ENVIRONMENTAL IMPACT REPORT

Draft– 03 May 2023

THE PROPOSED INYATHI SOLAR POWER PLANT NEAR LICHTENBURG, NORTH WEST PROVINCE

ENVIRONAMICS

PROJECT DETAIL

DFFE Reference No.	:	14/12/16/3/3/2/2239
Project Title	:	Proposed Inyathi Solar Power Plant near Lichtenburg, North West Province
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GLOSSARY OF TERMS AND ACRONYMS

BA	Basic Assessment
BAR	Basic Assessment Report
CEA	Cumulative Effects Assessment
DFFE	Department of Forestry, Fisheries and Environmental Affairs
DM	District Municipality
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EP	Equator Principles
EPFI	Equator Principles Financial Institutions
Environmental impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects.
GNR	Government Notice Regulation
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
kV	Kilo Volt
LM	Local Municipality
Mitigate	Activities designed to compensate for unavoidable environmental damage.
MW	Megawatt

NEMA	National Environmental Management Act No. 107 of 1998
NERSA	National Energy Regulator of South Africa
NWA	National Water Act No. 36 of 1998
PAOI	Project Area of Influence
PPP	Public Participation Process
PV	Photovoltaic
REIPPPP	Renewable Energy IPP Procurement Process
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework
SPP	Solar Power Plant
VU	Vegetation Unit

CONTEXT FOR THE DEVELOPMENT

According to Eskom, the demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand, fueled by increasing economic growth and social development, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmentally responsible development, the impacts of climate change and the need for sustainable development. The use of renewable energy technologies, as one of a mix of technologies needed to meet future energy consumption requirements is being investigated as part of the national Department of Mineral Resources and Energy's (DMRE) (previously referred to as the Department of Energy) long-term strategic planning and research process.

The primary rationale for the proposed solar photovoltaic (PV) facility is to add new generation capacity from renewable energy to the national electricity mix and to aid in achieving the goal of 42% share of all new installed generating capacity being derived from renewable energy forms, as targeted by DMRE (Integrated Resource Plan Update 2010-2030). The IRP also identifies the preferred generation technologies required to meet the expected demand growth up to 2030 and incorporates government objectives including affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources and localisation and regional development. In terms of the Integrated Resource Plan Update (2019 IRP Update, 2010-2030), over the short term (of the next two or three years), clear guidelines arose; namely to continue with the current renewable bid programme with additional annual rounds of 1000 MW PV, with approximately 8.4GW of the renewable energy capacity planned to be installed from PV technologies over the next twenty years.

The proposed project is intended to form part of the DMREs Renewable Energy Independent Power Producer Procurement (REIPPP) Programme. The REIPPP Programme aims to secure 14 725 Megawatts (MW) of new generation capacity from renewable energy sources, while simultaneously diversifying South Africa's electricity mix. According to the 2021 State of the Nation Address, Government will soon be initiating the procurement of an additional 11 800 MW of power from renewable energy, natural gas, battery storage and coal in line with the Integrated Resource Plan 2019 and fulfilling their commitments under the United Nations Framework Convention on Climate Change and its Paris Agreement which include the reduction of greenhouse gas emissions. Eskom, the largest greenhouse gas emitter of South Africa, has committed in principle to net zero emissions by 2050 and to increase its renewable capacity.

In response to the above, Inyathi Solar Power Plant (RF) (Pty) Ltd is proposing the development of a Photovoltaic (PV) solar facility and associated infrastructure for the purpose of commercial electricity generation on an identified site located on the Portion 5 (Portion of Portion 2) of the Farm Zamenkomst No. 4, Registration Division IP, North West Province situated within the Ditsobotla Local Municipality area of jurisdiction (refer to Figure A for the locality map). The project entails the generation of up to 150 MW electrical power through photovoltaic (PV) technology. The total development footprint of the project will approximately be 526 hectares (including supporting infrastructure on site). From a regional site selection perspective, this region is preferred for solar energy development due to its global horizontal irradiation value of around 2152kwh/m^2.

EXECUTIVE SUMMARY

Like many other small and developing municipalities in the country, the Ditsobotla Local Municipality faces a number of challenges in addressing the needs and improving the lives of the community such as low to medium income, high unemployment and low skills (IDP, 2020). The Ditsobotla Local Municipality's Integrated Development Plan (IDP, 2020) identifies the mission of the municipality as: "sustainable service delivery through transparent administration, dedicated staff, implementation of municipal programmes and consultation with communities". The IDP does not explicitly deal with renewable energy development, but since the Municipality has been categorized as a Priority 1 Investment Area in the Province, it may be argued that the proposed development will support the objective of economic growth and employment creation.

Inyathi Solar Power Plant (RF) (Pty) Ltd intends to develop a 150MW photovoltaic solar facility and associated infrastructureon the Portion 5 (Portion of Portion 2) of the Farm Zamenkomst No. 4, Registration Division IP, North West Province situated within the Ditsobotla Local Municipality and Ngaka Modiri Molema District Municipality area of jurisdiction. The town of Lichtenburg is located approximately 15km south of the proposed development (refer to Figure A and B for the locality and regional map). The total footprint of the project will approximately be 526 hectares (including supporting infrastructure on site). The site was identified as being highly desirable due to its suitable climatic conditions, topography (i.e. in terms of slope), environmental conditions (i.e. agricultural potential, ecological sensitivity and archaeology), proximity to a grid connection point (i.e. for the purpose of electricity evacuation), as well as site access via a main road (i.e. to facilitate the movement of machinery, equipment, infrastructure and people during the construction phase).

In terms of the National Environmental Management Act (Act 107 of 1998), with specific reference to Sections 24 and 24D, as read with GNR 324-327, as amended (2017), Environmental Authorisation is required for the Inyathi Solar Power Plant. The following listed activities have been identified with special reference to the proposed development and are listed in the EIA Regulations (as amended):

- Activity 11(i) (GN.R. 327): "The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."
- Activity 12(ii)(a)(c) (GN.R. 327): "The development of (ii) infrastructure or structures with a physical footprint of 100 square metres or more; (a) within a watercourse or (c) within 32 meters of a watercourse measured from the edge of a watercourse."
- Activity 14 (GN.R 327): "The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres."
- Activity 19 (GN.R 327): "The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse."
- Activity 24 (ii) (GN.R 327): "The development of a road (ii) with reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters"

- Activity 28(ii) (GN.R. 327): "Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."
- Activity 56 (ii) (GN.R 327): "The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres…"
- Activity 1 (GN.R. 325): "The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more..."
- Activity 15 (GN.R. 325): "The clearance of an area of 20 hectare or more of indigenous vegetation..."
- Activity 4 (h)(iv)(GN.R 324): "The development of a road wider than 4 metres with a reserve less than 13,5 metres in the (h) North West Province, in (iv) areas within 5 kilometers from protected areas identified in terms of NEMPAA or from a biosphere reserve."
- Activity 12 (h)(vi) (GN.R. 324): "The clearance of an area of 300 square metres or more of indigenous vegetation… … (h) in the North West (vi) areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland."
- Activity 18 (h)(ix) (GN.R 324): "The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre (h) in the North West (ix) areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland."

Activities required for the development of the solar facility which are listed under Listing Notice 1, 2 and 3 (GNR 327, 325 and 324) implies that the development could potentially have an impact on the environment that will require mitigation. Subsequently a 'thorough assessment process' is required as described in Regulations 21-24. Environamics has been appointed as the independent consultant to undertake the EIA on behalf of Inyathi Solar Power Plant (RF) (Pty) Ltd.

Regulation 21 of the EIA Regulations requires that an Environmental Impact Report (EIR) must contain the information set out in Appendix 3 of the Regulations or comply with a protocol or minimum information requirements relevant to the application as identified and gazetted by the Minister in a government notice. Appendix 3 of GNR326 requires a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred site, the scope of the assessment, and the consultation process undertaken be set out in the EIR report. It has been determined through the EIA process that the proposed development will have a net positive impact for the area and will subsequently ensure the optimal utilisation of resources and land, specifically where the affected landowner is experiencing challenges and limitations in terms of the current agricultural land use. All negative environmental impacts can be effectively mitigated through the recommended mitigation measures and no residual negative impacts are foreseen. The potentially most significant environmental impacts associated with the development are briefly summarised below:

Impacts during the construction phase:

During the construction phase minor negative impacts are foreseen over the short term. The latter refers to a period of 12-18 months. The potentially most significant impacts relate to habitat destruction caused by clearance of vegetation and socio-economic impacts such as the creation of direct and indirect employment opportunities, economic multiplier effects from the use of local goods and services and temporary increase in traffic disruptions and movement patterns.

Impacts during the operational phase:

During the operational phase the site will serve as a solar PV energy facility and the potential impacts will take place over a period of 20 – 25 years. The negative impacts are generally associated with the continued spread of alien and invasive plant species, collision and electrocutions of avifauna and visual impact of sensitive visual receptors located within a 500m radius of the proposed power line. The provision of sustainable services delivery also needs to be confirmed. The operational phase will have a direct positive impact through the creation of employment opportunities and skills development, development of non-polluting, renewable energy infrastructure and contribution to economic development and social upliftment.

Impacts during the decommissioning phase:

The negative impacts generally associated with the decommissioning phase include: the continued habitat degradation due to Invasive Alien Plant encroachment and erosion and loss of employment. However, skilled staff will be eminently employable, and a number of temporary jobs will also be created in the process. It is not expected that the facility will be decommissioned, but rather that the technology used will be upgraded.

Cumulative impacts:

Cumulative impacts could arise as other similar projects are constructed in the area. The potential for cumulative impacts may therefore exist. The Draft Environmental Impact Report includes an assessment of the potential cumulative impacts associated with the proposed development. Potential cumulative impacts with a significance rating of negative medium during the construction phase relate to: habitat destruction and fragmentation, impacts of employment opportunities, business opportunities and skills development and impact associated with large-scale in-migration of people. Cumulative impacts during the operational phase relate to: influence of pollution and visual impacts related to the SPP and power line. The cumulative effect of the generation of waste was identified as being potentially significant during the decommissioning phase.

Regulation 23 of the EIA Regulations determine that an EIA report be prepared and submitted for the proposed activity after the competent authority approves the final scoping report. The EIA report will evaluate and rate each identified impact and identify mitigation measures that may be required. The EIA report will contain information that is necessary for the competent authority to consider the application for Environmental Authorisation and to reach a decision contemplated in Regulation 24 of the EIA Regulations.

1 INTRODUCTION

This section aims to introduce the Environmental Impact Report (EIR) and specifically to address the following requirements of the regulations:

Appendix 3. (3) An environmental impact assessment report contains the information that is necessary for the competent authority to consider and come to a decision on the application, and must include-(a) details of: (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae.

1.1 LEGAL MANDATE AND PURPOSE OF THE REPORT

The National Environmental Management Act identifies listed activities (in terms of Section 24) which are likely to have an impact on the environment. These activities cannot commence without obtaining an Environmental Authorisation (EA) from the relevant competent authority. Sufficient information is required by the competent authority to make an informed decision and the project is therefore subject to an environmental assessment process which can be either a Basic Assessment Process or a full Scoping and Environmental Impact Assessment process.

The EIA Regulations No. 324, 325 and 327 outline the activities that may be triggered and therefore require EA. The following listed activities with special reference to the proposed development is triggered:

Table 1.1: Listed activities[1]

Relevant notice:	**Activity No (s)**	**Description of each listed activity as per project description**:
GNR. 327 (as amended in 2017)	Activity 11(i)	• *"The development of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."* • Activity 11(i) is triggered as the proposed photovoltaic solar facility will transmit and distribute electricity of 132 kilovolts outside an urban area. The infrastructure for

[1] Please refer to Table 6.2 for detailed description of the relevant aspects of the development that will apply to each specific activity.

		the distribution of electricity will include a power line (132 kV) and an on-site HV/MV substation (130 MVA). For the preferred power line corridor, the power line will be constructed in an ~12km long and 100 m (up to 500m in some instances) wide corridor. It is expected that generation from the facility will tie in with the Eskom Watershed 275/132/88 MTS substation.
GNR. 327 (as amended in 2017)	Activity 12(ii)(a)(c)	• "*The development of (ii) infrastructure or structures with a physical footprint of 100 square metres or more; (a) within a watercourse or (c) within 32 meters of a watercourse measured from the edge of a watercourse."* • Activity 12(ii)(a)(c) is triggered based on the presence of wetlands (including unchanneled valleybottom wetlands) located within the proposed grid connection corridor for the Inyathi solar Power Plant.
GNR. 327 (as amended in 2017)	Activity 14	• *"The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres."* • Activity 14 is triggered since the proposed development will need to develop infrastructure for the storage and handling of dangerous goods (diesel) in containers with combined capacity of 80 cubic metres. The capacity will not exceed 500 cubic metres.
GNR. 327 (as amended in 2017)	Activity 19	• "T*he infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse."* • Activity 19 is triggered based on the presence of wetlands (including unchanneled valleybottom wetlands) located within the proposed grid connection corridor for the Inyathi solar Power Plant The development of the power line will require a service road which will result in the removal of more than 10 cubic meters of rock from the watercourse.
GNR. 327 (as amended in 2017)	Activity 24(ii)	• *"The development of a road (ii) with reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters.*

		• Activity 24(ii) is triggered as the internal roads will vary between 6 and 12 meters in width. The internal roads will be 6m in width and the perimeter road will be up to 12m in width.
GNR. 327 (as amended in 2017)	Activity 28(ii)	• *"Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."* • Activity 28(ii) is triggered as portions of the affected property have been used for grazing and the property will be re-zoned to "special" use for the proposed development. The development footprint of the solar power plant will be 526 hectares.
GNR. 327 (as amended in 2017)	Activity 56(ii)	• *"The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres…"* • Activity 56 (ii) is triggered since the existing access to the affected property does not have a reserve and will need to be widened by more than 6 metres.
GNR. 325 (as amended in 2017)	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."* • Activity 1 is triggered since the proposed photovoltaic solar facility will generate up to 150 megawatts electricity through the use of a renewable resource.
GNR. 325 (as amended in 2017)	Activity 15	• *"The clearance of an area of 20 hectares or more of indigenous vegetation."* • In terms of vegetation type the preferred site falls within the Carletonville Dolomite Grassland which is described by Mucina and Rutherford (2006) as 'vulnerable'. Activity 15 is triggered since portions of the site has not been lawfully disturbed during the preceding ten years; therefore, more than 20 hectares of indigenous vegetation will be removed. The development footprint of the solar power plant will be 526 ha.
GNR. 324 (as	Activity 12 (h)(vi)	• *"The clearance of an area of 300 square metres or more of indigenous vegetation… … (h) in the North West (vi)*

amended in 2017)		*areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland."* • Activity 12 (h)(vi) is triggered since the proposed development is located in the North West province. Wetlands (including unchanneled valleybottom wetlands) are located within the proposed grid connection corridor for the Inyathi Solar Power Plant. The development of the power line will require a service road which will result in the removal of vegetation.
GNR. 324 (as amended in 2017)	Activity 18 (h)(ix)	• *"The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre (h) in the North West (ix) areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland."* • Activity 18 (h)(ix) is triggered since the existing access road to the site will need to be widened by more than 4 metres. The project is located within the North West Province. Wetlands (including unchanneled valleybottom wetlands) are located within the proposed grid connection corridor for the Inyathi Solar Power Plant. The development of the power line will require a service road.

The activities triggered under Listing Notice 1, 2 and 3 (Regulation 327, 325 and 324) for the project implies that the development is considered as potentially having a significant impact on the environment. Subsequently a 'thorough assessment process' is required as described in Regulations 21-24. According to Appendix 3 of Regulation 326 the objective of the Environmental Impact Report (EIR) is to, through a consultative process:

- Determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- Describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- Identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- Determine the—
    - nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
    - degree to which these impacts-

        - can be reversed;
        - may cause irreplaceable loss of resources, and
        - can be avoided, managed or mitigated;
- identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment; identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- identify suitable measures to avoid, manage or mitigate identified impacts; and
- identify residual risks that need to be managed and monitored.

This report is the Draft Environmental Impact Report (EIR) that has been submitted to the Department of Environment, Forestry and Fisheries for a 30-day review and comment period. According to Regulation 326 all registered I&APs and relevant State Departments must also be allowed the opportunity to review the report. The Draft EIR has been made available to registered I&APs and all relevant State Departments for a 30-day review period from **03 May 2023 to 01 June 2023**. These stakeholders and individuals have been requested to provide written comments on the Draft EIR within the allocated timeframe. All issues identified during this review period will be documented and compiled into a Comments and Response Report as part of the Final EIR (**Appendix C7**). All comments received during the Scoping Phase of the project are available in the Comments and Response Report as referred to above, as well as Appendix C5 and C6 of this Draft EIR.

1.2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Environamics was appointed by the applicant as the independent EAP to conduct the EIA and prepare all required reports. All correspondence to the EAP can be directed to:

Contact person: Lisa Opperman

EAPASA reg.: 2020/2150

Postal Address: 14 Kingfisher Street, Tuscany Ridge Estate, Potchefstroom, 2531

Telephone: 084 920 3111 (Cell)

Electronic Mail: lisa@environamics.co.za

And/or

Contact person: Christia van Dyk

Postal Address: 14 Kingfisher Street, Tuscany Ridge Estate, Potchefstroom, 2531

Telephone: 078 470 5252 (Cell)

Electronic Mail: christia@environamics.co.za

Regulation 13(1)(a) and (b) determines that an independent and suitably qualified and experienced EAP should conduct the EIA. In terms of the independent status of the EAP a declaration is attached

as Appendix A to this report. The expertise of the EAP responsible for conducting the EIA is also summarized in the curriculum vitae included as part of Appendix A.

1.3 DETAILS OF SPECIALISTS

Table 1.2 provides information on the specialists that have been appointed as part of the EIA process. Regulation 13(1)(a) and (b) determines that an independent and suitably qualified, experienced and independent specialist should conduct the specialist study, in the event where the specialist is not independent, a specialist should be appointed to externally review the work of the specialist as contemplated in sub regulation (2), must comply with sub regulation 1. In terms of the independent status of the specialists, their declarations are attached as Appendix H to this report. The expertise of the specialists is also summarised in their respective reports.

Table 1.2: Details of specialists

Study	Prepared by	Contact Person	Tel	e-mail
Avifaunal Impact Assessment	The Biodiversity Company	Mahomed Desai Andrew Husted	081 319 1225	info@thebiodiversitycompany.com
Terrestrial Biodiversity, and Wetland Impact Assessments	The Biodiversity Company	Marnus Erasmus Andrew Husted	081 319 1225	info@thebiodiversitycompany.com
Heritage Impact Assessment	J van Schalkwyk Heritage Consultant	J van Schalkwyk	076 790 6777	jvschalkwyk@mweb.co.za
Paleontological Study	Banzai Environmental (Pty) Ltd	Elize Butler	084 447 8759	elizebutler002@gmail.com
Agricultural Compliance Statement	The Biodiversity Company	Matthew Mamera / Andrew Husted	081 319 1225	info@thebiodiversitycompany.com
Visual Impact Assessment	Donaway Environmental Consultants	Johan Botha	082 316 7749	johan@donnaway.co.za
Social Impact Assessment	Donaway Environmental Consultants	Johan Botha	082 493 5166	johan@donnaway.co.za
Traffic Assessment Study	BVi Consulting Engineers	DJP van der Merwe	060 557 7467	dirkvdm@bviwc.co.za

1.4 STATUS OF THE EIA PROCESS

The EIA process is conducted strictly in accordance with the stipulations set out in Regulations 21-24 of Regulation No. 326. Table 1.2 provides a summary of the EIA process and future steps to be taken. It can be confirmed that to date:

- A newspaper advertisement was placed in the Noordwester on 29 July 2022, informing the public of the EIA process and for the public to register as I&APs.
- A site visit was conducted by the EAP on 21 July 2022.
- Site notices were erected on site on 21 July 2022 informing the public of the commencement of the EIA process.
- An application form and the draft Scoping Report has been submitted to DFFE on 15 November 2022.
- The draft Scoping Report has been made available for a 30-day review and comment period from 15 November 2022 to 06 Jan 2023.
- The Final Scoping Report was submitted to the DFFE on 12 January 2023 for decision making approval of the Plan of Study for the EIA.
- The DFFE accepted the Final Scoping Report (FSR) on 17 February 2023.
- The Draft EIR Report was submitted to the DFFE (and registered I&APs) on 03 May 2023 for the 30-day review and comment period which will be from 03 May 2023 – 01 June 2023.

It is envisaged that the EIA process should be completed within approximately four months of submission of the Final EIR, i.e. by October 2023 – see Table 1.3.

Table 1.3: Estimated timeframe for completion of the 'scoping and EIA process'

Activity	Prescribed timeframe	Timeframe
Site visit		July 2022
Public participation (BID, press advert, site notice)	30 Days	19 Aug. – 19 Sept. 2022
Submit application form and DSR	-	By 15 Nov 2022
Public participation (DSR)	30 Days	15 Nov.2022 – 06 Jan. 2023
Submit FSR	44 Days	12 Jan. 2023

Department acknowledges receipt	10 Days	Jan. 2023
Department approves/reject	43 Days	17 February 2023
Public participation (DEIR)	30 Days	03 May 2023 – 01 June 2023
Submission of FEIR & EMPr	-	June 2023
Department acknowledges receipt	10 Days	June 2023
Decision	107 Days	September 2023
Department notifies of decision	5 Days	September 2023
Registered I&APs notified of decision	14 Days	September 2023
Appeal	20 Days	October 2023

1.5 SPECIALIST STUDIES IDENTIFIED IN THE DFFE SCREENING TOOL REPORT

The table included below provides an indication of the specialist studies identified by the DFFE Screening Tool Report (Appendix B), an indication of whether the studies were undertaken or not and a motivation or confirmation of the studies being included or not.

Table 1.4: Summary of specialist studies identified by the Screening tool report

Study identified in the DFFE Screening Tool and sensitivity	Study included?	Confirmation / motivation
Agricultural Impact Assessment Sensitivity: Medium	Yes	A Soil and Agriculture Assessment is included in Appendix E4. The high sensitivity is disputed by the report
Landscape / Visual Impact Assessment Sensitivity: Very High	Yes	A Visual Impact Assessment is included in Appendix E3.
Archaeological and Cultural Heritage Impact Assessment Sensitivity: Low	Yes	A Heritage Impact Assessment is included in Appendix E5.

Palaeontological Impact Assessment Sensitivity: Very High	Yes	A Palaeontological Impact Assessment is included in Appendix E6.
Terrestrial Biodiversity Impact Assessment Sensitivity: Very High	Yes	A Terrestrial Biodiversity Impact Assessment is included in Appendix E1. This assessment has been undertaken in terms of the Protocols of GNR320 – refer to the content of the report.
Aquatic Biodiversity Impact Assessment Sensitivity: Very High	No	A Wetland / Riparian Impact Assessment is included in Appendix E1. This assessment has been undertaken in terms of the Protocols of GNR320 – refer to the content of the report.
Civil Aviation Assessment Sensitivity: Low	No	The Civil Aviation Authority has been consulted regarding the development of the project since the commencement of the EIA Process. No specific negative impacts or issues have been raised to date by the CAA regarding the project. The project is also not located within an area considered to be of a high sensitivity. Refer to the site verification report included as Appendix G.
Defence Assessment Sensitivity: Low	No	The sensitivity for the entire extent of the site is low and therefore no assessment has been included. Refer to the site verification report included as Appendix G.
RFI Assessment Sensitivity: Low	No	The RFI theme sensitivity is low for the entire extent of the project. The South African Radio

		Astronomy Observatory (SARAO) has been consulted regarding the development of the project since the commencement of the EIA Process. No specific negative impacts or issues have been raised to date by the SARAO regarding the project. The project is also not located within an area considered to be of a high sensitivity. Refer to the site verification report included as Appendix G.
Socio-Economic Assessment Sensitivity: Not indicated	Yes	A Social Impact Assessment is included in Appendix E7.
Plant species Assessment Sensitivity: Medium	Yes	Refer to Appendix E1. The Terrestrial Biodiversity Impact Assessment also includes the relevant Plant Species Assessment. This assessment has been undertaken in terms of the Protocols of GNR320 – refer to the content of the report.
Animal Species Assessment Sensitivity: High	Yes	Refer to Appendix E1. The Terrestrial Biodiversity Impact Assessment also includes the relevant Plant Species Assessment. This assessment has been undertaken in terms of the Protocols of GNR320 – refer to the content of the report.

1.6 STRUCTURE OF THE REPORT

This report is structured in accordance with the prescribed contents stipulated in Appendix 3 of Regulation No.326. It consists of seven sections demonstrating compliance to the specifications of the regulations as illustrated in Table 1.5.

Table 1.5: Structure of the report

Requirements for the contents of an EIR as specified in the Regulations		Section in report
Appendix 3. (3) - An environmental impact assessment 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-		
(a)	details of -	1
	(i) the EAP who prepared the report; and	
	ii) the expertise of the EAP, including a curriculum vitae.	
(b)	the location of the activity, including-	2
	(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 information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	
(c)	a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is-	
	(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	
	(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	
(d)	a description of the scope of the proposed activity, including-	
	(i) all listed and specified activities triggered and being applied for; and	
	(ii) a description of the associated structures and infrastructure related to the development.	
(e)	a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context.	3
(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;	4
(g)	A motivation for the preferred development footprint within the approved site.	5
(h)	a full description of the process followed to reach the proposed development footprint within the approved site, including –	
	(i) details of all the development footprint alternatives considered;	
	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	
	(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	
	(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	
	(ix) if no alternative development locations for the activity were investigated, the motivation for not considering such; and	
	(x) a concluding statement indicating the preferred alternative development location within the approved site.	

	(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	
	(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	
	(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	
	(viii) the possible mitigation measures that could be applied and level of residual risk;	
(i)	a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including-	6
	(i) a description of all environmental issues and risks that were identified during the EIA 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.	
(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 risk;	
	(iii) the extent and duration of the impact and risk;	
	(iv) the probability of the impact and risk occurring;	
	(v) the degree to which the impact and 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 mitigated;	
(k)	where applicable, a summary of the findings and recommendations of 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 assessment report;	6
(l)	an environmental impact statement which contains-	8
	(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;	
(m)	based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;	
(n)	the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;	Not applicable

(o)	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	Not applicable
(p)	a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	8
(q)	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 conditions that should be made in respect of that authorisation;	
(r)	where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;	8
(s)	an undertaking under oath or affirmation by the EAP in relation to-	Appendix A to the report
	(i) the correctness of the information provided in the report;	
	(ii) the inclusion of comments and inputs from stakeholders and interested and affected parties (I&APs);	
	(iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and	
	(iv) any information provided by the EAP to I&APs and any responses by the EAP to comments or inputs made by I&APs;	
(t)	where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	Not applicable
(u)	an indication of any deviation from the approved scoping report, including the plan of study, including-	Not applicable
	(i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and	
	(ii) a motivation for the deviation;	
(v)	any specific information that may be required by the CA; and	Not applicable
(w)	any other matters required in terms of section 24(4)(a) and (b) of the Act.	Not applicable

2 ACTIVITY DESCRIPTION

This section aims to address the following requirements of the regulations:

Appendix 3. (3) An EIR (...) must include-

(b) the location of the activity, including-

(i) the 21-digit Surveyor General code of each cadastral land parcel;

(ii) where available, the physical address and farm name;

(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;

(c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is-

(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or

(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;

(d) a description of the scope of the proposed activity, including-

(i) all listed and specified activities triggered and being applied for;

(ii) a description of the associated structures and infrastructure related to the development.

2.1 THE LOCATION OF THE ACTIVITY AND PROPERTY DESCRIPTION

The activity entails the development of a photovoltaic solar facility and associated infrastructure on the Portion 5 (Portion of Portion 2) of the Farm Zamenkomst No. 4, Registration Division IP, North West Province situated within the Ditsobotla Local Municipality area of jurisdiction. The proposed development is located in the North West Province in the northern central interior of South-Africa (refer to Figure B for the regional map). The town of Lichtenburg is located approximately 15km to the south of the proposed development (refer to Figure A for the locality map).

The project entails the generation of up to 150MW electrical power through the installation and operation of photovoltaic (PV) panels. The total footprint of the project will approximately be 526ha (including supporting infrastructure on site) - refer to Table 2.1 for general site information. The property on which the facility is to be constructed will be leased by Inyathi Solar Power Plant (RF) (Pty) Ltd from the property owner for the life span of the project (minimum of 20 years).

It is expected that generation from the facility will tie in with the Eskom Watershed 275/132/88 MTS substation.

Table 2.1: General site information

Description of affected farm portion	Solar Power Plant Portion 5 (Portion of Portion 2) of the Farm Zamenkomst No. 4 Power Line Portion 5 (Portion of Portion 2) of the Farm Zamenkomst No. 4 Portion 4 of the Farm Houthaaldoorns No. 2 Portion 2 of the Farm Zamenkomst No. 4 Portion 23 of the farm Houthaalbomen No. 31 Portion 24 of the farm Houthaalbomen No. 31 Portion 25 of the farm Houthaalbomen No. 31 Portion 10 of the Farm Lichtenburg Town and Townslands No. 27 Remaining Extent of Portion 1 of the Farm Lichtenburg Town and Townslands No. 27 Remaining Extent of the Farm Priem No.30
Province	North West
District Municipality	Ngaka Modiri Molema District Municipality
Local Municipality	Ditsobotla Local Municipality
Ward numbers	16
Closest towns	The town of Lichtenburg is located approximately 13km south of the proposed development.
21 Digit Surveyor General codes	Solar Power Plant Portion 5 (Portion of Portion 2) of the Farm Zamenkomst No. 4 T0IP00000000000400005 Power Line

	Portion 5 (Portion of Portion 2) of the Farm Zamenkomst No. 4 T0IP00000000000400005 Portion 4 of the Farm Houthaaldoorns No. 2 T0IP00000000000200004 Portion 2 of the Farm Zamenkomst No. 4 T0IP00000000000400002 Portion 23 of the farm Houthaalbomen No. 31 T0IP00000000003100023 Portion 24 of the farm Houthaalbomen No. 31 T0IP00000000003100024 Portion 25 of the farm Houthaalbomen No. 31 T0IP00000000003100025 Portion 10 of the Farm Lichtenburg Town and Townslands No. 27 T0IP00000000002700010 Remaining Extent of Portion 1 of the Farm Lichtenburg Town and Townslands No. 27 T0IP00000000002700001 Remaining Extent of the Farm Priem No.30 T0IP00000000003000000
Type of technology	Photovoltaic solar facility
Structure Height	Panels ~6m, buildings ~ 6m, power line ~32m and battery storage facility ~8m height
Battery storage	Within a 4-hectare area
Surface area to be covered (Development footprint)	Approximately 526 ha
EIA Footprint	Assessed 526 ha
Structure orientation	The panels will either be fixed to a single-axis horizontal tracking structure where the orientation of the panel varies

	according to the time of the day, as the sun moves from east to west or tilted at a fixed angle equivalent to the latitude at which the site is in order to capture the most sun.
Generation capacity	Up to 150MW
Expected production	320-360 GWh per annum (Expected production by 150MWdc modules Considering Bifacial and one-axis tracker)

The site is located in a rural area and is bordered by agricultural land uses. The site survey revealed that the affected property currently consists of agricultural activities – refer to plates 1-11 for photographs of the affected property and proposed development footprint area.

