projects. This may be related to the potential solar energy resources found in the area, the proximity to existing substations, and their evacuation capacity. Such developments, whether already approved or proposed, and if implemented, can have several cumulative implications, both positive or negative, and should be considered. Table 4-3 below lists the projects that will need to be considered when examining the cumulative impacts.

Table 4-3: Planned Developments in the Area

Proposed Development	Proponent	Proposed Capacity	Farm Details
Leeuwbosch 1 Solar PV PlantProject	Leeuwbosch PV Generation (Pty)Ltd	9.9MW	Farm Leeuwbosch44
Leeuwbosch 2 Solar PV Plant Project	Leeuwbosch PV Generation (Pty)Ltd	9.9MW	Farm Leeuwbosch44
Wildebeestkuil 1 Solar PV Plant Project	Wildebeestkuil PV Generation (Pty) Ltd	9.9MW	Farm Wildebeestkuil 59

Proposed Development	Proponent	Proposed Capacity	Farm Details
Wildebeestkuil 2 Solar PV Plant Project	Wildebeestkuil PV Generation(Pty) Ltd	9.9MW	Farm Wildebeestkuil59

Leeuwbosch 1 Solar PV Plant (part of a separate BA process) will be located on Portion 37 of the Farm Leeuwbosch No. 44, adjacent to the Leeuwbosch 2 Solar PV Plant (a separate BA process). In addition, two (2) more 9.9MW Solar PV Plants, namely the Wildebeestkuil 1 Solar PV Plant and Wildebeestkuil 2 Solar PV Plant (part of separate respective BA processes), will also be located on Portion 13, Portion 14, and Remainder of Portion 22 of the Farm Wildebeestkuil No. 59, 1km from the project area. The next closest approved renewable energy project is just over 150km from the Leeuwbosch 2 Solar PV Plant. Thus, the immediate area surrounding the proposed project has very limited renewable energy projects.

The significance of the cumulative impacts associated with the proposed development has been rated according to SiVEST's Impact Rating Methodology (Annexure A) in Table 5-1 below. The impact assessment has revealed that cumulative impacts are expected to be positive low after the implementation of the recommended mitigation measures.

4.8 Concluding Remarks

The chapter above highlights the Maquassi Hills LM's baseline profile. The profile contains details about the LM's history, demographics, economy, labour force, employment, and typical income levels. The baseline profile is an important aspect of the SEIA because it serves as a benchmark against which the proposed project's potential impacts can be compared. As a result, giving current information on the situation in the potentially affected area is critical in assessing both positive and negative socio-economic effects.

The study area comprises farms and agricultural activities with the nearest town of Leeudoringstad and Kgakala, the nearest township. The key insights drawn from the chapter show that Maquassi Hills LM has a small population growing at a relatively high annual growth rate of 2,3% which is higher than the national and provincial growth rates. The high population growth rates can be associated with the increasing crime rates Maquassi Hills LM has experienced over the period 2017-2019.

The increasing population will further strain the municipality's demand for electricity, hence indicating the need for additional electricity to be generated. Maquassi Hills LM is short by 2,6% to reach the desired target of 95% presented by the North West Provincial plan which the proposed project could potentially help reach.

Furthermore, it has been identified that there is a need for the creation of job opportunities to improve the living standards within the region and decrease levels of unemployment. Due to the municipality's low education levels, the community requires low-medium skill employment opportunities in the region, which can potentially be provided through the proposed development. At face value, the proposed project is likely to benefit the region, however, to understand the extent of its impact, it is important to do a thorough impact assessment as presented in Chapter 5.

5 SOLAR PV FACILITIES SOCIO-ECONOMIC IMPACT EVALUATION

The following section discusses the socio-economic impacts that the construction and operation of the proposed Leewbosch Solar PV 5 may create, based on knowledge of the potentially affected socio-economic environment. Project-related information concerning the capital costs and employment was sourced from the client and is assumed to be the most accurate data available at the time of the study. A summary of the findings is seen in Table 5-1 below and an explanation of the Impact assessment rating methodology can be viewed in Annexure A: Impact assessment rating methodology.

