



BASIC ASSESSMENT FOR LIU ENERGY 100 MW SOLAR PHOTOVOLTAIC PLANT ON FARM VARSPUTS 564 NEAR SPRINGBOK, NORTHERN CAPE

DEFF Reference Number: 14/12/16/3/3/1/2586



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DOCUMENT DETAILS

Applicant

Liu Energy (Pty) Ltd

Project Name

Development and Operation of the Liu Energy 100MW Solar Photovoltaic Facility and Associated Infrastructure

Project Location

Farm Varsputs 564 near Springbok
Nama Khoi Local Municipality, Northern Cape

GPS Coordinates

Latitude: 29° 28' 16.284"S

Longitude: 18° 17' 32.339"E

Document Name

Basic Assessment Report for the Liu Energy Photovoltaic Facility

Compiled By

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Date: 24 October 2022

PROJECT DETAILS

Report Title	Basic Assessment for the Proposed Development and Operation of the Liu Energy 100MW Solar Photovoltaic Plant and Associated Infrastructure
Purpose	<p>The purpose of the basic assessment process and report is to:</p> <ul style="list-style-type: none">- Present the proposed project- Discuss the need and desirability for the project- Describe the affected environment- Provide an overview of the Basic Assessment Process followed- Describe the public participation process- Identify and assess potential environmental impacts of the proposed project- Make recommendations to mitigate negative environmental impacts and enhance positive impacts- Development an Environmental Management Programme (EMP) for the proposed project
Prepared for	Liu Energy (Pty) Ltd
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Authors	Reetsang Mothibi Pr.Sci.Nat Gumisai Charles Chigurah
Dated	24 October 2022
Public Review	The Basic Assessment Report is made available to all interested and affected parties between 01 November 2022 to 30 November 2022. All comments received during the public participation process will be incorporated into the Final Basic Assessment Report.

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1. INTRODUCTION

1.1. Project Overview

Liu Energy (Pty) Ltd proposes to develop a Solar Photovoltaic (PV) facility and associated infrastructure on Farm 564 near Springbok. The farm falls within the Nama Khoi Local Municipality and the Namakwa District Municipality in the Northern Cape, refer to the Regional Map below. The planned generation capacity for the proposed solar photovoltaic facility is 100MW and it is a listed activity in terms of the Environmental Impact Assessment (EIA) Regulations of 2014 as amended. This implies that an Environmental Authorisation (EA) is required prior to commencement of any activities on site.

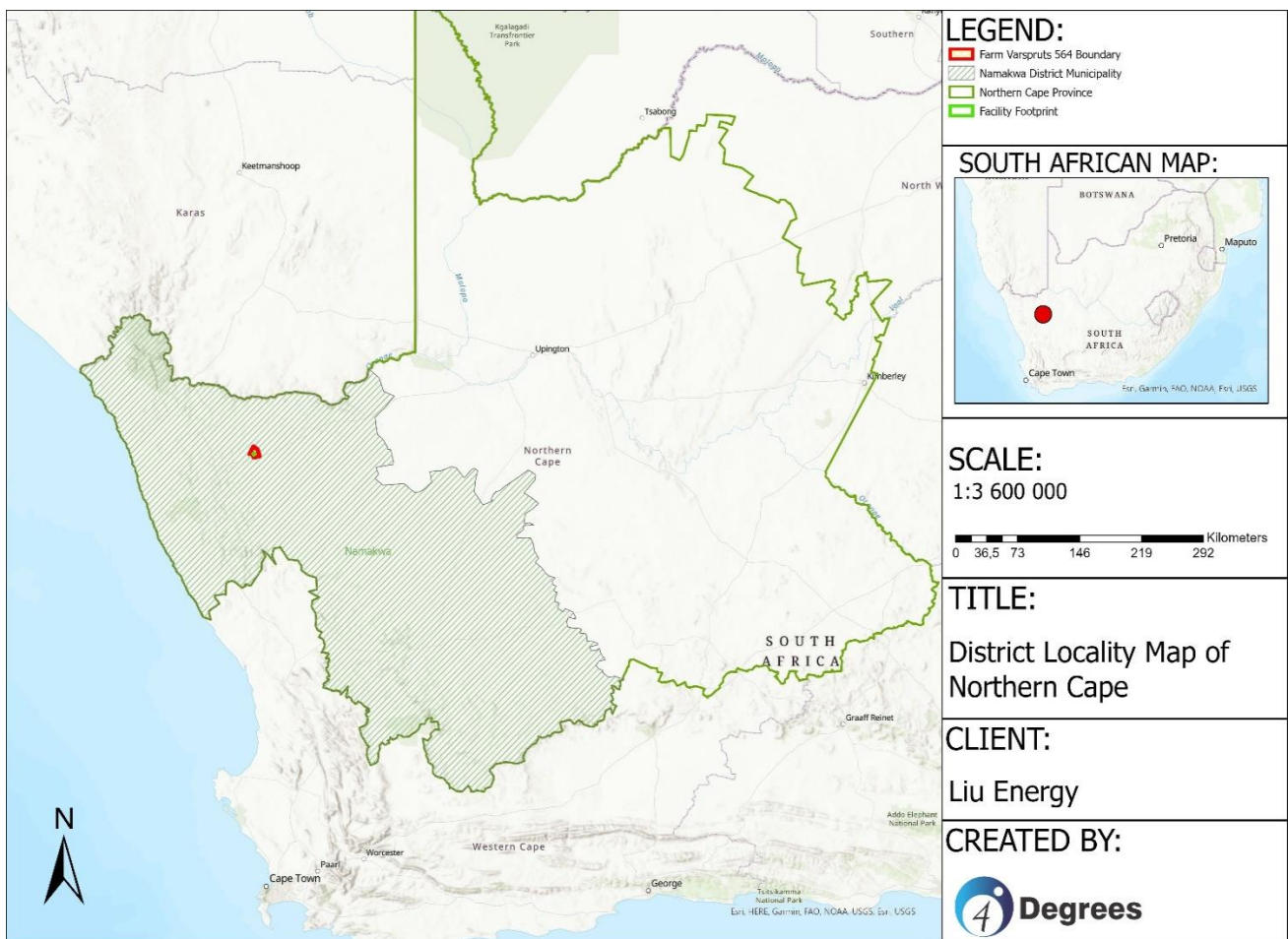


Figure 1: Regional Map of Liu Energy Solar Facility Project

1.2. Impact Assessment Process

The purpose of the EIA is to provide the Competent Authority, the Department of Environment, Forestry and Fisheries (DEFF) with comprehensive and adequate information on the proposed project to allow them to make an informed decision on whether the activity should be authorized or not. The EIA was conducted in line with the environmental legislation and EIA regulations of South Africa. The objectives of the EIA are to:

- i. Describe the proposed project, associated infrastructure, and environmental issues.
- ii. Identify and describe potential social and environment likely to be affected by the proposed project.
- iii. Identify, predict, and evaluate residual impacts and cumulative effects expected to arise during the construction and operational phases of the project.
- iv. Identify, assess, and specify methods, standards, and measures to be included in the detailed design, construction, and operational phases of the project to mitigate negative environmental impacts and enhance positive impacts.
- v. Identify environmental monitoring requirements during the construction and operational phases of the project.

1.3. Details of the Project Developer

Name of Applicant	Liu Energy (Pty) Ltd
Company Registration Number	2011 / 108522 / 07
Contact Person	Bongani Phillip
Postal Address	Postnet Suite 401 Private Bag x 121 Halfway House, 1685
Telephone No.	010 11 00 305
Email	bongani@liuenergy.co.za
Property Details	Farm Varsputs 564

1.4. Details of Environmental Assessment Practitioner

Liu Energy has appointed 4 Degrees as the Environmental Assessment Practitioner (EAP) in line with Regulation 12(1) to undertake the Basic Assessment Process for the proposed project. 4 Degrees declares that it is independent as required by Regulation 13(1) (a) of the EIA Regulations of 2014 as amended and has no vested interest in the proposed project. The EAP team was led by Mr. Gumisai Charles Chigurah who is registered as an Environmental Assessment Practitioner (EAP) with EAPASA and Ms. Reetsang Mothibi, a professional natural scientist registered in the field of environmental science with the South African Council for Natural Scientific Professions (SACNASP). The details of the project team are listed on the table below and a comprehensive CVs of the EAP is in Annexures.

EAP Contact Details

Gumisai Charles Chigurah

EAPASA Registration Number: 2019/727

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Table 1: Professional Team

Responsible Person	Field
Gumisai Charles Chigurah	Environmental Assessment Practitioner
Reetsang Mothibi (Pr.Sci.Nat)	Environmental Advisor and Biodiversity
Amantle Modjadji	Environmental Consultant and GIS
Tlamelo Matlala	Socio-Economic Assessment
Dr van Schalkwyk (D Litt et Phil)	Heritage Impact Assessment
Khayaletu Gqibitole Pr.Tech.Eng	Geotechnical Assessment

1.5. Requirements for a Basic Assessment Report

The table below references the relevant section in the report to confirm how the report complies with the requirements of Appendix 1 of the EIA Regulations.

Table 2: Requirements of the BA Report

Requirement of Appendix 1	Section in the Report
Basic Assessment Process	
1.	
Objective of the basic assessment process	
2. The objective of the basic assessment process is to, through a consultative process –	4
a. Determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;	
b. Identify the alternatives considered, including the activity, location, and technology alternatives;	3.2
c. Describe the need and desirability of the proposed alternatives;	3.1
d. Through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:	7.6
i. The nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and	
ii. The degree to which these impacts:-	
001. Can be reversed;	
002. May cause irreplaceable loss of resources; and	
003. Can be avoided, managed, or mitigated;	

Requirement of Appendix 1	Section in the Report
<p>e. Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to:</p> <ul style="list-style-type: none"> i. Identify and motivate a preferred site, activity, and technology alternative; ii. Identify suitable measures to avoid, manage or mitigate identified impacts; and iii. Identify residual risks that need to be managed and monitored. 	7
<p>Scope of assessment and content of basic assessment reports</p> <p>3. (1) A BA Report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include details of:</p> <p>a. Details of:</p> <ul style="list-style-type: none"> i. The EAP who prepared the report; and ii. The expertise of the EAP, including the curriculum vitae 	1.4
<p>b. The location of the activity, including:</p> <ul style="list-style-type: none"> i. The 21-digit Surveyor General code of each cadastral land parcel; ii. Where available, the physical address and farm name; iii. Where the required in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties 	2.2
<p>c. A plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or, if it is:-</p> <ul style="list-style-type: none"> 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 	2.2 Annexure 1 and 3
<p>d. A description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for, and a description of the activities to be undertaken including associated structures and infrastructure</p>	2.1
<p>e. A description of the policy and legislative context within which the development is proposed including:-</p> <ul style="list-style-type: none"> i. An identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and ii. How the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments 	4

Requirement of Appendix 1	Section in the Report
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	3.1
g. A motivation for the preferred site, activity, and technology alternative	3.2
h. A full description of the process followed to reach the proposed preferred alternative within the site including: i. Details of all alternatives considered	3.2
i. A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including- i. A description of all environmental issues and risks that were identified during the environmental impact assessment process; and ii. An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures	3.2
j. An assessment of each identified potentially significant impact and risk, including:- i. Cumulative impacts; ii. The nature, significance and consequences of the impact and risks; iii. The extent and duration of the impact and risks; iv. The probability of the impact and risk occurring; v. The degree to which the impact and the risk can be reversed; vi. The degree to which the impact and risk may cause irreplaceable loss of resources; and vii. The degree to which the impact and risk can be avoided, managed, or mitigated	7
k. Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report	7.7
l. An environmental impact statement which contains:- i. A summary of the key findings of the environmental impact assessment; ii. A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and iii. A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives	8.1
m. Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr	8.1

Requirement of Appendix 1	Section in the Report
n. Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation	N/A
o. A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed	N/A
p. A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any condition that should be made in respect of that authorisation	8.1
q. Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised	N/A
r. An undertaking under oath or affirmation by the EAP in relation to:- i. The correctness of the information provided in the reports; ii. The inclusion of comments and inputs from stakeholders and I&APs; iii. The inclusion of inputs and recommendations from specialist reports where relevant; and iv. Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties	9
s. Where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts	N/A
t. Any specific information that may be required by the competent authority	N/A
u. Any other matters required in terms of sections 24(4)(a) and (b) of the Act	N/A
(2) Where a government notice gazetted by the Minister provides for the basic assessment process to be followed, the requirements as indicated in such a notice will apply.	N/A

2. PROJECT DESCRIPTION AND LOCATION

2.1. Project Description

The Applicant, Liu Energy, is proposing to develop a 100 MW solar photovoltaic plant and associated electrical infrastructure on Farm Varsputs 564 near Springbok, in the Northern Cape. Farm Varsputs is located off the national road, N14, between Aggeneys and Springbok as illustrated on the maps below. The proposed development will comprise of the following components:

SOLAR FIELD

- Solar panels in a number of rows
- Inverter stations to convert direct current (DC) to alternate current (AC)
- 100MWh battery storage facility
- Internal substation to receive, convert and step-up electricity

ASSOCIATED INFRASTRUCTURE

- Internal road and paths
- Operation and maintenance building, including control room
- Septic tanks to service ablution activities
- Perimeter fencing for the solar PV site

The development footprint which includes the solar field and associated infrastructure is approximately 250 hectares, refer to a conceptual layout plan in Annexures. A detailed project layout and specifications of the project components will be formulated at final design phase. The table below provides a summary of the technical details for the project. The environmental assessment process does not include the transmission powerline, a separate process will be undertaken for the transmission powerline.

Table 3: Technical Details of the Proposed Solar PV Facility

Component	Description / Dimensions
Height of PV Panels	Min 1.6m
Area of PV Array	183 0482 m ² (184ha)
Number of inverters required	540
Area to be occupied by inverter	250 m ² (0.025ha)
Area to be occupied by transformer stations	250 m ² (0.025ha)
Area to be occupied by substation	3200 m ² (0.35ha)
Capacity of on-site substation	100MWAC
Area occupied by permanent laydown area	5000 m ² (0.5ha)
Area occupied by construction laydown area	215 279 m ² (21.5ha)
Area occupied by buildings	460 m ²
Length of internal roads	10 km
Width of internal roads	4m
Proximity to grid connection	<5km

Component	Description / Dimensions
Height of fencing	1.8m
Type of fencing	Diamond Mesh

2.2. Listed Activities

The table below illustrates the listed activities in terms of the EIA Regulations based on the project scope and technical details stated above.

Table 4: Listed Activities in terms of the Environmental Impact Assessment Regulations

Listed Activity	Description of the Proposed Activity that may trigger the listed activity
GRN 327 - Listing Notice 1	
<p>Activity 11 The development of facilities or infrastructure for the transmission and distribution of electricity-</p> <p>(i) Outside urban areas or industrial complexes with a capacity of more than 33KV but less than 275KV</p>	<ul style="list-style-type: none"> - The proposed development will have an internal substation and battery storage
<p>Activity 28 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:</p> <p>i. Will occur outside an urban area, where the total land to be development is bigger than 1 hectare</p>	<ul style="list-style-type: none"> - The current zoning for the development site is agriculture. Change of land-use application will be submitted to the Local Municipality prior to implementation of the project
GRN 325 – Listing Notice 2	
<p>Activity 1 The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more.</p>	<ul style="list-style-type: none"> - The proposed development will be for a maximum of 100MW

Listed Activity	Description of the Proposed Activity that may trigger the listed activity
<p>Activity 15</p> <p>The clearance of an area of 20 hectares or more of indigenous vegetation.</p>	<p>- The development footprint for the proposed project is approximately 250 ha.</p>
GRN 324 – Listing Notice 3	
<p>Activity 12</p> <p>The clearance of an area of 300 square meters or more of indigenous vegetation</p> <p>i. within a critical biodiversity area identified in bioregional plan</p>	<p>- The proposed project falls within a Critical Biodiversity Area 2; Ecological Support Area and Protected Area Expansion Strategy</p>

2.3. Project Location

The proposed project will be developed in an area of approximately 250 hectares on Farm Varsputs 564 near Springbok. The farm is bordered by the national road, N14 and the Karrasberge Protected Area to the south, and other farms to the north, east and west. The Groeipunt Substation is located approximately five (5) kilometres away to the south-west on Farm Arup. The proposed site is zoned as agricultural and change of land-use application shall be submitted to the Local Municipality for the relevant portion where the solar farm will be located. The property details are listed below:

GPS Coordinates: 29° 28' 16.284"S; 18° 17' 32.339"E

LPI Code: C05300000000056400000

The proposed project is located within the Springbok Renewable Energy Development Zone (REDZ) as illustrated on the figure below.