2.2 ACTIVITY DESCRIPTION

The proposed development will trigger the following activities:

Table 2.2: Listed activities[2]

Relevant notice:	**Activity No (s)**	**Description of each listed activity as per project description**:
GNR. 327 (as amended in 2017)	Activity 11(i)	• *"The development of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."* • Activity 11(i) is triggered as the proposed photovoltaic solar facility will transmit and distribute electricity of 132 kilovolts outside an urban area. The infrastructure for the distribution of electricity will include a power line (132 kV) and an on-site HV/MV substation (130 MVA). For the preferred power line corridor, the power line will be constructed in an ~12km long and 100 m (up to 500m in some instances) wide corridor. It is expected that generation from the facility will tie in with the Eskom Watershed 275/132/88 MTS substation.
GNR. 327 (as amended in 2017)	Activity 12(ii)(a)(c)	• "*The development of (ii) infrastructure or structures with a physical footprint of 100 square metres or more; (a) within a watercourse or (c) within 32 meters of a watercourse measured from the edge of a watercourse."* • Activity 12(ii)(a)(c) is triggered based on the presence of wetlands (including unchanneled valleybottom

[2] Please refer to Table 6.2 for a detailed description of the relevant aspects of the development that will apply to each specific listed activity.

		wetlands) located within the proposed grid connection corridor for the Inyathi solar Power Plant.
GNR. 327 (as amended in 2017)	Activity 14	• *"The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres."* • Activity 14 is triggered since the proposed development will need to develop infrastructure for the storage and handling of dangerous goods (diesel) in containers with combined capacity of 80 cubic metres. The capacity will not exceed 500 cubic metres.
GNR. 327 (as amended in 2017)	Activity 19	• "T*he infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse."* • Activity 19 is triggered based on the presence of wetlands (including unchanneled valleybottom wetlands) located within the proposed grid connection corridor for the Inyathi solar Power Plant The development of the power line will require a service road which will result in the removal of more than 10 cubic meters of rock from the watercourse.
GNR. 327 (as amended in 2017)	Activity 24(ii)	• *"The development of a road (ii) with reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters.* • Activity 24(ii) is triggered as the internal roads will vary between 6 and 12 meters in width. The internal roads will be 6m in width and the perimeter road will be up to 12m in width.
GNR. 327 (as amended in 2017)	Activity 28(ii)	• *"Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."* • Activity 28(ii) is triggered as portions of the affected property have been used for grazing and the property will be re-zoned to "special" use for the proposed development. The development footprint of the solar power plant will be 526 hectares.

GNR. 327 (as amended in 2017)	Activity 56(ii)	• *"The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres…"* • Activity 56 (ii) is triggered since the existing access to the affected property does not have a reserve and will need to be widened by more than 6 metres.
GNR. 325 (as amended in 2017)	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."* • Activity 1 is triggered since the proposed photovoltaic solar facility will generate up to 150 megawatts electricity through the use of a renewable resource.
GNR. 325 (as amended in 2017)	Activity 15	• *"The clearance of an area of 20 hectares or more of indigenous vegetation."* • In terms of vegetation type the preferred site falls within the Carletonville Dolomite Grassland which is described by Mucina and Rutherford (2006) as 'vulnerable'. Activity 15 is triggered since portions of the site has not been lawfully disturbed during the preceding ten years; therefore, more than 20 hectares of indigenous vegetation will be removed. The development footprint of the solar power plant will be 526 ha.
GNR. 324 (as amended in 2017)	Activity 12 (h)(vi)	• *"The clearance of an area of 300 square metres or more of indigenous vegetation… … (h) in the North West (vi) areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland."* • Activity 12 (h)(vi) is triggered since the proposed development is located in the North West province. Wetlands (including unchanneled valleybottom wetlands) are located within the proposed grid connection corridor for the Inyathi Solar Power Plant. The development of the power line will require a service road which will result in the removal of vegetation.
GNR. 324 (as amended in 2017)	Activity 18 (h)(ix)	• *"The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre (h) in the North West (ix) areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland."* • Activity 18 (h)(ix) is triggered since the existing access road to the site will need to be widened by more than 4 metres. The project is located within the North West

		Province. Wetlands (including unchanneled valleybottom wetlands) are located within the proposed grid connection corridor for the Inyathi Solar Power Plant. The development of the power line will require a service road.

The potentially most significant impacts will occur during the construction phase of the development, which will include the following activities:

- Site clearing and preparation: Certain areas of the site will need to be cleared of vegetation and some areas may need to be levelled.
- Civil works to be conducted:
  - Terrain levelling if necessary– Levelling will be minimal as the potential site chosen is relatively flat.
  - Laying foundation- The structures will be connected to the ground through cement pillars, cement slabs or metal screws. The exact method will depend on the detailed geotechnical analysis.
  - Construction of access and internal roads/paths – Access will be obtained from the R505 Regional Road onto a proposed new gravel access road situated adjacent the development footprint where direct access will be obtained to the facility. An internal site road network will also be required to provide access to the solar field and associated infrastructure.
  - Trenching – all Direct Current (DC) and Alternating Current (AC) wiring within the PV plant will be buried underground. Trenches will have a river sand base, space for pipes, backfill of sifted soil and soft sand and concrete layer where vehicles will pass.

2.3 PHOTOVOLTAIC TECHNOLOGY

The term photovoltaic describes a solid-state electronic cell that produces direct current electrical energy from the radiant energy of the sun through a process known as the Photovoltaic Effect. This refers to light energy placing electrons into a higher state of energy to create electricity. Each PV cell is made of silicon (i.e. semiconductors), which is positively and negatively charged on either side, with electrical conductors attached to both sides to form a circuit. This circuit captures the released electrons in the form of an electric current (direct current). The key components of the proposed project are described below:

- PV Panel Array - To produce up to 150MW, the proposed facility will require numerous linked cells placed behind a protective glass sheet to form a panel. Multiple panels will be required to form the solar PV arrays which will comprise the PV facility. The PV panels will be tilted at a northern angle in order to capture the most sun.
- Wiring to Central Inverters - Sections of the PV array will be wired to central inverters. The inverter is a pulse width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency.
- Connection to the grid - Connecting the array to the electrical grid requires transformation of the voltage from 480V to 33kV to 132kV. The normal components and dimensions of a distribution rated electrical substation will be required. Output voltage from the inverter is

480V and this is fed into step up transformers to 132kV. An onsite substation will be required on the site to step the voltage up to 132kV, after which the power will be evacuated into the national grid. Whilst Inyathi Solar Power Plant (RF) (Pty) Ltd has not yet received a cost estimate letter from Eskom, it is expected that generation from the facility will tie in with the existing Watershed 275/132/88 MTS Substation. The power line route have been assessed within a 100m to 500m wide corridor. The Project will inject up to 100MW into the National Grid. The installed capacity will be approximately 150MW.

- Electrical reticulation network – An internal electrical reticulation network will be required and will be lain ~2-4m underground as far as practically possible.
- Supporting Infrastructure – The following auxiliary buildings with basic services including water and electricity will be required on site:

  - Office (~200m²);

  - Switch gear and relay room (~400m²);

  - Staff lockers and changing room (~200m²); and

  - Security control (~60m²)

- Battery storage – A Battery Storage Facility with a maximum height of 8m and a maximum volume of 1,740 m3 of batteries and associated operational, safety and control infrastructure.
- Roads – Access will be obtained from the R505 Regional Road onto a proposed new gravel access road situated adjacent the development footprint where direct access will be obtained to the facility. An internal site road network will also be required to provide access to the solar field and associated infrastructure. The access and internal roads will be constructed within a 25-meter corridor.
- Fencing - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm. Fencing with a height of 2.5 meters will be used.

2.4 LAYOUT DESCRIPTION

The layout plan follows the limitations of the site and aspects such as environmentally sensitive areas, roads, fencing and servitudes on site will be considered – refer to Figures H3 – H5 and Figures I1 – I2.

The total surface area proposed include the PV panel arrays spaced to avoid shadowing, access and maintenance roads and associated infrastructure (buildings, power inverters, transmission lines and perimeter fences). Limited features of environmental significance exist on site, with the main features of significance being a cultural resource. A final layout plan is included as Figure I. Table 2.3 below provides detailed information regarding the layout for the proposed facility as per DFFE specifications.

Table 2.3: Technical details for the proposed facility

Component	Description / dimensions
Height of PV panels	6 meters
Area of PV Array	526 Hectares (Development footprint)
Number of inverters required	Minimum 50

Area occupied by inverter / transformerstations / substations / BESS	Central inverters+ LV/MV trafo: 20 m^2 HV/MV Substation with switching station: 15000 m^2 BESS: 4 000 m^2
Capacity of on-site substation	132kV
Capacity of the power line	132kV
Area occupied by both permanent and construction laydown areas	Permanent Laydown Area: 526 Hectares Construction Laydown Area: ~2000 m^2
Area occupied by buildings	Security Room: ~60 m^2Office: ~200 m^2 Staff Locker and Changing Room: ~200 m^2
Battery storage facility	Maximum height: 8m Maximum volume: 1740 m^3
Length of internal roads	Approximately 15 km
Width of internal roads	Between 6 & 12 meters
Proximity to grid connection	Approximately 6km
Grid connection corridor width	100m and up to 500m in width
Grid connection corridor length	Up to ~6km
Power line servitude width	32m
Height of fencing	Approximately 2.5 meters

Table 2.4 provide the coordinate points for the proposed project site, associated infrastructureand grid connection corridor options.

Table 2.4: Coordinates

Coordinates			
Project Site	A	26° 0'45.84"S	26° 6'58.93"E
	B	26° 0'8.81"S	26° 8'40.10"E
	C	26° 1'28.94"S	26° 8'56.28"E
	D	26° 1'18.54"S	26° 7'5.79"E
Proposed Access Road	1	26° 1'18.19"S	26° 7'6.74"E
	2	26° 1'18.30"S	26° 7'5.08"E
	3	26° 2'7.25"S	26° 7'15.54"E
	4	26° 2'10.10"S	26° 7'9.87"E
	5	26° 2'25.52"S	26° 7'18.50"E

	6	26° 2'43.84"S	26° 6'37.95"E
Switching Substation	A	26° 1'11.97"S	26° 7'6.46"E
	B	26° 1'12.01"S	26° 7'9.69"E
	C	26° 1'15.18"S	26° 7'9.65"E
	D	26° 1'15.18"S	26° 7'6.43"E
Step-up substation	A	26° 1'11.98"S	26° 7'9.67"E
	B	26° 1'12.01"S	26° 7'11.82"E
	C	26° 1'15.22"S	26° 7'11.81"E
	D	26° 1'15.21"S	26° 7'9.66"E
Battery Energy	A	26° 1'6.77"S	26° 7'4.67"E
	B	26° 1'6.84"S	26° 7'15.41"E
	C	26° 1'11.64"S	26° 7'15.39"E
	D	26° 1'11.61"S	26° 7'5.67"E
Connection Line Corridor	1	26° 1'11.23"S	26° 7'6.35"E
	2	26° 1'11.09"S	26° 6'20.51"E
	3	26° 1'4.63"S	26° 6'18.01"E
	4	26° 1'4.63"S	26° 5'50.41"E
	5	26° 2'43.41"S	26° 6'38.19"E
	6	26° 2'27.08"S	26° 7'14.47"E
	7	26° 2'28.17"S	26° 7'16.93"E
	8	26° 3'5.96"S	26° 7'24.88"E
	9	26° 3'14.52"S	26° 7'24.78"E
	10	26° 3'16.51"S	26° 7'28.87"E
	11	26° 3'35.26"S	26° 7'37.69"E
	12	26° 3'37.12"S	26° 7'43.37"E
	13	26° 5'18.03"S	26° 8'28.43"E

	14	26° 5'25.77"S	26° 8'24.82"E
	15	26° 5'32.19"S	26° 8'24.65"E
	16	26° 5'40.48"S	26° 8'40.07"E
	17	26° 5'40.27"S	26° 8'48.20"E
	18	26° 5'31.83"S	26° 8'52.84"E
	19	26° 5'20.52"S	26° 8'54.51"E
	20	26° 5'13.03"S	26° 8'38.78"E
	21	26° 5'14.69"S	26° 8'30.74"E
	22	26° 3'8.80"S	26° 7'34.68"E
	23	26° 3'5.81"S	26° 7'28.05"E
	24	26° 2'23.08"S	26° 7'19.14"E
	25	26° 2'39.80"S	26° 6'41.21"E
	26	26° 2'39.06"S	26° 6'38.67"E
	27	26° 2'38.20"S	26° 6'38.11"E
	28	26° 1'21.78"S	26° 6'1.25"E
	29	26° 1'21.73"S	26° 6'18.66"E
	30	26° 1'15.21"S	26° 6'20.55"E
	31	26° 1'15.20"S	26° 7'7.23"E

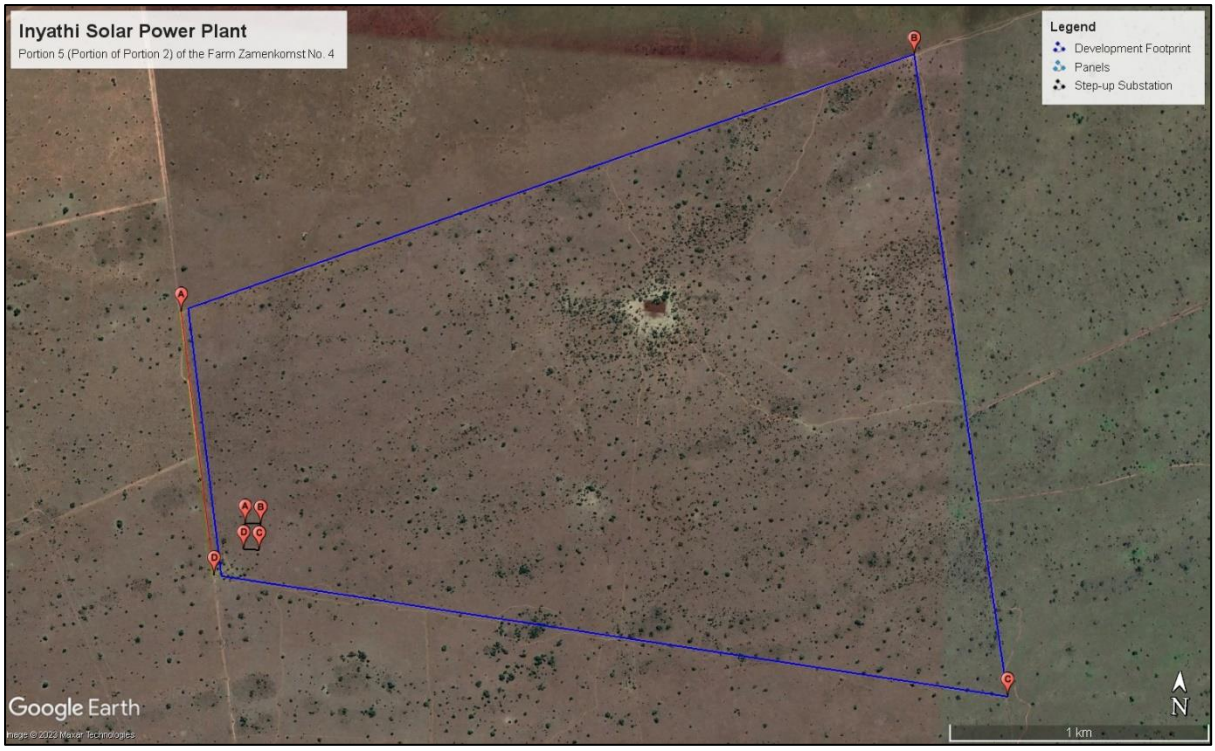


Figure 2.1: Map indicating coordinate points of the proposed Inyathi Solar Power plant (including project site and step-up substation)

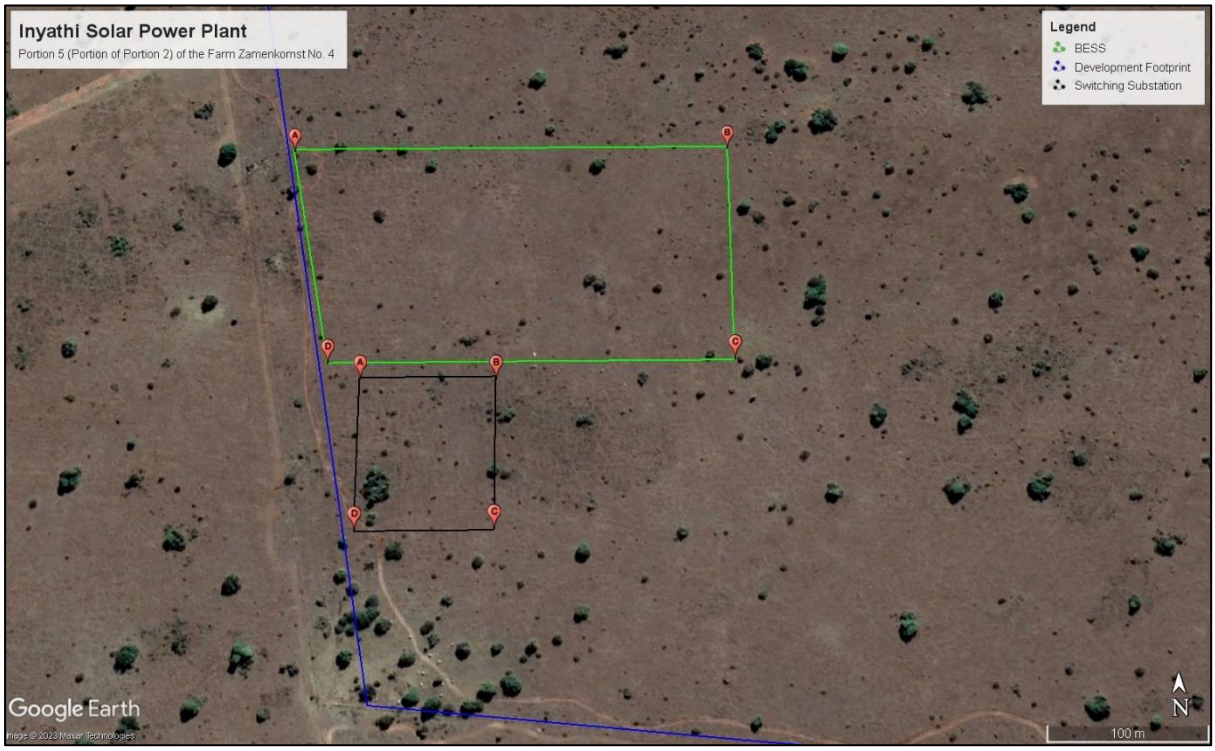


Figure 2.2: Map indicating coordinate points of the proposed Inyathi Solar Power Plant power line connecting the switching substation and BESS.

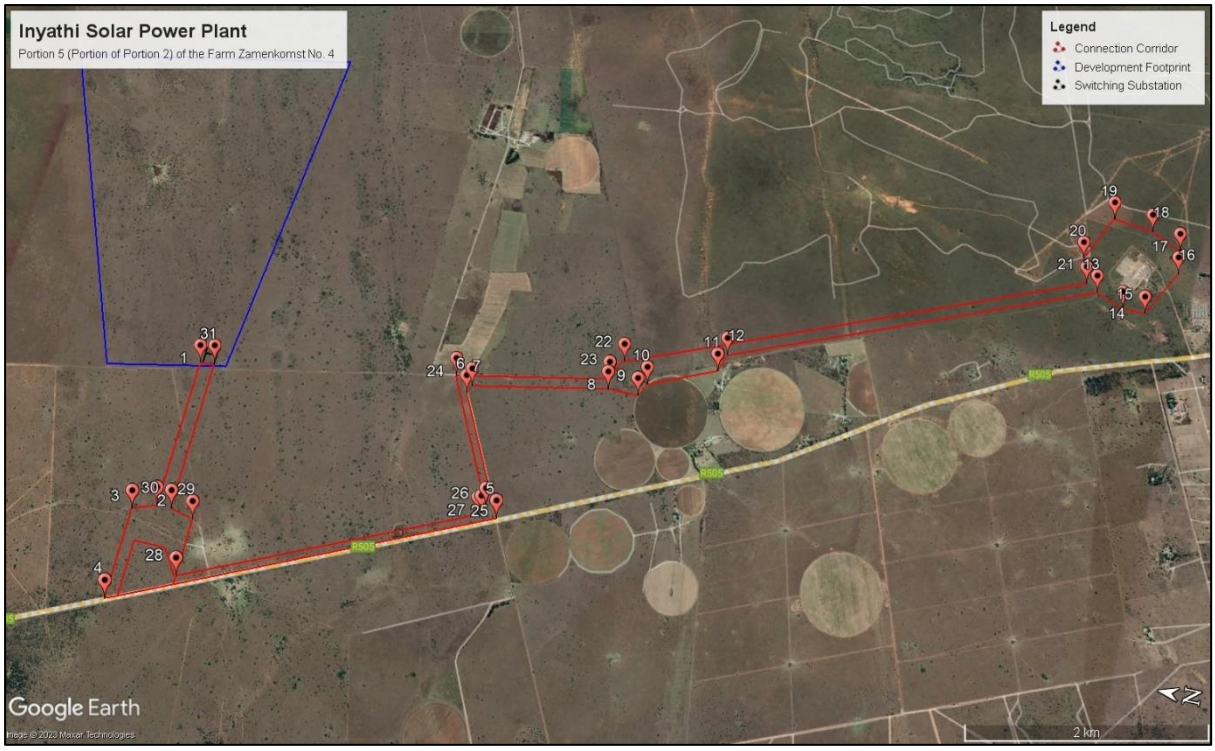


Figure 2.3: Map indicating coordinate points of the proposed Inyathi Solar Power Plant power line corridor to complete the connection between the collector substation and the existing Watershed MTS enabling evacuation of the power into the national grid.

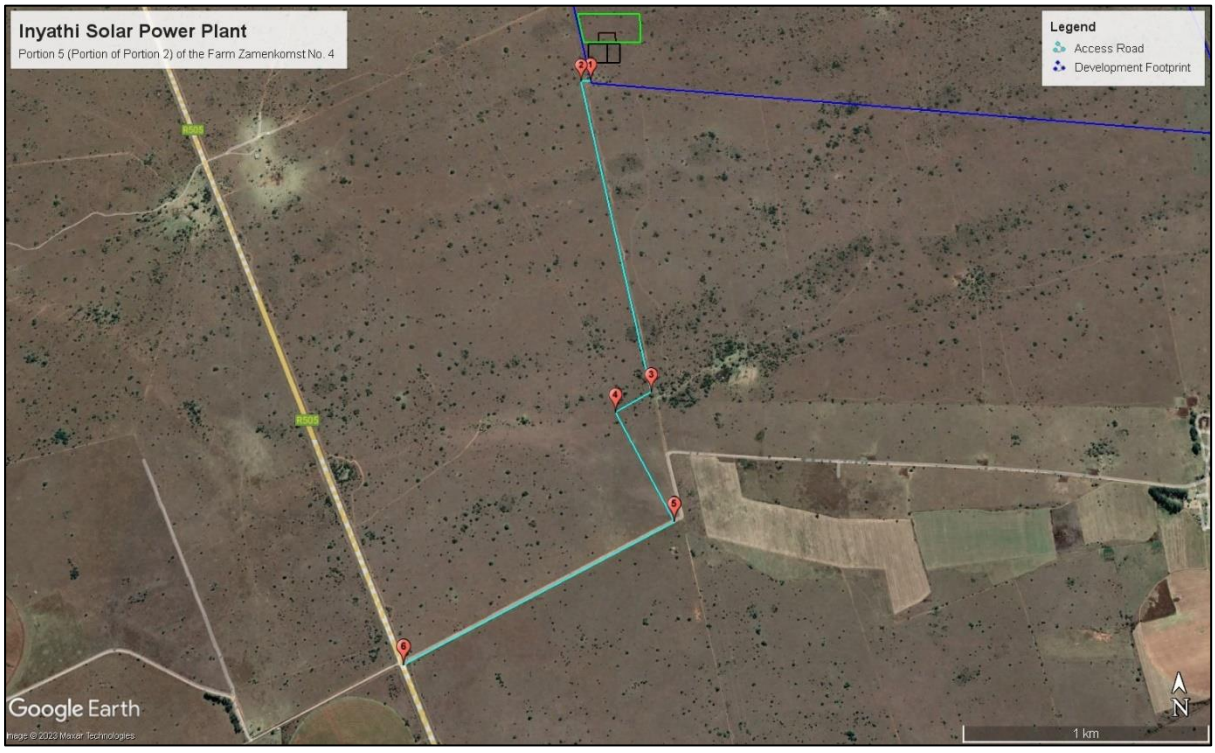


Figure 2.4: Map indicating coordinate points of the proposed Inyathi Solar Power Plant access road.

2.5 SERVICES PROVISION

The following sections provides information on services required on the site e.g., water, sewage, refuse removal, and electricity.

2.5.1 Water

Adequate provision of water will be a prerequisite for the development. Water for the proposed development will most likely be obtained from ground water resources or alternatively collected with water trucks from an authorized water service provider and stored on site. The Department of Water and Sanitation has been contacted by the project proponent to confirm the water resource availability in the relevant catchment management area in order to ensure sustainable water supply (refer to Appendix F for proof of correspondence). A full assessment of the application for water use authorisation will only be undertaken in the event that the project proponent has obtained preferred bidder status by the Department of Mineral Resources and Energy.

The estimated maximum amount of water required during construction is 1200m³ per month during the 12 - 18 months of construction. The estimated maximum amount of water required during the facility's 20 years of production is 4200m³ per annum. Department of Water Affairs has issued a Non-Binding Water Letter for up to 30 000 m³ per annum during the construction phase and 5000 m³ per annum during the operational phase. The majority of this usage is for the cleaning of the solar panels. It is estimated that the panels may only need to be washed twice per annum, but provision is made for quaternary cleaning (March, May, July, and September).

Drinking water supplied will comply with the SANS:241 quality requirements. Water quality from the borehole will be tested to confirm SANS:214 quality, if water quality is not sufficient for drinking, bottled water will be supplied to staff during construction and operational phases of the project.

Water saving devices and technologies such as the use of dual flush toilets and low-flow taps, the management of stormwater, the capture and use of rainwater from gutters and roofs will be considered by the developer. Furthermore, indigenous vegetation will be used during landscaping and the staff will be trained to implement good housekeeping techniques.

2.5.2 Stormwater

To avoid soil erosion, it is recommended that the clearing of vegetation be limited. Stormwater management and mitigation measures will be included in the Environmental Management Programme (EMPr) to be submitted as part of the EIR.

2.5.3 Sanitation and waste removal

Portable chemical toilets will be utilised, that will be serviced privately or by the local municipality. Waste will be disposed at a licensed landfill site. The construction- and hazardous waste will be removed and disposed of at licensed landfill sites accepting such kinds of wastes. During the operational phase household waste will be removed to a licensed landfill site by a private contractor or by the local municipality. The relevant Local Municipality(s) have been contacted, to formally confirm that it has the capacity to provide the proposed development with these services for the lifetime of the project (20 years). To date no feedback has been received.

2.5.4 Electricity

During the construction phase of the development, electricity will either be generated on site through a small solar system or through the use of generators or the existing Eskom supply on the affected property will be utilised. This will depend on the Engineering, Procurement, and Construction (EPC) contractor appointed. During operation electricity use will be limited and will primarily be related to the lighting of the facility and domestic use. Design measures such as the use of energy saving light bulbs would be considered by the developer. During the day, electricity will be sourced from the photovoltaic plant, and from the electricity connection at night.

2.5.5 Decommissioning of the facility

The operating period will be 20 years from the commencement date of the operation phase. Thereafter two rights of renewal periods of 40 years and 20 years will be relevant. It is anticipated that new PV technologies and equipment will be implemented, within the scope of the Environmental Authorisation, when influencing the profitability of the solar facility.

A likely extension of the plant's lifetime would involve putting new, more efficient, solar panels on the existing structures to improve the efficiency of the facility as the technology improves. The specifications of these new panels will be the same as the current panels under consideration, but the conversion efficiency of sunlight to energy will be greater (comparable to new computer chips, that are the same, but faster and more efficient). If, for whatever reason the plant halts operations, the Environmental Authorisation and contract with the landowner will be respected during the decommissioning phase.

The decommissioning process will consist of the following steps:

- The PV facility would be disconnected from the Eskom grid.
- The inverters and PV modules would be disconnected and disassembled.
- Concrete foundations (if used) would be removed and the structures would be dismantled.
- The underground cables would be unearthed and removed and buildings would be demolished and removed.
- The fencing would be dismantled and removed.
- The roads can be retained should the landowner choose to retain them, alternatively the roads will be removed and the compaction will be reversed.
- Most of the wires, steel and PV modules are recyclable and would be recycled to a reasonable extent. The Silicon and Aluminium in PV modules can be removed and reused in the production of new modules.
- Any rubble and non-recyclable materials will be disposed of at a registered landfill facility.

The rehabilitation of the site would form part of the decommissioning phase. The aim would be to restore the land to its original form (or as close as possible). The rehabilitation activities would include the following:

- Removal of all structures and rubble,
- Breaking up compaction where required, loosening of the soil and the redistribution of topsoil,
- The surface will be restored to the original contours and hydro seeding will take place.

3 LEGISLATIVE AND POLICY CONTEXT

This section aims to address the following requirements of the regulations:

Appendix 3. (3) An EIR (...) must include-

(e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context.

3.1 INTRODUCTION

Environmental decision making with regards to solar PV plants is based on numerous policy and legislative documents. These documents inform decisions on project level environmental authorisations issued by the DFFE as well as comments from local and district authorities. Moreover, it is significant to note that they also inform strategic decision making reflected in the IDPs and SDFs. Therefore, to ensure streamlining of environmental authorisations it is imperative for the proposed activity to align with the principles and objectives of key national, provincial and local development policies and legislation. The following acts and policies and their applicability to the proposed development are briefly summarised:

- The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)
- National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA]
- The National Energy Act, 2008 (Act 34 of 2008)
- National Water Act, 1998 (Act No. 36 of 1998)
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
- The National Heritage Resources Act, 1999 (Act No. 25 of 1999)
- Conservation of Agricultural Resources Act, 1983 (Act No. 85 of 1983)
- The National Forests Act, 1998 (Act 84 of 1998)
- The White Paper on the Energy Policy of the Republic of South Africa (1998)
- The White Paper on Renewable Energy (2003)
- Integrated Energy Plan (IEP) (2016)
- Integrated Resource Plan (IRP) for South Africa (2010-2030) (2019)
- National Development Plan of 2030 (2012)
- National Infrastructure Plan of South Africa (2012)
- New Growth Path Framework (2010)
- Climate Change Bill (2018)
- Strategic Integrated Projects (SIPs) (2010 – 2030)
- Strategic Environmental Assessment (SEA) for wind and solar PV Energy in South Africa (2014)
- North West Provincial Spatial Development Framework (PSDF) (2016)
- Ngaka Modiri Molema DM Final Integrated Development Plan (IDP) 2020 – 2021 (2020)

- Ditsobotla Local Municipality Draft Integrated Development Plan (IDP) Review 2020-2021 (2020)
- Ditsobotla LM Spatial Development Framework 2018 (SDF) (2018).