Table 5-1: Impact rating table for Leeuwbosch Solar PV Plant (including associated infrastructure) – All phases

ENVIRONMENTAL PARAMETER	ISSUE/IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Pre-construction Phase																				
Construction Materials	Availability of sufficient local construction materials for the PV Plant	1	3	3	2	1	4	40	-	Medium	Source unavailable materials from abroad (import)	4	3	1	2	1	3	33	+	Low
Construction Phase																				
Economic Production	Increase in production of the national and local economies due to project capital expenditure.	4	4	1	1	1	2	22	+	Low	• Procure inputs from local and domestic suppliers • Employ local contractors where possible	4	3	1	1	1	2	20	+	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Construction Phase																				
Employment opportunities	The creation of new direct and indirect opportunities related to the construction and operation of the proposed solar plant and facilities	4	4	1	1	1	1	11	+	Low	• Employ labour-intensive methods • Employ local residents and communities • Sub-contract to local construction companies • Utilise local suppliers	4	4	1	1	1	1	11	+	Low
Operational Phase																				
Economic Production	The plant will increase the size of the local utility sector and stimulate economic production through multiplier effects.	2	4	1	1	3	1	11	+	Low	Procure goods and services required for the operation of the plant from the local economy.	2	4	1	1	3	1	11	+	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Operational Phase																				
Employment	Creation of jobs to support the operation and maintenance of the plant	2	4	1	1	3	1	11	+	Low	Aim to fill all the positions with labour from the local community	2	4	1	1	3	1	11	+	Low
Municipal Service Delivery	The generated electricity will improve the security of electricity in the local municipality and increase the government's revenue and service delivery	2	4	1	1	3	2	22	+	Low	No mitigation measures proposed	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Decommissioning Phase																				
Loss of agricultural production	Land demarcated for the solar PV plant will be sterilized and all current activities taking place on said landwill be discontinued.	1	4	1	2	3	1	11	-	Low	• Rehabilitation of land should take place at the end of the project's life to allow for the land to be used for commercial livestock farming after the project's closure.	1	4	1	2	3	1	11	+	Low
Cumulative																				
The proposed project will result in several positive cumulative effects on the socio-economic environment	• Stimulation of the economy and increased production • Creation of employment and business opportunities • Increased household	2	3	1	1	3	2	20	+	Low	• Implement the "locals first" policy • Aim to employ the people who have already worked on other similarprojects in the area to provide them withan opportunity for long-term employment and to continue developing	2	3	1	1	3	2	20	+	Low

	income and standard of lving • Adoption of clean, renewable energy and benefits in terms of global warming and climate change.										their skills • Apply labour intensive construction methods, where feasible • Use local suppliers, where feasible.									

The above table serves as a summary of the impact analysis of the socio-economic impacts that the proposed Leeuwbosch Solar PV 5 plant is expected to create. As previously mentioned, the Impact assessment rating methodology can be viewed in Annexure A: Impact assessment rating methodology. The subsections below discuss the socio-economic impacts in more detail, specifically focusing on the following:

- The simulation of the economy during the construction phase
- The creation of employment during both the construction and operational phases
- Reduction of land area available for productive farming during both the construction and operational phases
- Stimulation of the local economy during operations
- The likelihood of improved municipal service delivery during the operational phase
- The potential cumulative effects that will arise from the proposed Solar PV
- The “no-go” scenario.

5.1 Stimulation of the Economy during Construction

The proposed construction of the Leewbosch solar PV 5 will be associated with multiple capital expenditures. Such expenses typically include the transportation and construction of PV modules, the connection of electricity and grids, foundations, civil engineering, and the construction of supporting structures. If goods and services are procured locally, that is, within South Africa, this will increase the production of the respective industries. This will in turn have a positive impact on the national economy and the economies of the municipalities where inputs are procured.

It is anticipated that the proposed development will include an approximate R130 million in investments. Some of this is expected to be spent in South Africa, which will resultantly stimulate the national economy, although for a temporary period of about twelve months during the construction of the Solar PV.

The size of the Maquassi Hills LM's economy was estimated at R 3 515,9 million at current prices and primarily comprises the agricultural and tertiary services sectors. Considering the small economic base of the municipality, the opportunities for the procurement of goods and services within the local economy will be very limited. It is therefore likely that some of the local businesses will benefit from sub-contracting opportunities, consumer expenditure of the construction crew, and an increase in income of locals who are directly employed in the construction activities, or who benefit from the project through local procurement.

The stimulation of the economy will not be dependent on the layout of the solar PV plant on the site (farm), thus, there are no fatal flaws associated with the layout being proposed as can be seen in Table 5-2 below.