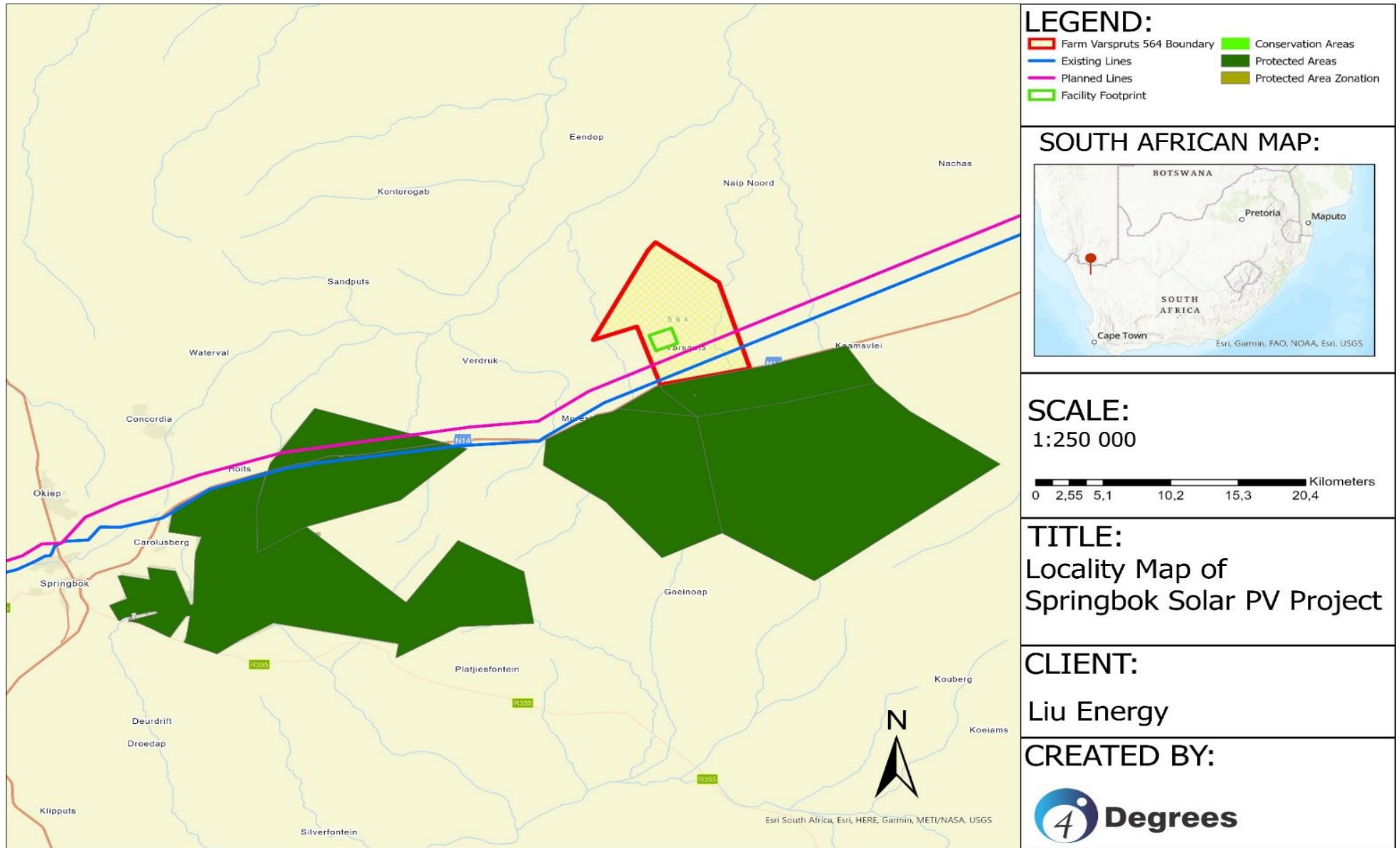


Figure 2: Locality Map

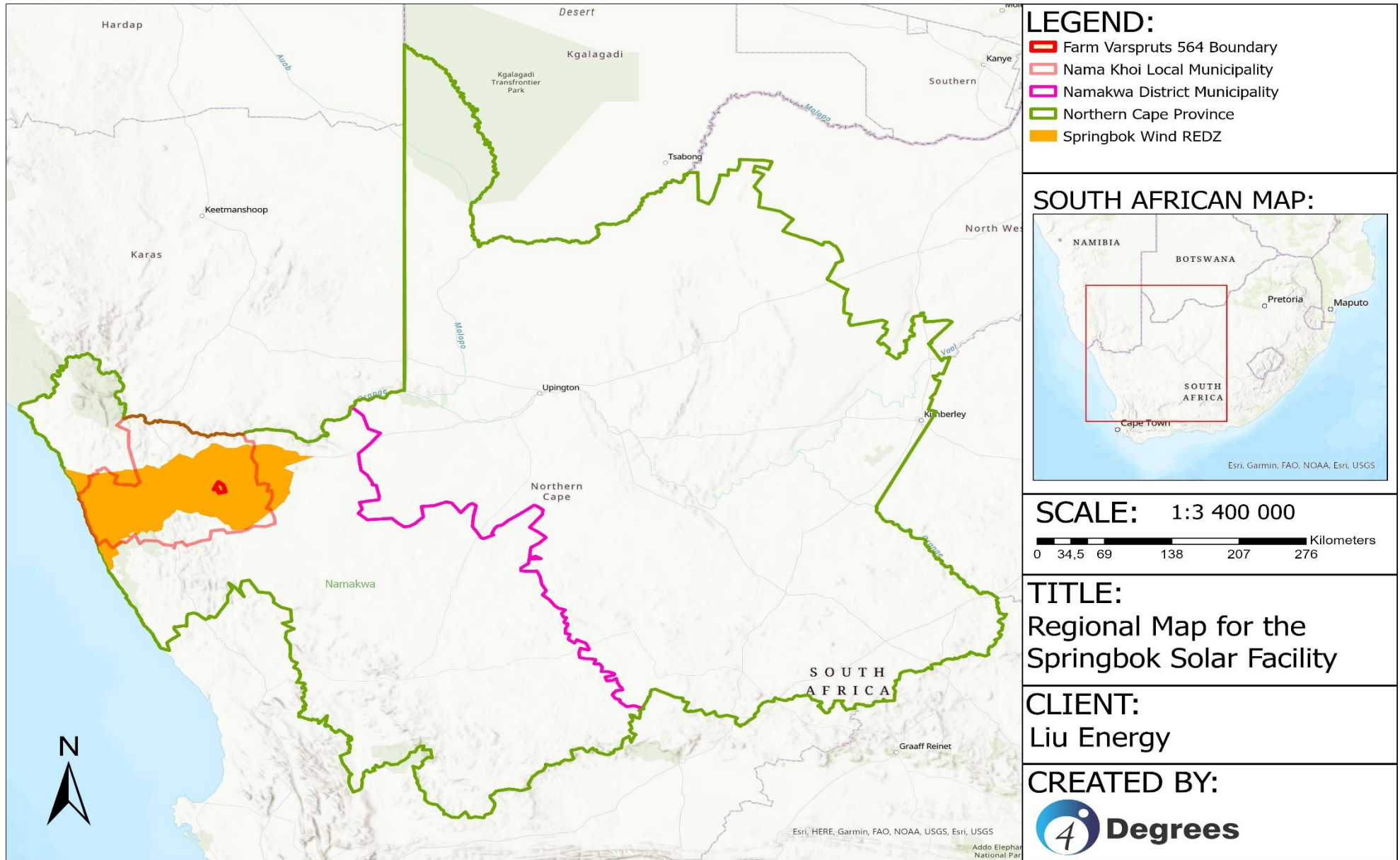


Figure 3: Regional Map with Renewable Energy Development Zone

2.4. Services: Water, Sewage, Waste and Power Supply

2.4.1. Water Supply

The farm is not serviced by Nama Khoi Local Municipal services. The water supply on the farm is by borehole and will continue to be supplied by borehole. A Water Use License (WUL) may be required in terms of Section 21 of the National Water Act (Act 36 of 1998). A confirmation will be sought from the Department of Water and Sanitation if the WUL is required, and the necessary authorisation applied for at the relevant stage of the project.

2.4.2. Sewage and Effluent

The proposed development is located on a farm that is not serviced by the Nama Khoi Local Municipality. The municipality does allow for installation of sanitation services by property owners where services cannot be provided. A septic tank will be installed on site – an approval is required from the Municipality prior to installation of the septic tank. The septic tank shall be designed by a Professional Civil Engineer registered with the Engineering Council of South Africa (ECSA). Liu Energy shall ensure that the septic tank:

- Complies with the relevant health and safety requirements and does not cause harm to persons on site and / or to the environment.
- Is located and operated not to cause a nuisance through noise or smell.
- Effluent from the septic tank is disposed in line with the conditions of approval from the municipality.
- No rainwater, stormwater or effluent other than that approved by the municipality is discharged into the tank.
- Regular maintenance and inspections are undertaken on the tank for continued safe operation of the facility

2.4.3. Access Road

The proposed solar photovoltaic facility will be accessed through the existing gate which is located on the boundary of the property off the Aggeneys – Springbok Road (N14) as illustrated on the image below. There are currently two (2) access gates to the property as illustrated on the Layout Map. The recommended access to be used for the project is Access Gate 2. This will ensure the activities of the Solar PV plant are separate from the main activities of the farm. This will also ensure that proper security measures are implemented for the project.

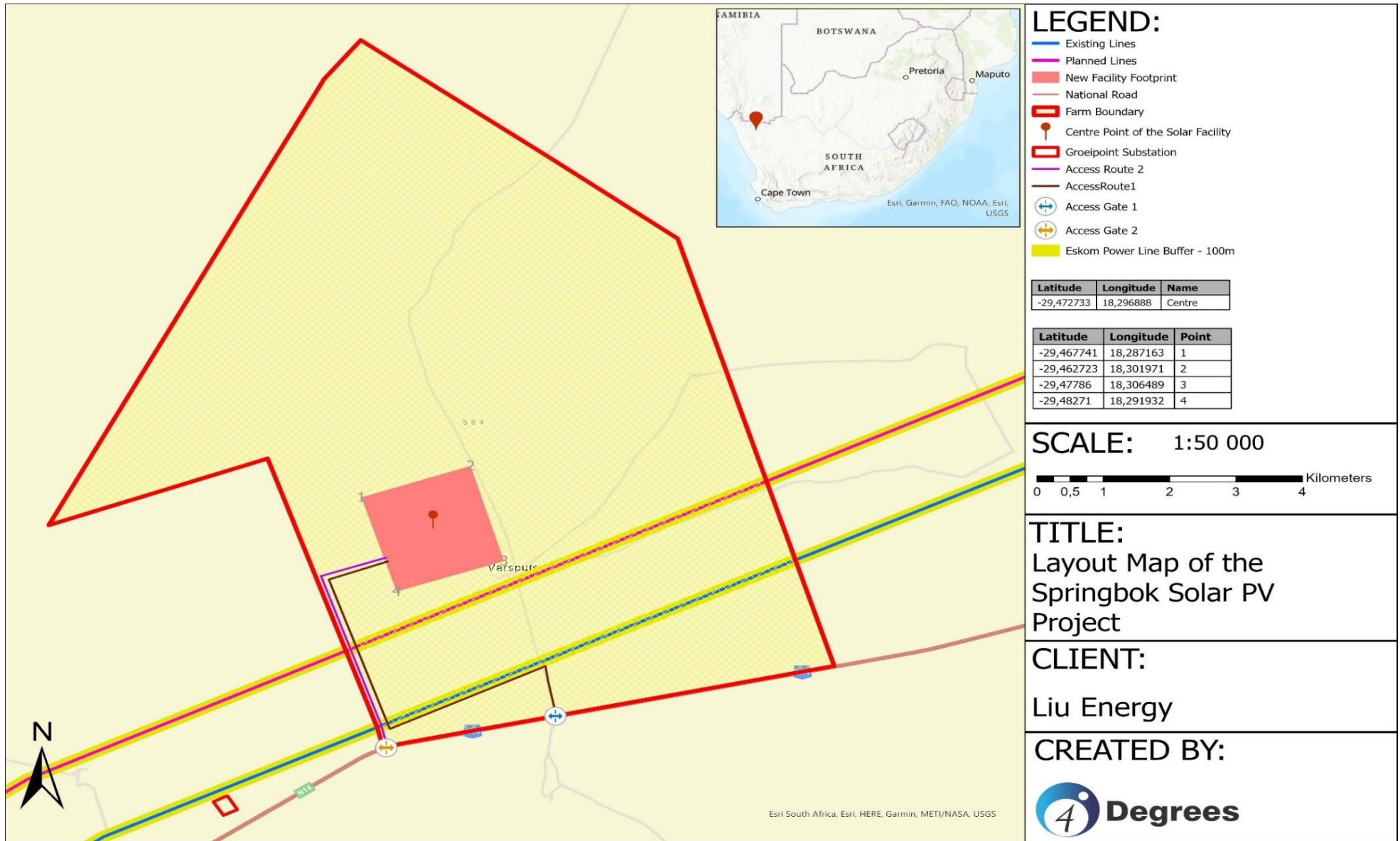


Figure 4: Layout Map for Liu Energy Project

2.5. Project Development Cycle

The proposed project can be divided into three (3) phases, namely, Construction Phase, Operational Phase and Decommissioning Phase. The environmental impact assessment process identifies potential impacts at all three (3) phases and recommend mitigation measures to minimise negative environmental impacts and enhance positive impacts. The impact assessment also identifies cumulative impacts with other renewable energy projects within the area.

2.5.1. Construction Phase

The construction phase includes preparatory works typically associated with development of solar PV developments, and will consist of the following key activities:

- Vegetation clearance in the areas required for building infrastructure and brush cutting in the areas of panel installation.
- Establishment of a laydown area or construction camp.
- Transportation of equipment and material to the site.
- Stripping and levelling 50mm to 100mm of topsoil for 4m wide internal roads.
- Excavation of trenches for low voltage cabling.
- Erection of construction fence.
- Substation construction and associated earthworks and tracker foundations; and installation of the solar PV panels and associated infrastructure (operations buildings).

2.5.2. Operational Phase

The operational phase includes the following activities:

- The generation of energy from the proposed Solar PV facility for electricity supply.
- Periodic inspections and maintenance of the Solar PV facility.

2.5.3. Decommissioning Phase

The proposed solar facility is expected to be operational for approximately 25 to 30 years. Should the plant not continue after the initial contractual period, the facility will be decommissioned, and the area rehabilitated. This would entail returning the land to its pre-construction state.