The key principles and objectives of each of the legislative and policy documents are briefly summarised in Table 3.1 and Table 3.2 to provide a reference framework for the implications for the proposed activity.

3.2 LEGISLATIVE CONTEXT

Table 3.1: Legislative context for the construction of photovoltaic solar plants

LEGISLATION	ADMINISTERING AUTHORITY	DATE	SUMMARY / IMPLICATIONS FOR PROPOSED DEVELOPMENT
The Constitution of South Africa (Act No. 108 of 1996)	National Government	1996	The Constitution is the supreme law of the Republic and all law and conduct must be consistentwith the Constitution. The Chapter on the Bill of Rights contains a number of provisions, whichare relevant to securing the protection of the environment. Section 24 states that "everyone has the right to (a) an environment that is not harmful to their health or well-being and (b) 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 economic and social development. TheConstitution, therefore, compels government to give effect to the people's environmental rightand places government under a legal duty to act as a responsible custodian of the country's environment. It compels government to pass legislation and use other measures to protect theenvironment, to prevent pollution and ecological degradation, promote conservation andsecure sustainable development. The development of the Inyathi Solar Power Plant and the aspects related thereto considers the creation of an environment which is not harmful or degraded through the implementation of appropriate mitigation measures.
The National Environmental Management Act (Act No. 107 of 1998)	National Department of Environmental Affairs (now known as the Department of Forestry, Fisheries and the	1998	NEMA provides for co-operative governance by establishing principles and procedures for decision-makers on matters affecting the environment. An important function of the Act is to serve as an enabling Act for the promulgation of legislation to effectively address integrated environmental management. Some of the principles in the Act are accountability; affordability; cradle to grave management; equity; integration; open information; polluter pays; subsidiary; waste avoidance and

	Environment) and the North West Province Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA)		minimisation; co-operative governance; sustainable development; and environmental protection and justice. The mandate for EIA lays with the National Environmental Management Act (107 of 1998) and the EIA Regulations No. 324, 325, 326, and 327 promulgated in terms of Section 24 of NEMA. The EIA Regulations determine that an Environmental Authorisation is required for certain listed activities, which might have a detrimental effect on the environment. The EIA process undertaken for the Inyathi Solar Power Plant is in-line with the requirements of NEMA for the Application for Environmental Authorisation.
The National Energy Act (Act No. 34 of 2008)	Department of Mineral Resources and Energy	2008	One of the objectives of the National Energy Act was to promote diversity of supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources, including solar: "To ensure that diverse energy resources are available, in sustainable quantities, and at affordable prices, to the South African economy, in support of economic growth and poverty alleviation, taking into account environmental management requirements (…); to provide for (…) increased generation and consumption of renewable energies…" (Preamble). Considering that the Inyathi Solar Power Plant is proposed to make use of PV technology and the solar resource for the generation of electricity, the proposed project is in-line with the Act.
The National Water Act (Act No. 36 of 1998)	Department of Water Affairs (now known as Department of Water and Sanitation)	1998	Sustainability and equity are identified as central guiding principles in the protection, use, development, conservation, management and control of water resources. The intention of the Act is to promote the equitable access to water and the sustainable use of water, redress past racial and gender discrimination, and facilitate economic and social development. The Act provides the rights of access to basic water supply and sanitation, and environmentally, it provides for the protection of aquatic and associated ecosystems, the reduction and prevention of pollution and degradation of water resources. As this Act is founded on the principle that National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use

			of water in the public interest, a person can only be entitled to use water if the use is permissible under the Act. Chapter 4 of the Act lays the basis for regulating water use. The site is located within the C31A quaternary catchment and is situated in the Lower Vaal Water Management Area. Should a water use license be required for the project, the National Water Act will be applicable in terms of obtaining the relevant license.
National Environmental Management: Waste Act (Act No. 59 of 2008)	National Department Environmental Affairs (DEA) (now known as the Department of Forestry, Fisheries and the Environment)	2008	NEMWA has been developed as part of the law reform process enacted through the White Paper on Integrated Pollution and Waste Management and the National Waste Management Strategy (NWMS). The objectives of the Act relate to the provision of measures to protect health, well-being and the environment, to ensure that people are aware of the impact of waste on their health, well-being and the environment, to provide for compliance with the measures, and to give effect to section 24 of the Constitution in order to secure an environment that is not harmful to health and well-being. Regulations No. R921 (of 2013) promulgated in terms of Section 19(1) of the National Environmental Management: Waste Act (59 of 2008) determines that no person may commence, undertake or conduct a waste management activity listed in this schedule unless a license is issued in respect of that activity. It is not envisaged that a waste permit will be required for the proposed development as no listed activities in terms of waste management are expected to be triggered.
National Environment Management: Air Quality Act (Act No. 39 of 2004)	National Department Environmental Affairs (DEA) (now known as the Department of Forestry, Fisheries and the Environment)	2004	The object of this Act is to protect the environment by providing reasonable measures for the protection and enhancement of the quality of air in the Republic; the prevention of air pollution and ecological degradation; and securing ecologically sustainable development while promoting justifiable economic and social development. Regulations No. R248 (of 31 March 2010) promulgated in terms of Section 21(1)(a) of the National Environmental Management Act: Air Quality Act (39 of 2004) determine that an Atmospheric Emission License (AEL) is required for certain listed activities, which result in atmospheric emissions which have or may have a detrimental effect on the environment. The Regulation also sets out the

			minimum emission standards for the listed activities. It is not envisaged that an Atmospheric Emission License will be required for the proposed development.
The National Heritage Resources Act (Act No. 25 of 1999)	South African Heritage Resources Agency (SAHRA)	1999	The Act aims to introduce an integrated and interactive system for the management of heritage resources, to promote good governance at all levels, and empower civil society to nurture and conserve heritage resources so that they may be bequeathed to future generations and to lay down principles for governing heritage resources management throughout the Republic. It also aims to establish the South African Heritage Resources Agency together with its Council to co-ordinate and promote the management of heritage resources, to set norms and maintain essential national standards and to protect heritage resources, to provide for the protection and management of conservation-worthy places and areas by local authorities, and to provide for matters connected therewith. The Act protects and manages certain categories of heritage resources in South Africa. For the purposes of the Heritage Resources Act, a "heritage resource" includes any place or object of cultural significance. In this regard the Act makes provision for a person undertaking an activity listed in Section 28 of the Act to notify the resources authority. The resources authority may request that a heritage impact assessment be conducted if there is reason to believe that heritage resources will be affected. A case file has been opened on SAHRIS for the Inyathi Solar Power Plant and all relevant documents have been submitted for their comments and approval. The Heritage Impact Assessment undertaken for the solar power plant is included as Appendix E5, and the Palaeontological Impact Assessment is included as Appendix E6.
Conservation of Agricultural Resources Act (Act No. 85 of 1983)	National and Provincial Government	1983	The objective of the Act is to provide control over the utilisation of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.

			Consent will be required from the Department of Agriculture, Forestry and Fisheries (now known as the Department of Forestry, Fisheries and the Environment) in order to confirm that the proposed development is not located on high potential agricultural land and to approve the long-term lease agreement. An Soil and Agricultural Assessment has been undertaken for the Inyathi Solar Power Plant and is included as Appendix E4.
The National Forests Act, 1998 (Act 84 of 1998)	Department of Environmental Affairs (now known as the Department of Forestry, Fisheries and the Environment)	1998	The purposes of this Act are to: (a) promote the sustainable management and development of forests for the benefit of all; (b) create the conditions necessary to restructure forestry in State forests; (c) provide special measures for the protection of certain forests and trees: (d) promote the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes. (e) promote community forestry; (f) promote greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination. Section 12(1) read with s15(1) of the NFA stated that the Minister may declare a particular tree, group of trees, woodland; or trees belonging to a particular species, to be a protected tree, group of trees, woodland or species. A list of protected tree species was gazetted in GN 635 of 6 December 2019. The effect of the declaration is that no person may (a) cut, disturb, damage or destroy; or (b) possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, or any forest product derived from a protected tree, except under

			a license granted by the Minister; or in terms of an exemption published by the Minister in the Gazette. A Terrestrial Biodiversity Impact Assessment has been undertaken for the Inyathi Solar Power Plant and is included in Appendix E1.
North West Nature Conservation Ordinance, 1983 (Act 12 of 1983)	North West Province Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA)	1983	The Act provides for the conservation of fauna and flora and the hunting of animals causing damage and for matters incidental thereto. This includes wild animals, fish, indigenous plants, as well as nature reserves. The Act also provides for the permitting of the disturbance of such species. A Terrestrial Biodiversity Impact Assessment has been undertaken for the Inyathi Solar Power Plant and is included in Appendix E1.

3.3 POLICY CONTEXT

Table 3.2: Policy context for the construction of photovoltaic solar plants

POLICY	ADMINISTERING AUTHORITY	DATE	SUMMARY / IMPLICATIONS FOR PROPOSED DEVELOPMENT
The White Paper on the Energy Policy of the Republic of South Africa	Department of Mineral Resources and Energy	1998	The White Paper on the Energy Policy of the Republic of South Africa establishes the international and national policy context for the energy sector, and identifies the following energy policy objectives: • Increasing access to affordable energy services • Improving energy governance • Stimulating economic development • Managing energy-related environmental and health impacts • Securing supply through diversity

			• Energy policy priorities The White Paper sets out the advantages of renewable energy and states that Government believes that renewables can in many cases provide the least cost energy service, particularly when social and environmental costs are included. The White Paper acknowledges that South Africa has neglected the development and implementation of renewable energy applications, despite the fact that the country's renewable energy resource base is extensive, and many appropriate applications exist. The White Paper notes that renewable energy applications have specific characteristics that need to be considered. Advantages include: • Minimal environmental impacts in operation in comparison with traditional supply technologies; and • Generally lower running costs, and high labour intensities. Disadvantages include: • Higher capital costs in some cases; • Lower energy densities; and • Lower levels of availability, depending on specific conditions, especially with sun and wind-based systems. The Inyathi Solar Power Plant is in line with this policy as it proposes the generation of renewable energy from the solar resource.
The White Paper on Renewable Energy	Department of Mineral Resources and Energy	2003	This White Paper on Renewable Energy supplements the *White Paper on Energy Policy*, which recognises that the medium and long-term potential of renewable energy is significant. This Paper sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa.

			The White Paper notes that while South Africa is well-endowed with renewable energy resources that have the potential to become sustainable alternatives to fossil fuels, these have thus far remained largely untapped. Government's long-term goal is the establishment of a renewable energy industry producing modern energy carriers that will offer in future years a sustainable, fully non-subsidised alternative to fossil fuels. The medium-term (10-year) target set in the White Paper is: *10 000 GWh (0.8 Mtoe) renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro. The renewable energy is to be utilised for power generation and non-electric technologies such as solar water heating and bio-fuels. This is approximately 4% (1667 MW) of the projected electricity demand for 2013 (41539 MW)* (Executive Summary, ix). The Inyathi Solar Power Plant is in line with this paper as it proposes the generation of renewable energy from the solar resource.
Integrated Energy Plan (IEP) (2016)	Department of Mineral Resources and Energy	2016	The Integrated Energy Plan (IEP) (which was developed under the National Energy Act (No. 34 of 2008)), recognises that energy is essential to many human activities, and is critical to the social and economic development of a country. The purpose of the IEP is essentially to ensure the availability of energy resources, and access to energy services in an affordable and sustainable manner, while minimising associated adverse environmental impacts. Energy planning therefore needs to balance the need for continued economic growth with social needs, and the need to protect the natural environment. The 8 key objectives of the integrated energy planning process, are as follows: • Objective 1: Ensure security of supply. • Objective 2: Minimise the cost of energy. • Objective 3: Promote the creation of jobs and localisation. • Objective 4: Minimise negative environmental impacts from the energy sector. • Objective 5: Promote the conservation of water. • Objective 6: Diversify supply sources and primary sources of energy. • Objective 7: Promote energy efficiency in the economy.

			• Objective 8: Increase access to modern energy. The Inyathi Solar Power Plant is in line with this policy as it proposes the generation of renewable energy from the solar resource.
Integrated Resource Plan (IRP) for South Africa	Department of Mineral Resources and Energy	2019	The Integrated Resource Plan (IRP) for Electricity 2010 – 2030 is a subset of the IEP and constitutes South Africa's National electricity plan. The primary objective of the IRP is to determine the long-term electricity demand and detail how this demand should be met in terms of generating capacity, type, timing and cost. The IRP also serves as input to other planning functions, including amongst others, economic development and funding, and environmental and social policy formulation. The current iteration of the IRP led to the Revised Balanced Scenario (RBS) that was published in October 2010. Following a round of public participation which was conducted in November / December 2010, several changes were made to the IRP model assumptions. The document outlines the proposed generation new-build fleet for South Africa for the period 2010 to 2030. This scenario was derived based on a cost-optimal solution for new-build options (considering the direct costs of new build power plants), which was then "balanced" in accordance with qualitative measures such as local job creation. The Policy-Adjusted IRP reflected recent developments with respect to prices for renewables. In addition to all existing and committed power plants, the plan includes 9.6GW of nuclear, 6.25GW of coal, 17.8GW of renewables, and approximately 8.9GW of other generation sources such as hydro, and gas. Besides capacity additions, several assumptions have changed since the promulgation of IRP 2010–2030. Key assumptions that changed include the electricity demand projection, Eskom's existing plant performance, as well as new technology costs. These changes necessitated the review and update of the IRP which resulted in the draft IRP 2018. According to the South African Energy Sector Overview (2021), there is currently 1 723MW of installed PV capacity, while an additional 2 600MW from wind and solar has been rewarded as part of Bid window 5.

			The Inyathi Solar Power Plant is in line with this plan as it proposes the generation of renewable energy from the solar resource and will contribute to the energy mix of the country as set out in this plan.
National Development Plan of 2030	The Presidency: National Planning Commission	-	The National Development Plan aims to "eliminate poverty and reduce inequality by 2030" (RSA, undated). In order to eliminate or reduce inequality, the economy of South Africa needs to grow faster in order to benefit all South Africans. In May 2010 a draft national development plan was drafted, which highlighted the nine (9) key challenges for South Africa. The highest priority areas according to the plan are considered to be the creation of employment opportunities and to improve the quality of national education. In this regard, the plan sets out three (3) priority areas, namely, to raise employment by a faster growing economy, improve the quality of education, and to build the capability of the state in order to play a more developmental and transformative role. One of the key challenges identified was that the economy is unsustainably resource intensive, and the acceleration and expansion of renewable energy was identified as a key intervention strategy to address this challenge. The development of the Inyathi Solar Power Plant will contribute to the intervention strategy as identified within the plan.
National Infrastructure Plan of South Africa	Presidential Infrastructure Coordinating Commission	2012	In the year 2012 the South African Government adopted a National Infrastructure Plan (hereafter referred to as the Plan). The aim of this Plan is to transform the economic landscape, while strengthening the delivery of basic services and creating new employment opportunities. This Plan also supports the integration of African communities, and also sets out the challenges and enablers that our country needs in order to respond to the planning and development of infrastructure with regards to fostering economic growth (RSA, 2012). The Plan has developed eighteen (18) strategic integrated projects (further referred to as SIPs). These SIPs stretch over all nine (9) provinces, covering social and economic infrastructure, and projects that enhances development and growth. Of the eighteen (18), five (5) are geographically focused, three (3) spatial, three (3) energy, three (3) social infrastructure, two (2) knowledge, one (1) regional integration, and one (1) water and sanitation focussed. The three (3) SIPs according to the Plan, which are energy focused and correlate to the proposed project are as follow: - SIP 8: Green energy in support of the South African economy;

		- SIP 9: Electricity generation to support socio-economic development; and - SIP 10: Electricity transmission and distribution for all. SIP 8 according to the Plan "support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the IRP 2010 and support bio-fuel production facilities". The purpose of SIP 9 according to the Plan is to "accelerate the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances". SIP 9 should also monitor the implementation of major projects such as new power stations like Medupi, Kusile and Ingula. Lastly, SIP 10 aims to "expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development" (RSA, 2012:20). The Inyathi Solar Power Plant is in line with this plan as it proposes the generation of renewable energy from the solar resource which supports socio-economic development and will contribute to meeting the electricity demand of the country as set out in this plan.
New Growth Path Framework	Department of - Economic Development	The New Growth Path was developed after 16 years of South Africa's democracy, to respond to emerging opportunities and risks while building on policies. This framework provides a dynamic vision on how to collectively achieve a more developed, equitable and democratic society and economy. This framework mainly reflects the commitment of the South African Government to create employment opportunities for its people in all economic policies (RSA, 2011b). This framework sets out the markers for job creation and growth and also identify where there are viable changes in the character and structure of production, in order to create a more inclusive, greener economy on the long-term. It is stated in the framework that in order for this framework to reach its objectives, the Government is committed to: - Identify the possible areas of employment creation; and - Develop a policy to facilitate employment creation especially with regards to social equity, sustainable employment and growth in the creation of employment activities (RSA, 2011b).

			This framework also identifies investments in five key areas, one of which is energy. This framework also states that the green economy is a priority area, which includes the construction of and investment in renewable energy technologies like solar (RSA, 2011b). In this regard it will also assist creating employment opportunities over the medium- and long-term. Considering that the construction of and investment in renewable energy is a key are identified within the framework, the Inyathi Solar Power Plant is considered to be in-line with the framework.
Climate Change Bill	National Department of Environmental Affairs (now known as the Department of Forestry, Fisheries and the Environment)	2018	On 08 June 2018 the Minister of Environmental Affairs published the Climate Change Bill ("the Bill") for public comment. The Bill provides a framework for climate change regulation in South Africa aimed at governing South Africa's sustainable transition to a climate resilient, low carbon economy and society. The Bill provides a procedural outline that will be developed through the creation of frameworks and plans. The following objectives are set within the Bill: e coordinated and integrated response to climate change and its impacts by all spheres of government in :h the principles of cooperative governance; ıe effective management of inevitable climate change impacts through enhancing adaptive capacity, resilience and reducing vulnerability to climate change, with a view to building social, economic, and resilience and an adequate national adaptation response in the context of the global climate change ntribution to the global effort to stabilise greenhouse gas concentrations in the atmosphere at a level that ɔus anthropogenic interference with the climate system within a timeframe and in a manner that enables ɔloyment, social and environmental development to proceed in a sustainable manner. Inyathi Solar Power Plant comprises a renewable energy generation facility and would not result in the generation or release of emissions during its operation.
Strategic Integrated Projects (SIPs)	The Presidential Infrastructure	2010 - 2030	The Presidential Infrastructure Coordinating Committee (PICC) is integrating and phasing investment plans across 18 Strategic Infrastructure Projects (SIPs) which have five core functions: to unlock opportunity, transform the economic landscape, create new jobs, strengthen the delivery of basic services and support

	Coordinating Committee		the integration of African economies. A balanced approach is being fostered through greening of the economy, boosting energy security, promoting integrated municipal infrastructure investment, facilitating integrated urban development, accelerating skills development, investing in rural development and enabling regional integration. SIP 8 and 9 of the energy SIPs supports the development of the solar energy facility: • SIP 8: Green energy in support of the South African economy: Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010 – 2030) and supports bio-fuel production facilities. • SIP 9: Electricity generation to support socio-economic development: The proposed Springbok Solar Power Plant is a potential SIP 9 Project as electricity will be generated and social and economic upliftment, development and growth will take place within the surrounding communities. It would become a SIP 9 project if selected as a Preferred Bidder project by the Department of Energy. SIP 9 supports the acceleration of the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances. Inyathi Solar Power Plant could be registered as a SIP project once selected as a preferred bidder under the REIPPP Programme. The project would then contribute to the above-mentioned SIPs.
Strategic Environmental Assessment (SEA) for wind and solar PV Energy in South Africa	National Department of Environmental Affairs (now known as the Department of Forestry, Fisheries and the Environment)	2014	The then Department of Forestry, Fisheries and the Environment (DFFE) has committed to contribute to the implementation of the National Development Plan and National Infrastructure Plan by undertaking Strategic Environmental Assessments (SEAs) to identify adaptive processes that integrate the regulatory environmental requirements for Strategic Integrated Projects (SIPs) while safeguarding the environment. The wind and solar photovoltaic (PV) SEA was accordingly commissioned by DEA in support of SIP 8, which aims to facilitate the implementation of sustainable green energy initiatives. This SEA identifies areas where large scale wind and solar PV energy facilities can be developed in terms of SIP 8 and in a manner that limits significant negative impacts on the environment, while yielding the highest

		possible socio-economic benefits to the country. These areas are referred to as Renewable Energy Development Zones (REDZs). The REDZs also provide priority areas for investment into the electricity grid. Currently one of the greatest challenges to renewable energy development in South Africa is the saturation of existing grid infrastructure and the difficulties in expanding the grid. Proactive investment in grid infrastructure is the likely to be the most important factor determining the success of REDZs. Although it is intended for the SEA to facilitate proactive grid investment in REDZs, such investment should not be limited to these areas. Suitable wind and solar PV development should still be promoted across the country and any proposed development must be evaluated on its own merit. Even though the Inyathi Solar Power Plant is not located within a REDZ, it will still contribute to the overall development of renewable energy within the country.
North West Provincial Spatial Development Framework (PSDF)	North West Provincial Government 2012	The North West PSDF is a policy document that promotes a 'developmental state' in accordance with national and provincial legislation and directives. It aligns with the North West Provincial Growth and Development Strategy which has committed the North West to 'building a prosperous, sustainable and growing provincial economy which reduces poverty and improves social development'. The PSDF includes comprehensive plans and strategies that collectively indicate which type of land-use should be promoted in the province, where such land-use should take place, and how it should be implemented and managed. In broad terms, the PSDF: • Adopt a holistic approach to spatial development in order to minimise the long-term negative impacts of current land use or development decisions. • Ensure that spatial planning serves national, provincial and/or local interest. • Support the long-term adequacy or availability of physical, social and economic resources to support or carry development. • Protect existing natural, environmental, and cultural resources.

		• Ensure that land which is currently in agricultural use would only be reallocated to other uses where real need exists, and prime agricultural land should remain in production. • Support mining as a vital economic driver in the province without jeopardizing the biodiversity value of the environment. • Adopt a climate change strategy that will provide for responsible actions to curb the effect of global warming and climate change. The Spatial Challenges and Opportunities provide the crucial components that underlie sustainable development, i.e., need for basic infrastructure and development for the poor, economic growth and development, environmental conservation, and improved livelihoods. These spatial development priorities form the basis for guiding specific decisions regarding the desired spatial development and arrangement of broad land uses within North West and investment and development spending. The PSDF provides Spatial Framework and Development Strategies that will manage future growth and associated change in a way that protects and enhance the use of natural resources, biodiversity, and lifestyle values. This requires a highly sustainable pattern of development based on the efficient utilisation of land and infrastructure, supported by management decisions over ad hoc and dispersed forms of development. The PSDF builds upon achievements and learns from mistakes of the past, reacts to the challenges of our time, incorporates the traditional knowledge of the people of the North West, and builds upon international best-practice and technology. The development of the Inyathi Solar Power Plant is in-line with the framework based on the contributions and opportunities presented by a development of this nature.
Ngaka Modiri Molema District Municipality Draft Integrated Development	Ngaka Modiri Molema District Municipality 2020	The long-term vision of the Ngaka Modiri Molema DM is to be the: “Leaders in integrated municipal governance”. The above stated vision defines what the Ngaka Modiri Molema DM would like to attain over medium to long-term, and for that achievement to effectively materialize, their mission is: “To provide a developmental municipal governance system for a better life for all”.

Plan (IDP) 2020-2021			The SIPS provide an integrated framework for the delivery and implementation of social and economic infrastructure across the face of South Africa. Some of the SIPSs include catalytic projects that can be used to fast-track growth, address unemployment and reduce poverty and inequality. Due to the various nature and geographic spatial locations, the municipality is only involved in a few of the SIPS. The municipality's plans will be aligned with these SIPs in an effort to respond to national government's service delivery initiatives. Furthermore, work is to be done to align key cross-cutting areas, namely human settlement planning and skills development in line with each of the Strategic Infrastructure Projects, especially: - Green Energy in support of the South African economy (SIP 8): Supporting sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010). - Electricity Generation to support socio-economic development (SIP 9): acceleration of the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy; and addressing historical imbalances. Considering the plans for the alignment of the DM's plans with SIP 8 and SIP 9 it is confirmed that the Inyathi Solar Power Plant is in line with the plan.
Ditsobotla Local Municipality Final Integrated Development Plan (IDP) 2020-2021	Ditsobotla Local Municipality	2020	The vision of the Ditsobotla LM is to be "A developmental municipality dedicated to the social and economic upliftment of its communities." The Mission Statement is: "Sustainable service delivery through transparent administration, dedicated staff, implementation of municipal programmes and consultation with communities". The development of the Inyathi Solar Power Plant will contribute to the local economy of the area and therefore assist (albeit to a limited extent) to socio-economic growth.
Ditsobotla Local Municipality Spatial	Ditsobotla Local Municipality	2018	The spatial development vision is aligned with the municipal general vision and mission statements: "A developmental Municipality dedicated to the social and economic upliftment of its communities". Its mission is: "Sustainable service delivery through transparent administration, dedicated staff, implementation of municipal programmes and consultation with communities". The municipal area is

Development Framework	characterised by low to medium income, high unemployment and low skills. Because of the high level of needs in the area, the Municipality has been categorized as a Priority 1 Investment Area in the Province. Taking also into account the National Spatial Development perspective which states that economic growth and employment creation should be focussed in areas where it will be most effective and sustainable in terms of local potential, and supporting restructuring (addressing the mismatch where people have to live and work), the spatial development vision for Ditsobotla LM was formulated: "Address key national, provincial and local priorities by focussing the provision of socio-economic infrastructure in areas with the highest growth potential (with prospects of the highest return on capital and social upliftment) but still attending to the basic needs of people elsewhere." The development of the Inyathi Solar Power Plant will contribute to the local economy of the area and therefore assist (albeit to a limited extent) to socio-economic growth and the alleviation of poverty.

3.4 OTHER LEGISLATION

Other legislation mainly refers to the following:

- Planning legislation governing the rezoning process and approval of the layout plan.
- Design standards and legislation for services provision such as water, sewerage, electricity, etc.
- Municipal bylaws related to building plans, building regulations, etc.

3.5 RELEVANT GUIDANCE

The following guidance was considered in conducting the EIA:

- The Equator principles III (2013)
- World Bank Group Environmental, Health and Safety General Guidelines (EHS Guidelines) (2007)
- Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution (2007)
- International Finance Corporation's Policy on Environmental and Social Sustainability (2012)
- DEA. (2013). Draft National Renewable Energy Guideline. Department of Environmental Affairs, Pretoria, South Africa
- DEA, (2012), Guideline 5 – Final companion to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2010
- DEA, (2012), Guideline 7 – Public participation in the Environmental Impact Assessment process
- DEA, (2012), Guideline 9 – Need and desirability
- DEA, (2006), Guideline 3 – General guide to the Environmental Impact Assessment Regulations
- DEAT, (2006), Guideline 4 – Public participation in support of the Environmental Impact Assessment Regulations
- DEAT, (2006), Guideline 5 – Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations
- BirdLife, (2017). Best Practise Guidelines Birds & Solar Energy: Guidelines for assessing and monitoring the impact of solar power generating facilities on bird in southern Africa.

3.6 CONCLUSION

The EIA was undertaken in accordance with the EIA Regulations (as amended) published in GNR 326, in terms of Section 24(5) and 44 of the NEMA as amended as well as all relevant National legislation, policy documents and national guideline, the World Bank EHS Guidelines, the IFC Performance Standards, and the Equator Principles.

The legislative and policy context plays an important role in identifying and assessing the potential social impacts associated with the proposed development, as well as an indication of the need and desirability of the proposed development from a national, provincial and local level. For this reason,

the proposed development project will be assessed in terms of its fit with the key legislative, policy and planning documents discussed above.

The main findings of the review of the policy documents on all spheres of Government indicated that strong support was given towards renewable energy, specifically PV solar energy and therefore it is concluded that there is support for the development of the Inyathi Solar Power Plant. The White Paper on the Energy Policy of the Republic of South Africa of 1998 stated that due to the fact that renewable energy resources operate from an unlimited resource base, i.e., the sun, renewable energy can increasingly contribute towards a long-term sustainable energy supply for future generations. This policy further highlights that due to the unlimited resources base of renewable energy in South Africa, renewable energy applications, like PV solar energy and associated infrastructure, are more sustainable in terms of social and environmental costs. The Integrated Resource Planning for Electricity for South Africa of 2010–2030, the National Infrastructure Plan of South Africa and the New Growth Path Framework all support the development of the renewable energy sector. In particular, the IRP also indicated that 43% of the energy generation in South Africa is allocated to renewable energy applications. On a District and Local level limited attention is given explicitly to renewable sources like PV solar energy, however the documents reviewed do make provision for increase energy supply and efficiency in improving the quality of lives in terms of efficient physical infrastructure as well as socio-economic growth. At Provincial, District and Local level the policy documents support the applications of renewables.

The review of the relevant policies and documents related to the energy sector therefore indicate that renewables, like solar energy and the establishment of solar energy facilities and associated infrastructure, are supported on all spheres of Government. The proposed Inyathi Solar Power Plant is therefore supported by the related policy and planning documents reviewed in this section of the report.

4 THE NEED AND DESIRABILITY

This section aims to address the following requirements of the regulations:

Appendix 3. (3) An EIR (...) must include-

(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;

4.1 THE NEED FOR THE PROPOSED ACTIVITY

The proposed activity is a direct result of the growing demand for electricity and the need for renewable energy in South Africa. According to Eskom, the demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand, fuelled by increasing economic growth and social development, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmentally responsible development, the impacts of climate change and the need for sustainable development.

Over 90% of South Africa's electricity generation is coal based, the Word bank estimates that these results in an annual, per capita carbon emission of ~8.9 tons per person. Based on 2008 fossil-fuel CO_2 emissions statistics released by the Carbon Dioxide Information Analysis Centre, South Africa is the 13th largest carbon dioxide emitting country in the world and the largest emitter in Africa (Boden, et al. 2011). In August 2021 article confirmed that South Africa is the 12th highest greenhouse gas emitter in the world (source: https://www.news24.com/fin24/economy/eskom-will-only-able-to-meet-global-air-quality-standards-by-2050-owing-to-financial-woes-20210818).