Table 5-2: Impact of Economic Stimulation during Construction

PROJECT PHASE	*Construction Phase*
IMPACT SUMMARY	*R130 million investment will lead to an increase in production in the national and local economies.*
FATAL FLAWS	*None Identified*

5.2 Creation of Employment during Construction

The construction of the proposed solar PV plant and associated infrastructure will require the temporary employment of construction workers, foremen, and engineers on site. It is anticipated that approximately 25 employment opportunities will be created during the construction phase as can be seen in Table 5-3. Considering the current skills profile of the local municipality, a good portion of these jobs are likely to be filled by people from the local communities. This project will thus contribute to increasing employment opportunities in the local municipality for a temporary period. Employment of the individuals, albeit temporary, will increase their household income, improve their standard of living, and benefit their families.

In addition to those benefitting from direct employment created at the project, various multiplier effects will assist in temporarily supporting existing jobs in the businesses offering services and goods that will be procured during construction activities. The increased temporary income earned by these businesses will in turn stimulate consumption spending, creating another round of multiplier effects.

Table 5-3: Assessment of Employment during Construction

PROJECT PHASE	*Construction Phase*
IMPACT SUMMARY	*During the construction phase of the project, 25 temporary employment opportunities are expected to be created.*
FATAL FLAWS	*None Identified*

5.3 Reduction of Land Area Available for Productive Farming

The proposed project location and surrounding land is currently used for commercial farming, as discussed in chapter 3 above. Table 3-1 in chapter 3 provides a summary of the current economic activity(ies) and place of residence of directly affected facilities, adjacent facilities, and facilities in the immediate vicinity of the proposed site.

The area where the solar PV plant and facilities are located will be sterilised, i.e., any activity that is currently taking place on the site that will be affected by the plant's footprint will be stopped. It is estimated that the solar PV plant and facilities footprint will be approximately 20ha as can be seen in Table 5-4 below. These will be established on land currently used for commercial livestock farming.

The nature of the activities taking place on the farms adjacent to the proposed facilities is also not expected to be sensitive to the proposed project's construction or operation. Therefore, the visual or noise effects that may result from the development of the PV system are not expected to adversely affect the farming activities and their respective farmhouses observed in the region.

Table 5-4: Assessment of Impact on Agricultural Production

PROJECT PHASE	*Construction and Operational Phase*
IMPACT SUMMARY	*Approximately 20ha of land will be sterilised.*
FATAL FLAWS	*None Identified*

5.4 Creation of Employment and Increased Household Income during Operations

The operation of the solar PV plant and associated infrastructure will require functional and maintenance employees. It is envisaged that approximately five (5) persons will be employed during the 20 years in which the proposed solar PV plant will be operational, as shown in Table 5-6 below. This includes the people that will be employed for cleaning, maintenance, and security purposes. The employment of the five individuals for the entire operational period will increase their household income, improve their standard of living, and benefit their families.

Table 5-5: Assessment of Employment during Operations

PROJECT PHASE	*Operational Phase*
IMPACT SUMMARY	Five sustainable jobs will be created.
FATAL FLAWS	*None Identified*

5.5 Stimulation of the Local Economy during Operations

The operational period of the proposed Solar PV plant is 20 years, during which the solar plant will have expenses such as salaries and wages of the plant's employees, general operating expenses and maintenance costs. As shown in Table 5-5, the operations of the plant will make some contribution to the growth of the local economy, as it will increase the size of the local electricity sector, as well as stimulate the demand for other sector's services and goods such as water, transportation, and trade.

Table 5-6: Assessment of Economic Stimulation during Operations

PROJECT PHASE	*Operational Phase*
IMPACT SUMMARY	Operational Expenditure (OPEX) will stimulate the local economy.
FATAL FLAWS	*None Identified*

5.6 Improved Municipal Service Delivery

The proposed 10MW solar PV plant will be connected to the Leeudoringstad Solar Plant Substation and used generated electricity that will be sold nationwide. As stated in chapter 4, the municipality's electricity network has aged, and a notable electricity supply backlog exists. Though the proposed project might seem relatively small, it will contribute towards diminishing this backlog. This could contribute to the growth of the local economy by improving the provision of government services and increasing the overall supply of electricity to the local economy.

Table 5-7: Assessment of Service Delivery Improvement

PROJECT PHASE	*Operational Phase*
IMPACT SUMMARY	Improvement in municipal service delivery will take place.
FATAL FLAWS	*None Identified*

5.7 Potential Cumulative effects

As stated in Chapter 4.7 of this report, the area has seen notable interest from developers of various renewable energy projects (Table 4-3). This is likely due to the potential of solar energy resources found in the area, proximity to the existing substation and its evacuation capacity, and other factors. As a result, four (4) additional solar PV projects are planned in the area which has not been developed yet. Therefore, there is a possibility that the construction and operational phases of all five (5) developments, including this proposed development, may coincide with increasing collective socio-economic impacts.