3. NEED, DESIRABILITY AND PROJECT ALTERNATIVES

3.1. Need and Desirability

The EIA Regulations requires that developments consider the need and desirability of projects. The need and desirability assessment are based on the principles of sustainability that are guaranteed by the Constitution of South Africa and NEMA. Addressing the need and desirability of a project is a way of ensuring that the development meets sustainable development requirements. Therefore, it is important that the development is ecologically sustainable, as well as socially and economically justifiable. The Liu Energy Solar PV facility and associated infrastructure meets the ecological and socio-economic requirements of the need and desirability as highlighted in the section below.

3.1.1. Ecological Sustainability

South Africa heavily depends on coal for the generation of electricity with the Department of Energy indicating that 77% of the country's power supply was from coal in 2017. Coal is a non-renewable resource and creates wastes that have long-term impacts on the environment. Coal also results in greenhouse gas emissions which have long-term impacts on the atmosphere and climate. According to the DEFF and publicly available information, South Africa is the 12th largest greenhouse gas emitter in the world and Eskom is the largest greenhouse gas emitter in the country because of coal burning during electricity generation. The development of the Liu Energy solar PV facility will contribute towards reducing greenhouse gas emissions in the country.

Parts of farm Varsputs 564 are sensitive with drainage lines in some areas. The location of the project on the farm was strategically identified in an area that is less sensitive to ensure minimal disturbance to the environment.

3.1.2. Social and Economic Development

The proposed project is located in the Nama Khoi Local Municipality. The area has low employment levels. It is envisioned that there will be a number of temporary employment opportunities that will be created during the construction phase. The project will also create a number of full-time opportunities during the operational phase. Furthermore, the project is planned to bid for the Department of Energy's Independent Power Producer programme. This will contribute to the strengthening of the national power grid which will ultimately lead to investment and economic opportunity for the region and the country as a whole.

3.2. Project Alternatives

3.2.1. No-go Alternative

The proposed project is intended to be developed to participate in the Independent Power Producer (IPP) programme of the Department of Energy (DoE) to strengthen power supply in the country. The no-go alternative is an undesirable option.

3.2.2. Site Alternatives

Three (3) sites were identified as potential location for the Solar Photovoltaic Facility as follows: Alternative 1 – Farm Hamburg near Kimberley; Alternative 2 – Farm Alexandersfontein near Kimberley and Alternative 3 – Farm Varsputs 564 near Springbok – refer to the Alternatives Map below. All three (3) sites were located areas identified by the DEFF Renewable Energy Development Zone (REDZ) and are discussed in detail below.

ALTERNATIVE 1 – HARBURG AND TRIANGLE FARMS

The site was on Farm Hamburg 213 which is located approximately 40 kilometres from Kimberley. The initial assessment found that the farm was too far from the feeder substation, Boundary Substation. This would have resulted in the project being economically not feasible.

ALTERNATIVE 2 – FARM ALEXANDERSFONTEIN

The second identified location was farm Alexanders Fontein 123 which was located approximately 10 kilometres from Kimberley. The initial assessment identified the following issues that could have negative impact on the outcome of the environmental assessment:

- i. The site was located adjacent to the Kimberley Airport which may have created a glaring impact on the planes during landing and take-off.
- ii. The farm was identified as a breeding site for Secretary birds and Weaver birds.
- iii. The site was too close to the small-scale farming community of Ronaldsvalei which may have resulted in negative social impacts.
- iv. Part of the identified site was on a floodplain which created restrictions on the layout options.

ALTERNATIVE 3 – FARM VARSPUTS 564

The site is approximately 5 kilometres from the Groeipunt Substation. The size of the farm is large, this allowed flexibility in terms of identifying the suitable site for the proposed solar facility to avoid sensitive areas. The total farm size is 6872 and the development footprint is approximately 250 ha which is less than 4% of the total farm size.

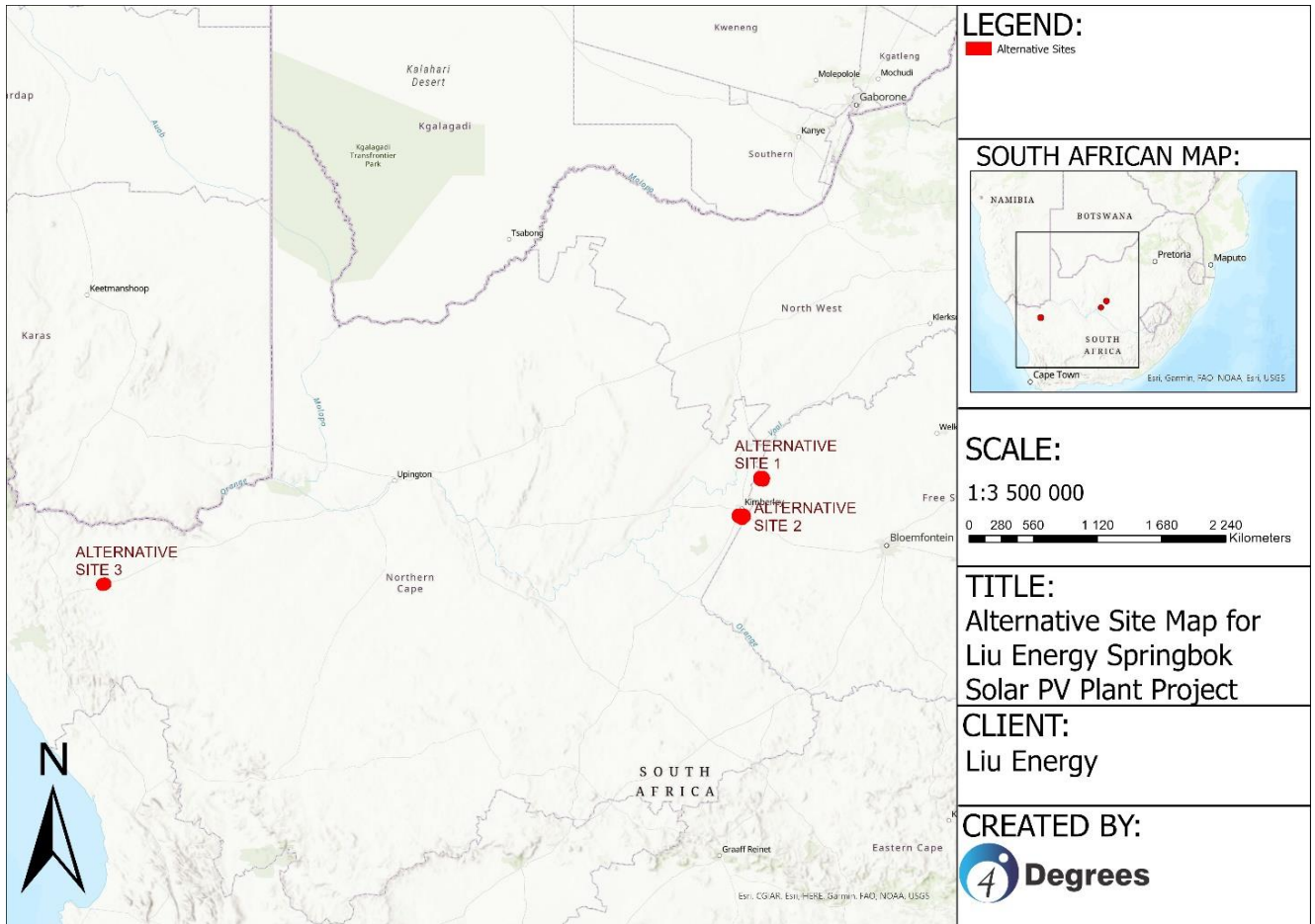


Figure 5: Site Alternatives for the Proposed Liu Energy Solar Facility

3.2.3. Land Use Alternatives

The site falls within an area zoned as agriculture and it is currently being used for agricultural activities. The main agricultural activity is small stock grazing, sheep grazing. The Namakwaland is generally classified as having low agricultural potential and the area has experienced ongoing droughts for the past six (6) years – refer to the image below for the pictures taken on the day of the site visit. The development of the Solar PV facility on the property will allow the farmer to have an alternative source of income by sub-letting the property for the proposed project.



Figure 6: Image of the Proposed Development Site

3.2.4. Technology Alternatives

The technologies considered are Photovoltaic and Concentrated Solar Power (CSP) whereby the preferred technology for the project is photovoltaic due to the following reasons:

- There are no greenhouse gas emissions from the technology
- PV are versatile and can generate electricity anywhere
- The area required for the generation of electricity is significantly lower than for CSP
- The technology is cost effective and requires minimal maintenance

3.2.5. Layout Alternatives

A preliminary design has been undertaken for this project to determine the suitable areas within the 250-ha total project area. Additionally, studies to inform the environmental sensitivity of the site have been undertaken to indicate sensitivities within the proposed area and create buffers. The preliminary layout is shown in the image below and was deliberately developed to avoid sensitive areas. It is important to note that the area assessed during the Environmental Assessment process is 250 ha which is larger than what the Solar PV facility require. This is to allow for flexibility during the final design phase. Any revisions and/or updates of the layout within the 250-ha area will not be regarded as a change in project scope.

4. LEGAL FRAMEWORK

4.1. Guiding Legislation

The Basic Assessment process and report has been informed by the legislation, regulations, protocols, and guidelines outlined in the table below.

Title of Legislation or Regulation	Applicability
National Environmental Management Act (Act 107 of 1998) as amended	Implementation of the environmental management principles and duty of care provisions
NEMA EIA Regulations of 2014 as amended on the 7 April 2017	Provides procedures to be followed when undertaking the assessment. All the activities triggered by the Regulations are listed in the report
NEM: Waste Act (Act 59 of 2008)	Aimed at protecting the health and environment by providing reasonable measures for prevention of pollution and ecological degradation. Liu Energy facility will produce waste that will need to be managed in line with the requirements of the Act and municipal by-laws
NEM: Biodiversity Act (Act 10 of 2004)	Provides for the management of Biodiversity in the country. The Liu Energy solar PV facility is in an agricultural land that has alien and invasive plant that need to be managed for sustainable use of resources.
National Water Act (Act 36 of 1998) as amended	The Act provides for the reform in water use in the country. It is aimed at addressing the sustainability, equity, and efficiency to guide the protection, use, development, conservation, management, and control of water resources.
Water Services Act (Act 108 of 1997)	The Act provides for the basic water supply and basic sanitation. The basic supply of water and sanitation is the function of the Local Municipality
National Heritage Resources Act (Act 25 of 1999)	The Act is aimed at introducing the integrated and interactive system for the management of natural heritage resources. Of relevance to the project, the archaeological and cultural resources for the area has been rated low.

Title of Legislation or Regulation	Applicability
Spatial Planning and Land Use Management Act (Act 16 of 2013)	The objective of the act is to provide for spatial planning and land-use in the country. The proposed project is located in an area designated for agriculture. No land-use change, or rezoning will be required for the project.
National Development Plan: A Vision for 2030	The Plan was developed by the government with the objective of eliminating poverty and reducing inequality. The Plan has culminated in a number of programmes and initiatives that Liu Energy solar PV will directly and indirectly benefit from.
Department of Environmental Affairs Guidelines on: <ul style="list-style-type: none"> - Public Participation - Need and Desirability 	The guidelines outline the measures to be implemented for prospective projects to meet the requirements of NEMA. The public participation process was undertaken in line with the requirements of the guidelines as far as practically feasible. The project meets the needs and desirability criteria – it is located in an area with low ecological sensitivity and the implementation of the project will meet the socio-economic objectives by contributing to the local GDP.

4.2. Overview of National Legislation

4.2.1. Constitution of South Africa

The South African legislation has undergone rapid transformation and various laws and policies were promulgated with a strong emphasis on environmental concerns and the need for sustainable development. The Constitution of South Africa (No. 108 of 1996), herein referred to as the Constitution, provides for environmental rights. Section 24 of the Constitution 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:

- i. Prevent pollution and ecological degradation*
- ii. Promote conservation and*
- iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable*

The Constitution is supported by the National Environmental Management Act (Act 107 of 1998), herein referred to as NEMA, which is in turn supported by a number of subsidiary and complimentary legislations.

4.2.2. National Environmental Management Act (Act 107 of 1998)

The NEMA provides the environmental legislative framework for South Africa and requires that activities that may have a potential impact on the environment, socio-economic conditions, and cultural heritage be investigated prior to commencement. The results of such investigation must be reported to the competent authority. Procedures for the investigation and communication of the potential impact of activities are contained in Section 24(7) of the Act.

The proposed development will require the consideration and implementation of environmental management practices in all stages of the project. An application for EA for the proposed project is submitted in terms of GNR 326 of the EIA Regulations promulgated under NEMA.

4.2.3. National Environmental Management: Biodiversity Act (Act 10 of 2004)

The National Environmental Management: Biodiversity Act (Act 10 of 2004), herein referred to as NEMBA, provides for the management and conservation of national biodiversity. The NEMBA's primary aims are:

- Protection of species and ecosystems that requires national protection,
- Sustainable use of indigenous biological resources
- Fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources.

In addition, the NEMBA provides for the establishment and functions of a South African National Biodiversity Institute (SANBI). SANBI was established by the NEMBA with the primary purpose of reporting on the status of the country's biodiversity and conservation status of all listed threatened or protected species and ecosystems.

4.2.4. National Environmental Management: Protected Areas Act (Act 53 of 2003)

The Act regulates the protection of geographical areas to be protected and describes the type of protected areas at a National, Provincial and Local level. The Act provides for:

- The protection and conservation of ecologically viable areas representative of the country's biological diversity, natural landscapes, and seascapes.
- The establishment of a national register of all national, provincial, and local protected areas.
- The management of protected areas in accordance with the national norms and standards.
- For intergovernmental co-operation and public consultation in matters concerning protected areas.

Farm Varsputs 564 is located adjacent to the recently proclaimed protected area, Karrasberge Protected Area

4.2.5. National Heritage Resources Act (Act 25 of 1999)

The National Heritage Resource Act (Act 25 of 1999), herein referred to as NHRA aims to protect national and provincial heritage resources in the country. The Act provides for the protection of all archaeological and paleontological sites, the conservation and care of cemeteries and graves by the South African Heritage Resources Agency (SAHRA), and lists activities which require any person who intends to undertake a development to notify the responsible heritage resources agency and furnish details regarding the location, nature, and extent of the proposed development.

In terms of the Act, the Heritage Impact Assessment is required for a number of projects - sections of the Act that are applicable to the proposed project are listed below:

- No person may, without a permit issued by the responsible heritage resources authority-
 - destroy, damage, excavate, alter, deface, or otherwise disturb any archaeological or paleontological site or any meteorite;
 - destroy, damage, excavate, remove from its original position, collect, or own any archaeological or paleontological material or object or any meteorite.
- Any person who intends to undertake a development categorised as-
 - any development or other activity which will change the character of a site exceeding 5 000 m² in extent, 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.

A Heritage and Cultural Assessment was undertaken as part of the Basic Assessment process for the proposed project. A copy of the specialist report is attached in Annexures. According to the assessment, no sites of historical significance were identified, and the area is rated as low for heritage and palaeontology.

4.2.6. *National Environmental Management: Waste Act*

The National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM:WA) is a subsidiary and supporting legislation to the NEMA. The Act is a framework legislation that provides the basis for the regulation of waste management. The Act also contains policy elements and gives a mandate for further regulations to be promulgated.

Waste handling, storage and disposal during the construction and operational phases of the project must be undertaken in accordance with the requirements of this Act and the Best Practicable Environmental Options which will be incorporated into the site-specific Environmental Management Programme (EMPr).

4.2.7. *Occupational Health and Safety Act (Act 85 of 1993)*

The Occupational Health and Safety Act (Act 85 of 1993), herein referred to as the OHSAct, and its regulations are applicable to the proposed project. This includes the Construction Regulations of 2014 which are promulgated under Section 43 of the Act. Adherence to the country's OHSAct and its requirements is critical for safe working conditions during the construction and operational phases of the project.