The proposed project is intended to form part of the Department of Mineral Resources and Energy's (DMREs) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme or any other appropriate energy generation programmes / opportunities. The REIPPP Programme aims to secure 14 725 Megawatts (MW) of new generation capacity from renewable energy sources, while simultaneously diversifying South Africa's electricity mix. According to the 2021 State of the Nation Address, Government will soon be initiating the procurement of an additional 11 800 MW of power from renewable energy, natural gas, battery storage and coal in line with the Integrated Resource Plan 2019 and fulfilling their commitments under the United Nations Framework Convention on Climate Change and its Paris Agreement which include the reduction of greenhouse gas emissions. Eskom, the largest greenhouse gas emitter of South Africa, has committed in principle to net zero emission by 2050 and to increase its renewable capacity. During the 2022 State of the Nation Address it was indicated that during the past year the government had taken "firm steps" to bring additional generation capacity online as quickly as possible to close the shortfall in terms of electricity. As a result it was confirmed that several new generation projects will be coming online over the next few years.

Besides capacity additions, several assumptions have changed since the promulgation of IRP 2010–2030. Key assumptions that changed include the electricity demand projection, Eskom's existing plant performance, as well as new technology costs. These changes necessitated the review and update of the IRP which resulted in the draft IRP 2018 as per table 4.1 below:

Table 4.1: Published Draft IRP 2018 (Approved by Cabinet for Consultation)

	Coal	Nuclear	Hydro	Storage (Pumped Storage)	PV	Wind	CSP	Gas / Diesel	Other (CoGen, Biomass, Landfill)	Embedded Generation
2018	39 126	1 860	2 196	2 912	1 474	1 980	300	3 830	499	Unknown
2019	2 155					244	300			200
2020	1 433				114	300				200
2021	1 433				300	818				200
2022	711				400					200
2023	500									200
2024	500									200
2025					670	200				200
2026					1 000	1 500		2 250		200
2027					1 000	1 600		1 200		200
2028					1 000	1 600		1 800		200
2029					1 000	1 600		2 850		200
2030			2 500		1 000	1 600				200
TOTAL INSTALLED	33 847	1 860	4 696	2 912	7 958	11 442	600	11 930	499	2600
Installed Capacity Mix (%)	44.6	2.5	6.2	3.8	10.5	15.1	0.9	15.7	0.7	

Installed Capacity
Committed / Already Contracted Capacity
New Additional Capacity (IRP Update)

According to the South African Energy Sector Overview (2021), there is currently 1 723MW of installed PV capacity, while an additional 2 600MW from wind and solar has been rewarded as part of Bid Window 5.

4.2 THE DESIRABILITY OF THE PROPOSED ACTIVITY

The facility's contribution towards sustainable development and the associated benefits to society in general is discussed below:

- Lesser dependence on fossil fuel generated power - The deployment of the facility will have a positive macro-economic impact by reducing South Africa's dependence on fossil fuel generated power and assisting the country in meeting its growing electricity demand.
- Increased surety of supply - By diversifying the sources of power in the country, the surety of supply will increase. The power demands of South Africa are ever increasing and by adding solar power this demand can be met, even exceeded without increasing pollution in relation to the use of fossil fuels. The project has the potential of "securing" economic activity by assisting in removing supply constraints if Eskom generation activities result in a supply shortfall. When supply is constrained, it represents a limitation to economic growth. When a supply reserve is available, it represents an opportunity for economic growth.
- Local economic growth - The proposed project will contribute to local economic growth by supporting industry development in line with provincial and regional goals and ensuring advanced skills are drawn to the North West Province. The project will likely encounter widespread support from government, civil society and businesses, all of whom see potential opportunities for revenues, employment and business opportunities locally. The development

of the photovoltaic solar facility will in turn lead to growth in tax revenues for local municipalities and sales of carbon credits, resulting in increased foreign direct investment. The location of the proposed development within the Ditsobotla Local Municipality is desirable since this municipality has been categorized as a Priority 1 Investment Area in the Province. (Ditsobotla IDP, 2018).

- Lower costs of alternative energy - An increase in the number of solar facilities commissioned will eventually reduce the cost of the power generated through solar facilities. This will contribute to the country's objective of utilising more renewable energy and less fossil fuel-based power sources. It will assist in achieving the goal to generate 14 725 MW of electricity from renewable energy as per the Renewable Energy Independent Power Producer Procurement (REIPPP) Programme of the Department of Mineral Resources and Energy. The Government will soon be initiating the procurement of an additional 11 800 MW of renewable energy as stated during the 2021 State of the Nation Address.
- Reduction in greenhouse gas emissions - The additional power supplied through solar energy will reduce the reliance on the combustion of fossil fuels to produce power. The South African electricity grid is predominantly coal-fired and therefore GHG emissions intensive (coal accounts for more than 92% of the fuel used in South Africa's electricity generation). The reduction of GHG emissions as a result of the project implementation will be achieved due to reduction of CO_2 emissions from combustion of fossil fuels at the existing grid-connected power plants and plants which would likely be built in the absence of the project activity.
- CDM Project - A solar energy facility also qualifies as a Clean Development Mechanism (CDM) project (i.e., a financial mechanism developed to encourage the development of renewable technologies).
- Climate change mitigation - On a global scale, the project contributes to greenhouse gas emission reduction and therefore contributes toward climate change mitigation.
- Reduced environmental impacts - The reduction in electricity consumed from the grid will not only result in a reduction in greenhouse gas emissions, but also the prevention of negative impacts associated with coal mining. For example, coal power requires high volumes of water, in areas of South Africa where water supply is already over-stretched and water availability is highly variable. Photovoltaic solar energy technology also does not produce the sulphur emissions, ash or coal mining concerns associated with conventional coal fired electricity generation technologies resulting in a relatively low level of environmental impacts. It is a clean technology which contributes toward a better-quality environment for employees and nearby communities.
- Social benefits - The project activity is likely to have significant long-term, indirect positive social impacts that may extend to a regional and even national scale. The larger scale impacts are to be derived in the utilisation of solar power and the experience gained through the construction and operation of the power plant. In future, this experience can be employed at other similar solar installations in South Africa.
- Provision of job opportunities - The main benefit of the proposed development operating in the area is that local companies or contractors will be hired for the duration of the construction period. The operational phase will provide permanent job opportunities to the local communities from the surrounding area since security guards and general labourers will be required on a full-time basis. Approximately 800 employment opportunities will be created during the construction and operational phases.

- Indirect socio-economic benefits - The increase in the demand for services such as accommodation, transportation, security, general maintenance, and catering will generate additional indirect socio-economic benefits for the local community members.
- Effective use of resources - Due to the climate limitations, the site is totally unsuitable for cultivated crops, and viable agricultural land use is limited to grazing only. The proposed development in this specific area will generate alternative land use income through rental for the energy facility, which will have a positive impact on agriculture. It will provide the landowner with increased cash flow and rural livelihood, and thereby improve the financial sustainability of agricultural activities.
- Increased access to electricity: The Ngaka Modiri Molema District Municipality's IDP (2020) highlights that according to the 2016 Community Survey, 89,4% of households have access to electricity for lighting. This figure declines for the local municipality where 88,1% have access to electricity for lighting.
- Cumulative impacts of low to medium significance - No cumulative impacts with a high residual risk have been identified. In terms of the desirability of the developmentof sources of renewable energy therefore, it may be preferable to incur a higher cumulative loss in such a region as this one, than to lose land with a higher environmental value elsewhere in the country.

5 DESCRIPTION OF ENVIRONMENTAL ISSUES

This section aims to address the following requirements of the regulations:

Appendix 3. (3) An EIR (...) must include-

(g) A motivation for the preferred development footprint within the approved site (i) details of all the alternatives considered;

(h) a full description of the process followed to reach the proposed development footprint, within the approved site, including –

(i) details of all the development footprint alternatives considered;

(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;

(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;

(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and

(xi) a concluding statement indicating the preferred alternative development location within the approved site.

5.1 CONSIDERATION OF ALTERNATIVES

The DEAT 2006 guidelines on 'assessment of alternatives and impacts' proposes the consideration of four types of alternatives namely, the no-go, location, activity, and design alternatives. It is, however, important to note that the regulation and guidelines specifically state that only 'feasible' and 'reasonable' alternatives should be explored. It also recognizes that the consideration of alternatives is an iterative process of feedback between the developer and EAP, which in some instances culminates in a single preferred project proposal.

An initial site assessment (refer to Appendix D) was conducted by the developer on Portion 5 (Portion of Portion 2) of the Farm Zamenkomst No. 4 and the farm was found favorable due to its close proximity to grid connections, solar radiation, ecology and relative flat terrain. Where specific features of environmental sensitivity are identified by the independent specialists, these areas and the associated required buffers will be considered by the developer to ensure that the facility layout is appropriate considering the sensitive features present. The site selection also took the site geology, land capability, water availability and land use into consideration before deciding on the specific site within the affected property. A single alternative site on the same farm has been identified (Subsolar, 2022).

The following sections explore different types of alternatives in relation to the proposed activity in more detail.

5.1.1 No-go alternative

This alternative considers the option of 'do nothing' and maintaining the current status quo of the site, which primarily relates to agricultural use. The description provided in section 5.3 of this report could be considered the baseline conditions (status quo) to persist should the no-go alternative be preferred. The site is currently zoned for agricultural land uses. Should the proposed activity not proceed, the site will remain unchanged and will continue to be used for grazing for livestock farming (refer to the photographs of the site). The area has limited agricultural potential and is unsuitable for cultivation. The potential opportunity costs in terms of alternative land use income through rental for energy facility and the supporting social and economic development in the area would be lost if the status quo persist.

5.1.2 Location alternatives

This alternative asks the question, if there is not, from an environmental perspective, a more suitable location for the solar power plant. No other properties have at this stage been secured by Inyathi Solar Power Plant (RF) (Pty) Ltd in the Lichtenburg area to potentially establish the Inyathi Solar Power Plant. From a local perspective Portion 5 (Portion of Portion 2) of the Farm Zamenkomst No. 4 is preferred due to its suitable climatic conditions, topography (i.e. in terms of slope), environmental conditions (i.e. agricultural potential and archaeology), proximity to a grid connection point (i.e. for the purpose of electricity evacuation), as well as site access (i.e. to facilitate the movement of machinery, equipment, infrastructure and people during the construction phase).

No alternative areas on Portion 5 (Portion of Portion 2) of the Farm Zamenkomst No. 4 have been considered for the development footprint.

However, provision has been made in this draft EIA report to consider the results of the specialist studies to exclude the sensitive areas present, which includes the no-go buffer areas recommended by the specialist. The sensitive areas and associated buffers have been considered by the developer for the facility layout design to optimize the layout for avoidance of the environmental sensitivities identified.

As part of the specialist studies undertaken, no areas will need to be avoided has been identified on the development footprint. However, unchanneled valleybottom wetlands features are present within the grid connection corridor which must be avoided by the placement of the power line pylons. The exact positions of the pylons will only be determined during the micro-siting of the site and will avoid sensitive environmental features.

Therefore, a single preferred location alternative was assessed – refer to Figures 5.1.

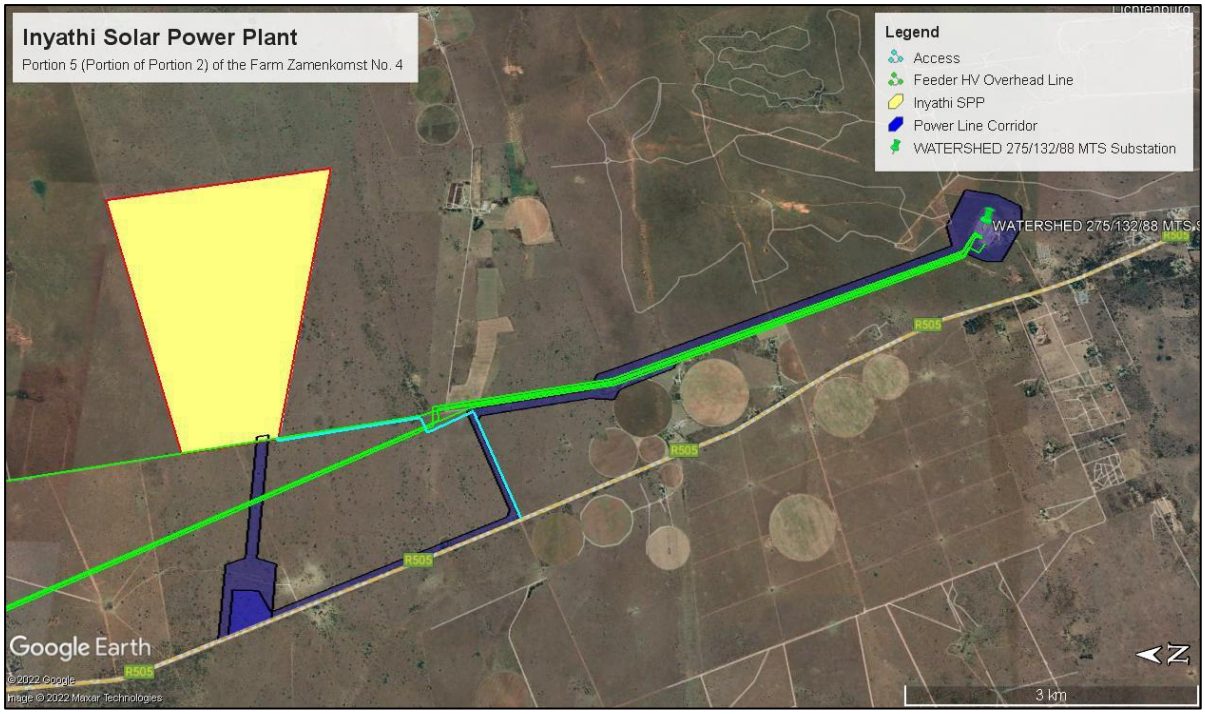


Figure 5.1: Location of the single preferred location alternative.

5.1.3 Activity alternatives

The EIA process also needs to consider if the development of a solar PV facility would be the most appropriate land use for the particular site.

- Photovoltaic (PV) solar facility –Inyathi Solar Power Plant (RF) (Pty) Ltd is part of a portfolio of solar PV projects throughout South Africa. Inyathi Solar Power Plant (RF) (Pty) Ltd is of the opinion that solar PV technology is perfectly suited to the site, given the high irradiation values for of the Lichtenburg area – refer to Figure 5.2. The technology furthermore entails low visual impacts, have relatively low water requirements, is a simple and reliable type of technology and all the components can be recycled.
- Wind energy facility - Due to the local climatic conditions a wind energy facility is not considered suitable as the area does not have the required wind resource. Furthermore, the applicant has opted for the generation of electricity via solar power rather than the use of wind turbines based on the overall suitability of the site. This alternative is therefore regarded as not feasible and will not be evaluated further in this report.
- Concentrated solar power (CSP) technology - CSP technology requires large volumes of water and this is a major constraint for this type of technology considering the water challenges and limitation experienced not only in the country but also the local area. While the irradiation values are high enough to generate sufficient solar power, the water constraints render this alternative not feasible. It must also be noted that the IRP no longer includes the use of CSP as part of the energy mix of the country. Therefore, this alternative will not be considered further in this report.

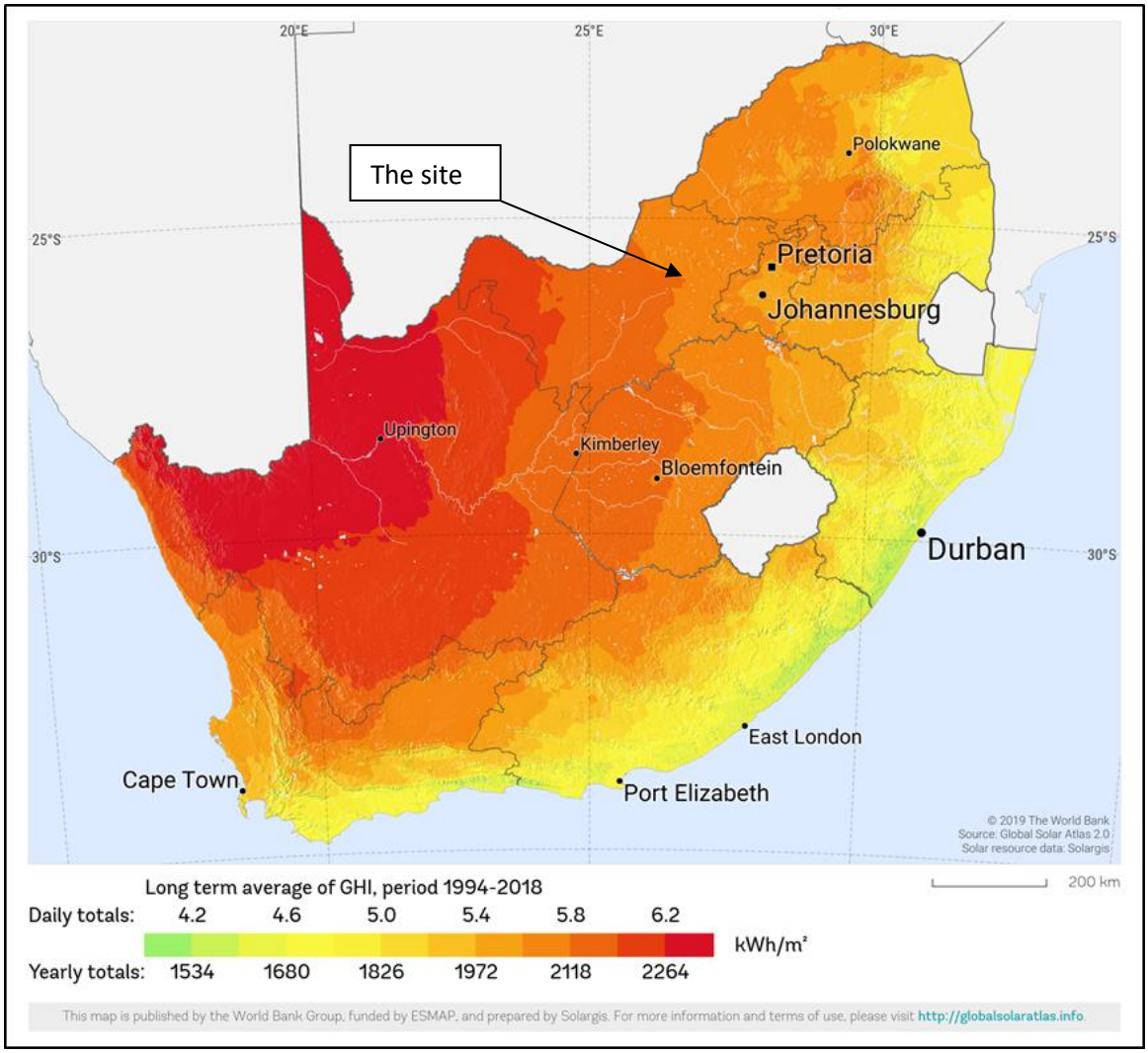


Figure 5.2: Global horizontal irradiation values for South Africa (SolarGIS, 2021) and the Inyathi Solar Power Plant.

5.1.4 Technical alternatives

Possible technical alternatives for the development of a solar PV facility needs to be considered during the EIA process.

5.1.4.1 Distribution lines

One grid connection option for the Inyathi Solar Power Plant is available. It is expected that generation from the facility will connect into the existing Eskom Watershed 275/132/88 MTS Substation. The power line route has been assessed within a 12km long and 100m to 500m wide corridor. A new 132kV power line will be constructed to connect the solar power plant to the existing Eskom Watershed MTS Substation.

A 132kV overhead distribution line is the only preferred alternative for the applicant due to the following reasons:

- **Overhead Distribution Lines** - Overhead lines are less costly to construct than underground lines. Therefore, the preference for overhead lines is mainly based on cost. Overhead lines allow high

voltage operations, and the surrounding air provides the necessary electrical insulation to earth. Further, the surrounding air cools the conductors that produce heat due to lost energy (Swingler et al, 2006).

The overall weather conditions in the North West Province is unlikely to cause damage and faults on the proposed overhead distribution power line. Nonetheless, if a fault occurs, it can be found quickly by visual means using a manual line patrol. Repair to overhead lines is relatively simple in most cases and the line can usually be put back into service within a few days. In terms of potential impacts associated with overhead distribution lines these include visual intrusion and threats to sensitive habitat (where applicable).

Furthermore, overhead power lines also provides an opportunity for the avoidance of sensitive environmental features as the overhead lines can span on-ground environmental features to ensure conservation, therefore providing more flexibility in terms of mitigation of the associated on-ground disturbance.

The choice of structure to be used for the power line will be determined in consultation with Eskom once the Engineers have assessed the geotechnical and topographical conditions of the route and decided on a suitable structure which meets the prescribed technical requirements. The choice of structures to be used will not have any adverse impacts on the environment, and the independent specialists, of various fields of study, have considered the development of the power line and recommended appropriate mitigation measures where required. The line will be constructed according to the authorised standards for a power line approved by Eskom Holdings SoC Ltd.

The following alternatives may be considered for the overhead power line:

- Single Circuit Overhead Power Line

The use of single circuit overhead power lines to distribute electricity is considered the most appropriate technology and has been designed over many years for the existing environmental conditions and terrain as specified in the Eskom Specifications and best international practice. Based on all current technologies available, single circuit overhead power lines are considered the most environmentally practicable technology available for the distribution of power. This option is considered appropriate for the following reasons:

    - More cost-effective installation costs;
    - Less environmental damage during installation; and
    - More effective and cheaper maintenance costs over the lifetime of the power line.
- Double Circuit Overhead Power Line

Where sensitive environmental features are identified, and there is sufficient justification, Eskom will consider the use of double circuit (placing 2 power lines on either side of the same tower structure) to minimise impacts. However, the use of double-circuiting has a number of technical disadvantages:

    - Faults or problems on one power line may mean that the other power line is also disabled during maintenance, and this will affect the quality of supply to an area. Larger and taller towers as well as more towers are required for double-circuit power lines.

The double-circuit overhead power line proves more feasible since the single circuit may not have the capacity to transmit the large amount of electricity generated from the plant and during maintenance the entire plant would not have to be offline as one of the double circuit lines would still be able to supply electricity. However, due to the rapid requirement changes, this will only be determined before construction.

- **Underground Distribution Lines** - Underground cables have generally been used where it is impossible to use overhead lines (for example due to space constraints). Underground cables are oil cooled and are also at risk of groundwater contamination. Maintenance is also difficult on underground lines compared to overhead lines. When a fault occurs in an underground cable circuit, it is almost exclusively a permanent fault due to poor visibility. Underground lines are also more expensive to construct than overhead lines.

5.1.4.2 Battery Energy Storage Facility (BESS)

It is proposed that a Battery Energy Storage Facility for grid storage would be housed in stacked containers, or a multi-storey building, with a maximum height of 8m and a maximum volume of 1,740m^3 of batteries and associated operational, safety and control infrastructure. Three types of battery technologies are being considered for the proposed project: Lithium-ion, Sodium-sulphur or Vanadium Redox flow battery. While there are various battery storage technologies available, the preferred alternative is the utility-scale Lithium-ion (Li-ion) battery energy storage. Li-ion batteries have emerged as the leading technology in utility-scale energy storage applications because it offers the best mix of performance specifications, such as high charge and discharge efficiency, low self-discharge, high energy density, and long cycle life (Divya KC et al., 2009).

Battery storage offers a wide range of advantages to South Africa including renewable energy time shift, renewable capacity firming, electricity supply reliability and quality improvement, voltage regulation, electricity reserve capacity improvement, transmission congestion relief, load following and time of use energy cost management. In essence, this technology allows renewable energy to enter the base load and peak power generation market and therefore can compete directly with fossil fuel sources of power generation and offer a truly sustainable electricity supply option.

5.1.5 Design and layout alternatives

Design alternatives were considered throughout the planning and design phase (i.e. what would be the best design option for the development?). In this regard discussions on the design were held between the EAP and the developer, which also included the consideration of sensitive environmental areas and features present as identified by the independent specialists that needs to be avoided by the placement of infrastructure. A final layout plan is included as Figure I.

The layout follows the limitations of the site and aspects such as environmental sensitive areas (supported by specialist input), roads, fencing and servitudes are considered. The developer has considered the environmental sensitivities as identified during the Scoping Phase and have accordingly optimised the layout of the SPP facility to ensure avoidance of the sensitive areas (Figure G). This optimised layout is considered to be the final layout plan as assessed within this draft EIR.

The total surface area proposed include the PV panel arrays spaced to avoid shadowing, access and maintenance roads and associated infrastructure (buildings, power inverters, power lines, BESS and perimeter fences). With regards to the structure orientation, the panels will either be fixed to a single-axis horizontal tracking structure where the orientation of the panel varies according to the time of the day, as the sun moves from east to west or tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture the most sun.

The choice of pylon structure to be used for the power line will be determined in consultationwith Eskom and does not significantly affect the environmental impacts of the proposed development as provision has already been made for the visual, ecological and heritage impacts of erecting a power line. No defined structure has been confirmed at this stage and will depend on Eskom's technical requirements. The 132kV line must be constructed accordingto the authorised standards for a power line approved by Eskom Holdings SoC Ltd. The structure to be utilised for the power line towers will also be informed by the local geotechnical and topographical conditions. The following alternatives are considered with regards to the proposed structures:

Steel lattice towers:

The steel lattice towers provide the following advantages over the other tower types available:

- Enables multipath earthing which enhances the overall electrical performance ofthe power line.
- Is visually less obtrusive than the mono-pole options.
- Is more practicable that other options i.e. more cost effective and more practicalto construct and maintain.
- Is safer to work on than the monopole and wood pole structures.
- Is more durable than the wood pole structures.Steel monopoles:

The steel monopole is considered less suitable than the steel lattice towers for the followingreasons:

- Is visually more intrusive than the lattice towers.
- Is more expensive than the lattice towers.
- Requires more steel than the lattice towers.
- Is more difficult to erect.
- Is not as safe to work on as the lattice towers.Wood poles:

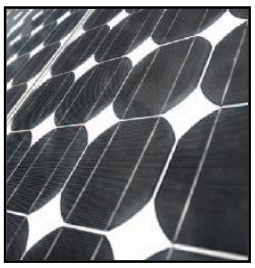
Wood pole structures are only used in extreme circumstances where a visual impact needs tobe avoided. Wood pole structures may be cheaper to produce and to construct, but they haveone tenth of the lifespan of the metal counterparts and are far more susceptible to weather conditions which makes them less efficient and practicable. The wood pole structure is also more susceptible to having the cross arms burnt off by electrical faults as well as being susceptible to deformation with height.

5.1.6 Technology alternatives

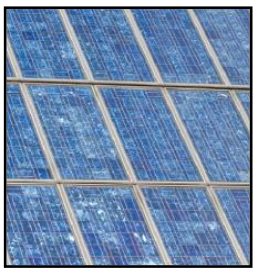
There are several types of semiconductor technologies currently available and in use for PV solar panels. Two, however, have become the most widely adopted, namely crystalline silicon, thin film or bifacial PV panels. These technologies are discussed in more detail below:

Crystalline (high efficiency technology at higher cost):

Crystalline silicon panels are constructed by first putting a single slice of silicon through a series of processing steps, creating one solar cell. These cells are then assembled together in multiples to make a solar panel. Crystalline silicon, also called wafer silicon, is the oldest and the most widely used material in commercial solar panels. Crystalline silicon modules represent 85-90% of the global annual market today. There are two main types of crystalline silicon panels that can be considered for the solar facility:



- Mono-crystalline Silicon - mono-crystalline (also called single crystal) panels use solar cells that are cut from a piece of silicon grown from a single, uniform crystal. Mono-crystalline panels are among the most efficient yet most expensive on the market. They require the highest purity silicon and have the most involved manufacturing process.



- Poly-crystalline Silicon – poly-crystalline panels use solar cells that are cut from multifaceted silicon crystals. They are less uniform in appearance than mono-crystalline cells, resembling pieces of shattered glass. These are the most common solar panels on the market, being less expensive than mono-crystalline silicon. They are also less efficient, though the performance gap has begun to close in recent years (First Solar, 2011).

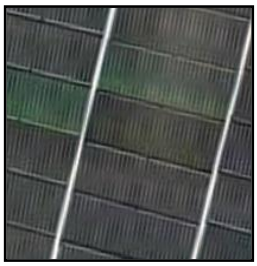
Thin film (low-cost technology with lower efficiency):

Thin film solar panels are made by placing thin layers of semiconductor material onto various surfaces, usually on glass. The term *thin film* refers to the amount of semiconductor material used. It is applied in a thin film to a surface structure, such as a sheet of glass. Contrary to popular belief, most thin film panels are not flexible. Overall, thin film solar panels offer the lowest manufacturing costs, and are becoming more prevalent in the industry. Thin films currently account for 10-15% of global PV module sales. There are three main types of thin film used:

- Cadmium Telluride (CdTe) - CdTe is a semiconductor compound formed from cadmium and tellurium. CdTe solar panels are manufactured on glass. They are the most common type of thin film solar panel on the market and the most cost-effective to manufacture. CdTe panels perform significantly

better in high temperatures and in low-light conditions.

- Amorphous Silicon - Amorphous silicon is the non-crystalline form of silicon and was the first thin film material to yield a commercial product, first used in consumer items such as calculators. It can be deposited in thin layers onto a variety of surfaces and offers lower costs than traditional crystalline silicon, though it is less efficient at converting sunlight into electricity.



- Copper, Indium, Gallium, Selenide (CIGS) - CIGS is a compound semiconductor that can be deposited onto many different materials. CIGS has only recently become available for small commercial applications and is considered a developing PV technology (First Solar, 2011).

Bifacial panels:

As the name suggests, bifacial solar panels have two faces, or rather, they can absorb light from both sides of the panel. A lot of potential energy transfer is lost in traditional solar cells when the light hits the back of a solar panel. Most bifacial solar panels use monocrystalline cells, whereas traditional cells use polycrystalline materials. The monocrystalline materials, alongside the clear light pathway on both sides of the panel, enable the light to be absorbed from either side of the cell, and it is thought that the overall efficiency of these cells can be up to 30% greater in commercial applications. Although, the exact amount is variable depending on the surface that they are installed on. The front side of the solar panel still absorbs most of the solar light, but the back side of the solar panel can absorb between 5-90% of the light absorbed by the front of the solar panel.

Traditional solar panels use an opaque back sheet. By comparison, bifacial solar panels either have a clear/reflective back sheet or have dual panes of glass. Most of these solar panels are frameless so any issues with potential-induced degradation (PID) are reduced. To efficiently convert light into electricity from both sides, bifacial solar cells have selective-area metallization schemes that enable light to pass between the metallized areas, rather than the conventional thick metal collectors as seen with monofacial solar panels.

The technology that (at this stage) proves to be most feasible and reasonable with respect to the proposed solar facility is crystalline silicon panels, due to it being non-reflective, more efficient, and with a higher durability. However, due to the rapid technological advances being made in the field of solar technology the exact type of technology to be used, such as bifacial panels, will only be confirmed at the onset of the project.