The significance of the cumulative impacts associated with the proposed development has been rated in Table 5-1. The impact assessment has revealed that cumulative impacts are expected to be positive low after the implementation of the recommended mitigation measures included in Table 5-1.

5.8 The "NO-GO" Scenario

No site alternatives for this proposed development are being considered as the placement of solar PV installations is dependent on several factors, all of which are favourable at the proposed site location. The factors considered include:

- Land availability and terrain,
- environmental considerations,
- distance to the national grid,
- accessibility to solar resource sites, and,
- current land use.

The proposed introduction of a solar PV plant on the project site near the town of Leeudoringstad in the North West Province will have several significant impacts, as discussed in the following sub-section. In the case where the project is delayed or abandoned, it could be expected that the baseline information will remain the same. There will be no economic and employment growth directly attributable to the solar PV plant.

In the case of the "no-go" scenario, the continued strain placed on the national energy grid will continue to worsen as population growth adds higher energy demands, therefore the load-shedding strategy utilised by Eskom will continue to hamper businesses production and leave households without energy for heating, cooking, and lighting.

5.9 Alternatives

Location alternatives

The placement of solar PV installations is reliant on various parameters, all of which are favourable for the proposed site location, therefore, no site alternatives are being examined for this proposed development.

Technology alternatives

No other activity / technology alternatives are being considered. Renewable energy development in South Africa is highly desirable from a social, environmental and development point of view. Based on the flat terrain, the climatic conditions and current land use being agricultural, it was determined that the proposed site would be best suited for a solar PV plant, instead of any other type of renewable energy technology. It is generally preferred to install wind energy facilities (WEFs) on elevated ground. In addition, concentrated solar power (CSP) installations are not feasible because they have a high-water requirement, and the project site is in a relatively arid area. There is also not enough rainfall in the area to justify a hydro-electric plant. Therefore, the only feasible technology alternative on this site is solar PV.

Layout alternatives

No design or layout alternatives for the PV development area and associated infrastructure are being considered or assessed as part of the current BA process. It is assumed that all associated infrastructure has been placed to avoid site sensitivities identified as part of previous BA processes as well as the current BA process. Specialist studies were originally undertaken in 2016 and the current layout and/or positions being proposed were selected based on the environmental sensitivities identified as part of these studies in 2016. All specialist studies were undertaken in 2016, updated in 2020, and again in 2022 (including ground-truthing, where required) to focus on the impacts of the layout being proposed as part of the current project. The results of the updated specialist assessments have informed the layout being proposed as part of the current BA process. The proposed layout has therefore been informed by the identified environmental sensitive and/or “no-go” areas. As such, no layout alternatives are being considered and assessed as part of the current BA process

6 CONCLUSION

The proposed development of Leeuwbosch Solar PV 5 and associated infrastructure near the town of Leeudoringstad in the Maquassi Hills LM, which forms part of the Dr Kenneth Kaunda District Municipality located in the North West Province. It has been recognised that the area has potential for renewable energy projects which will stimulate the local economy, create new jobs, and contribute to sustainable development.

The policy review indicates that renewable energy projects, at national and local levels, are key to the sustainable development of the national economy. The area has experienced a notable interest from developers of various renewable energy projects and has been deemed favourable for the placement of solar PV installations. The proposed development is, therefore, at face value, aligned with the national and local policies and located at a favourable location for a renewable energy project.

In terms of economic activity, the economy, and communities of Maquassi Hills need an economic injection, particularly considering the decline and stagnation of the economy since 2009. The proposed development will impact the economy of Mauassi Hills through both direct and indirect opportunities which will contribute to the growth of the GDP. Furthermore, the proposed development of Leeuwbosch Solar PV 5 could inspire and stimulate the development of similar projects in the area, contributing to the growth of the utility sector as well as stimulating economic development further. The project will also have the potential to improve the standard of living of the local communities and slightly decrease unemployment in the area.

Regarding the impacts which will arise from the proposed development, it is anticipated that there will be no major direct or indirect concerns. The proposed solar PV plant will sterilise 20ha of agricultural land currently used for commercial livestock farming, however, it is not expected that the proposed development will impact the production levels on the farm due to the size and land capacity of the farm portion. Due to the nature of the activities taking place on the farms adjacent to the planned development, it is not expected to cause major disruptions during both construction and operational phase on the farms and their respective farmhouses. Furthermore, all potential impacts considered had no fatal flaws identified across all potential impacts considered.