4.2.8. *Environmental Impact Assessment Regulations*

The EIA Regulations, as amended, includes three (3) listing notices (GNR 327, 325 and 324) which identify activities that are subject to either a Basic Assessment or Scoping and Environmental Impact Assessment (S&EIA) to obtain an Environmental Authorisation. The table below outlines the listed activities that are triggered by the proposed project. The activities below are from both Listing Notice 1 and Listing Notice 2. The process followed for the environmental assessment is the Basic Assessment as the project falls within the Renewable Energy Development Zone (REDZ).

5. DESCRIPTION OF THE RECEIVING ENVIRONMENT

This section focuses on the receiving environment with relation to the proposed solar photovoltaic facility.

5.1. Climatic Conditions

According to the South African Weather Service (SAWS), the Northern Cape is experiencing stressed vegetation conditions compared to the same period in previous years. The Northern Cape, including the Namakwa area, is being gripped by the worst drought in 100 years. The publicly available data indicates that the Springbok area has received reduced rainfall rates over past years as illustrated in the figure below.

Table 5: Climatic Conditions for Springbok Area

Month	Max Temp °C	Min Temp °C	Average Temp °C	Rain Days	Sunny Hours
January	30	18	22	2	11.9
February	30	18	22	3	11.4
March	29	17	21	3	10.6
April	26	15	18	2	9.5
May	22	11	14	2	8.6
June	17	8	11	2	7.8
July	17	7	11	2	8.1
August	19	8	11	3	8.3
September	23	10	14	2	9.4
October	26	13	17	1	10.7
November	27	14	19	2	11.3
December	29	15	20	2	12.0

5.2. Biodiversity

The proposed project is located in the Nama Karoo biome, in the Bushmanland Bioregion. The vegetation unit for the area is classified as Bushman Arid Grassland and Bushman Sandy Grassland. The Nama Karoo biome is high in species diversity and contains approximately 3500 species in 135 families and 725 genera. Approximately 25% of the vegetation in the area is endemic and species diversity is not evenly distributed throughout the region but concentrated in specific areas. This makes it critical to ensure that rare species are not unnecessarily disturbed during project

development. The DEA Screening Report indicates that the proposed project is located in a Critical Biodiversity Area 2 and Ecological Support Area.

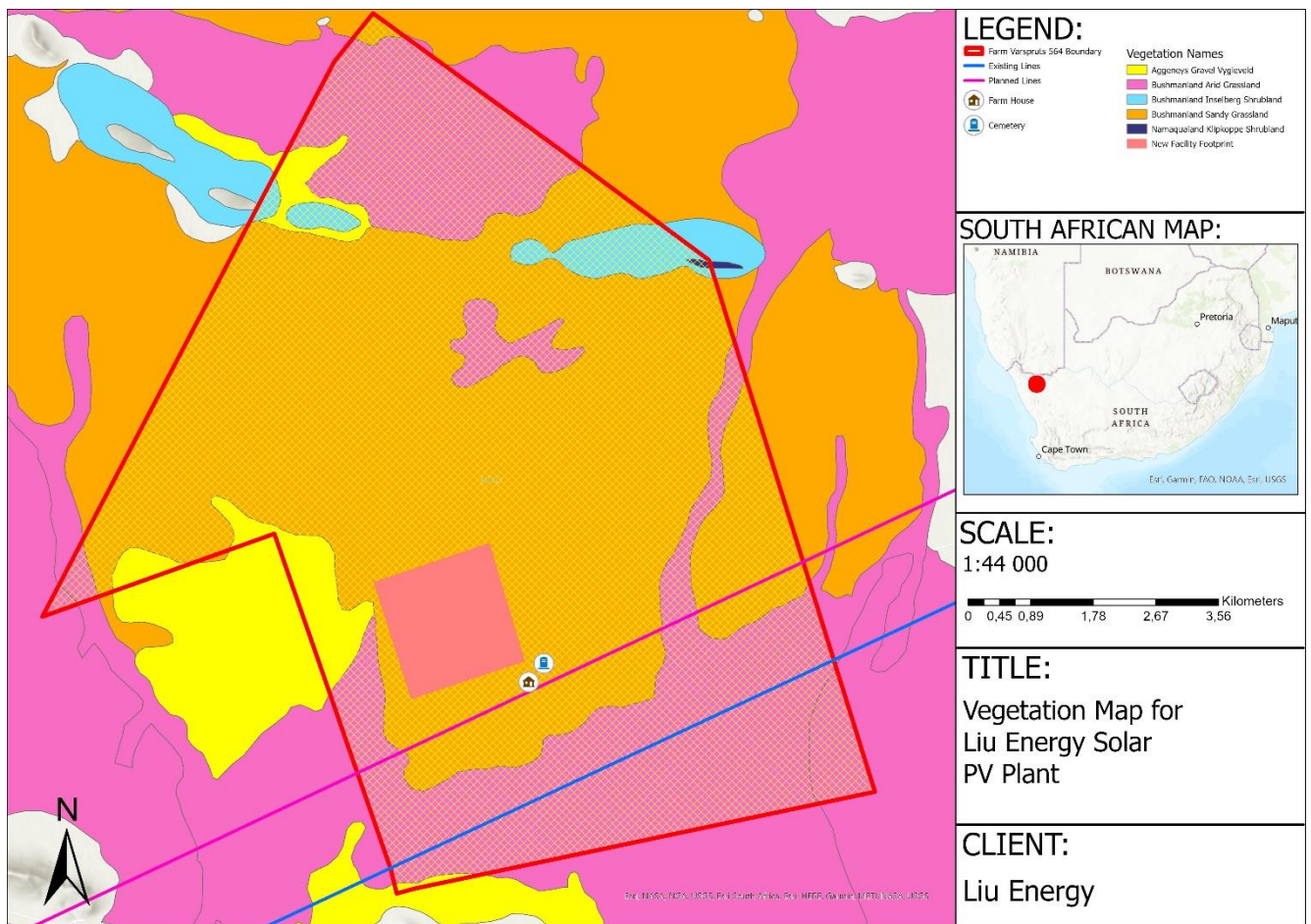


Figure 7: Vegetation Map for Liu Energy Solar Facility

Critical Biodiversity Area is defined as the area of the landscape that need to be maintained in a natural or near natural state in order to ensure that continued existence and functioning of species and ecosystems and delivery of ecosystem services.

Ecological Support Area is defined as area that is not essential for meeting biodiversity representation targets / threshold, but which nevertheless plays an important role in supporting the ecological functioning of critical biodiversity areas and/or delivering ecosystems services that support socio-economic development such as water provision, flood mitigation and carbon sequestration.

Maintaining the CBA areas in a natural state can include a variety of biodiversity compatible land-use and resource uses. The degree of restriction on land use and resource use in the ecological support area can be lower than that recommended for critical biodiversity areas. The Screening Report further identified sensitive species that have been identified by the South African National

Botanical Institute (SANBI). The identified sensitive species were not present at the initial site identified during the site visit. No sensitive plant species should be removed without a permit from the Northern Cape Nature Conservation.



Figure 8: image of the Proposed Development Site

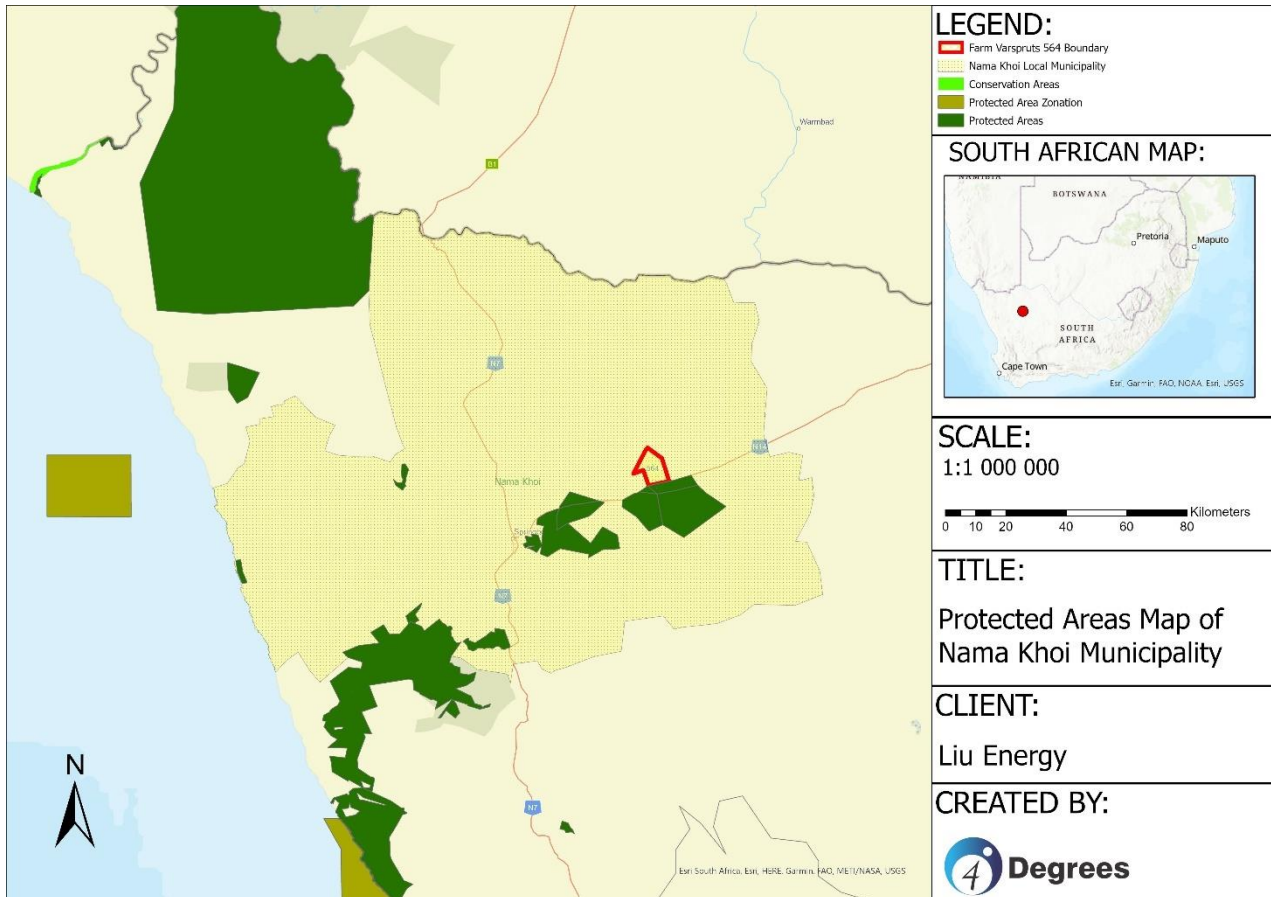


Figure 9: Protected Areas in close vicinity to the proposed development site

The Karresberge Protected Areas was proclaimed in 2020. The protected area is opposite Farm Varsputs 564 and is made up of four (4) reserves, Areb, Karas, Marietjie van Niekerk and Smorgenskadu Nature Reserves. The Protected Area is approximately three (3) kilometres away from the proposed development site. Farm Varsputs 564 is currently being used for livestock farming and the vegetation disturbance is through sheep grazing. It is expected that the proposed project can assist in meeting the CBA targets – the solar panels will be installed at an elevated height with minimal disturbance to the vegetation. This will allow the vegetation to re-establish over time as there will be minimal disturbance.

5.3. Topography and Landscape

The farm is located on an area that is generally flat as illustrated on the images taken during the site visit. There are no mountains or elevated features that may create a challenge for the proposed project.

5.4. Soil, Land Capability and Agriculture

The current land use at the proposed site is agriculture, the main activity undertaken is livestock farming mainly sheep farming. The area generally has low agricultural potential and land capability with a large surface area required for the few livestock currently supported. No crop farming is being undertaken on site.

5.5. Heritage and Palaeontology

The cultural heritage profile of the region is rated low by the Screening Report and was confirmed as such by the Specialist study. Most frequently found are stone artefacts dating to the Middle Stone Age. Sites containing such material are usually located along the margins of water features, small hills, and rocky outcrops. According to Orton, 2016a, such surface scatters or 'background scatter' has limited significance. In addition to the lithic materials, San and Khoi rock art dating to the Later Stone Age occur in the larger region. However, these are mostly confined to the more mountainous regions where shelters and rock faces are to be found. The colonial period, in all its complexity, largely manifests as individual farmsteads, burial sites and infrastructure features such as roads, railways and power lines.

An archaeologist was appointed to conduct an assessment, the following sites, features, or objects of cultural significance were identified:

- i. Three probable MSA tools were found in a pan-like depression. The tools were identified over a transect distance of approximately 70 m, indicating a very low presence. The tools are made of quartz and can be classified as scrapers.
- ii. The main farmstead on the property is visible on the 1960 version of the aerial photographs, and is therefore deemed to be older than 60 years.
- iii. An informal burial site with five (5) graves. The graves belong to former landowners, all with the surname of Van den Heever. The death dates on the headstones range between 1973 and 2014.

The impact analysis of cultural heritage resources under threat of the proposed prospecting activities based on the scope of the project is rated as low. The allocated field rating is 4C, no additional recordings and/or permits from SAHRA or PHRA are required prior to the commencement of the project. The Paleontological Sensitivity Map (<http://www.sahra.org.za/sahris/map/palaeo>) indicate that project area has a low sensitivity of fossil remains to be found and therefore no paleontological studies are required. However, a protocol for finds is required.

5.6. Surface Water

Farm Varsputs 564 is located in an area that is generally arid with low rainfall. There are no water bodies on the property, however that are a number of drainage lines on that farm. The drainage lines were critical in identifying a suitable site on the farm – due care was taken to ensure that the sensitive areas are avoided in the final sighting of the proposed development.