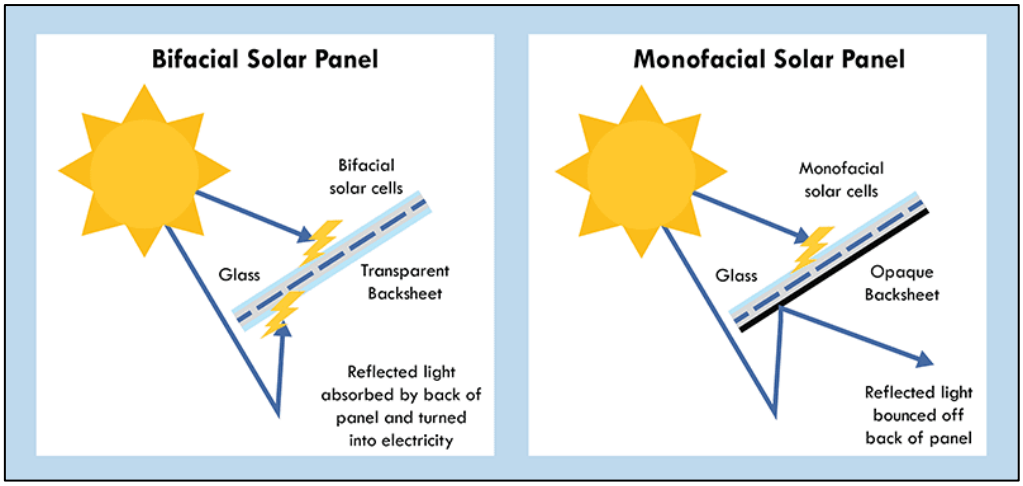


Figure 5.3: Bifacial vs Monofacial Solar Panel absorption.

5.2 PUBLIC PARTICIPATION PROCESS

The following sections provide detailed information on the public participation process conducted in terms of Regulations 39 to 44. The approved public participation plan is also included as Appendix J to the report.

5.2.1 General

The public participation process was conducted strictly in accordance with Regulations 39 to 44. The following three categories of variables were taken into account when deciding the required level of public participation:

- The scale of anticipated impacts
- The sensitivity of the affected environment and the degree of controversy of the project
- The characteristics of the potentially affected parties

Since the scale of anticipated impacts is low, the low environmental sensitivity of the site and the fact that no conflict was foreseen between potentially affected parties, no additional public participation mechanisms were considered at this stage of the process. The following actions have already been taken in line with the approved public participation plan (refer to Appendix J):

- Newspaper advertisement
  Since the proposed development is unlikely to result in any impacts that extend beyond the municipal area where it is located, it was deemed sufficient to advertise in a local newspaper. An advertisement was placed in English in the local newspaper (Noordwester) on the 29 July 2022 (see Appendix C2) notifying the public of the EIA process and requesting Interested and Affected Parties (I&APs) to register with and submit their comments to Environamics Environmental Consultants. I&APs were given the opportunity to raise comments within 30 days of the advertisement (by 31 August 2022).
- Site notices
  Site notices were placed on site in Afrikaans and English on 21 July 2022 to inform surrounding communities and immediately adjacent landowners of the proposed development. I&APs were

given the opportunity to raise comments by 21 August 2022. Photographic evidence of the site notices is included in Appendix C3.

- Direct notification of identified I&APs

  Identified I&APs, including key stakeholders representing various sectors, has been directly informed of the EIA process on 19 August 2022 via registered post, telephone calls, WhatsApps and emails (as relevant). The Background Information Document (BID) was distributed with the notification. For a complete list of I&APs with their contact details see Appendix C4 to this report. It was expected from I&APs to provide their inputs and comments by 19 September 2022. To date comments have been received from various parties that have an interest in the development (Appendix C5 – C7).

- Direct notification of surrounding landowners and occupiers

  Written notices were also provided via registered post, WhatsApp or email (as relevant) to all surrounding landowners and occupiers on 19 August 2022. The surrounding landowners were given the opportunity to raise comments within 30 days. For a list of surrounding landowners see Appendix C4. The surrounding landowners were given the opportunity to raise comments by 19 September 2022. To date comments have been received from various parties that have an interest in the development (Appendix C5 – C7). Refer to Figure 5.4.

- Circulation of the Draft Scoping Report

  Copies of the draft Scoping report was provided to all I&APs via courier, Dropbox and/or email (as relevant). Hard copies of the report have been made available on request and where an I&AP does not have the resources to view the report on an online platform. I&AP's and organs of state were requested to provide their comments on the report from 15 November 2022 until 06 Jan 2023. All issues identified during the 30-day review and comment period have been recorded and documented and compiled into a Comments and Response Report included as part of the Final Scoping Report for decision-making.

- Circulation of the Draft Environmental Impact Assessment Report

  All registered I&APs and State Department have been informed of the availability of the Draft EIR on 03 May 2023 and requested to provide their comments within 30 days (refer to Appendix C). The 30-day review and comment period are from 03 May 2023 – 01 June 2023. All comments received during this period will be included in the final EIR. All comments received prior to the release of the Draft EIR have been included in Appendix C. The Comments and Responses report are included as Appendix C7 of this draft EIR.

- Circulation of decision and submission of appeals:

  Notice will be given to all identified and registered I&APs of the decision taken by the DFFE on the Application for EA. The attention of all registered I&APs will also be drawn to the fact that an appeal may be lodged against the decision in terms of the National Appeals Regulations. In accordance with the provisions of Regulation 4(1) of Government Notice No. 993, an appellant must submit the appeal to the appeal administrator, and a copy of the appeal to the applicant,

any registered I&APs and any organ of state with interest in the matter within 20 days from the date that the notification of the decision was sent to the applicant by the competent authority.

5.2.2 Consultation process

Regulation 41 requires that the municipality, relevant ward councillor and any organ of state having jurisdiction in respect of any aspect of the activity should be given written notice of the activity. A complete list of all the consultees who received written notice as well as proof of correspondence is attached as Appendices C4 and C5.

Figure 5.4: Surrounding Landowners

5.2.3 Registered I&APs

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

This report is the Draft Environmental Impact Report. The Draft Environmental Impact Report has been made available to all potential and/or registered I&APs and State Departments. They were provided with a copy of the Draft EIR and were requested to provide written comments on the report within 30 days. All issues identified during this review period, and previous review periods (i.e. Scoping Phase), will be documented and compiled into a Comments and Response Report to be included as part of the Final EIR (Appendix C7).

All comments received during the Scoping Phase, and prior to the release of the Draft EIR for the 30-day review and comment period have also been included in this Draft report as Appendix C which provided I&APs an opportunity to confirm that their comments raised during the Scoping Phase have been included and considered as part of the EIA Phase.

5.2.4 Issues raised by I&APs and consultation bodies

Comments from the DFFE Directorate: Biodiversity and Conservation and SAHRA have been received. All comments received during the circulation of the draft Scoping Report have been included in the Comments and responses report included as Appendix C7. All comments received during the circulation of the Draft EIR will be addressed accordingly in the Final EIR. The full wording and original correspondence are included in Appendix C5 and Appendix C6 of the Draft EIR.

5.3 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PREFERRED ALTERNATIVE

The following sections provide general information on the biophysical and socio-economic attributed associated with the preferred alternative (i.e. the location of the development footprint within the affected property).

5.3.1 Biophysical environment

The biophysical environment is described with specific reference to geology, soils, agricultural potential, vegetation and landscape features, climate, biodiversity and the visual landscape. A number of specialists were consulted to assist with the compilation of this chapter of the report – refer to the Table 1.2. However, due to the fact that the area proposed for development exclusively consists of land used for grazing, nothing of note was identified from an ecological or conservation point have been identified. For the development of the power line, some environmental sensitive features have been identified in the grid connection corridor these include unchanneled valley bottom wetlands. These features are described in more detail below.

5.3.1.1 Geology, soil and agricultural potential

The Soil and Agricultural Assessment (Appendix E4) indicated that the project area is characterised by the Fa 10 and Fa 11 land types. The Fa land types are predominately characterised with Hutton and Glenrosa soil forms with other associated soil forms and rocky areas also occur in the terrains. The Fa land types mostly have shallow and rocky soil profiles. Lime is rare or absent in the entire landscape. It is underlain by dolomite and chert of the Chuniespoort Group parent material. Most of the project area is characterised by a slope percentage between 0 and 4%, with some smaller patches within the project area characterised by a slope percentage ranging from 4 to 9%.

The land capability is determined by the physical features of the landscape including the soils present. The land potential or agricultural potential is determined by combining the land capability results and the climate capability for the region.

The climatic capability has been determined by means of the Smith (2006) methodology, of which the first step includes determining the climate capability of the region by means of the Mean Annual Precipitation (MAP) and annual Class A pan (potential evaporation). According to Smith (2006), the climatic capability of a region is only refined past the first step if the climatic capability is determined to be between climatic capability 1 and 6. Given the fact that the climatic capability has been determined to be "C8" for the project area, no further steps will be taken to refine the climate capability.

The land capability was determined by using the guidelines described in "The farming handbook" (Smith, 2006). The delineated soil forms were clipped into the four different slope classes (0-3%, 3-7%, 7-12% and >12%) to determine the land capability of each soil form. Accordingly, the most sensitive soil forms associated with the project area are restricted to land capability class 6 (see Table 5.1).

Table 5.1: Land Capability for the soils within the project area

Land Capability Class	Definition of Class	Conservation Need	Use-Suitability	Land Capability Group	Sensitivity
6	Limited preclude cultivation. Suitablefor perennial vegetation	Protection measures for establishment, e.g sod-seeding	Veld, pasture, and afforestation	Non- Arable	Low

The land potential has been determined to be level 7 (this land potential level is characterised by a low potential land. Severe limitations due to soil, slope, temperatures or rainfall. Non-arable).

Fifteen land capabilities have been digitised by (DAFF, 2017) across South Africa, of which ten potential land capability classes are located within the proposed footprint area's assessment corridor, including;

- Land Capability 1 to 5 (Very Low to Low Sensitivity);
- Land Capability 6 to 8 (Low to Moderate Sensitivity) and;
- Land Capability 9 to 10 (Moderate to High Sensitivity).

The land capability sensitivity (DAFF, 2017) indicates a range of sensitivities expected throughout the project focus area, which is predominantly covers “Low” to “Moderate” sensitivities. Smaller patches are characterised by sensitivities with “Very Low to Low” and “Moderately High” (Figure 5.5). Furthermore, various crop field boundaries were identified by means of the DEA Screening Tool (2022), and small patches of the crop field boundaries are characterised by “High” sensitivities with some areas being classified as “Very High” sensitivity. It is the specialist`s recommendation that such high potential crop fields be avoid for the project. The Inyathi SPP and powerline infrastructure can be rearranged around the “Very High to High” crop fields to preserve them where possible. In a case relocating of the project is not feasible, the stakeholders should engage with the owners of the crop fields for an appropriate compensation for use of those crop fields.

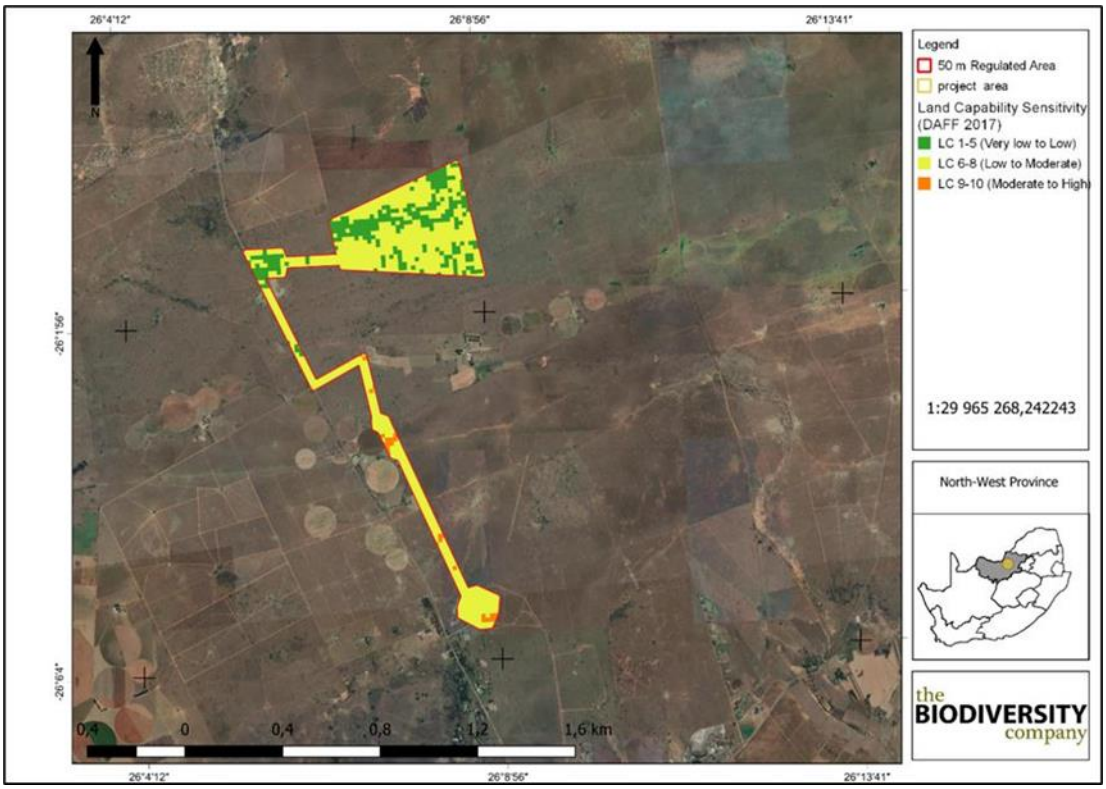


Figure 5.5: The land capability sensitivity for the Inyathi Solar Power Plant

5.3.1.2 Vegetation and, topography and landscape features

The project area is situated within the grassland biome. This biome is centrally located in southern Africa, and adjoins all except the desert, fynbos and succulent Karoo biomes (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the grassland biome include:

a) Seasonal precipitation; and
b) The minimum temperatures in winter (Mucina & Rutherford, 2006).

The grassland biome is found chiefly on the high central plateau of South Africa, and the inland areas of KwaZulu-Natal and the Eastern Cape. The topography is mainly flat and rolling but includes the escarpment itself. Altitude varies from near sea level to 2 850 m above sea level.

Grasslands are dominated by a single layer of grasses. The amount of cover depends on rainfall and the degree of grazing. The grassland biome experiences summer rainfall and dry winters with frost (and fire), which are unfavourable for tree growth. Thus, trees are typically absent, except in a few localized habitats. Geophytes (bulbs) are often abundant. Frosts, fire and grazing maintain the grass dominance and prevent the establishment of trees.

On a fine-scale vegetation type, the project area overlaps with the Carletonville Dolomite Grassland vegetation type (Figure 5.6).

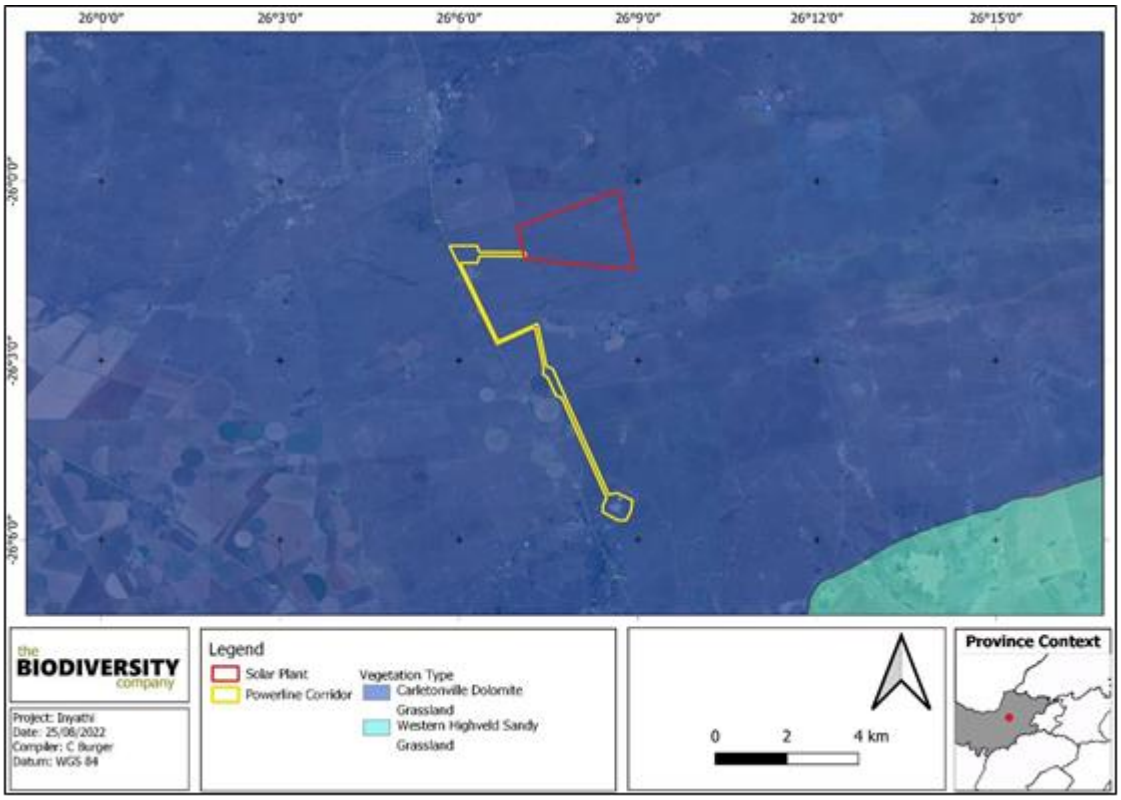


Figure 5.6: Vegetation types associated with the Inyathi Solar Power Plant

This vegetation type occurs on slightly undulating plains dissected by prominent rocky chert ridges. Species-rich grasslands forming a complex mosaic pattern dominated by many species (Mucina & Rutherford, 2006). This vegetation type occurs in the North-West, Gauteng and marginally into the Free State Province: In the region of Potchefstroom, Ventersdorp and Carletonville, extending westwards to the vicinity of Ottoshoop, but also occurring as far east as Centurion and Bapsfontein in Gauteng Province.

According to Mucina and Rutherford (2006), this vegetation type is classified as Vulnerable (VU). The national target for conservation protection for both these vegetation types is 24%, but only a small extent is conserved in statutory (Sterkfontein Caves — part of the Cradle of Humankind World Heritage Site, Oog Van Malmanie, Abe Bailey, Boskop Dam, Schoonspruit, Krugersdorp, Olifantsvlei, Groenkloof) and in at least six private conservation areas. Almost a quarter already transformed for cultivation, by urban sprawl or by mining activity as well as the building of the Boskop and Klerkskraal Dams.

Ecologically Important Landscape Features

Table 5.2 below has been produced as a result of the spatial data collected and analysed (as provided by various sources such as the national and provincial environmental authorities and SANBI). It presents a summative breakdown of the ecological boundaries considered and the associated relevance that each has to the region or project area. Where a feature is regarded as relevant it is considered an ecologically important landscape feature and discussed further as part of the sub-sections that follow.

Table 5.2: Summary of the spatial relevance of the project are to local ecologically important landscape features

Desktop Information Considered	Relevant?	Reasoning
Provincial Conservation Plan	Yes	The project area intercepts with CBA2 and ESA1 areas
NBA 2018: Ecosystem Threat Status	Yes	The project area overlaps with a 'Least Concern' ecosystem
NBA 2018: Ecosystem Protection Level	Yes	The project area overlaps with a 'Poorly Protected' ecosystem
National Protected Areas Expansion Strategy (NPAES)	Yes	The southern portion of the project area overlaps with a NPAES priority focus areas for expansion
Important Bird and Biodiversity Areas (IBA)	No	The nearest IBA, the Botsalano Nature Reserve, lies more than 60 km north west of the project area
South African Inventory of Inland Aquatic Ecosystems (SAIIAE)	Yes	A CR wetland overlaps with the southern portion of the project area
National Freshwater Ecosystem Priority Areas	Yes	The NFEPA database lists several wetlands nearby, none of which are FEPA systems
Protected and Conservation Areas (SAPAD & SACAD)	No	According to the latest datasets, the Marico Biosphere Reserve lies 2 km north of the project area while the Rall Broer Private nature Reserve lies approximately 8 km east of the project area.
Strategic Water Source Areas	No	No Strategic Water Source Areas occur nearby according to the 2021 dataset
Powerline Corridor	Yes	The project area lies within the northern corridor

Critical Biodiversity Areas

According to the 2015 North West CBA and ESA map dataset the project area overlaps with CBA2 and ESA1 areas (Figure 5.7).

CBAs are areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and healthy functioning of important species and ecosystems and the delivery of ecosystem services. Thus, if these areas are not maintained in a natural or near natural state then provincial biodiversity targets cannot be met (SANBI, 2017).

ESAs are areas that are not essential for meeting biodiversity representation targets but play an important role in supporting the ecological functioning of ecosystems as well as adjacent Critical Biodiversity Areas, and/or in delivering ecosystem services that support socio-economic development (SANBI, 2017).

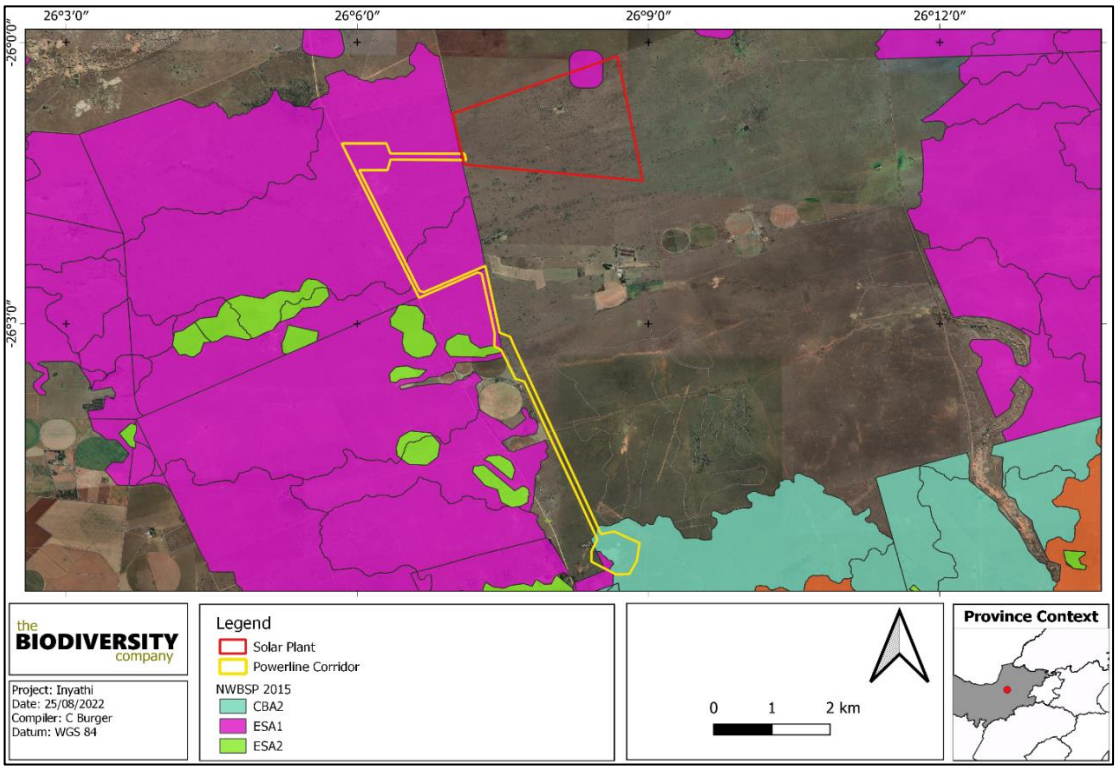


Figure 5.7: Map illustrating the North West CBA and ESA map dataset relevance

National Protected Areas Expansion Strategy (NPAES) and Protected Areas

The project area overlaps with priority focus areas for protected area expansion (Figure 5.8). These priority areas are likely to have been selected due to the relatively large amount of habitat connectivity present, in addition to the proximity of nearby protected areas.

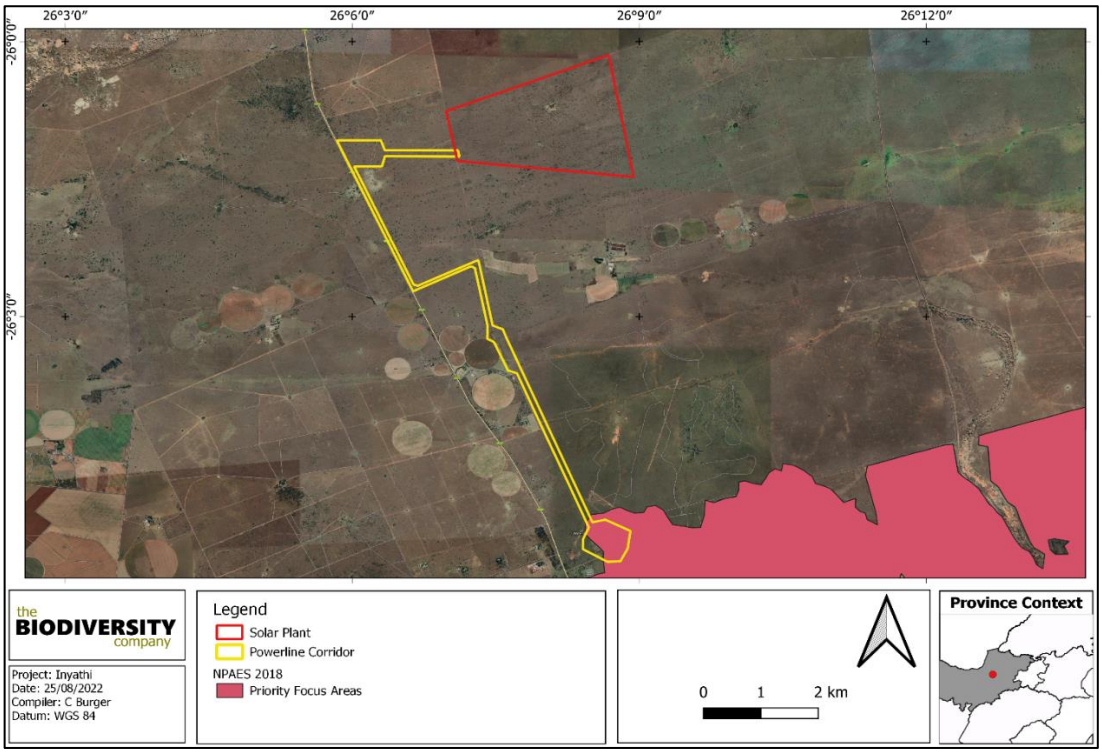


Figure 5.8: Map illustrating the project area location in relation to the 2018 NPAES dataset.

According to the protected area spatial datasets from SACAD (2022) and SAPAD (2022), the Marico Biosphere Reserve lies 2 km north of the project area, and the Rall Broer Private nature Reserve lies approximately 8 km east of the project area (Figure 5.9).

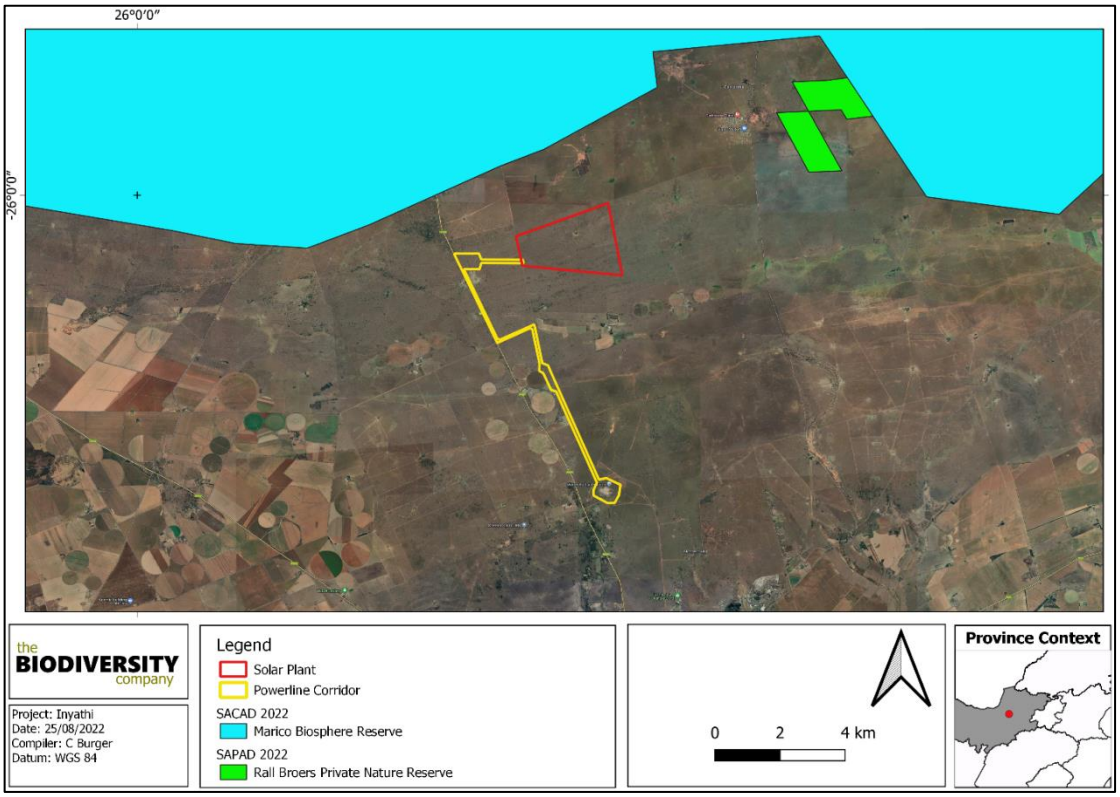


Figure 5.9: Map illustrating the project area in relation to the protected areas

Habitat Assessment

The main habitat types identified across the project area were initially identified largely based on aerial imagery. These main habitat types were refined based on the field coverage and data collected during the survey; the delineated habitats can be seen in Figure 5.10. Emphasis was placed on limiting timed meander searches along the proposed project area within the natural habitats and therefore habitats with a higher potential of hosting SCC. Three habitat types were identified during the site assessment, which includes degraded grassland habitat, transformed habitat and wetland habitats.

The majority of the project area, both the solar plant as well as the powerline corridors, comprised of ***degraded dolomite grassland*** which is typically characterised by open grassland areas with scattered medium to large trees clustered together. This habitat type is regarded as semi-natural grassland, but slightly disturbed due to the presence of roads, mismanagement (overgrazing and/or burning) and also human infringement as it is being used for agricultural practices as well as a game farming in certain portions. The dominant vegetation across the habitat unit included grass species such as *Aristida congesta*, *Diheteropogon amplectens, Bewsia biflora* and *Eragrostis chloromelas,* while several herbs were also prominent and included *Helichrysum caespititium, Bulbine abyssinica, Felicia mossamedensis, Gazania krebsiana subsp. serrulata* as well as the succulent *Aloe greatheadii.* The tree species typically found in clusters included *Celtis africana, Grewia flava, Gymnosporia buxifolia and Vachellia karoo.*

This habitat unit can be regarded as important, not only within the local landscape, but also regionally. The unit functions as remaining greenlands which supports viable indigenous plant species populations and is also used for foraging. The unit also serves as a movement corridor for fauna within a landscape mainly fragmented by agricultural practices. Within the habitat unit there is a difference in the condition pertaining to some areas being exposed to more disturbance from adjacent anthropogenic activities than others.