Overall, the project will require an investment of about R130 million and create about 25 temporary jobs during various stages of the construction period. Many of these jobs will be filled by labourers from the local communities, which will be highly beneficial considering the high unemployment rate observed in the local municipality. During operations, the project will employ five people. Although few, the area has a high demand for jobs and will contribute to overall employment in the municipality. However, these jobs will not make a notable positive effect on the high unemployment rate in the area. The major benefit of the project will be in the improved electricity security that the municipality will gain as the electricity generated by the plant will be supplied directly to the municipality and then to its customers.

The local government will also experience an increase in its earnings through the collection of taxes and rates from the operating plant, which in turn will be spent on providing services to the residents and businesses. In addition, the project will contribute to the expansion of the local utility industry.

ANNEXURE A: IMPACT ASSESSMENT RATING METHODOLOGY

The objective of the assessment of potential impacts is to identify and assess all the significant, potential impacts that may arise as a result of the project. For each of the main project phases the existing and potential future impacts and benefits (associated only with the project) will be described using the criteria listed below. The assignment of ratings has been undertaken based on past experience of the team, as well as through research. Subsequently, mitigation measures will be identified and considered for each impact and the assessment repeated in order to determine the significance of the residual impacts (the impact remaining after the mitigation measure has been implemented).

Table 1: Impact Assessment Criteria

ENVIRONMENTAL PARAMETER		
A brief description of the environmental aspect likely to be affected by the proposed activity (e.g., Surface Water).		
ISSUE / IMPACT / ENVIRONMENTAL EFFECT / NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of theproject. This criterion includes a brief written statement of the environmental aspect being impacted uponby a particular action or activity (e.g., oil spill in surface water).		
EXTENT (E)		
This is defined as the area over which the impact will be expressed. Typically, the severity andsignificance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	Site	The impact will only affect the site
2	Local/district	Will affect the local area or district
3	Province/region	Will affect the entire province or region
4	International and National	Will affect the entire country
PROBABILITY (P)		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY (R)		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures

2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible, and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES (L)		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION (D)		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorterthan the construction phase (0 – 1 years), or the impact andits effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a wayor such a time span that the impact can be considered transient (Indefinite).
INTENSITY / MAGNITUDE (I / M)		
Describes the severity of an impact (i.e., whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily).		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).

3	High	Impact affects the continued viability of the system/component, and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION (D)		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorterthan the construction phase (0 – 1 years), or the impact andits effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a wayor such a time span that the impact can be considered transient (Indefinite).
INTENSITY / MAGNITUDE (I / M)		
Describes the severity of an impact (i.e., whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily).		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component, and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.

SIGNIFICANCE (S)
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula: **Significance = (Extent + probability + reversibility + irreplaceability + duration) x magnitude/intensity.** The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	**Impact Significance Rating**	**Description**
5 to 23	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
5 to 23	Positive Low impact	The anticipated impact will have minor positive effects.
24 to 42	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
24 to 42	Positive Medium impact	The anticipated impact will have moderate positive effects.
43 to 61	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
43 to 61	Positive High impact	The anticipated impact will have significant positive effects.
62 to 80	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
62 to 80	Positive Very high impact	The anticipated impact will have highly significant positive effects.

Annexure B: EIA Regulations, 2014 (Government Notice (GN) R982) Checklist

This report has been compiled in accordance with the EIA Regulations, 2014 (Government Notice (GN) R982). Note that there are no specific government protocols for assessment of impacts of solar PV developments for use in socio-economic assessments.

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
1. (1) A specialist report prepared in terms of these Regulations must contain- a) details of- i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	Page iii
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page iv-v
c) an indication of the scope of, and the purpose for which, the report was prepared;	Chapter 1
(cA) an indication of the quality and age of base data used for the specialist report;	Chapter 1.5
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Chapter 5.7
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Chapter 1.5
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Chapter 1.3
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Chapter 3
g) an identification of any areas to be avoided, including buffers;	Chapter 3,
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Chapter 3
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Chapter 1.6
j) a description of the findings and potential implications of such findings on the impact of the proposed activity, (including identified alternatives on the environment) or activities;	Chapter 5
k) any mitigation measures for inclusion in the EMPr;	Chapter 5
l) any conditions for inclusion in the environmental authorisation;	Chapter 5
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Chapter 5
n) a reasoned opinion- i. whether the proposed activity, activities or portions thereof should be authorised. (iA) regarding the acceptability of the proposed activity or activities; and	Chapter 6

ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	N/A
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
q) any other information requested by the competent authority.	N/A
2) Where a government notice *gazetted* by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A

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