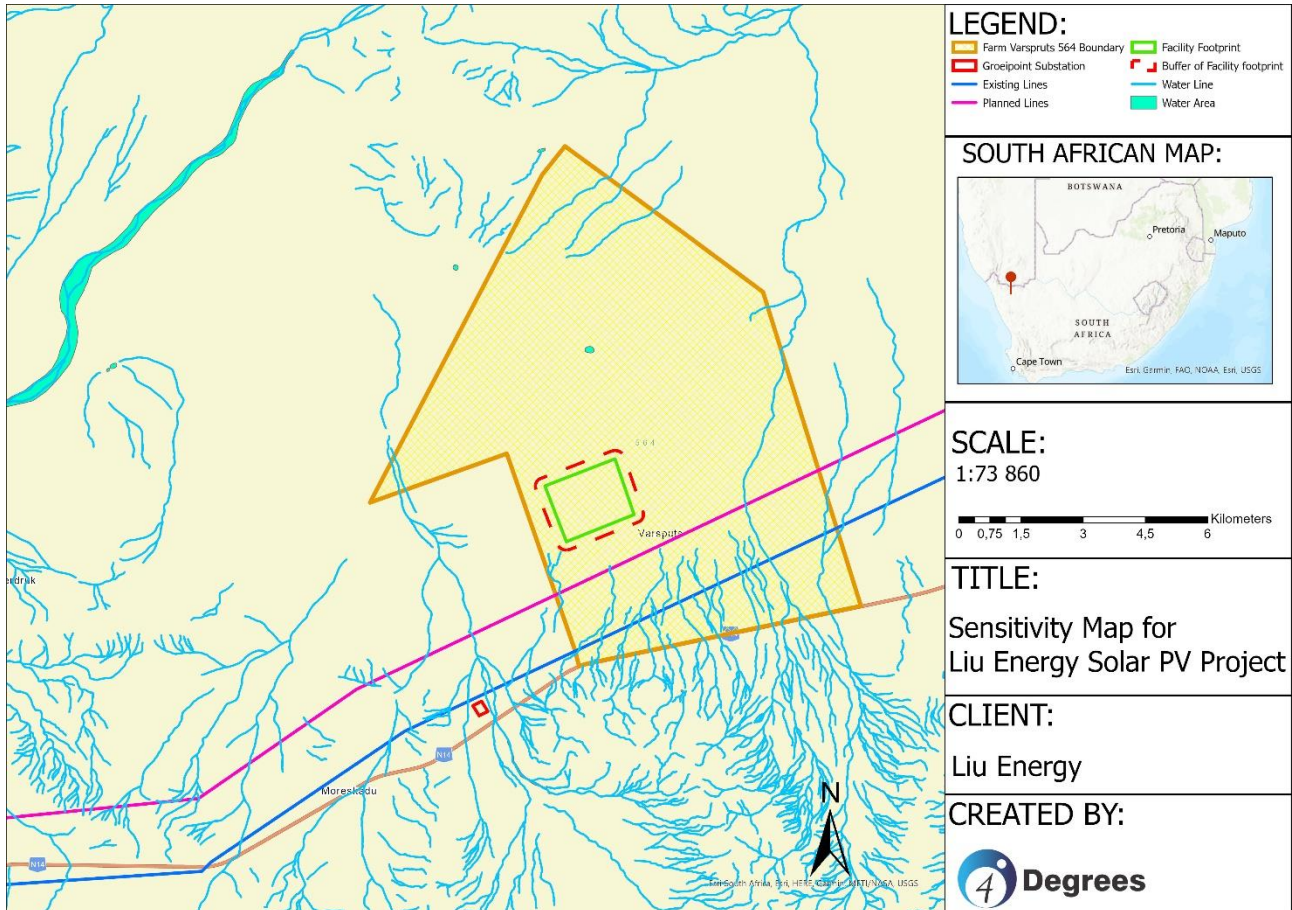


Figure 10: Waterlines on the Farm Varsputs 564

5.7. Socio-Economic Profile

5.7.1. Regional Context

The Namakwa District Municipality (NDM) is situated in the North-Western corner of South Africa, it is bordered by the Atlantic Ocean to the West and by Namibia to the North. It shares its borders with the ZF Mgcawu and Pixley ka Seme Districts of the Northern Cape Province to the North-East and East, respectively, refer to the map below for the geographical location of the proposed development in the Namakwa District Municipality. The district municipality is bordered by the Western Cape Province to the South, specifically, the West Coast, Cape Winelands, and Central Karoo District Municipalities.

The district is one of five districts in the Northern Cape Province and situated in the western part of the province. The Namakwa District is the largest district geographically in South Africa with a total area of 126 836 km. The Namakwa District Municipality comprises of six local municipalities, namely Richtersveld Municipality; Nama Khoi; Khai Ma Municipality; Kamiesberg Municipality; Hantam Municipality and Karoo Hoogland Municipality.

Even though the NDM is the largest in the country in terms of geographical setting it is also found to be the least populated according to Stats SA data; the latest population according to the 2011 census, the population was 115 842 and the survey of 2016 recorded the population at 115 488 which is a slight decline in population numbers.

The breakdown of the population in the district indicates that the coloured population is at approximately 83.2% which makes it the largest, followed by about 8.7% white population while those classified as Black African make up 6.8% with the Asian/Indian population at 0.5 percent and those who are classified as “Other” making up 0.7% of the population.

The widely spoken language in the Municipality is Afrikaans with a total population of 95 percent listing it as their home language, followed by a 0.9% of the population listing IsiXhosa as their home language and 0.7% indicated English as their home language.

5.7.2. Local Context

The proposed project is in the Nama Khoi Local Municipality, the municipality is in the North-west part of the Northern Cape Province covering a total area of 14 921km. The Municipality is regarded as the economic hub and administrative area of the Namakwa District Municipality, the main town in the Municipality is Springbok. The nearest towns to the proposed development footprint are Carolusberg, Corcodia and Springbok,

According to Stats SA and the Community Surveys of 2016, the total population of Nama Khoi increased from about 43 841 in 1996 to about 46 512 persons in 2016. The total increase of male persons is about 1389 while the increase by female is 1282. Even though the increase was in the male population, the data show that there are more females than males in the municipality. There is a general decrease of 0.3% of the population in the municipality between 2011 and 2016. This is consistent with the decline identified in the District Municipality population during the same period

Demographics indicates a decline of the population notably between the period of 2011 and 2016. The appears to be more female than there are males despite the decrease in growth. The Coloured population has the most representation at 88.10%; followed by the white with a representation of

6.60%; with the black population at 4.20%, the Indian/Asian and “Other” at 0.50% and 0.80% respectively.

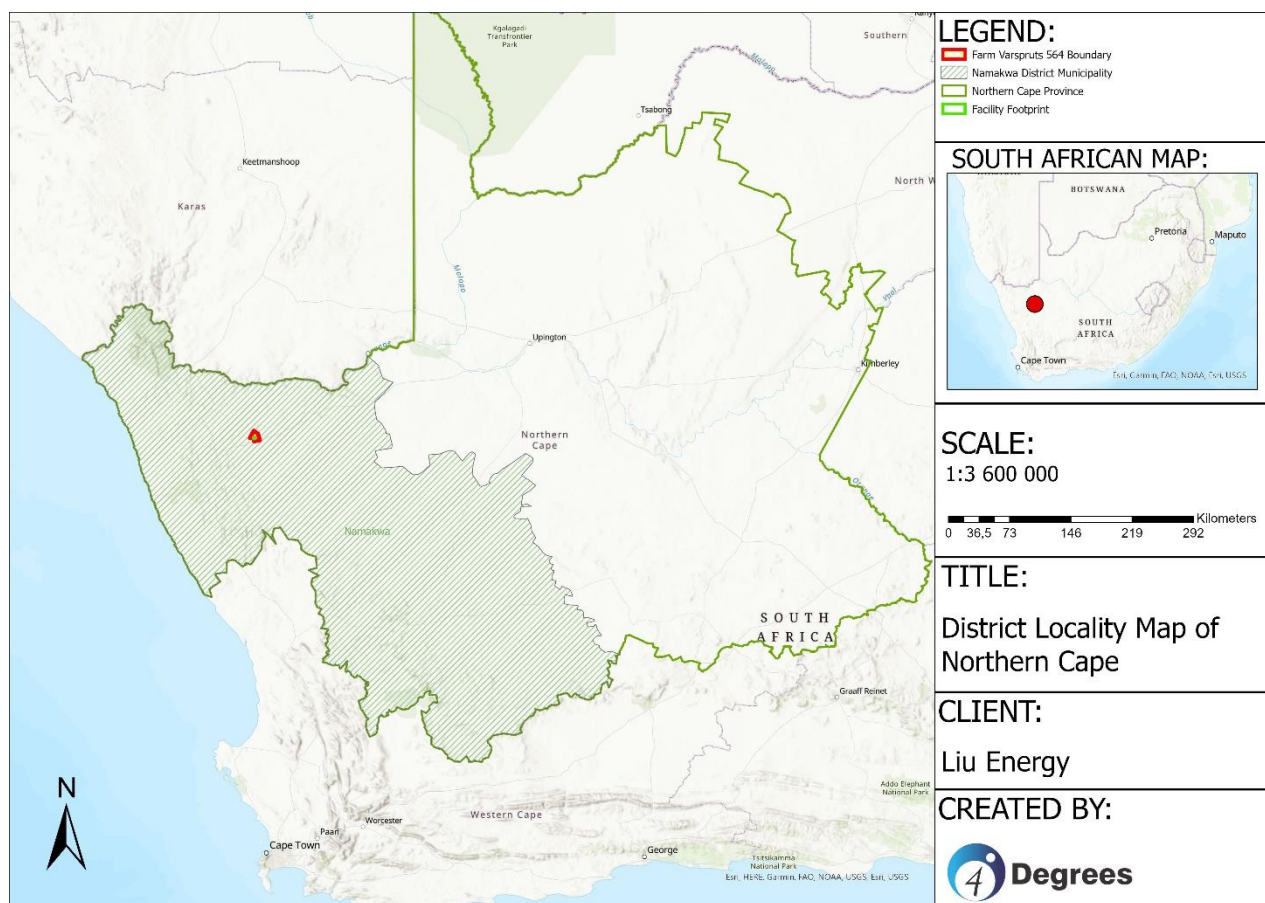
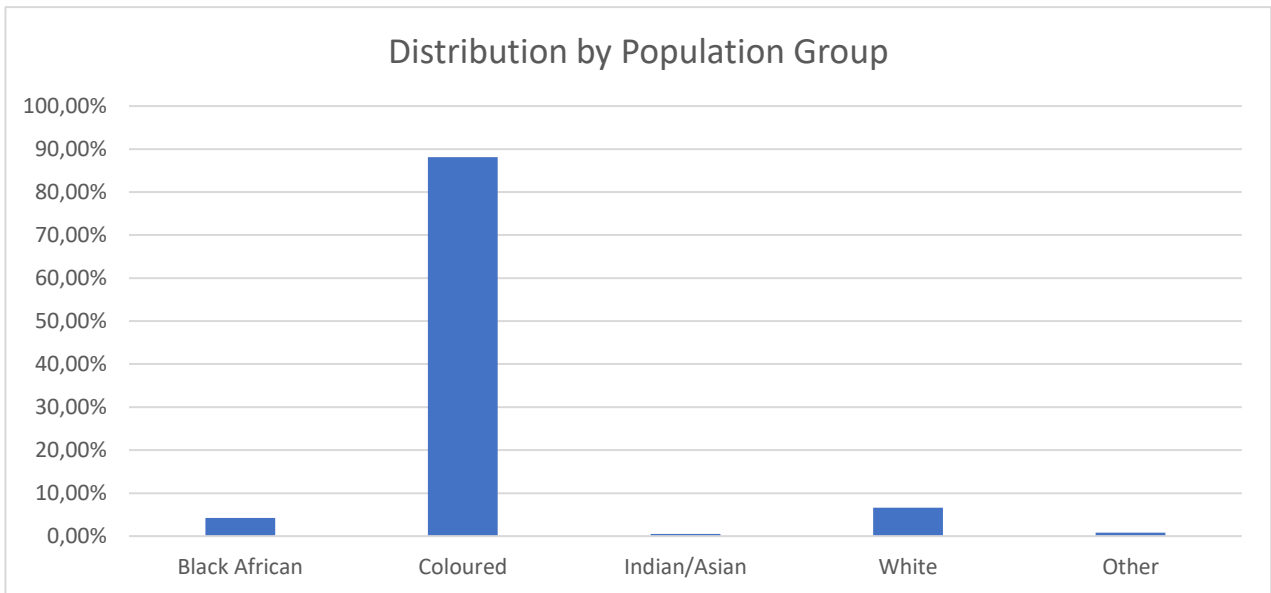


Figure 11: District Map for Liu Energy Solar PV Facility

The tables and graphs below provide an overview of the socio-economic data for the municipality that is relevant to the proposed project and is aimed at guiding Liu Energy transformation and socio-economic programmes.

Table 6: Population Distribution

Population Group	Percentage of Population (%)
Black African	4.20
Coloured	88.10
Indian / Asian	0.50
White	6.60
Other	0.80



Education Level

Table 7: Education Level

Education Level	Percentage of Population (%)
No Schooling	2.20
Some Primary	41.90
Completed Primary	7.10
Some Secondary	32.10
Completed Secondary	11.30
Higher Education	1.10
Not Applicable	4.30

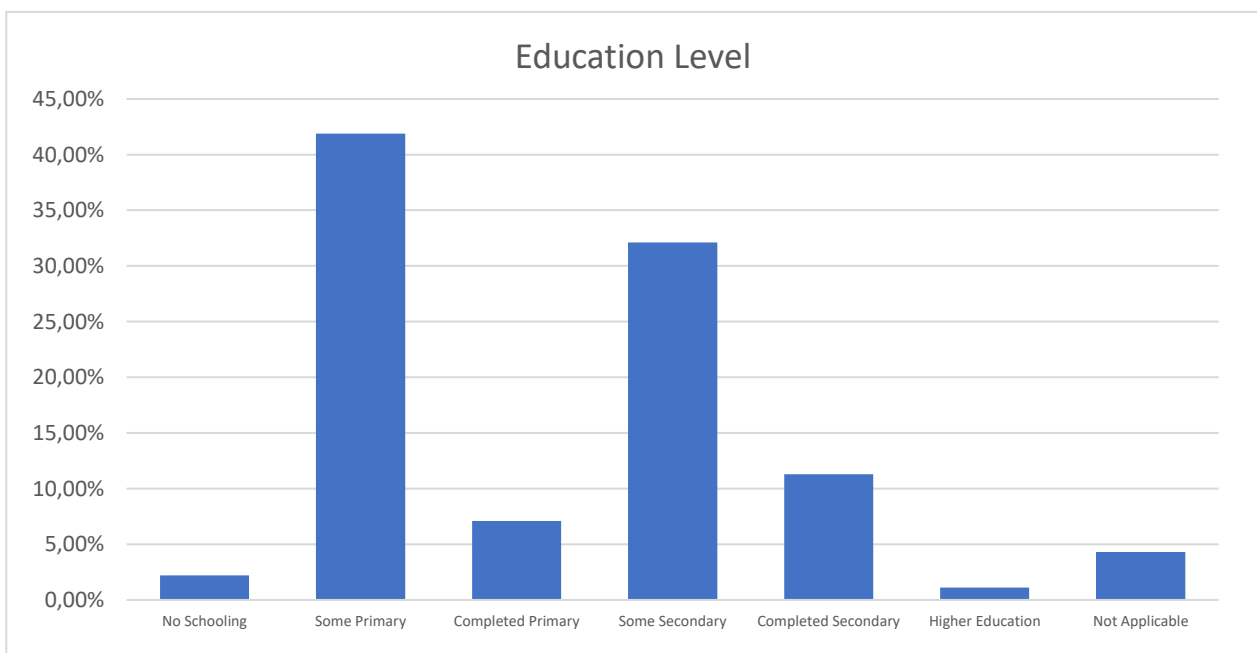


Figure 12: Distribution by Population Group

The data indicates there are less people with Higher Education at 1.10% in the Municipality, more people at 41.90% have some Primary education.

Table 8: Employment Status

Employment Status	Number of Persons
Employed	12351
Unemployed	3665
Discouraged Work Seeker	1935

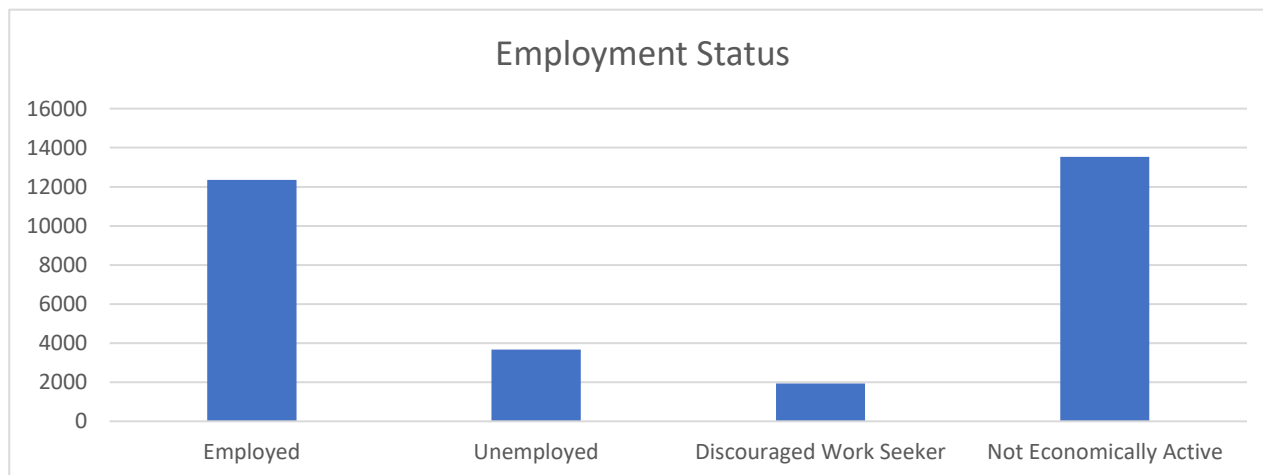


Figure 13: Employment Status

39.23% of the population is employed, while 42.97% is regarded as those who are not economically active. The data indicates a high level of unemployment as compared to those who are employed.