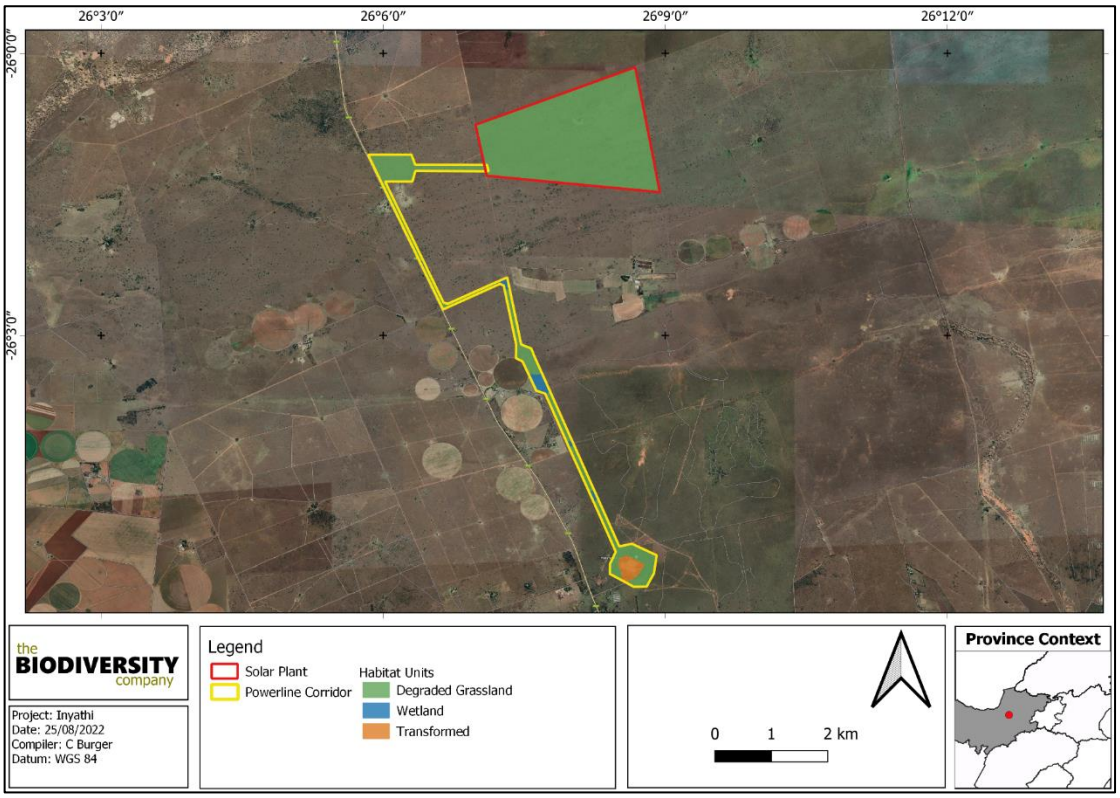


Figure 5.10: Map illustrating the habitats identified in the project area.

The ***transformed habitat*** is associated with the existing Watershed substation located in the southern portion of the project area. The transformed area has little to no remaining natural vegetation due to land transformation to accommodate the substation. This habitat exists in a constant disturbed state as it cannot recover to a more natural state unless through human intervention.

This **habitat unit** represents the wetlands found along the project area. The ecological integrity, importance and functioning of these areas play a crucial role as a water resource system, important habitat and movement corridor for various fauna and flora. The preservation of this system is the most important aspect to consider for the proposed development. This habitat needs to be protected and improved due to the role of this habitat as a water resource.

Site Ecological Importance

The three delineated habitat types have each been allocated a sensitivity category, or SEI, and this breakdown is presented in Table 5.3 below.

Table 5.3: Sensitivity summary of the habitat types delineated within the Project Area of Influence

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Degraded Grassland	Medium - > 50% of receptor	High - Good habitat connectivity	Medium	Medium	Medium

	contains natural habitat with potential to support SCC	with potentially functional ecological corridors and a regularly used road network between intact habitat patches.			
Wetlands	Medium - > 50% of receptor contains natural habitat with potential to support SCC	High - Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches.	Medium	Medium	Medium
Transformed	Low - < 50% of receptor contains natural habitat with limited potential to support SCC	Low - Several minor and major current negative ecological impacts.	Low	High	Very Low

Consider the following guidelines when interpreting SEI in the context of any proposed development or disturbance activities (noted in conjunction with provincial guidelines pertaining to CBA and ESA areas):

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

<u>Species of Conservation Concern</u>

A list of red data plant species previously recorded in the grid square in which the proposed development is planned was obtained from SANBI. No red listed plant species occur in the QDS or was recorded in the site.

Ecological monitoring should however still be implemented during the construction phase and specific sensitive habitats (riparian) needs to be avoided to ensure that any potential red data species potentially missed during the field surveys are preserved and not potentially impacted on.

The DFFE Screening Report also did not highlight any red listed flora (Appendix B).

Declared Invasive Alien Species

The Alien and Invasive Species Regulations (GNR 599 of 2014) are stipulated as part of the National Environmental Management: Biodiversity Act (10/2004). The regulation listed a total of 559 alien species as invasive and further 560 species are listed as prohibited and may not be introduced into South Africa. Below is a brief explanation of the four categories of Invasive Alien Plants as per the regulation.

Category 1 plants are prohibited plants which must be controlled or eradicated. These plants serve no economic purpose and possess characteristics that are harmful to humans, animals or the environment.

- Category 1a: Plants are high-priority emerging species requiring compulsory control. All breeding, growing, moving and selling are banned
- Category 1b: Plants are widespread invasive species controlled by a management program.

Category 2 plants are invaders with certain useful qualities, such as commercial use or for woodlots, animal fodder, soil stabilisation, etc. These plants are allowed in demarcated areas under controlled conditions and in biocontrol reserves.

Category 3 plants are alien plants that are currently growing in, or have escaped from areas such as gardens, but that are proven invaders. No further planting is allowed (except with special permission), nor trade in propagative material. Existing plants may remain but must be prevented from spreading. Plants within the flood line and watercourses must be removed (Bromilow, 2010).

The following alien invasive and exotic plant species were recorded on site during the surveys as stipulated in the Alien and Invasive Species Regulations (GNR 599 of 2014):

- Argemone mexicana – Category 1b
- *Datura ferox* - Category 1b
- Flaveria bidentis - Category 1b
- Melia azedarach - Category 1b
- Opuntia ficus-indica - Category 3
- Solanum sisymbriifolium - Category 1b

5.3.1.3 Wetlands and Riparian Features

The proposed solar project is located 6.5 km north of Lichtenburg in the North West Province. The project area is situated in the C31A quaternary catchment within the Vaal Water Management Area (WMA). The mean annual precipitation for this region reaches approximately 593 mm and is characterised by summer rainfall (Mucina & Rutherford, 2006). This area is characterised by frequent severe frost during winter (Mucina & Rutherford, 2006).

During the site visit, five Hydrogeomorphic (HGM) units were identified within the 500 m Project Area of Influence (PAOI) (see Figure 5.12). The wetland areas were delineated in accordance with the DWAF (2005) guidelines. The five HGM units have all been identified as Unchannelled Valley Bottom (UCVB) wetlands.

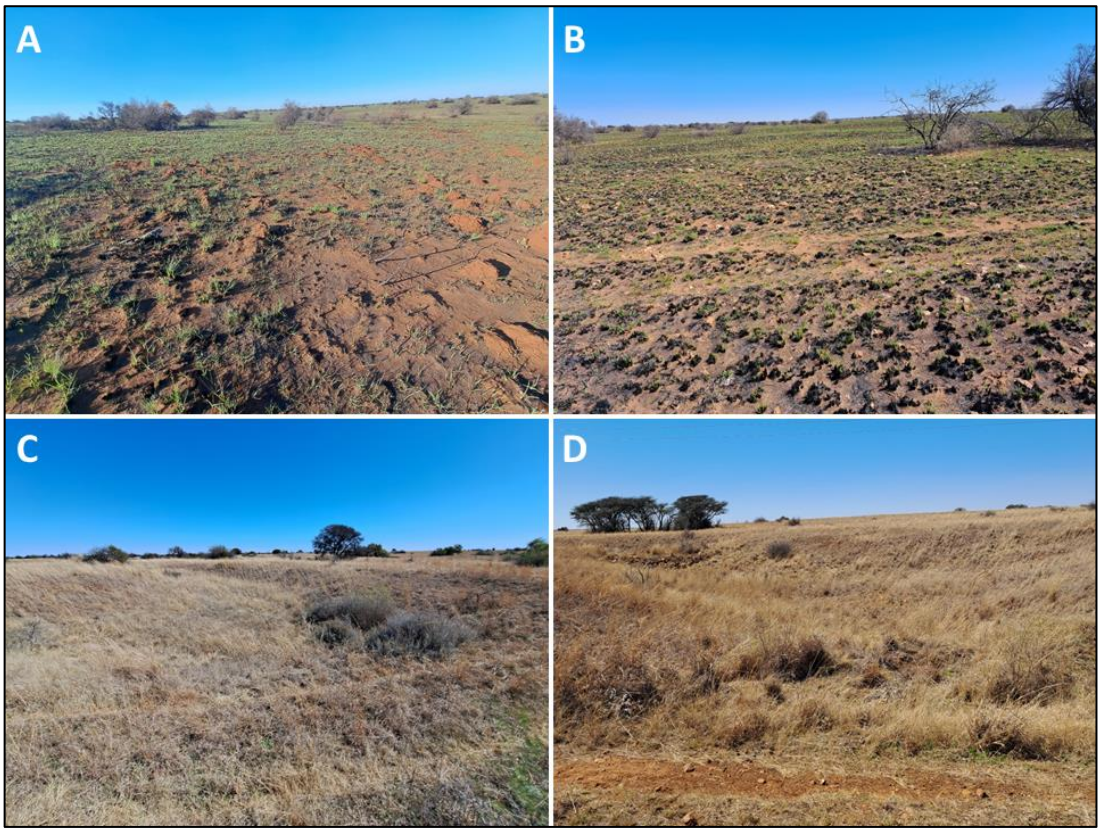


Figure 5.11: Photographical evidence of the different wet areas found within the 500 m PAOI.

Unchanneled valley bottoms are characterised by sediment deposition, a gentle gradient with streamflow generally being spread diffusely across the wetland, ultimately ensuring prolonged saturation levels and high levels of organic matter. The assimilation of toxicants, nitrates and phosphates are usually high for unchanneled valley-bottom wetlands, especially in cases where the valley is fed by sub-surface interflow from slopes. The shallow depths of surface water within this system adds to the degradation of toxic contaminants by means of sunlight penetration.

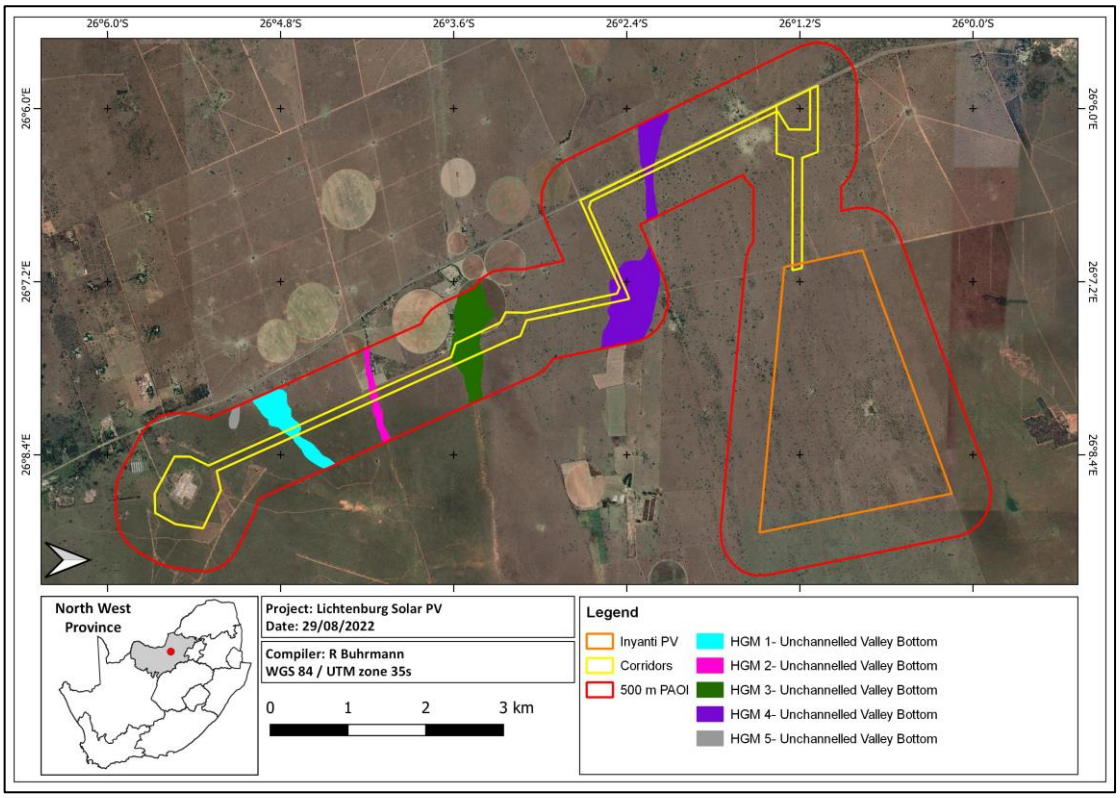


Figure 5.12: Delineation and location of the different HGM units within the 500 m PAOI

The ecosystem services provided by the wetlands identified within the 500 m PAOI were assessed and rated using the WET-EcoServices method (Kotze *et al*. 2008). Overall, all five UCVB wetlands scored "Intermediate" for ecosystem services. Ecosystem services contributing to these scores include flood attenuation, streamflow regulation, sediment trapping, phosphate assimilation, nitrate assimilation, toxicant assimilation, erosion control, and biodiversity maintenance.

The PES for the assessed HGM units is presented in Table 5.4. The overall PES score for HGMs 1 and 5 has been calculated to be "Moderately Modified", which HGMs 2 – 4 have been calculated to be "Largely Modified". The main impacts associated with these HGMs include the fact that these wetland's (and catchment) have been transformed to such an extent that indigenous hydrophytic vegetation has been removed to make way for grazing, and crops (both current and historical). HGMs 1 and 5 are located outside any present-day cultivation, however, still experience grazing pressures.

Table 5.4: Summary of the scores for the wetland PES

Moderately Modified (C)	**Largely Modified (D)**
HGM 1	HGM 2
HGM 5	HGM 3
	HGM 4

Importance & Sensitivity Assessment (IS)

The results of the IS assessment are shown in Table 5.5. Various components pertaining to the protection status of a wetland is considered for the IS, including Strategic Water Source Areas (SWSA), the NFEPA wet veg protection status and the protection status of the wetland itself considering the NBA wetland dataset. The IS for the depression wetlands has been calculated to be "Low", which combines the relatively low threat status of the wet veg type and the low protection status of the wetland itself.

Table 5.5: The IS results for the delineated HGM unit

HGM Type	**Wet Veg**			**NBA Wetlands**			**SWSA (Y/N)**	**Calculated IS**
	EcoRegion	Ecosystem Threat Status	Ecosystem Protection Level	Wetland Condition	Ecosystem Threat Status 2018	Ecosystem Protection Level		
HGM 1 - 5	Mesic Highveld Grassland Group 3	Least Threatened	Not Protected	N/A	N/A	N/A	N	Low

5.3.1.4 Climate

The project is situated within the summer and autumn rainfall region with very dry winters and frequent frost that occurs during the colder winter months. The spatial and temporal distribution of rainfall is very complex and has great effects on the productivity, distribution and life forms of the major terrestrial biomes. The mean annual precipitation for the region is around 560mm. The mean annual temperature for the area is 15.2°C, and the mean annual frost days is 43 days. Mean Annual Potential Evaporation is 2226mm, with Mean Annual Soil Moisture Stress of 78%.

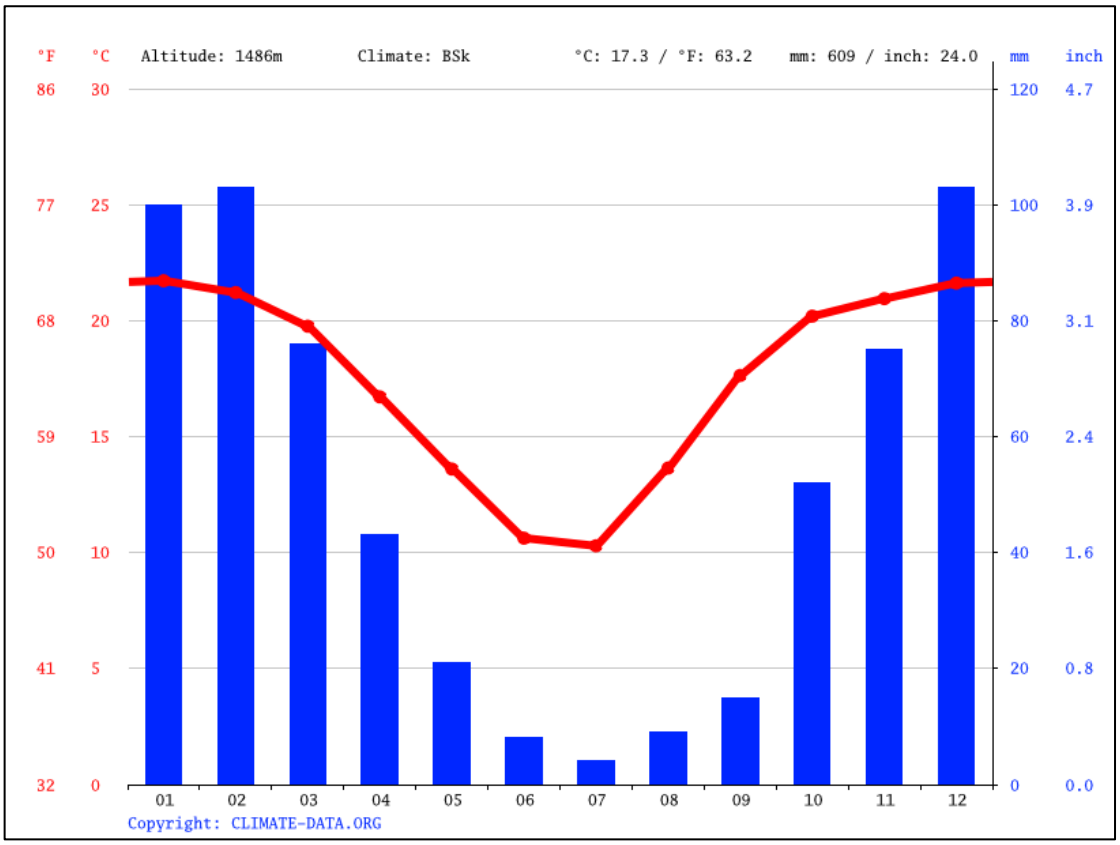


Figure 5.13: Column and line plot illustrating climatic characteristics of Lichtenburg

5.3.1.5 Biodiversity

The primary cause of loss of biological diversity is habitat degradation and loss (IUCN, 2004; Primack, 2006). In the case of this study special attention was given to the identification of sensitive species or animal life and birds on site. The following section will discuss the state of biodiversity on the site in more detail.

Avifaunal

According to the Avifaunal Assessment (Appendix E2) the avifauna community recorded within the Project Area of Influence (PAOI) could be regarded as relatively diverse with 101 species recorded, accounting for approximately 43% of the total number of expected species. However, considering that the survey was undertaken during the dry season and the limited survey time, these results should be interpreted with caution as avifauna communities within arid and semi-arid regions exhibit temporal movements in response to shifts in resource availability.

One of the expected SCC was recorded within the PAOI during the survey period i.e., *Gyps africanus* (White-backed Vulture). As aforementioned, the species is listed as CR on regional scale (Taylor *et al*, 2015) and global scale (BirdLife International, 2021b). Four individual was observed perched on existing powerlines. However, based on the extensive foraging range size of this species (Phipps *et al*, 2013), it will utilise the majority of the PAOI and proximal habitats for foraging.

Priority Species' are those avifauna that are particularly susceptible to energy developments, and although these priority species were developed for Wind Energy developments (Ralston Paton *et al*, 2017), the type of impact is congruent with SEFs, i.e., collision, electrocution, and habitat loss. Even though the panels may not pose an extensive collision risk for larger avifauna species, powerlines associated with the infrastructure, guidelines (anchor lines) and connection lines do pose a risk. The fence could also pose a collision risk for various species. Twelve of the species observed within the PAOI are regarded as priority species which includes the African Darter, African Harrier-Hawk, Domestic Goose, Egyptian Goose, Gabar Goshawk, Greater Kestrel, Hadada Ibis, Helmeted Guineafowl, Northern Black Korhaan, Reed Cormorant South African Shelduck and the White-backed Vulture.

The density of the most abundant avifauna species (68% of the total abundance) recorded within the PAOI. The Pied Crow (*Corvus albus*), Red-billed Quelea (*Quelea quelea*), Helmeted Guineafowl (*Numida meleagris*) and Red-knobbed Coot (*Fulica cristata*) were the most abundant species.

Fauna

Mammal activity was moderate, where twelve (12) mammal species were recorded, either through direct observations or evidence of species. Two (2) reptile species were recorded (Table 5.6) and no amphibian species were observed during the survey.

No fauna SCC were recorded, however, the following species that were recorded are listed as protected under Schedule 2 of the North West Biodiversity Management Act No 4 (2016): *Orycteropus afer* (Aardvark), *Damaliscus pygargus phillipsi* (Blesbok), *Tragelaphus oryx* (Common Eland) and *Pachydactylus capensis* (Cape thick-toed gecko).

Table 5.6: Fauna species recorded during the field survey

Species	**Common Name**	**Conservation Status**	
		SANBI (2022)	IUCN (2021)
Mammals			
Canis mesomelas	Black-backed Jackal	LC	LC
Cryptomus hottentotus	Common Mole-rat	LC	Unlisted
Cynictis penicillata	Yellow Mongoose	LC	LC
Damaliscus pygargus phillipsi	Blesbok (Protected, Schedule 2)	LC	LC
Hystrix africaeaustralis	Cape Porcupine	LC	LC
Lepus saxatilis	Scrub Hare	LC	LC
Phacochoerus africanus	Common Warthog	LC	LC
Raphicerus campestris	Steenbok	LC	LC

Sylvicapra grimmia	Common Duiker	LC	LC
Tragelaphus oryx	Common Eland (Protected, Schedule 2)	LC	LC
Orycteropus afer	Aardvark (Protected, Schedule 2)	LC	LC
Xerus inauris	Cape Ground Squirrel	LC	LC
Reptiles			
Afrotyphlops bibronii	Bibron's blind snake	LC	LC
Pachydactylus capensis	Cape thick-toed gecko (Protected, Schedule 2)	LC	LC

5.3.1.6 Visual landscape

The visual impact of photovoltaic facility depends on the complex relationship between the visual environment (landscape), the development (object), and the observer/receptor (e.g. farmer). The establishment of a solar facility on the site is not expected to have a significant visual effect, given that the number of sensitive receptors is very low. The visual landscape is already degraded due to the large number of mines and Eskom electricity infrastructure in the area. Furthermore, the technology considered for this development will be non-reflective.

The site is located in an area with a low significance in elevation, meaning that the site is not located on a mountain or at the foot of a mountain, with an unsignificant difference in elevation. The preferred site is located at an above mean sea level (amsl) of approximately 1527m at the highest elevation and at an amsl of 1516m at the lowest elevation. The landform and drainage described above is unlikely to limit visibility. The proposed development is not visible from the town of Lichtenburg or Bakerville, due to the elevation. Areas within 5km from the proposed development might have a clear view without taking existing screening into account. The only receptors likely to be impacted by the proposed development are the nearby property owners and on nearby roads (refer to figures 5.14 – 5.15).

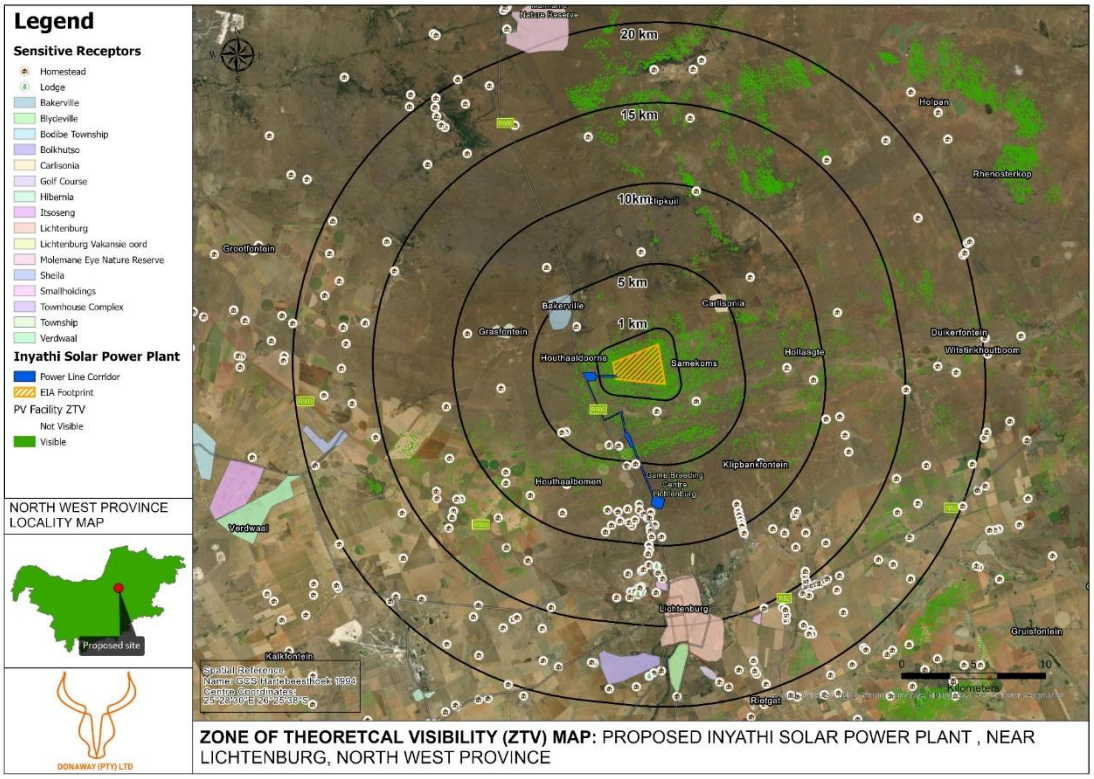


Figure 5.14: Zone of theoretical visibility (ZTV) for the proposed Solar Power Plant

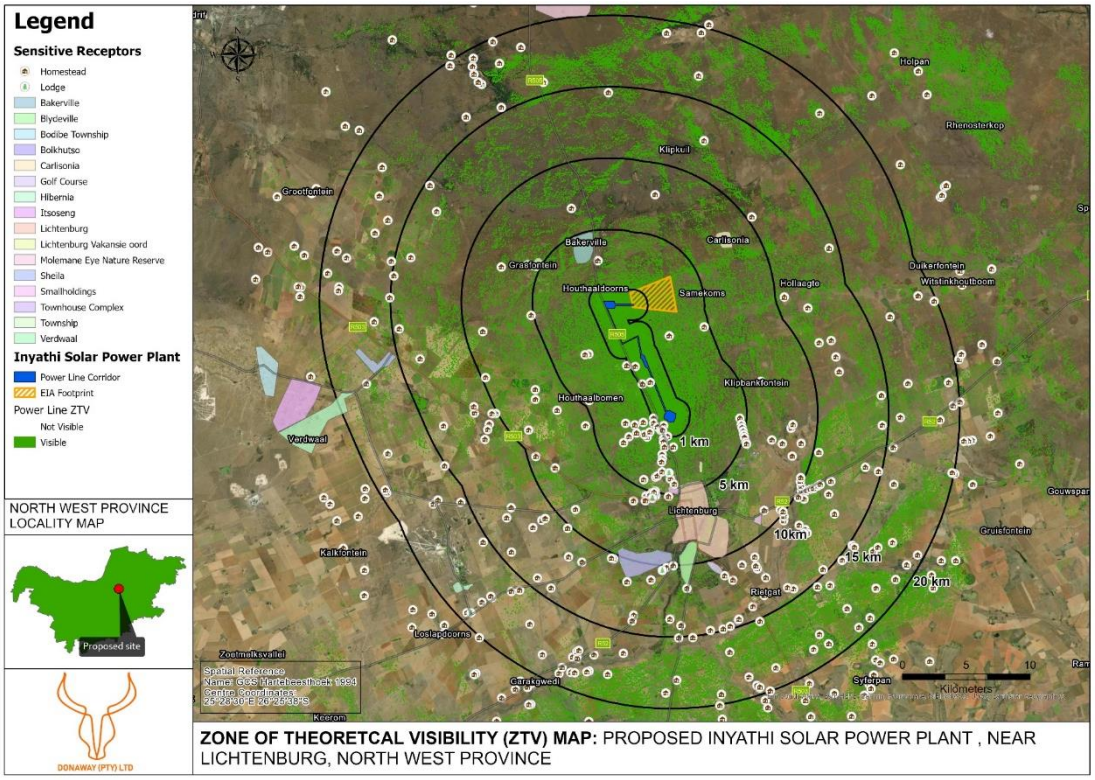


Figure 5.15: Zone of Theoretical Visibility (ZTV) for the Power line

5.3.1.7 Traffic consideration

According to the Traffic Impact Study (Appendix E8), the existing external road network, in the vicinity of the Inyathi Solar Power Plant consists of R505 and various gravel roads.

A formal application for these access points will need to be lodged with the Ditsobotla Local Municipality and the North West Department: Police, Roads and Transport. The formalisation of these access points to the standard, will in all probability be a requirement as part of the wayleave approval.

An internal site road network will also be required to provide access to the solar field and associated infrastructure. It is anticipated that approximately 15 km of internal roads will be required for the facility. Furthermore, an additional 15 km of smaller tracks may be required, for cleaning and maintenance of the solar modules.

Two (2) possible ports of entry have been identified from where the solar panel technology and large electrical components will be transported, namely: Durban and Richards Bay. The distance from Durban to the Inyathi Solar Power Plant, via road, is approximately 585 km via the N3 and N5 and from Richards Bay to the Inyathi Solar Power Plant is approximately 685 km via the N5.

It is critical to ensure that the abnormal load vehicle will be able to move safely and without obstruction along the preferred route.

5.3.2 Description of the socio-economic environment

The socio-economic environment is described with specific reference to social, economic, heritage and cultural aspects.