Table 9: Household Income

Household Income	Percentage of Population (%)
No income	9.50
R 1 – R 4,800	2.50
R 4,801 – R 9,600	5
R 9,601 – R 19,600	17.40
R 19,601 – R 38,200	20.80
R 38,201 – R 76,400	18.30
R 76,401 – R 153,800	13.20

According to the 2016 Community survey stats, about 20.80% of the population earns between R19,601-R38,200. Over 70% of the population survives on a combined household income of less than R19,600.

Key Economic Activities

The area is mainly known for the flowering season which attracts tourists to the area annually. This has resulted in tourism being the key economic contributor to the Municipality following a constant decline in mining activities over the years. Other tourist attractions in the area includes the Goegap Nature Reserve, the Namakwa Festival, the Blue Mine, two national monuments known as the Van Der Stel Mine Shaft and Orbicule Hill as well as the Orange River.

The Municipality falls in the area that has been identified as a strategic node for renewable energy projects. The Strategic Infrastructure Plan (SIP) 8 base its focus on the promotion of green energy, for this to be achieved it therefore needs to identify which strategic geographical areas are viable and best suited for the intended roll out plans of both wind and solar energy projects. These strategic geographical areas are referred to as Renewable Energy Developmental Zones (REDZ). The Liu Energy Solar facility project is located within the REDZ 8 – commonly referred to as the Springbok REDZ – which is supports the development of Solar and Wind energies development projects.

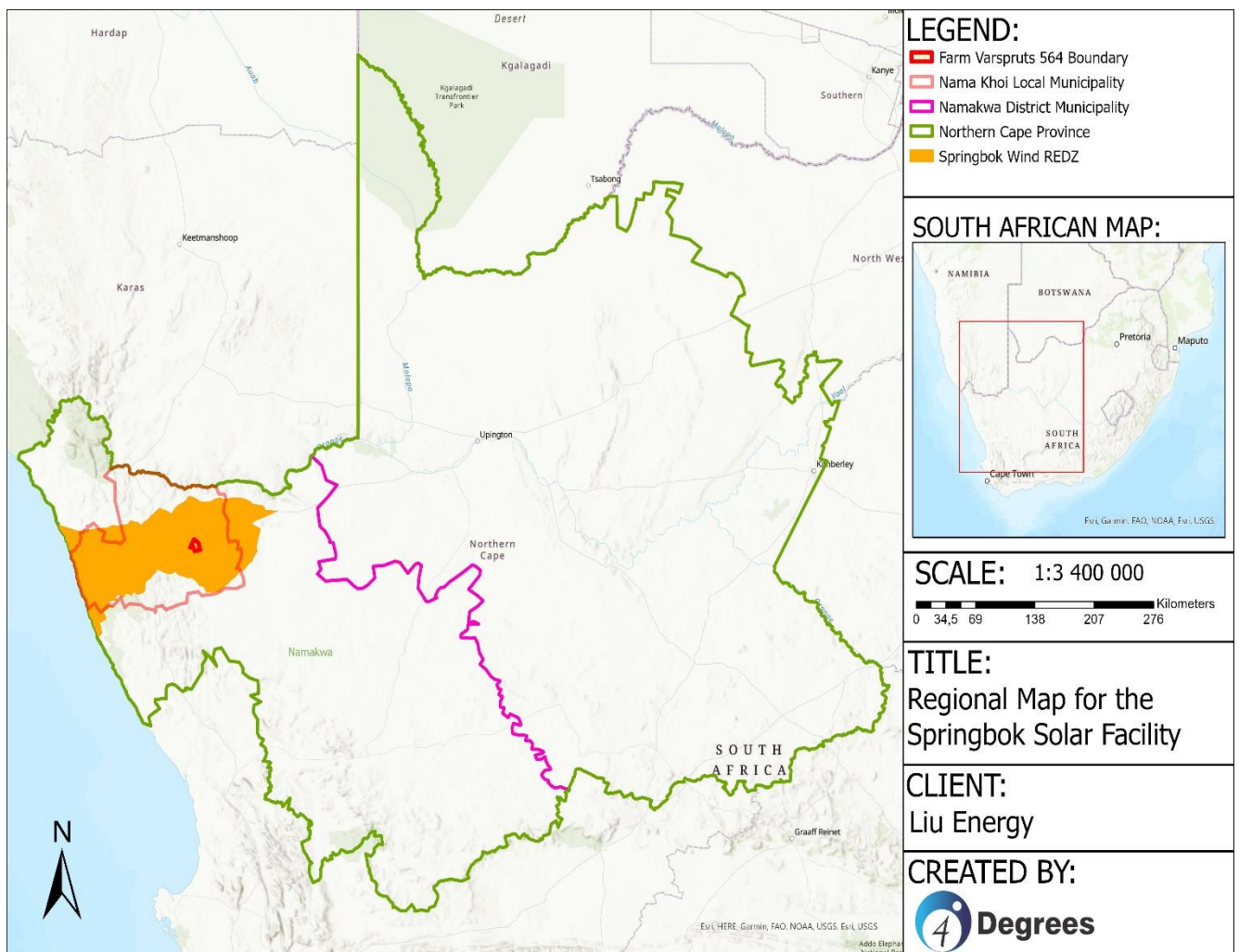


Figure 14: REDZ Map

6. PUBLIC PARTICIPATION

The Public Participation process is an important part of the Basic Assessment process. It is designed to give potential Interested and Affected Parties (I&APs) an opportunity to contribute to the proposed project. The objectives of the Public Participation Process (PPP) are to:

- Ensure an open and transparent basic assessment process
- Notify potential I&APs of the proposed project and afford them an opportunity to contribute to the project
- Ensure that all relevant issues are addressed as part of the basic assessment process

The public participation process is undertaken in line with the Public Participation guidelines published under the EIA Regulations. The activities undertaken as part of the public participation process are outlined below and supporting documentation included in the Annexures.

6.1. Landowner Consultation and Consent

The landowner of Farm Varsputs 564 has given consent for the environmental assessment for the Solar PV facility on the farm, the landowner consent form is attached in Annexures. In addition, the suitable site on the farm was identified in consultation with the landowner to ensure that the Solar PV facility does not cause adverse negative impact on farming activities.

6.2. I&AP Consultation

6.2.1. Identification of I&APs

Interested and Affected Parties (I&APs) were proactively identified by using publicly available information on organisations that may have an interest in the project. The list of registered I&APs is contained in Annexures under the public participation section. It should be noted only the name and organisation represented are listed on the report. Personal details such as telephone numbers and email address are not included in the report to ensure compliance with the Protection of Personal Information Act (Act 4 of 2013), referred to as POPIA. The details of I&APs can be made available on request by submission of relevant documentation to the EAP.

6.2.2. Advertisement

Newspapers adverts were placed in two (2) local newspapers, the Namakwalander and Plattelander on 26 March 2021. The purpose of the adverts were to inform potential interested and affected parties of the proposed project and invite them to register on the I&AP database. The closing date for registration on the I&AP database was 30 April 2021.

6.2.3. Site Notices

The EIA Regulations (2014) require that a Site notice be placed where it will be easily seen by the public, at the boundary or on the fence of the Site where the proposed activity will take place. The purpose of this is to notify and invite the public to register as I&APs and to notify them of the Public Participation Process.

Site notices of A3 size, laminated and colour print, where placed at a number of places in Springbok and on the boundary of Farm Varsputs 564, refer to the image below for an example of the site notice and further copies in the Annexures.

6.2.4. Draft Report

The Basic Assessment Report is being made available for public review for the period of 01 November 2022 to 30 November 2022 to registered I&APs and government authorities responsible for different aspects of the identified environmental sensitivities. A copy of the Report is also available on request from the EAP at the details listed below.

Telephone: 011 238 6300

Cell: 084 440 1122

Email: reetsang@4degrees.co.za and project@4degrees.co.za

Address: International Business Gateway
113 Elizabeth Road
Midridge Park, Midrand, 1685

The Basic Assessment Report is also available for review at the following address:

Springbok Public Library

Namakwa Street

Springbok

6.3. Public Participation Meeting

No public participation meeting is planned due to the low response to the advertisements and site notices. However, 4 Degrees team is available to consult with any Interested and Affected Parties during the public review phase.

6.4. Authority Consultation

A virtual Pre-Application meeting was held on the 03rd February 2021 on Microsoft Teams with the officials from DEFF. The purpose of the meeting was to introduce the proposed project and to discuss the project description and location, possible triggered listed activities, environmental sensitivity areas, key environmental issues, and the public participation plan. The minutes of the Pre-Application Meeting and the approved Public Participation Plan are attached in the Annexures.

6.5. Issues Raised by I&APs

The only issue raised during the initial engagement was by the Northern Cape Department Agriculture, Environment and Conservation and they are listed below:

- i. Requested that the ecological assessment be undertaken during the Namakwa flowering season. The assessment was undertaken in August 2021 to coincide with the flowing reason.
- ii. Requested that the representatives of Karrasberge Nature Reserve be included in the I&AP list. The Background Information Document and Letter of Invitation were sent to the identified individuals, and they confirmed their registration on the I&AP database.

The section will be updated following the public review of the Draft Basic Assessment Report to record any issues identified.

7. IMPACT ASSESSMENT

7.1. Overview of the Approach to Preparing BA and EMP

The environmental assessment process was initiated by preparing a Screening Report using the Department of Environment, Forestry and Fisheries (DEFF) National Screening Tool. The purpose of the screening tool is to:

- i. Allow the visualisation of environmental sensitivities of the proposed study area; and
- ii. Generate a report that summarises the environmental sensitivities of the study area.

The screening tool identified the following environmental themes and provided a rating for each theme as outlined in the table below. The table indicates whether the specialist studies were not undertaken for the identified environmental theme, where studies are not undertaken, an explanation is provided in column 4.

Table 10: Summary of the Rating Environmental Screening Report

Theme	Screening Tool Rating	Specialist Study (Y/N)	Motivation
Agriculture	Low	N	The agricultural potential for the area is generally rated as low
Animal Species	High	Y	Form part of ecological assessment
Aquatic Biodiversity	Low	N	There are no nearby open water
Avian	Very High	Y	Ecological Assessment
Archaeology and Cultural Heritage	Low	N	Yes, the site is 250 ha
Civil Aviation	Low	N	There are no nearby aerodrome
Defence	Low	N	There are no nearby defence facilities
Palaeontology	Low	N	The Palaeontological Sensitivity Map indicated that that the project area has a low sensitivity of fossil remains to be found and therefore no palaeontological study is not required.
Plant	Medium	N	Forms part of Ecological Assessment
RFI	Low	N	N/A
Terrestrial Biodiversity	High	Y	Ecological Assessment

7.2. Key Environmental Issues

7.2.1. Visual Impact

Solar PV panels can have a visual impact on the surrounding environment and sensitive receptors. The potential visual impacts include the glint and glare which can be a safety issue and/or cause annoyance. The height of the proposed solar panels has been determined to be approximately 1.6 meters above surface. Due to the stage that the project is at, the angle and facing of the solar panels has not yet been determined. This provides an opportunity to ensure that the panels used are designed to minimise the impacts on sensitive receptors as far as practically feasible. The nearest property to the proposed solar PV facility will be the farmhouse which is approximately 150 meters away from the site. The sensitive receptors will be the farmers, employees, and the visitors to the farm.

The project site is approximately 2.5 meters from the main road, the N14 and the nearest neighbouring property is approximately 900 meters from the edge of the proposed Solar PV facility. The visual impacts of the proposed project are most likely to be experienced during the construction phase due to increased activity on site and movement of construction vehicles. The solar PV facility will not be visible to the nearest road (the N14) and the neighbouring property due to the height of the panels. The supporting infrastructure will not necessarily be different to the current infrastructure in the area, i.e., transmission lines, buildings, and nearby substation. The overall rating of the visual impact assessment of the proposed development on the surrounding environment and sensitive receptors can be rated as low.

7.2.2. Air Quality Management

The proposed project may have an impact on the traffic and air quality in the area during the construction phase due to increased activities and the movement of construction vehicles. The roads are unpaved, this may result in the generation of dust which can be a nuisance if not adequately managed. Access to the site is from the N14, the road is not busy, but a large number of construction vehicles may cause a traffic congestion on the road and turning vehicles can be a safety risk if not properly managed. The impacts will be short-term and are restricted to the construction phase. There will be minimal movement of persons to the site during the operational phase of the project.

7.2.3. Geotechnical Assessment

A Geotechnical Assessment was undertaken on the farm to determine the site suitability for the proposed development. In addition, a literature review of technical studies within the fifty (50) kilometres radius was undertaken to have multiple sources of data for informed decision making. The material found on site is igneous and sedimentary material. The material lack in binding content. It is also collapsible and dispersive in nature posing a risk of heaving differential settlement. The material is hard and cannot be excavated manually on depths exceeding one (1) meter. The area is generally flat and there is no challenges of slope instability.

It is recommended that the material be improved through replacement with suitable imported or available material where there are no rocks. If rocks exists, further rock tests need to be employed to ensure firmness of the foundation. The geotechnical assessment also identified that white disintegrated rocks “Kalk stone” were found towards the mountainous area of the site. The table below provides a summary of soil characteristics of the area:

Estimated Safety Bearing Capacity	200 kpa
Excavatability	Hard material and cannot be excavated manually. Hydraulic equipment will be required
Slope stability	The ground is stable with no indications of unstable conditions in all exploratory holes
Groundwater	No groundwater was identified; however, consideration should be taken to avoid perched water as a result of fractured bedrock
Development Status	Development is permitted on condition of improving in-situ material where there is no rock available. The site is composed of collapsible and dispersive material
Recommended Foundation	Cast-in-situ pad footing
Recommendation	Replace all unwanted layers from ground level to 1m and replace with G7 sandstone material under each pad footing. The material should be either sourced from nearby borrow pits or from a supplier

It is recommended that G7 of sandstone with sufficient binding content be sourced from the supplier or a nearby borrow pit as the material on site lacks binding content making it susceptible to turbulent wind and water flow erosion. The steps to use imported material include:

- Remove unwanted in-situ material which is approximately one (1) meter
- Backfill with G7 sandstone material and compact it at 150 mm layers and compact the layers at 98% Mod AASHTO to the level of the natural ground level

- The material is good in ensuring minimal erosion by turbulent water flow and wind
- A competent person should be available on site during the construction phase to ensure proper implementation of the recommendations of the Geotechnical Assessment

7.2.4. Safety and Security

Potential safety and security impacts may be experienced during both the construction and operational phases of the project. During the construction phase, the increased number of persons on site may pose a risk for both the farmer and neighbouring farms. The farm is located in a remote area which make the site not susceptible to community strikes and uprising. The safety and security risk during the operational phase will be significantly reduced as there will be minimal persons on site.

7.2.5. Waste Management

The proposed development is located on a farm that is not serviced by the Nama Khoi Local Municipality. Solid waste will be temporarily stored on site and disposed of at the nearby landfill site. The municipality does allow for installation of sanitation services by property owners where services cannot be provided. A septic tank will be installed on site – an approval is required from the municipality prior to installation of the septic tank. The septic tank shall be designed by a Professional Civil Engineer registered with the Engineering Council of South Africa (ECSA). Liu Energy shall ensure that the septic tank:

- Complies with the relevant health and safety requirements and does not cause harm to persons on site and / or to the environment.
- Is located and operated not to cause a nuisance through noise or smell.
- Effluent from the septic tank is disposed in line with the conditions of approval from the municipality.
- No rainwater, stormwater or effluent other than that approved by the municipality is discharged into the tank.
- Regular maintenance and inspections are undertaken on the tank for continued safe operation of the facility.

7.2.6. Groundwater Management

The area, in particular Farm Varsputs 564 has a number of drainage lines and the groundwater depth varies between 5 and 30 meters below natural ground level. and the groundwater on the farm is

used for domestic and livestock purposes. The solar PV facility will have few activities with minimal employees on site. It is determined that the available groundwater will be sufficient to meet the additional activities.

7.2.7. Radio Frequency Interference

Electromagnetic interference (EMI) refers to the mean radio frequency (RF) emissions from photovoltaic (PV) systems which can interfere with nearby radio receivers and interfere with communication devices. According to the United States of America (USA) Federal Aviation Administration (FAA), the EMI from PV installations poses a low risk. This is supported by the DEFF Screening Report which indicates that the RFI rating on Farm Varsputs 564 is low. In addition, there are no telecommunication towers or an airfield on the farm or nearby the proposed facility. PV system equipment such as transformers and PV panels do not emit EMI because of their low frequency operation. The only component of the system that may emit EMI is the inverter. However, inverters may produce extremely low frequency EMI similar to electrical appliances. Therefore, it is determined that a technical RFI study is not required for the proposed development and the separation distance of 150 meters between the farmhouse and the solar facility is adequate.

7.3. Environmental Assessment Methodology

The impact assessment is undertaken to meet the requirements of Appendix 3 of the EIA Regulations. Appendix 3(3)(j) states that an environmental impact assessment report must include the assessment of each identified potentially significant impact and risk, including:

- i. Cumulative impacts
- ii. Nature, significance and consequence of the impacts and risks
- iii. The extent and duration of impacts and risks probability of impact and risk occurring
- iv. Degree to which the impact and risk can be reversed
- v. Degree to which the impact and risk may cause irreplaceable loss of resources
- vi. Degree to which impact and risk can be mitigated.

The risk rating in this section has been developed to meet the requirements of the EIA regulations outlined above. Rating of significant impacts allows for identifying high impacts that needs to be managed during the construction and operational phases of the project. Significance is determined by a three-phase process as outlined below.

Table 11: Description of Significance Rating Scale

Rating		Description
7	Severe	Impact most substantive, no mitigation possible
6	Very High	Impact substantive, mitigation difficult/expensive
5	High	Impact substantive, mitigation possible and easier to implement
4	Moderate-High	Impact real, mitigation difficult/expensive
3	Moderate-low	Impact real, mitigation easy, cost-effective and/or quick to implement
2	Low	Impact negligible, with mitigation
1	Very Low	Impact negligible, no mitigation required
0	No Impact	There is no impact at all - not even an exceptionally low impact on a party or system.

Table 12: Spatial Rating Scale

Rating		Description
7	National	The maximum extent of any impact
6	Provincial	The spatial scale is moderate within the bounds of impacts possible, and will be felt at a provincial scale
5	District	The spatial scale is moderate within the bounds of impacts possible, and will be felt at a district scale
4	Local	The impact will affect an area up to 5 km from the proposed route corridor.
3	Adjacent	The impact will affect the development footprint and 500m buffer around development footprint
2	Development footprint	Impact occurring within the development footprint
1	Isolated Sites	The impact will affect an area no bigger than the servitude

Table 13: Temporal Scale

Rating		Description
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.
3	Medium term	The environmental impact identified will operate for the duration of life of the line.
4	Long term	The environmental impact identified will operate beyond the life of operation.
5	Permanent	The environmental impact will be permanent.

Table 14: Probability Rating Scale

Rating	Description
1	Practically impossible
2	Unlikely
3	Likely
4	Very Likely
5	It is going to occur / has occurred

Table 15: Degree of Certainty

Rating	Description
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40 and 70% sure of a particular fact or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
Cannot Know	The consultant believes an assessment is not possible even with additional research.

For potential impacts to be described in a quantitative manner in addition to the qualitative description, a rating scale of between 1 and 7 is used for each of the assessment criteria. Thus the total value of impact is described by the equation below:

$$\text{Impact Risk} = ((\text{Significance} + \text{Spatial} + \text{Temporal})/3) * (\text{Probability}/5)$$

Table 16: Impact Risk Rating

Rating	Impact Class	Description
6.1 - 7.0	7	SEVERE
5.1 - 6.0	6	VERY HIGH
4.1 - 5.0	5	HIGH
3.1 - 4.0	4	MODERATE-HIGH
2.1 - 3.0	3	MODERATE-LOW
1.1 - 2.0	2	LOW
0.1 - 1.0	1	VERY LOW

The following abbreviations are used in the environmental risk assessment in the section below:

- S: Significance
- SS: Spatial Scale
- TS: Temporal Scale
- P: Degree of Probability
- C: Degree of Certainty

7.4. Environmental Risk Assessment

This section identifies potential impacts that will be experienced during the different phases of project development, Construction, Operational and Decommissioning Phase. The risk rating for each potential impact is calculated and rerating is recalculated after identifying suitable mitigation measures.

7.4.1. Construction Phase

The greatest impacts are expected to occur during the construction phase with the influx of persons and transportation of equipment to site. The potential impacts identified under the section are allocated a rating and rerated after identification of mitigation measures.

Table 17: Risk Assessment Before Mitigation Measures

Nature of Impact	S	SS	TS	P	C	Impact Risk
Air Emission						
Impact on air quality due to dust generated by vehicle movement	6	4	3	4	Probable	3.47
Noise Emission						
Increase in noise due construction activities and additional people on site	5	3	2	4	Probable	2.67
Soil and Land Capability						
Loss of land available for agriculture	6	3	4	5	Definite	4.33
Potential soil degradation and soil erosion	6	4	4	4	Probable	3.73
Soil contamination due to oil and chemical spillages	6	2	4	4	Probable	3.20
Waste Generation						
Improper handling, storage, and disposal of waste	5	3	3	5	Definite	3.67
Littering by employees	5	3	3	5	Probable	3.67
Traffic Impacts						

Nature of Impact	S	SS	TS	P	C	Impact Risk
Increase in traffic movement and disturbance of traffic on the N14	6	3	2	4	Probable	2.93
Road kills	7	4	2	4	Probable	3.47
Ecological Disturbance						
Loss of plant communities	7	4	4	4	Definite	4.00
Introduction of alien and invasive species due to movement of persons and vehicles	6	4	5	4	Probable	4.00
Disturbance of fauna due to construction activities	6	4	5	5	Definite	5.00
Impacts on Avifauna						
Habitat loss and mortality due to collision with infrastructure	6	4	4	4	Probable	3.73
Disturbance of avifauna due to human movement	6	4	4	5	Definite	4.67
Visual Impacts						
Potential visual impacts on sensitive receptors	5	3	4	4	Definite	3.20
Socio-economic						
Temporary employment opportunities during the construction phase	5	5	3	5	Definite	4.33
Increased safety risks for persons on the farm and on neighbouring farms	5	3	4	4	Probable	3.20

MITIGATION MEASURES

Air Quality

- Dust to be monitored to ensure that the levels are not elevated, should the levels be elevated, dust suppressant measures should be implemented
- Vehicle speed on the property should be restricted to discourage unintended creation of dust
- Avoid and / or minimise dust generating activities as far as practically feasible
- Revegetate disturbed area as soon as possible to avoid unnecessary dust generation

Noise Emission

- Maintain vehicles and machinery in good working order
- Investigate all complaints or observations of excessive noise and assess possibilities for mitigation.
- Avoid noisy activities at night-time and outside of normal working hours where possible.
- Provide employees and contractors with appropriate hearing protection when undertaking noisy activities

Soil and Land Capability

- Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint

- Implement an effective system of storm water run-off control
- Unnecessary land clearance must be avoided at all costs
- No activities are permitted in areas outside the buffer area

Waste Management

- Ensure that all the waste is removed from site and disposed of at an appropriately licensed landfill site
- A spill response kit must be kept on site and made available to employees at all time
- Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use
- No servicing of equipment and vehicles must be undertaken on site unless necessary.
- Provide secure storage for fuel, oil, chemicals, and other waste materials to prevent contamination of stormwater runoff
- Designated areas for waste management should be identified by type of waste and properly managed to avoid potential contamination or pollution
- Bins and skips must be emptied regularly and collected by a licensed contractor for disposal at an appropriate, licensed facility

Ecological Disturbance

- No disturbance of areas outside the development footprint should occur
- The development footprint must be demarcated to ensure that construction activities only occurs within the footprint
- All vehicles transporting people and equipment to the site must only make use of the identified access route
- Areas that are disturbed during the construction phase must be revegetated with indigenous vegetation
- An Environmental Control Officer must be appointed prior to project commencement phase and form part of the Project team to demarcate areas to be avoided
- No trapping, killing, or poisoning of any wildlife is to be allowed, signs must be put up to enforce this
- The facility lighting should be designed and limited to minimize impacts on fauna
- Speed limits must be enforced to ensure minimal impact on the fauna and flora
- Any holes that are excavated must be sealed to ensure that no animals fall in
- Develop and implement an alien and invasive species management plan

Avifauna

- Special care must be taken to ensure nests found on site are not disturbed
- The areas where the drainable line should be managed as no-go areas, except where the access road is located
- The facility must be nest proofed and anti-perch devices placed on areas that can lead to electrocution or bird collision

Heritage and Cultural

- Upon finding any archaeological or historical material all work at the affected area must cease and the heritage authority must be notified
- The area should be demarcated to prevent further work until an investigation has been completed
- Work on site will continue after removal of the archaeological or historical material was done

Socio-economic

- Develop and implement a Stakeholder Engagement Plan to liaise with the local communities
- Appoint contractors from local communities and source goods and services from local suppliers as far as practically feasible
- Employ a Community Liaison Officer to manage the expectations of local communities

Traffic Impact

- Permits must be obtained from the relevant authorities at local and provincial level for transportation of abnormal cargo
- The movement of vehicles into and out of the site must be managed to ensure that the traffic on the national road, the N14 is not disturbed
- Signages should be placed on the road to warn motorists of construction vehicles and/or turning vehicles
- The planning and approval of this signage must be obtained from the South African National Roads Agency

Table 18: Risk Assessment After Mitigation

Nature of Impact	S	SS	TS	P	C	Impact Risk
Air Emission						
Impact on air quality due to dust generated by vehicle movement	2	2	1	3	Probable	1.00
Noise Emission						
Increase in noise due construction activities and additional people on site	2	2	1	3	Probable	1.00
Soil and Land Capability						
Loss of land available for agriculture	3	2	3	3	Definite	1.60
Potential soil degradation and soil erosion	2	1	1	2	Probable	0.53
Soil contamination due to oil and chemical spillages	2	1	1	2	Probable	0.53
Waste Generation						
Improper handling, storage, and disposal of waste	1	1	1	2	Definite	0.40
Littering by employees	0	1	1	2	Probable	0.27

Nature of Impact	S	SS	TS	P	C	Impact Risk
Traffic Impacts						
Increase in traffic movement and disturbance of traffic on the N14	1	2	1	2	Probable	0.53
Road kills	2	1	1	2	Probable	0.53
Ecological Disturbance						
Loss of plant communities	3	1	1	3	Definite	1.00
Introduction of alien and invasive species due to movement of persons and vehicles	1	1	1	2	Probable	0.40
Disturbance of fauna due to construction activities	1	1	1	3	Definite	0.60
Impacts on Avifauna						
Habitat loss and mortality due to collision with infrastructure	1	1	1	2	Probable	0.40
Disturbance of avifauna due to human movement	1	1	1	2	Definite	0.40
Visual Impacts						
Potential visual impacts on sensitive receptors	1	1	1	2	Definite	0.40
Socio-economic						
Temporary employment opportunities during the construction phase	2	4	3	3	Definite	1.80
Increased safety risks for persons on the farm and on neighbouring farms	2	1	2	3	Probable	1.00

7.4.2. Operational Phase Impact Assessment

The risk assessment is based on potential risks that have been identified for the operational phase. The section discusses identified risks before and after implementation of mitigation measures.

Table 19: Risk Assessment Before Mitigation

Nature of Impact	S	SS	TS	P	C	Impact Risk
Soil and Land Capability						
Loss of land available for agriculture	4	3	4	5	Definite	4.33
Potential soil degradation and soil erosion	6	3	4	4	Possible	3.73
Waste Generation						
Improper handling, storage, and disposal of waste	5	2	4	4	Possible	3.67
Ecological Disturbance						
Loss of plant communities	6	3	5	5	Probable	4.00

Nature of Impact	S	SS	TS	P	C	Impact Risk
Introduction of alien and invasive species due to movement of persons and vehicles	6	4	5	4	Possible	4.00
Impacts on Avifauna						
Habitat loss and mortality due to collision with infrastructure	7	4	5	4	Possible	3.73
Disturbance of avifauna due to human movement	6	4	5	4	Possible	4.67
Visual Impacts						
Potential visual impacts on sensitive receptors	6	4	5	4	Possible	3.20
Socio-economic						
Temporary employment opportunities during the construction phase	5	4	4	4	Probable	4.33
Increased safety risks for persons on the farm and on neighbouring farms	6	3	4	4	Possible	3.20

MITIGATION MEASURES

- Maintain vegetation to ensure minimal disturbance to surfaces.
- Develop and implement a stormwater management plan to manage surface water runoff.
- Ensure continued monitoring and eradication of alien invasive plant species;
- No trapping, killing, or poisoning of any wildlife is to be allowed;
- Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests on site.
-
- Where possible, existing access routes and walking paths must be made use of.
- Have a perimeter fence on the site to avoid unauthorized access by persons other than employees and visitors to the site
- Maximise local employment and procurement of goods and services from local communities as far as practically feasible.