5.3.2.1 Socio-economic conditions

The According to the Social Impact Assessment (attached as Appendix E9) the construction phase for an entire SPP will extend over a period of 12-18 months. The anticipated capital expenditure value of the proposed Inyathi SPP on completion will be approximately R1.5 Billion. The construction phase in terms of employment will employ approximately 800 workers and of those employment opportunities likely to be generated, approximately 60% will accrue to low skilled workers, 25% to semiskilled workers, and 15% to skilled workers. It is anticipated that the operation of the project is likely to create between 35-99 employment opportunities, comprising of low-skilled, semi-skilled, and skilled opportunities. Employment opportunities include safety and security staff, operation and monitoring, and maintenance crew.

The Ngaka Modiri Molema DM is a Category C municipality located in the North West Province. It is situated centrally within the province and shares an international border with Botswana. It is comprised of five local municipalities: Mahikeng, Ratlou, Ramotshere Moiloa, Ditsobotla and Tswaing.

The Ngaka Modiri Molema DM covers an area of 28 114km2 and is home to Mahikeng (previously Mafikeng), the capital of the province. Aptly named, the capital is nicknamed ‘The City of Goodwill', which is also the city's slogan. It is a rapidly growing, modern, residential, administrative and commercial town, which contrasts with its fascinating history. The municipality has a total population of 889 108 according to the 2016 Community Survey, living in 269 977 households of which 89,4% have access to electricity for lighting and 41,2% are female headed. The DM had an unemployment rate of 33,78% and a youth unemployment

rate of 44,1% in 2011 which contributed to a Dependency ratio of 64.5. The main economic sectors include: Agriculture, tourism and mining.

The Ditsobotla Local Municipality is a Category B municipality situated within the Ngaka Modiri Molema District in the North West Province. It is one of the five municipalities in the district, making up almost a quarter of its geographical area and covering 6 387km2. The seat of the local municipality is Lichtenburg. The municipality was established through the amalgamation of the former Lichtenburg, Coligny and Biesiesvlei Transitional Councils.

Its main attractions are cultural, heritage and agricultural museums; the burning vlei – a unique vlei consisting of the thick layers of subterranean peat that burnt for years, creating a rare natural phenomenon; the Lichtenburg Game Breeding Centre; Eufees and Duch Roode Dams, situated between the CBD and Burgersdorp; and Molopo Oog/Wondergat.

The LM has a total population of 181 865 according to the 2016 Community Survey, living in 54 154 households of which 88,1% have access to electricity for lighting, 31,1% have access to piped water inside the dwelling and 33,5% are female headed. The LM had a Dependency ratio of 46,1 in 2016.

The main economic sectors in the municipality are Manufacturing (38.5%), agriculture (16.5%), wholesale and retail (7.4%).

5.3.2.2 Cultural and heritage aspects

According to the Heritage Impact Assessment (attached as Appendix E7) the cultural landscape qualities of the region essentially consist of a rural area in which the human occupation is made up of a limited Stone Age occupation. This was followed much later by Tswana-speaking agro-pasturalist that settled in the larger region. They were soon followed by a colonial (farmer) component, which gave rise to the development of small villages and towns that dot the larger landscape. The final transformation was brought about by the development of infrastructure in the region, such as roads and railway lines, which was extended due to large scale diamond mining activities.

Stone Age

Very little habitation of the central highveld area took place during Stone Age times. Tools dating to the Early Stone Age period are mostly found in the vicinity of larger watercourses, e.g., the Vaal River or the Harts River and especially in sheltered areas such as at the Taung fossil site. During Middle Stone Age (MSA) times (c. 150 000 – 30 000 BP), people became more mobile, occupying areas formerly avoided. In many cases, tools dating to this period are found on the banks of the many pans that occur all over. The MSA is a technological stage characterized by flakes and flake-blades with faceted platforms, produced from prepared cores, as distinct from the core tool-based ESA technology.

Tools dating to the ESA and MSA periods are found in the vicinity of watercourses, e.g., the Molopo River and large numbers were also unearthed by the diamond mining activities in the Bakerville area.

Late Stone Age (LSA) people had even more advanced technology than the MSA people and therefore succeeded in occupying even more diverse habitats. Some sites are known to occur

in the region. These are mostly open sites located near river and pans. For the first time we also get evidence of people's activities derived from material other than stone tools. Ostrich eggshell beads, ground bone arrowheads, small bored stones and wood fragments with incised markings are traditionally linked with the LSA.

Iron Age

Iron Age people started to settle in southern Africa c. AD 300, with one of the oldest known sites at Broederstroom south of Hartebeespoort Dam dating to AD 470. Having only had cereals (sorghum, millet) that need summer rainfall, Early Iron Age (EIA) people did not move outside this rainfall zone, and neither did they occupy the central interior highveld area.

As yet, no sites dating to the Early Iron Age have been reported from the region and most sites date to the Late Iron Age. The occupation of the larger geographical area (including the study area) did not start much before the 1500s. By the 16th century things changed, with the climate becoming warmer and wetter, creating conditions that allowed Late Iron Age (LIA) farmers to occupy areas previously unsuitable, for example the treeless plains of the Free State.

The earliest Iron Age settlers who moved into the North West Province region were Tswana-speakers such as the Tlhaping, Hurutshe, Fokeng, Kgatla and Rolong. In the region of the study area, it was mostly the booRapulana and booRatlou sections of the Rolong (Breutz 1957). To the east of them is found the baTloung, who, it is said, originally are of Ndebele origin. They left the Pretoria region and settled in the Rustenburg region, from where they moved to the Klerksdorp area. By the early 1800s they moved to the farm Putfontein, where the Hermannsburg Mission Society had established a mission station.

Historic period

The area was occupied by white farmers since the 1850s. As resources were few they depended on farming and hunting to survive. The town of Lichtenburg was founded in 1866 and proclaimed in 1873.

During the Anglo-Boer War, a number of skirmishes took place in the larger region. Most famous of these was the siege of Mafikeng, although a short battle was also fought in the town of Lichtenburg in March 1901 (Van den Berg 1996).

In the early twentieth century, diamonds were found in various places in the Lichtenburg district of the former Transvaal Province. However, it was only during the early 1920s that large quantities of diamonds were found, resulting in the proclamation of the Bakerville diamond fields (more correctly: the Lichtenburg-diamond field) in 1926. Thousands of miners swarmed to the area in search of wealth. At the height of activity, in 1927, an estimated 90 000 people were involved at the diamond fields. Bakerville was the most important of a number of settlements where the miners congregated. It was laid out in 1927 and is named after A W Baker, the then owner of the farm Uitgevonden 355JP. As early as 1928, activities started to decline - and continued to decline. Currently only a few people are involved in diamond mining in this area.

Site specific review

From a review of the available old maps and aerial photographs it can be seen that the project area has always been open space, with the main activity being grazing or the making of agricultural fields. The Imperial Map of South Africa indicates the farm Zamenkomst, showing the road to Mafikeng crossing the farm.

South of Bakerville, the area is so devoid of natural as well as human made features (Fig. 8), that it makes the georectification of the images virtually impossible. This is also the case even until the 1972 version of the 1:50 000 topographic map where no built features are shown in the project area. This is even the case on the 2021 Google Earth image of the project area.

The remains of an old single roomed, stone-built structure was identified on the site. Apparently, it was occupied by a labourer who worked for the previous farm owner, but was abandoned when the current owner took over.

No sites, features or objects of cultural significance dating to the historic period were identified in the project area.

Palaeontology

The Palaeontological Impact Assessment (refer to Appendix E6) indicated that the project site is underlain by the Precambrian dolomites and associated marine sedimentary rocks of the Malmani Subgroup (Chuniespoort Group, Transvaal Supergroup). According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) the Palaeontological Sensitivity of the Malmani Subgroup (Chuniespoort Group, Transvaal Supergroup) is Very High (Almond et al, 2013; SAHRIS website). In the Palaeotechnical report of the Northwest Groenewald et al (2014) allocated a High Sensitivity to the Malmani Subgroup.

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on 30 July 2022. Outcrops of weathered to fairly well-preserved stromatolites were discovered on the development. Mitigation of a sample of well-preserved stromatolites is thus recommended. By implementing mitigation measures the significance of the impact will be reduced to low. Mitigation should take place after initial vegetation is cleared away but before the ground is levelled for construction. These recommendations should be included in the Environmental Management Plan of the Inyathi Solar Plant.

5.4 SITE SELECTION MATRIX

Due to the nature of the proposed development, the location of the solar power plant is largely dependent on technical and environmental factors such as solar irradiation, climatic conditions, topography of the site, access to the grid and capacity of the grid. Studies of solar irradiation worldwide indicate that the North West Province has a high potential for the generation of power from solar.

The receptiveness of the site to PV Development includes the presence of optimal conditions for the sitting of a solar energy facility due to high irradiation values and optimum grid connection opportunities (i.e. the grid connection points are located within the affected property which minimizes the length of power line development and consolidates the overall impacts and disturbance of the project within the affected property). Portion 5 (Portion of

Portion 2) of the Farm Zamenkomst No. 4 , where the project is proposed to be located is considered favorable and suitable from a technical perspective due to the following characteristics:

- Climatic conditions: Climatic conditions determine if the project will be viable from an economic perspective as the solar power plant is directly dependent on the annual direct solar irradiation values of a particular area. The North West receives high averages of direct normal and global horizontal irradiation, daily. This is an indication that the regional location of the project includes a low number of rainy days and a high number of daylight hours experienced in the region. Global Horizontal Radiation of ~2118 kWh/m^2/year is relevant in the area.
- Topographic conditions: The surface area on which the proposed facility will be located has a favourable level topography, which facilitates work involved with construction and maintenance of the facility and ensures that shadowing on the panels do not occur. The topographic conditions, which are favourable, minimizes the significance of the impact that will occur during the clearing and leveling of the site for the construction activities.
- Extent of the site: A significant portion of land is required to evacuate the prescribed 150MW and space is a constraining factor in PV facility installations. Provision was made to assess a larger area than is required for the facility to make provision for any other environmental or technical constraints that may arise and avoiding those areas. Larger farms are sought after to make provision for any constraints imposed by the Department of Agriculture on the extent of land that may be used for such facilities per farm, as well as the opportunities presented for the avoidance of sensitive environmental features present. Portion 5 (Portion of Portion 2) of the Farm Zamenkomst No. 4 , and the development footprint assessed therein is considered to provide an opportunity for the successful construction and operation of a solar power plant with a capacity of 150MW, as well as opportunities for the avoidance and mitigation of impacts on the affected environment and sensitive environmental features.
- Site availability and access: The land is available for lease by the developer. Reluctant farm owners or farmers over capitalizing hamper efforts to find suitable farms. Access will be obtained via a gravel road off of the R505.
- Grid connection: In order for the PV facility to connect to the national grid the facility will have to construct an on-site substation, Eskom switching station and a power line from the project site to connect to the Eskom grid. Available grid connections are becoming scarce and play a huge role when selecting a viable site.
- Environmental sensitivities: From an environmental perspective the proposed site is considered highly desirable due to limited environmental sensitivities in terms of geology, and soils, agricultural potential, vegetation and landscape features, climate, biodiversity and the visual landscape – refer to Section 5.3.1 of this report. The area proposed for development exclusively consists of land used for agriculture, but wetland features located on the development footprint and power line corridor that will need to be considered by the developer for the placement of the facility infrastructure within the development footprint.

It is evident from the discussion above that Portion 5 (Portion of Portion 2) of the Farm Zamenkomst No. 4 may be considered favourable and suitable in terms of the site and environmental characteristics. As mentioned previously, no alternative areas on the property have been considered for the placement of the development footprint. The development footprint of this project will cover a significant portion of the farm. No environmentally sensitive features have been identified on the development site for the Solar Facility.

5.5 CONCLUDING STATEMENT ON ALTERNATIVES

When considering the information provided by the specialists with regards to the site selection criteria, the site is identified as preferred due to fact that the opportunities presented on the site to develop the project in such a way which avoids the areas and features (including the associated buffers) of environmental sensitivity.

Therefore, development of the 150 MW Inyathi Solar Power Plant on Portion 5 (Portion of Portion 2) of the Farm Zamenkomst No. 4 is the preferred option. The final layout is included as part of this Draft EIR (refer to Figure I1 and I2). It may be concluded that this is the only location that will be assessed in further detail within sections 6 and 7.

6 DESCRIPTION OF THE IMPACTS AND RISKS

This section aims to address the following requirements of the regulations:

Appendix 3. (3)(h) An EIR (...) must include-

(h) a full description of the process followed to reach the proposed development footprint, within the approved site, including –

(v) the impacts and risks identified, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;

(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;

(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; and

(viii) the possible mitigation measures that could be applied and level of residual risk

(i) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure 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 EIA 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.

(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 risk;

(iii) the extent and duration of the impact and risk;

(iv) the probability of the impact and risk occurring;

(v) the degree to which the impact and 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 mitigated;

(k) where applicable, a summary of the findings and recommendations of 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 assessment report;

6.1 SCOPING METHODOLOGY

The contents and methodology of the Environmental Impact Report aimed to provide, as far as possible, a user-friendly analysis of information to allow for easy interpretation.

- Checklist (see section 6.1.1): The checklist consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts.
- Matrix (see section 6.1.2): The matrix analysis provides a holistic indication of the relationship and interaction between the various activities, development phases and the impact thereof on the environment. The method aims at providing a first order cause and effect relationship between the environment and the proposed activity. The matrix is designed to indicate the relationship between the different stressors and receptors which leads to specific impacts. The matrix also indicates the specialist studies that have been conducted to address the potentially most significant impacts.

6.1.1 Checklist analysis

The independent consultant conducted a site visit on 24 February 2022. The site visit was conducted to ensure a proper analysis of the site-specific characteristics of the site. Table 6.1 provides a checklist, which is designed to stimulate thought regarding possible consequences of specific actions and so assist scoping of key issues. It consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts. The table highlights certain issues, which are further analysed in matrix format in section 6.2.

Table 6.1: Environmental checklist

QUESTION	YES	NO	Un-sure	Description
1. Are any of the following located on the site earmarked for the development?				
I. A river, stream, dam or wetland	✕			Five (5) unchanneled valley bottom wetlands are located within the grid connection corridor.
II. A conservation or open space area	✕			A portion of the site falls within an Ecological Support Area 1 as described in bioregional plans. A small section of the powerline corridor is located within a CBA 2.
III. An area that is of cultural importance		✕		None.

IV. Site of geological significance	✕			Outcrops of weathered to fairly well-preserved stromatolites were discovered on the development.
V. Areas of outstanding natural beauty		✕		None.
VI. Highly productive agricultural land		✕		None.
VII. Floodplain		✕		None.
VIII. Indigenous forest		✕		None.
IX. Grass land		✕		None.
X. Bird nesting sites	✕			Nesting sites were located for only a single species within the PAOI, namely Corvus albus (Pied Crow), which is regarded as a 'priority species'.
XI. Red data species	✕			One SCC White-backed Vulture (Gyps africanus) and twelve priority (risk) species were recorded in the project area. No nests of the White-backed Vulture were observed.
XII. Tourist resort		✕		None.
2. Will the project potentially result in potential?				
I. Removal of people		✕		None.
II. Visual Impacts	✕			The VIA (refer to Appendix H5) confirmed that the establishment of a solar facility on the site is not expected to have a significant visual effect, given that the number of sensitive receptors is very low. The visual landscape is already degraded due to the large number of mines and Eskom electricity infrastructure in the area.

III. Noise pollution		✕		Construction activities will result in the generation of noise over a period of months. The noise impact is unlikely to be significant and will be managed on site as required.
IV. Construction of an access road	✕			Access will be obtained from the R505 Regional Road. An internal site road network will also be required.
V. Risk to human or valuable ecosystems due to explosion/fire/ discharge of waste into water or air.		✕		None.
VI. Accumulation of large workforce (>50 manual workers) into the site.	✕			Approximately 800 employment opportunities will be created during the construction phase and up to 99 employment opportunities during the operation phase of the SPP project.
VII. Utilisation of significant volumes of local raw materials such as water, wood etc.	✕			The estimated maximum amount of water required during the facility's 20 years of production is approximately 4200 m^3 per annum.
VIII. Job creation	✕			Approximately 800 employment opportunities will be created during the construction and up to 99 employment opportunities during the operational phases for the SPP.

IX. Traffic generation	×			It is estimated that the construction phase of Inyathi SPP will generate approximately 23 329 trips over the fourteen (14) month period. See the Traffic Impact Assessment (Appendix E8).
X. Soil erosion	×			The site will need to be cleared or graded to a limited extent, which may potentially result in a degree of dust being created, increased runoff and potentially soil erosion. The time that these areas are left bare will be limited to the construction phase, since vegetation will be allowed to grow back after construction.
XI. Installation of additional bulk telecommunication transmission lines or facilities		×		None.
3. Is the proposed project located near the following?				
I. A river, stream, dam or wetland		×		None.
II. A conservation or open space area	×			The Lichtenburg Game Breeding Centre is located approximately 5 km south of the development site. It should however be noted that the Breeding Centre is no longer in operation.
III. An area that is of cultural importance		×		None.
IV. A site of geological significance		×		None.
V. An area of outstanding natural beauty		×		None.
VI. Highly productive agricultural land		×		None.
VII. A tourist resort		×		None.
VIII. A formal or informal settlement		×		None.

6.1.2 Matrix analysis

The matrix describes the relevant listed activities, the aspects of the development that will apply to the specific listed activity, a description of the environmental issues and potential

impacts, the significance and magnitude of the potential impacts and possible mitigation measures. The matrix also highlights areas of particular concern (see Table 6.2) for more in-depth assessment during the EIA process. An indication is provided of the specialist studies conducted and which informed the initial assessment. Each cell is evaluated individually in terms of the nature of the impact, duration and its significance – should no mitigation measures be applied. This is important since many impacts would not be considered insignificant if proper mitigation measures were implemented.

In order to conceptualise the different impacts, the matrix specify the following:

Stressor:	Indicates the aspect of the proposed activity, which initiates and cause impacts on elements of the environment.
Receptor:	Highlights the recipient and most important components of the environment affected by the stressor.
Impacts:	Indicates the net result of the cause-effect between the stressor and receptor.
Mitigation:	Impacts need to be mitigated to minimise the effect on the environment.

Detailed impact assessments have been undertaken by each of the respective specialists which has informed the matrix analysis as included in Table 6.2 below, as well as the key issues identified as included in sections 6.2.1-6.2.3. The table included on the overleaf includes reference to the sections in the respective specialist studies where the details of the in-depth assessment of potential environmental impacts can be obtained.

Table 6.2: Matrix analysis

For ease of reference the significance of the impacts is colour-coded as follow:

Low significance	Medium significance	High significance	Positive impact

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY	POTENTIAL IMPACTS			SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS							MITIGATION OF POTENTIAL IMPACTS			SPECIALIST STUDIES / INFORMATION
			Receptors	Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk	
CONSTRUCTION PHASE															
Activity 11(i) (GN.R. 327): "The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts." Activity 12(ii)(a)(c) (GN.R. 327): "The development of (ii) infrastructure or structures with a physical footprint of 100 square metres or more; (a) within a watercourse or (c) within 32 meters of a watercourse measured from the edge of a watercourse." Activity 14 (GNR 327): "The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good,	Site clearing and preparation Certain areas of the site will need to be cleared of vegetation and some areas may need to be levelled. Civil works The main civil works are: • Terrain levelling if necessary– Levelling will be minimal as the potential site chosen is relatively flat. • Laying foundation- The structures will be connected to the ground through cement pillars, cement slabs or metal screws. The exact method will depend on the detailed geotechnical analysis. • Construction of access and inside roads/paths –	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	• Destruction, loss and fragmentation of habitats, ecosystems and the vegetation community. • Introduction of IAP species and invasive fauna. • Displacement of the indigenous faunal community (including SCC) due to habitat loss, direct mortalities, and disturbance (road collisions, noise, dust, light, vibration, and poaching).		-	S	L	D	PR	ML	Yes	- See Table 6.3	L	Terrestrial Biodiversity Assessment (Appendix E1)
			Avifauna	• Habitat destruction • Destruction, degradation and fragmentation of surrounding habitats • Displacement of avifauna community • Direct mortality from persecution or poaching of avifauna species and collection of eggs		-	S	M	Pr	PR	ML	Yes	- See Table 6.3	L	Avifauna Impact Assessment (Appendix E2)

where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres." Activity 19 (GN.R. 327): "The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse." Activity 24 (ii) (GN.R 327): "The development of a road (ii) with reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters." Activity 28(ii) (GN.R. 327): "Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare." Activity 56 (ii) (GN.R 327): "The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres…"	existing paths will be used were reasonably possible. Additionally, the turning circle for trucks will also be taken into consideration. Transportation and installation of PV panels into an Array The panels are assembled at the supplier's premises and will be transported from the factory to the site on trucks. The panels will be mounted on metal structures which are fixed into the ground either through a concrete foundation or a deep-seated screw. Wiring to the Central Inverters Sections of the PV array would be wired to central inverters which have a maximum rated power of 2000kW each. The inverter is a pulse width mode inverter that converts DC electricity to alternating electricity (AC) at grid frequency.			• Direct mortality from increased vehicle and heavy machinery traffic										
			Air	• Air pollution due to the increase of traffic of construction vehicles and the undertaking of construction activities.	-		S	S	D	CR	NL	Yes	- Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.	L	-
			Soil	• Loss of land capability	-		S	S	Pr	PR	ML	Yes	- See Table 6.3	L	Soils and Agriculture Assessment (Appendix E4)
			Geology	• Collapsible soil. • Seepage. • Active soil (high soil heave). • Erodible soil. • Hard/compact geology. If the bedrock occurs close to surface it may present problems when driving solar panel columns. • The presence of undermined ground. • Instability due to soluble rock. • Steep slopes or areas of unstable natural slopes. • Areas subject to seismic activity.	-	-	S	S	Pr	CR	NL	Yes	- The most effective mitigation will be the minimisation of the project footprint by using the existing roads in the area and not create new roads to prevent other areas also getting compacted. - Retention of vegetation where possible to avoid soil erosion.	L	-
			Existing services infrastructure	• Generation of waste that need to be accommodated at a licensed landfill site.	-		L	S	D	PR	ML	Yes	-	L	Confirmation from the Local Municipality

Activity 1 (GN.R. 325): "The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more..." Activity 15 (GN.R. 325): "The clearance of an area of 20 hectares or more of indigenous vegetation..." Activity 4 (b)(i)(ee) (GN.R 324): "The development of a road wider than 4 metres with a reserve less than 13,5 metres within (b) the North West, (i) outside urban areas, (ee) within critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans." Activity 10 (b)(i)(ee)(hh) (GN.R 324): "The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres (b) in the North West, (i) outside urban areas,(ee) critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans and (hh) areas within a watercourse or wetland; or				• Generation of sewage that need to be accommodated by the local sewage plant. • Increase in construction vehicles on existing roads.										
			Groundwater	• Pollution due to construction vehicles and the storage and handling of dangerous goods.	-		S	S	Pr	CR	ML	Yes	- A groundwater monitoring programme (quality and groundwater levels) should be designed and installed for the site. - Monitoring boreholes should be securely capped, and must be fitted with a suitable sanitary seal to prevent surface water flowing down the outside of the casing. - Full construction details of monitoring boreholes must be recorded when they are drilled. - Sampling of monitoring boreholes should be done according to recognised standards.	L	-
			Surface water	• Altered surface flow dynamics; • Erosion; • Alteration of sub-surface flow dynamics; • Sedimentation of the water resource; • Direct and indirect loss of wetland areas; • Water quality impairment; • Compaction; • Decrease in vegetation; • Change of drainage patterns;		-	L	S	Pr	PR	ML	Yes	- See Table 6.3	L	Wetland Assessment (Appendix E1)

within 100 metres from the edge of a watercourse or wetland." Activity 12 (b)(i)(ii)(vi) (GN.R 324): "The clearance of an area of 300 square metres or more of indigenous vegetation (b) in the North West, (i) within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment of 2004, (ii) within critical biodiversity areas identified in bioregional plans and (vi) areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland." Activity 14(ii)(a)(c)(b)(i)(ff) (GN.R 324): "The development of (ii) infrastructure or structures with a physical footprint of 10 square metres or more, where such development occurs (a) within a watercourse or (c) within 32 metres of a watercourse, measured from the edge of a watercourse, (b) within the North West, (i) outside urban areas within (ff) critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by				• Altering hydromorphic properties; and • Indirect loss of wetland areas										
			General Environment (risks associated with BESS)	• Mechanical breakdown / Exposure to high temperatures • Fires, electrocutions and spillage of toxic substances into the surrounding environment. • Spillage of hazardous substances into the surrounding environment. • Soil contamination – leachate from spillages which could lead to an impact of the productivity of soil forms in affected areas. • Water Pollution – spillages into surrounding watercourses as well as groundwater. • Health impacts – on the surrounding communities, particularly those relying on watercourses (i.e. rivers, streams, etc) as a primary source of water. • Generation of hazardous waste		-	S	M	Pr	PR	ML	Yes	- Operators are trained and competent to operate the BESS. Training should include the discussion of the following: - Potential impact of electrolyte spills on groundwater; - Suitable disposal of waste and effluent; - Key measures in the EMPr relevant to worker's activities; - How incidents and suggestions for improvement can be reported. - Training records should be kept on file and be made available during audits. - Battery supplier user manuals safety specifications and Material Safety Data Sheets (MSDS) are filed on site at all times. - Compile method statements for approval by the Technical/SHEQ Manager for the operation and management and replacement of the	L	-

the competent authority or in bioregional plans." Activity 18 (b)(i)(ee)(hh) (GN.R 324): "The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre (b) in the North West (i) outside urban areas, within (ee) critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans and (hh) areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland."													battery units / electrolyte for the duration of the project life cycle. Method statements should be kept on site at all times. - Provide signage on site specifying the types of batteries in use and the risk of exposure to hazardous material and electric shock. Signage should also specify how electrical and chemical fires should be dealt with by first responders, and the potential risks to first responders (e.g. the inhalation of toxic fumes, etc.). - Firefighting equipment should readily be available at the BESS area and within the site. - Maintain strict access control to the BESS area. - Ensure all maintenance contractors / staff are familiar with the supplier's specifications. - Undertake daily risk assessment prior to the commencement of daily tasks at the BESS. This should consider any aspects which could result in		

														fire or spillage, and appropriate actions should be taken to prevent these. - Standard Operating Procedures (SOPs) should be made available by the Supplier to ensure that the batteries are handled in accordance with required best practices. - Spill kits must be made available to address any incidents associated with the flow of chemicals from the batteries into the surrounding environment. - The assembly of the batteries on-site should be avoided as far as possible. Activities on-site for the BESS should only be limited to the placement of the container wherein the batteries are placed. - Undertake periodic inspections on the BESS to ensure issues are identified timeously and addressed with the supplier where relevant. - The applicant in consultation with the supplier must compile and implement a Leak		

												and Detection Monitoring Programme during the project life cycle of the BESS. - Batteries must be strictly maintained by the supplier or suitably qualified persons for the duration of the project life cycle. No unauthorised personnel should be allowed to maintain the BESS. - Damaged and used batteries must be removed from site by the supplier or any other suitably qualified professional for recycling or appropriate disposal. - The applicant should obtain a cradle to grave battery management plan from the supplier during the planning and design phase of the system. The plan must be kept on site and adhered to.		
		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	• Job creation. • Business opportunities. • Skills development.		+	P	S	D	I	N/A	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E7)
			Visual landscape	• Potential visual impact on residents of farmsteads and motorists in close proximity to proposed facility.	-		L	S	D	CR	NL	Yes	- See Table 6.3	M	Visual Impact Assessment (Appendix E3)

				• Lighting impacts. • Solar glint and glare impacts. • Visual sense of place impacts.											
			Traffic volumes	• Increase in construction vehicles.	-		L	S	Pr	CR	NL	Yes	- Delivery and construction trips will be insignificant when compared to the Average Daily Traffic (ADT) and will not affect the existing Level of Service (LOS). It can therefore be concluded that, on both routes, no mitigation measures will be necessary.	L	Traffic Impact Assessment (Appendix E8)
			Health & Safety	• Air/dust pollution. • Road safety. • Impacts associated with the presence of construction workers on site and in the area. • Influx of job seekers to the area. • Increased safety risk to farmers, risk of stock theft and damage to farm infrastructure associated with presence of construction workers on the site. • Increased risk of veld fires.		-	L	L	Pr	PR	ML	Yes	- See Table 6.3	M	Social Impact Assessment (Appendix E7)
			Noise levels	• The generation of noise as a result of construction vehicles, the use of machinery such as drills and people working on the site.	-		L	S	D	CR	NL	Yes	- During construction care should be taken to ensure that noise from construction vehicles and plant equipment does not intrude on the	L	Social Impact Assessment (Appendix E7)

														surrounding residential areas. Plant equipment such as generators, compressors, concrete mixers as well as vehicles should be kept in good operating order and where appropriate have effective exhaust mufflers.		
			Tourism industry	• Since there are no sensitive tourism facilities in close proximity to the site, the proposed activities will not have an impact on tourism in the area.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Heritage resources	• Loss or damage to sites, features or objects of cultural heritage significance	-		S	S	U	PR	ML	Yes	- See Table 6.3	L	Heritage Impact Assessment (Appendix E5)
			Paleontological Heritage	• Disturbance, damage or destruction of legally-protected fossil heritage* within the development footprint during the construction phase	-		S	P	U	IR	ML	Yes	N/A	L	Paleontological Impact Assessment (Appendix E6)
OPERATIONAL PHASE																
Activity 11(i) (GN.R. 327): "The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes	The key components of the proposed project are described below: • PV Panel Array - To produce 150 MW, the	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	• Continued fragmentation and degradation of natural habitats and ecosystems. • Continuing spread of IAP and weed species. • Ongoing displacement and direct mortalities of the faunal community		-	L	L	Po	PR	ML	Yes	- See Table 6.4	L	Terrestrial Biodiversity Assessment (Appendix E1)

with a capacity of more than 33 but less than 275 kilovolts." Activity 1 (GN.R 325): "The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more." Activity 10 (b)(hh) (GN.R 324): "The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres (b) in the North West (hh) areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland."	proposed facility will require numerous linked cells placed behind a protective glass sheet to form a panel. Multiple panels will be required to form the solar PV arrays which will comprise the PV facility. The PV panels will be tilted at a northern angle in order to capture the most sun. • Wiring to Central Inverters - Sections of the PV array will be wired to central inverters. The inverter is a pulse width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency. • Connection to the grid - Connecting the array to the electrical grid requires transformation of the voltage from 480V to 33kV to 132kV. The normal components and dimensions of a distribution rated electrical substation will be required. Output voltage from the inverter is 480V and this is fed into step up transformers to 132kV. An onsite substation will be required on the site to step the voltage up to 132kV, after which the power will be evacuated into the national grid.			(including SCC) due to continued disturbance (road collisions, noise, light, dust, vibration, poaching, etc.).										
			Avifauna	• Collisions with infrastructure associated with the PV Facility • Electrocution due to infrastructure associated with the PV Facility • Direct mortality from persecution or poaching of avifauna species and collection of eggs • Direct mortality by roadkill during maintenance procedures • Encroachment of Invasive Alien Plants into disturbed areas		-	S	L	Pr	PR	ML	Yes	- See Table 6.4	M	Avifaunal Impact Assessment (Appendix E2)
			Air quality	• The proposed development will not result in any air pollution during the operational phase.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Soil	• Soil degradation, including erosion. • Disturbance of soils and existing land use (soil compaction). • Loss of agricultural potential (low significance relative to agricultural potential of the site).		-	L	L	D	PR	SL	Yes	- See Table 6.4	L	Soil and Agriculture Assessment (Appendix E4)
			Geology	• Collapsible soil. • Active soil (high soil heave). • Erodible soil. • Hard/compact geology. If the bedrock occurs close to surface it may present	-		S	S	Po	PR	ML	Yes	- Surface drainage should be provided to prevent water ponding. - Mitigation measures proposed by the detailed engineering	L	-