Table 20: Risk Assessment After Mitigation

Nature of Impact	S	SS	TS	P	C	Impact Risk
Soil and Land Capability						
Loss of land available for agriculture	2	2	3	3	Definite	1.40
Potential soil degradation and soil erosion	2	2	3	2	Possible	0.93
Waste Generation						
Improper handling, storage, and disposal of waste	1	1	1	2	Possible	0.40

Nature of Impact	S	SS	TS	P	C	Impact Risk
Ecological Disturbance						
Loss of plant communities	2	1	1	2	Possible	0.53
Introduction of alien and invasive species due to movement of persons and vehicles	2	1	1	2	Possible	0.53
Impacts on Avifauna						
Habitat loss and mortality due to collision with infrastructure	2	2	1	2	Possible	0.67
Disturbance of avifauna due to human movement	2	2	1	2	Possible	0.67
Visual Impacts						
Potential visual impacts on sensitive receptors	2	2	2	2	Possible	0.80
Socio-economic						
Temporary employment opportunities during the construction phase	2	2	4	2	Possible	1.07
Increased safety risks for persons on the farm and on neighbouring farms	2	2	1	2	Possible	0.67

7.4.3. Decommissioning Phase Impact Assessment

Table 21: Risk Assessment Before Mitigation

Nature of Impact	S	SS	TS	P	C	Impact Risk
Management and safe disposal of building rubble	6	5	4	3	Probable	3
Management of scrap from process and well as equipment on site	6	5	4	4	Probable	4
Decline in employment opportunities due to closure of operations	6	5	5	4	Definite	4.3
Decline in economic opportunities due to discontinuation of procurement of local supplies	6	5	4	3	Probable	3
Potential social ills, depression, and anxiety due to decline in employment opportunities	6	5	4	4	Possible	4
Decrease in employment rate due to closure of business operations	5	5	5	3	Probable	3

MITIGATION MEASURES

- Ensure that all Liu Energy equipment, scrap, and waste is removed from site – the removed material shall be recycled, sold as scrap, or disposed of at a license landfill site.
- The scrap should be recycled as far as practically feasible
- Continue to procure services from local suppliers as far as practically feasible
- Manage the discharge of employees in a sensitive and responsible manner in line with the requirements of the Labour Relation Act and Basic Conditions of Employment Act to minimise the risk of anxiety and depression
- Implement the skills development programmes to encourage employees to acquire new skills in preparation for closure phase
- Obtain environmental license for the extension of the operation

Table 22: Risk Assessment After Mitigation

Nature of Impact	S	SS	TS	P	C	Impact Risk
Management and safe disposal of building rubble	2	4	1	1	Possible	0.5
Management of scrap from process and well as equipment on site	2	4	1	2	Probable	0.9
Decline in employment opportunities due to closure of operations	3	5	2	3	Probable	2
Decline in economic opportunities due to discontinuation of procurement of local supplies	3	5	2	3	Possible	2
Potential social ills, depression, and anxiety due to decline in employment opportunities	3	5	3	3	Possible	2.2
Decrease in employment rate due to closure of business operations	2	5	3	3	Possible	2

7.5. Cumulative Impacts

The Liu Energy is located on a remote farm between Springbok and Aggeneys – according to the Renewable Energy Map and the Screening Report by the Department of Environment, Fisheries and Forests (DEFF) there are four (4) approved renewable energy facilities within the 30kilometers radius of the Liu Energy facility. The nearest facility is the Kangnas Wind Energy, all the solar photovoltaic facilities are located at least 29.3 kilometres away.

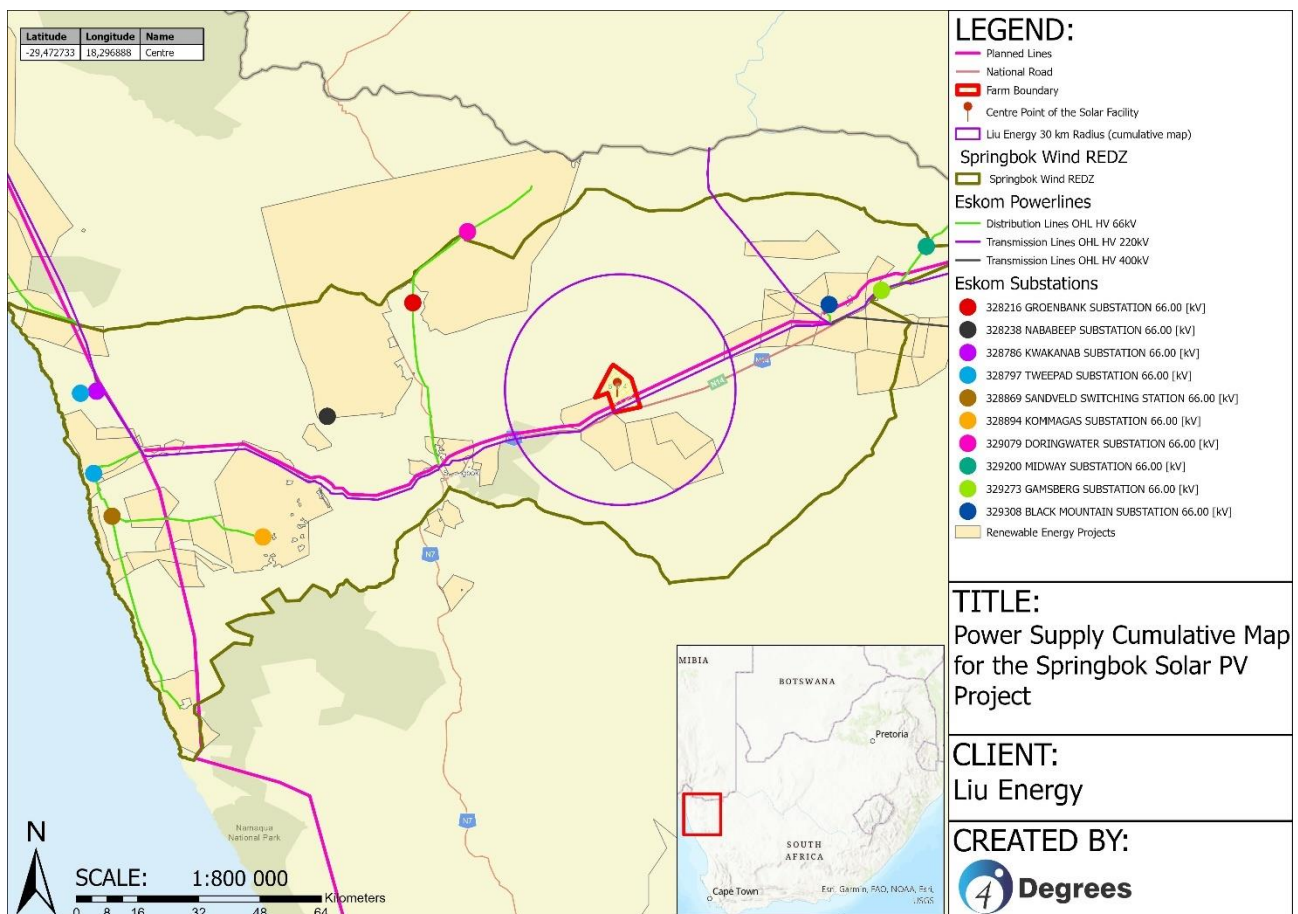


Figure 15: Cumulative Map of Liu Energy Solar Project

The cumulative impacts of solar photovoltaic facilities generally include Glint and Glare; Radio and Radar Interference; and Visual Impact.

7.5.1. Glint and Glare

The solar photovoltaic panels can cause the glint and glare. The glint and glare can affect the neighbours and motorists. This can be a safety risk or cause an annoyance. However, the location of the proposed solar photovoltaic facility will result in the facility not being visible from the road. This eliminates the cumulative impact of glint and glare from the facility.

7.5.2. Visual Impact

Solar PV facilities can have visual impacts on the surrounding areas, especially in the rural setting such as the Namakwa area, making it difficult for the inhabitants and visitors to the area to enjoy the views. The advantage of the Liu Energy solar PV facility is that it is located inwards in the farm. The facility will be located approximately 2.5 kms from the N14 and 900 meters to the nearest farm. There are no other planned solar PV facility on the farm. Therefore, it is not foreseen that there will be cumulative visual impacts from the proposed development.

7.5.3. Avian Impacts

The proposed facility is located in the area that is close to other electricity related infrastructure such as the nearby transmission powerlines, the Groeipunt substation and the Kangnas Wind Energy Project. The potential cumulative impacts that may occur as a result of the proposed project include changes to bird habitat and bird strikes which may result in high mortality rate. It is recommended that the Avian Monitoring Programme be implemented on the farm at least three (3) months prior to the commencement of the construction phase and determined intervals during the project implementation phase to monitor the potential impact the facility may have on the avian population in the area.

7.6. Summary of Impacts

The section outlines a summary of environmental impacts during the construction and operational phases of the project. It can be seen from the summary is that the environmental risks can be significantly reduced with the implementation of the mitigation measures. The impacts are generally rated as Low after the implementation of mitigation measures.

Table 23: Summary of impacts During Construction Phase

Nature of Impact	Impact Risk before Mitigation	Impact Risk After Mitigation
Impact on air quality due to dust generated by vehicle movement	3.47	1.00
Increase in noise due construction activities and additional people on site	2.67	1.00
Loss of land available for agriculture	4.33	1.60
Potential soil degradation and soil erosion	3.73	0.53
Soil contamination due to oil and chemical spillages	3.20	0.53
Improper handling, storage, and disposal of waste	3.67	0.40
Littering by employees	3.67	0.27
Increase in traffic movement and disturbance of traffic on the N14	2.93	0.53
Road kills	3.47	0.53
Loss of plant communities	4.00	1.00
Introduction of alien and invasive species due to movement of persons and vehicles	4.00	0.40
Disturbance of fauna due to construction activities	5.00	0.60
Habitat loss and mortality due to collision with infrastructure	3.73	0.40
Disturbance of avifauna due to human movement	4.67	0.40
Potential visual impacts on sensitive receptors	3.20	0.40
Temporary employment opportunities during the construction phase	4.33	1.80
Increased safety risks for persons on the farm and on neighbouring farms	3.20	1.00

Table 24: Summary of Impacts During the Operation Phase

Nature of Impact	Impact Risk before Mitigation	Impact Risk After Mitigation
Loss of land available for agriculture	4.33	1.40
Potential soil degradation and soil erosion	3.73	0.93
Improper handling, storage, and disposal of waste	3.67	0.40
Loss of plant communities	4.00	0.53
Introduction of alien and invasive species due to movement of persons and vehicles	4.00	0.53
Habitat loss and mortality due to collision with infrastructure	3.73	0.67
Disturbance of avifauna due to human movement	4.67	0.67
Potential visual impacts on sensitive receptors	3.20	0.80

Nature of Impact	Impact Risk before Mitigation	Impact Risk After Mitigation
Temporary employment opportunities during the construction phase	4.33	1.07
Increased safety risks for persons on the farm and on neighbouring farms	3.20	0.67

The risk rating indicates that the activity can commence with minimal impact to the environment and surrounding landowners. The implementation of the mitigation measures suggested in this report, the significance of impacts on site can be significantly reduced to Low. Based on the site visit, the specialist studies, and the information available to date, it is 4 Degrees Consulting’s opinion that the positive impacts of the project outweigh the negative environmental impacts of the projects that may be experienced during the life of the project.

8. CONCLUSION AND RECOMMENDATIONS

8.1. Impact Statement

Section 24 of the Constitution of South Africa 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 prevents pollution and ecological degradation; promotes conservation; and secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

The environmental assessment was undertaken to meet the objectives of the Constitution and principles of the National Environmental Management Act (Act 107 of 1998). The findings of the environmental impact assessment determined that the proposed development will have minimal negative impact on the surrounding environment. It is the recommendation of the EAP that the proposed project be authorized by DEFF and proceed to implementation.

8.2. Validity of Environmental Authorisation

It is recommended that the period for validity of environmental authorisation be ten (10) years. This is due to the current constraint of availability of the grid network. Eskom has initiated the process of strengthening the grid and the planned expansion is estimated to be completed by 2029. This ensures that Liu Energy will only be able to implement the project when the grid network strengthening project has been completed. Given the long project lead-times for the implementation of renewable energy projects, it is projected that a ten (10) year validity period is feasible.

8.3. Project Map

The final layout map of the project is on the image below, the final site of the proposed project was carefully chosen to avoid sensitive receptors such as the farmhouse, the existing and planned Eskom line as well as drainage lines that are present on the farm.

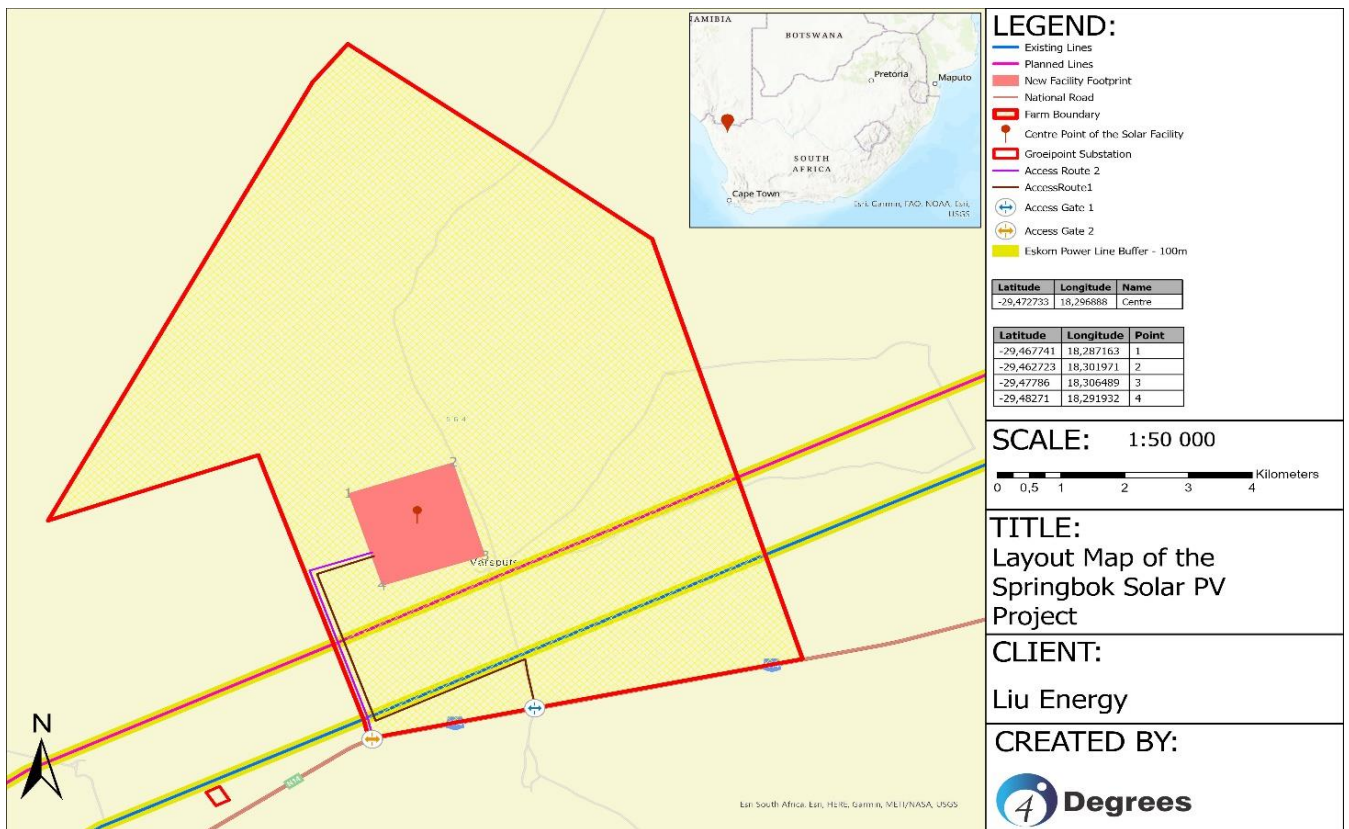


Figure 16: Layout Map for Liu Energy Solar Facility

8.4. Conditions to be included in the Environmental Authorisation

- i. No construction activities must be undertaken outside normal working hours without consultation of the landowner and neighbouring farm.
- ii. The speed limit should be restricted to 40km/h on the farm.
- iii. An Environmental Control Officer must be appointed prior to commencement of the construction phase to oversee the implementation of the Environmental Authorisation and the EMPr.
- iv. That a storm water management plan to manage surface water on site is developed and implemented.
- v. An emergency preparedness and response plan to identify and manage potential risks that may arise during different project phases is developed and implemented.

ANNEXURES

ANNEXURE 1: DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

ANNEXURE 2: SPECIALIST DECLARATION FORMS

ANNEXURE 3: LOCALITY MAPS

ANNEXURE 4: PHOTOGRAPHS FROM SITE VISIT

ANNEXURE 5: SITE LAYOUT PLAN

ANNEXURE 6: PUBLIC PARTICIPATION

ANNEXURE 7: ENVIRONMENTAL MANAGEMENT PLAN

ANNEXURE 8: SPECIALIST STUDIES