	• Supporting Infrastructure – Auxiliary buildings with basic services such as water and electricity will be constructed on the site and will have an approximate footprint 820m². Other supporting infrastructure includes voltage and current regulators and protection circuitry. • Roads – Access will be obtained via gravel road off the R505. An internal site road network will also be required to provide access to the solar field and associated infrastructure. All site roads will require a width of approximately 6 m – 12 m. health, safety and security reasons, be required to be fenced off from the rm.			problems when driving power line columns. • The presence of undermined ground. • Instability due to soluble rock. • Steep slopes or areas of unstable natural slopes. • Areas subject to seismic activity. • Areas subject to flooding.								geological investigation should be implemented.		
			Groundwater	• Leakage of hazardous materials. The development will comprise of a distribution substation and will include transformer bays which will contain transformer oils. Leakage of these oils can contaminate water supplies.	-		L	L	Po	PR	ML	Yes	- All areas in which substances potentially hazardous to groundwater are stored, loaded, worked with or disposed of should be securely bunded (impermeable floor and sides) to prevent accidental discharge to groundwater.	L	-
			Surface water	• Impact on the characteristics of the watercourse • Soil compaction and increased risk of sediment transport and erosion • Soil and water pollution • Spread and establishment of alien invasive species	-		L	L	Pr	PR	ML	Yes	- See Table 6.4	L	Wetland Assessment (Appendix E1)
		SOCIAL/ECONOMIC	Visual landscape	• Visual impact on observers travelling along the roads and residents at homesteads within a 5km radius of the SPP. • Visual impact on observers travelling along the roads and residents at homesteads within a 5-10km radius of the SPP.		-	L	L	D	PR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E3)

				• Visual impacts of lighting at night on sensitive visual receptors in close proximity to the proposed facility. • Visual impacts of glint and glare on sensitive visual receptors in close proximity to the proposed facility. • Visual impacts on observers travelling along the roads and residents at homesteads in close proximity to the power line structures. • Visual impacts and sense of place impacts associated with the operation phase of SPP.										
			Traffic volumes	• The proposed development will not result in any traffic impacts during the operational phase.	-		L	L	Po	CR	NL	Yes	-	L	Traffic Impact Assessment (Appendix E8)
			Health & Safety	• The proposed development will not result in any health and safety impacts during the operational phase.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-	N/A	N/A
			Noise levels	• The proposed development will not result in any noise pollution during the operational phase.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Heritage resources	• Loss or damage to sites, features or objects of cultural heritage significance	-		S	S	U	PR	ML	Yes	- See Table 6.4	L	Heritage Impact Assessment (Appendix E5)
			Electricity supply	• Generation of additional electricity. The power line will transport generated electricity into the grid.	+		I	L	D	I	N/A	Yes	-	N/A	-

			Electrical infrastructure	• Additional electrical infrastructure. The proposed solar facility will add to the existing electrical infrastructure and aid to lessen the reliance of electricity generation from coal-fired power stations.	+		I	L	D	I	N/A	Yes	-	N/A	-
DECOMMISSIONING PHASE															
-	Dismantlement of infrastructure During the decommissioning phase the Solar PV Energy facility and its associated infrastructure will be dismantled. Rehabilitation of biophysical environment The biophysical environment will be rehabilitated.	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	• Improvement of habitat through revegetation / succession over time • Soil erosion and sedimentation. • Spreading and establishment of alien invasive species • Habitat degradation due to dust • Spillages of harmful substances • Road mortalities of fauna / impact of human activities on site.		-	S	L	Po	N/A	N/A	Yes	- See Table 6.5	L	Terrestrial Biodiversity Assessment(Appendix E1)
			Air quality	• Air pollution due to the increase of traffic of construction vehicles.	-		S	S	D	CR	NL	Yes	- Regular maintenance of equipment to ensure reduced exhaust emissions.	L	-
			Soil	• Soil degradation, including erosion. • Disturbance of soils and existing land use (soil compaction). • Physical and chemical degradation of the soils by construction vehicles (hydrocarbon spills).		-	S	S	Pr	PR	M	Yes	- See Table 6.3	L	Agricultural and Soil Compliance Statement (Appendix E4)
			Geology	• It is not foreseen that the decommissioning phase	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

				will impact on the geology of the site or vice versa.											
			Existing services infrastructure	• Generation of waste that needs to be accommodated at a licensed landfill site. • Generation of sewage that needs to be accommodated by the municipal sewerage system and the local sewage plant. • Increase in construction vehicles.	-		L	S	D	I	NL	Yes	-	L	-
			Groundwater	• Pollution due to construction vehicles.	-		S	S	Pr	CR	ML	Yes	-	L	-
			Surface water	• Increase in stormwater run-off. • Pollution of water sources due to soil erosion.		-	L	S	Pr	PR	ML	Yes	- Removal of any historically contaminated soil as hazardous waste. - Removal of hydrocarbons and other hazardous substances by a suitable contractor to reduce contamination risks. - Removal of all substances which can result in groundwater (or surface water) contamination.	M	-
			Visual landscape	• Potential visual impact on visual receptors in close proximity to proposed facility. • The decommissioning phase of the project will result in the same visual impacts experienced	-		L	S	D	CR	NL	Yes	- See Table 6.3	L	Visual Impact Assessment (Appendix E3)

				during the construction phase of the project. However, in the case of Inyathi SPP it is anticipated that the proposed facility will be refurbished and upgraded to prolong its life.											
			Traffic volumes	• Increase in construction vehicles.	-		L	S	Pr	CR	NL	Yes	- Movement of heavy construction vehicles through residential areas should be timed to avoid peak morning and evening traffic periods. In addition, movement of heavy construction vehicles through residential areas should not take place over weekends.	L	Traffic Impact Assessment (Appendix E8)
			Health & Safety	• Air/dust pollution. • Road safety. • Increased crime levels. The presence of construction workers on the site may increase security risks associated with an increase in crime levels as a result of influx of people in the rural area.	-		L	S	Pr	PR	ML	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E7)
			Noise levels	• The generation of noise as a result of construction vehicles, the use of machinery and people working on the site.	-		L	S	D	CR	NL	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E7)
			Tourism industry	• Since there are no tourism facilities in close proximity to the site, the decommissioning activities	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

				will not have an impact on tourism in the area.											
			Heritage resources	• It is not foreseen that the decommissioning phase will impact on any heritage resources.	-		S	S	U	PR	ML	Yes	- See Table 6.3	L	Heritage Impact Assessment (Appendix E5)

Nature of the impact:	(N/A) No impact	(+) Positive Impact (-)	Negative Impact		
Geographical extent:	(S) Site;	(L) Local/District;	(P) Province/Region;	(I) International and National	
Probability:	(U) Unlikely;	(Po) Possible;	(Pr) Probable;	(D) Definite	
Duration:	(S) Short Term;	(M) Medium Term;	(L) Long Term;	(P) Permanent	
Intensity / Magnitude:	(L) Low;	(M) Medium;	(H) High;	(VH) Very High	
Reversibility:	(CR) Completely Reversible;	(PR) Partly Reversible;	(BR) Barely Reversible;	-	
Irreplaceable loss of resources:	(IR) Irreversible	(NL) No Loss;	(ML) Marginal Loss;	(SL) Significant Loss;	(CL) Complete Loss
Level of residual risk:	(L) Low;	(M) Medium;	(H) High;	(VH) Very High	-

6.2 KEY ISSUES IDENTIFIED

From the above it is evident that mitigation measures should be available for potential impacts associated with the proposed activity and development phases. The scoping methodology identified the following key issues which are addressed in more detail in this draft EIR.

6.2.1 Impacts during the construction phase

During the construction phase the following activities will have various potential impacts on the biophysical and socio-economic environment:

- Activity 11(i) (GN.R. 327): "The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."
- Activity 12(ii)(a)(c) (GN.R. 327): "The development of (ii) infrastructure or structures with a physical footprint of 100 square metres or more; (a) within a watercourse or (c) within 32 meters of a watercourse measured from the edge of a watercourse."
- Activity 14 (GN.R 327): "The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres."
- Activity 19 (GN.R 327): "The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse."
- Activity 24 (ii) (GN.R 327): "The development of a road (ii) with reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters"
- Activity 28(ii) (GN.R. 327): "Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."
- Activity 56 (ii) (GN.R 327): "The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres…"
- Activity 1 (GN.R. 325): "The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more..."
- Activity 15 (GN.R. 325): "The clearance of an area of 20 hectare or more of indigenous vegetation..."
- Activity 4 (h)(iv)(GN.R 324): "The development of a road wider than 4 metres with a reserve less than 13,5 metres in the (h) North West Province, in (iv) areas within 5 kilometers from protected areas identified in terms of NEMPAA or from a biosphere reserve."
- Activity 12 (h)(vi) (GN.R. 324): "The clearance of an area of 300 square metres or more of indigenous vegetation… … (h) in the North West (vi) areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland."

- Activity 18 (h)(ix) (GN.R 324): "The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre (h) in the North West (ix) areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland."

During the construction phase minor negative impacts are foreseen over the short term. The latter refers to a period of months. Table 6.3 summarises the potentially most significant impacts and the mitigation measures that are proposed during the construction phase.

Table 6.3: Impacts and the mitigation measures during the construction phase

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
Terrestrial biodiversity Assessment (Appendix E1)	Destruction, loss and fragmentation of habitats, ecosystems and the vegetation community.	Negative High	Negative Medium	• Bruch cutting should be implemented beneath the panels, no vegetation clearing should be permitted. • Laydown and construction preparation activities (such as cement mixing, temporary toilets, etc.) must be limited to the 'Very Low' sensitivity areas as far as possible. • The clearing of vegetation must be minimized where possible. All activities must be restricted to within the authorised areas. It is recommended that areas to be developed be specifically and responsibly demarcated so that during the construction phase only the demarcated areas be impacted upon. • All protected flora must be clearly demarcated prior to the commencement of site clearing. If construction activities are likely to affect any protected plants, these individuals should be relocated as part of a plant search and rescue plan and a permit must be obtained before doing so. • Existing access routes, especially roads, must be made use of. • Any materials may not be stored for extended periods of time and must be removed from the project area once the construction phase has been concluded. No permanent construction phase structures should be permitted. Construction buildings should preferably be prefabricated or constructed of re-usable/recyclable materials. No storage of vehicles or equipment will be allowed outside of the designated laydown areas. • A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run
	Introduction of IAP species and invasive fauna.	Negative Medium	Negative Low	
	Displacement of the indigenous faunal community (including SCC) due to habitat loss, direct mortalities, and disturbance (road collisions, noise, dust, light, vibration, and poaching).	Negative High	Negative Low	

				into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. • 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 on site unless necessary. • All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. • Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them from leaking and entering the environment. • Construction activities and vehicles could cause spillages of lubricants, fuels and waste material negatively affecting the functioning of the ecosystem. • All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the project area. • It must be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants. • A fire management plan needs to be complied and implemented to restrict the impact fire would have on the surrounding areas. • All construction waste must be removed from site at the closure of the construction phase. • A qualified environmental control officer must be on site when activities begin. A site walk through is recommended by a suitably qualified ecologist prior to any activities taking place and any SSC or protected species should be noted. In situations where these species are observed and must be removed, the proponent may only do so

				after the required permission/permits have been obtained in accordance with national and provincial legislation. In the abovementioned situation the development and implementation of a search, rescue and recovery program is suggested for the protection of these species. Should animals not move out of the area on their own relevant specialists must be contacted to advise on how the species can be relocated. • Clearing and disturbance activities must be conducted in a progressive linear manner, from the north to the south of the project area and over several days, so as to provide an easy escape route for all small mammals and herpetofauna. • The areas to be disturbed must be specifically and responsibly demarcated to prevent the movement of staff or any individual into the surrounding environments, signs must be put up to enforce this. • The duration of the activities should be minimized to as short a term as possible, to reduce the period of disturbance on fauna. • Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to reptile species and nocturnal mammals. • No trapping, killing, or poisoning of any wildlife is to be allowed and • Signs must be put up to enforce this. Monitoring must take place in this regard. • Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible. • All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed

				limits must be enforced to ensure that road killings and erosion is limited. • Schedule activities and operations during least sensitive periods, to avoid migration, nesting, and breeding seasons. • Any holes/deep excavations must be dug and planted in a progressive manner and shouldn't be left open overnight. Should any holes remain open overnight they must be properly covered temporarily to ensure that no small fauna species fall in, and subsequently inspected prior to backfilling. • Wildlife-permeable fencing with holes large enough for mongoose and other smaller mammals should be installed, the holes must not be placed in the fence where it is next to a major road as this will increase road killings in the area. • Use environmentally friendly cleaning and dust suppressant products. • Once the development layout has been confirmed, the footprint area must be fenced off appropriately in segments pre-construction to allow animals to move or be moved out of these areas before breaking ground activities occur. Construction activities must take place systemically and the perimeter fence should not be completed (i.e., leaving sections unfenced to allow fauna to escape) until systematic clearing is completed. • An Invasive Alien Plant Management Plan must be compiled and implemented. This should regularly be updated to reflect the annual changed in IAP composition. • The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprints of the roads must be kept to prescribed widths. • 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 entering the site. A location specific waste management plan must be put in place to limit the presence of rodents and pests and waste must not be allowed to enter surrounding areas. • A pest control plan must be put in place and implemented; it is imperative that poisons not be used to control pests. • Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes the wetting of exposed soft soil surfaces. • No non-environmentally friendly suppressants may be used as this could result in the pollution of water sources. • Waste management must be a priority and all waste must be collected and stored effectively and responsibly according to a site-specific waste management plan. Dangerous waste such as metal wires and glass must only be stored in fully sealed and secure containers, before being moved off site as soon as possible. • Litter, spills, fuels, chemical and human waste in and around the project area must be minimised and controlled according to the waste management plan. • Cement mixing may not be performed on the ground. It is recommended that only closed side drum or pan type concrete mixers be utilised. Any spills must be immediately contained and isolated from the natural environment, before being removed from site. • A minimum of one toilet must be provided per 10 persons. Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area. • The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility within every 10 days at least.

				• Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regards to waste management. Under no circumstances may domestic waste be burned on site or buried on open pits. • Refuse bins will be responsibly emptied and secured. Temporary storage of domestic waste shall be in covered and secured waste skips. Maximum domestic waste storage period will be 10 days. • All personnel and contractors are to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. • Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of sensitive flora and fauna species, their identification, conservation status and importance, biology, habitat requirements and management requirements in line with the Environmental Authorisation and within the EMPr. • Contractors and employees must all undergo the induction and must be made aware of the sensitive areas to be avoided. • Speed limits must be put in place to reduce erosion. Soil surfaces must be wetted as necessary to reduce the dust generated by the project activities. Speed bumps and signs must be erected to enforce slow speeds. • Only existing access routes and walking paths may be made use of. • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events etc. • A stormwater management plan must be compiled and implemented.
Avifaunal Assessment (Appendix E2)	Habitat destruction	Negative High	Negative Medium	• Solar panels must be mounted on pile driven or screw foundations, such as post support spikes, rather than heavy foundations, such as trench-fill or mass concrete foundations, to reduce the negative effects on natural soil functioning, such as its filtering and buffering

				characteristics, while maintaining habitats for both fossorial and epigeic biodiversity (Bennun et al, 2021). If concrete foundations are used that would increase the impact of the project as there would be direct impacts to soil permeability and characteristics, thereby influencing inhabitant fauna. In addition, stormwater runoff and runoff from cleaning the panels would be increased, increasing erosion in the surrounding areas. • Indigenous vegetation to be maintained under the solar panels to ensure biodiversity is maintained and to prevent soil erosion (Beatty et al, 2017; Sinha et al, 2018). The photographs below are sourced from these documents. • Vegetation clearing to commence only after the necessary permits have been obtained. • Environmental Officer (EO) to provide supervision and oversight of vegetation clearing activities
	Destruction of surrounding habitats	Negative Very High	Negative Low	• Pre-construction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, remaining within demarcated construction areas etc. • All solid waste must be managed in accordance with the Solid Waste Management Plan. Recycling is encouraged. • All construction activity and roads to be within the clearly defined and demarcated areas. • Temporary laydown areas should be clearly demarcated and rehabilitated subsequent to end of use. • Appropriate dust control measures to be implemented. • Suitable sanitary facilities to be provided for construction staff as per the guidelines in Health and Safety Act.

				• All hazardous materials, if any, should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner.
	Displacement/emigration of avifauna community (including SCC) due to noise pollution	Negative High	Negative Low	• Noise pollution is difficult to mitigate against. • No construction activity is to occur at night, as nocturnal species are highly dependent on sound and/or vocalisations for behavioural processes. • If generators are to be used these must be soundproofed.
	Direct mortality from persecution or poaching of avifauna species and collection of eggs	Negative Medium	Negative Low	• All personnel should undergo environmental awareness training that includes educating on not poaching/persecuting species and collecting eggs. • Prior to commencing work each day, two individuals should traverse the working area in order to disturb any avifauna and so they have a chance to vacate the area. • Any avifauna threatened by the construction activities that does not vacate the area should be removed safely by an appropriately qualified environmental officer or removal specialist.
	Direct mortality from increased vehicle and heavy machinery traffic	Negative Medium	Negative Low	• All personnel should undergo environmental induction with regards to awareness about speed limits and roadkill. • All construction vehicles should adhere to a speed limit of maximum 40 km/h to avoid collisions. Appropriate speed control measures and signs must be erected.
Wetland Baseline and Risk Assessment (Appendix E1)	Altered surface flow dynamics; Erosion;	Negative Medium	Negative Low	• The wetlands and buffer areas must be avoided; • A stormwater management plan must be compiled and implemented for the project, facilitating the diversion of clean water to the delineated resources;

	Alteration of sub-surface flow dynamics; Sedimentation of the water resource; Direct and indirect loss of wetland areas; Water quality impairment; Compaction; Decrease in vegetation; Change of drainage patterns; Altering hydromorphic properties; and Indirect loss of wetland areas			• The construction vehicles and machinery must make use of existing access routes as much as possible, before adjacent areas are considered for access; • Laydown yards, camps and storage areas must be within project area; • The contractors used for the project must have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly; • It is preferable that construction takes place during the dry season to reduce the erosion potential of the exposed surfaces; • All chemicals and toxicants to be used for the construction must be stored within the construction site and in a bunded area; • All machinery and equipment must be inspected regularly for faults and possible leaks, these should be serviced off-site; • All contractors and employees must undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good “housekeeping”; • Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation); • Have action plans on site, and training for contractors and employees in the event of spills, leaks and other impacts to the aquatic systems; • Any exposed earth must be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil; • No dumping of material on-site may take place; and • All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials must be supported.

Visual Impact Assessment (Appendix E3)	Visual impact of construction activities on sensitive visual receptors in close proximity to the SPP.	Negative Medium	Negative Low	Planning: • Retain and maintain natural vegetation immediately adjacent to the development footprint. Construction: • Ensure that vegetation is not unnecessarily removed during the construction phase. • Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e., in already disturbed areas) where possible. • Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. • Ensure that rubble, litter, etc. are appropriately stored (if it can't be removed daily) and then disposed of regularly at a licenced waste site. • Reduce and control dust during construction by utilising dust suppression measures. • Limit construction activities to between 07:00 and 18:00, where possible, in order to reduce the impacts of construction lighting. • Rehabilitate all disturbed areas immediately after the completion of construction work and maintain good housekeeping.
	Visual impact of construction activities on sensitive visual receptors to the PL.	Negative Medium	Negative Low	
Soil and Agricultural Assessment (Appendix E4)	Loss of Land Capability	Negative Low	Negative Low	• Vegetate or cover all stockpiles after stripping/removing soils • Storage of potential contaminants should be undertaken in bunded areas • All contractors must have spill kits available and be trained in the correct use thereof. • All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping". • No cleaning or servicing of vehicles, machines and equipment may be undertaken in water resources.

				• Have action plans on site, and training for contractors and employees in the event of spills, leaks and other impacts to the aquatic systems.
Heritage Impact Assessment (Appendix E5)	Loss or damage to sites, features or objects of cultural heritage significance	Negative Low	Negative Low	• Known sites should be clearly marked, so that they can be avoided during construction activities; • The contractors and workers should be notified that archaeological sites might be exposed during the construction activities; • Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer (ECO) shall be notified as soon as possible; • All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the ECO will advise the necessary actions to be taken; • Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and • Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the NHRA, Section 51(1).
Palaeontological Impact Assessment (Appendix E6)	Disturbance, damage or destruction of legally-protected fossil heritage (Refers essentially to impacts on well-preserved and / or rare fossils of scientific and conservation value within the development footprint during the construction phase)	Negative Medium	Negative Low	• The ECO must be made aware that fossils (stromatolites) of the Malmani (Chuniespoort Group, Transvaal Supergroup) has a High to Very High Palaeontological Significance. • If a well-preserved stromatolite outcrop s is uncovered in the development footprint (after vegetation clearance) the stromatolites may be cordoned off and a buffer of 30m may be placed around the outcrop or a reprehensive example should be removed and placed near the offices of the PV as an informative example of fossils in the area. • Recommended mitigation of chance fossil finds during the construction phase of the solar facility and associated grid connection involves safeguarding of the fossils (preferably in situ) by the responsible ECO and reporting of finds to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South

				Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). Where appropriate, judicious sampling and recording of fossil material and associated geological data by a qualified palaeontologist, appointed by the developer, may be required by the relevant heritage regulatory authority.
Social Impact Assessment (Appendix E7)	Creation of direct and indirect employment opportunities.	Positive Low	Positive Medium	• A local employment policy should be adopted to maximise opportunities made available to the local labour force. • Labour should be sourced from the local labour pool, and only if the necessary skills are unavailable should labour be sourced from (in order of preference) the greater Ditsobotla LM, Ngaka Modiri Molema DM, North West Province, South Africa, or elsewhere. • Where feasible, training and skills development programmes should be initiated prior to the commencement of the construction phase. • As with the labour force, suppliers should also as far as possible be sourced locally. • As far as possible local contractors that are compliant with Broad-Based Black Economic Empowerment (B-BBEE) criteria should be used. • The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.
	Economic multiplier effects from the use of local goods and services.	Positive Low	Positive Medium	• It is recommended that a local procurement policy is adopted to maximise the benefit to the local economy. • A database of local companies, specifically Historically Disadvantaged Individuals (HDIs) which qualify as potential service providers (e.g., construction companies, security companies, catering companies, waste collection companies, transportation companies etc.) should be created and companies listed thereon should be invited to bid for project-related work where applicable. • Local procurement is encouraged along with engagement with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods and products from local suppliers where feasible.

	Potential loss in productive farmland	Negative Medium	Negative Low	• The proposed site for the Inyathi SPP needs to be fenced off prior to the construction phase and all construction related activities should be confined in this fenced off area. • Livestock grazing on the proposed site need to be relocated. • All affected areas, which are disturbed during the construction phase, need to be rehabilitated prior to the operational phase and should be continuously monitored by the Environmental Control Officer (ECO). • Implement, manage and monitor a grievance mechanism for the recording and management of social issues and complaints. • Mitigation measures from the Agricultural and Soil Compliance Statement, should also be implemented.
	In-migration of labourers in search of employment opportunities, and a resultant change in population, and increase in pressure on local resources and social networks, or existing services and infrastructure.	Negative Medium	Negative Low	• Develop and implement a local procurement policy which prioritises "locals first" to prevent the movement of people into the area in search of work. • Engage with local community representatives prior to construction to facilitate the adoption of the locals first procurement policy. • Provide transportation for workers (from Lichtenburg) to ensure workers can easily access their place of employment and do not need to move closer to the project site. • Working hours should be kept between daylight hours during the construction phase, and / or as any deviation that is approved by the relevant authorities. • Compile and implement a grievance mechanism. • Appoint a Community Liaison Officer (CLO) to assist with the procurement of local labour. • Prevent the recruitment of workers at the site. • Implement a method of communication whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process. • Establish clear rules and regulations for access to the proposed site.

				• Appoint a security company and implement appropriate security procedures to ensure that workers do not remain onsite after working hours. • Inform local community organisations and policing forums of construction times and the duration of the construction phase. • Establish procedures for the control and removal of loiterers from the construction site.
	Temporary increase in safety and security concerns associated with the influx of people	Negative Medium	Negative Low	• Working hours should be kept within daylight hours during the construction phase, and / or as any deviation that is approved by the relevant authorities. • Provide transportation for workers to prevent loitering within or near the project site outside of working hours. • The perimeter of the construction site should be appropriately secured to prevent any unauthorised access to the site. The fencing of the site should be maintained throughout the construction period. • The appointed EPC Contractor must appoint a security company to ensure appropriate security procedures and measures are implemented. • Access in and out of the construction site should be strictly controlled by a security company appointed to the project. • A CLO should be appointed as a grievance mechanism. A method of communication should be implemented whereby procedures to lodge complaints are set out for the local community to express any complaints or grievances with the construction process. • The EPC Contractor should implement a stakeholder management plan to address neighbouring farmer concerns regarding safety and security. • The project proposed must prepare and implement a Fire Management Plan; this must be done in conjunction with surrounding landowners. • The EPC Contractor must prepare a Method Statement which deals with fire prevention and management.

	Impacts on daily living and movement patterns	Negative Medium	Negative Medium	• All vehicles must be road worthy, and drivers must be qualified, obey traffic rules, follow speed limits and be made aware of the potential road safety issues. • Heavy vehicles should be inspected regularly to ensure their road worthiness. • Provision of adequate and strategically placed traffic warning signs and control measures along the R505 Regional Road to warn road users of the construction activities taking place for the duration of the construction phase. Warning signs must be always visible, especially at night. • Implement penalties for reckless driving to enforce compliance to traffic rules. • Avoid heavy vehicle activity during "peak" hours (when children are taken to school, or people are driving to work). • The developer and EPC Contractor must ensure that all fencing along access roads is maintained in the present condition or repaired if disturbed due to construction activities. • The developer and EPC Contractor must ensure that the roads utilised for construction activities are either maintained in the present condition or upgraded if disturbed due to construction activities. • The EPC Contractor must ensure that damage / wear and tear caused by construction related traffic to the access roads is repaired before the completion of the construction phase. • A method of communication must be implemented whereby procedures to lodge complaints are set out for the local community to express any complaints or grievances with the construction process.
	Nuisance impact (noise and dust)	Negative Medium	Negative Low	• The movement of heavy vehicles associated with the construction phase should be timed to avoid weekends, public holidays, and holiday periods where feasible. • Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.

				• Ensure all vehicles are road worthy, drivers are qualified and are made aware of the potential noise and dust issues. • A CLO should be appointed, and a grievance mechanism implemented.
	Increased risk of potential veld fires	Negative Medium	Negative Low	• A firebreak should be implemented before the construction phase. The firebreak should be controlled and constructed around the perimeters of the project site. • Adequate fire-fighting equipment should be provided and readily available on site and all staff should be trained in firefighting and how to use the fire-fighting equipment. • No staff (except security) should be accommodated overnight on site and the contractor should ensure that no open fires are allowed on site. • The use of cooking or heating implements should only be used in designated areas. • Contractors need to ensure that any construction related activities that might pose potential fire risks, are done in the designated areas where it is also managed properly. • Precautionary measures need to be taken during high wind conditions or during the winter months when the fields are dry. • The contractor should enter an agreement with the local farmers before the construction phase that any damages or losses during the construction phase related to the risk of fire and that are created by staff during the construction phase, are borne by the contractor.
	Impacts on the sense of place	Negative Low	Negative Low	• Implement mitigation measures identified in the Visual Impact Assessment (VIA) prepared for the project. • Limit noise generating activities to normal daylight working hours and avoid weekends and public holidays. • The movement of heavy vehicles associated with the construction phase should be timed to avoid weekends, public holidays, and holiday periods where feasible. • Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that

				vehicles used to transport sand and building materials are fitted with tarpaulins or covers. • All vehicles must be road-worthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits. • Communication, complaints, and grievance channels must be implemented and contact details of the CLO must be provided to the local community in the site.
Traffic Impact Assessment (Appendix E8)	Increase in traffic on the Durban or Saldanha delivery routes	Negative Low	Negative Low	• It can be seen that the delivery and construction trips will be insignificant when compared to the Average Daily Traffic (ADT) and will not affect the existing Level of Service (LOS). It can therefore be concluded that, on both routes, no mitigation measures will be necessary.
	Increase in traffic for commuter trips	Negative Low	Negative Low	• It can be concluded from the table above that the estimated additional traffic generated by the construction staff, when travelling to/ from the SPP, can be accommodated on the existing road network. Therefore, no mitigation measures will be necessary.

6.2.2 Impacts during the operational phase

During the operational phase the site will serve as a solar plant. The potential impacts will take place over a period of 20 – 25 years. During the operational phase the following activities will have various potential impacts on the biophysical and socio-economic environment:

- Activity 11(i) (GN.R. 327): "The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexeswith a capacity of more than 33 but less than 275 kilovolts."
- Activity 14 (GNR 327): "The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metresor more but not exceeding 500 cubic metres."
- Activity 1 (GN.R 325): "The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more."

During the operational phase minor negative impacts are foreseen over the long term. The latter refers to at least a 20-year period. Table 6.4 summarises the potentially most significant impacts and the mitigation measures that are proposed during the operational phase.

Table 6.4: Impacts and the mitigation measures during the operational phase

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
Terrestrial biodiversity impact assessment (Appendix E1)	Continued fragmentation and degradation of natural habitats and ecosystems.	Negative Medium	Negative Low	• A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. • 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 on site unless necessary. • All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. • Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them from leaking and entering the environment. • Construction activities and vehicles could cause spillages of lubricants, fuels and waste material negatively affecting the functioning of the ecosystem. • All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the project area. • It must be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.
	Continuing spread of IAP and weed species.	Negative High	Negative Low	
	Ongoing displacement and direct mortalities of the faunal community (including SCC) due to continued disturbance (road collisions, noise, light, dust, vibration, poaching, etc.).	Negative High	Negative Low	

				• A fire management plan needs to be complied and implemented to restrict the impact fire would have on the surrounding areas. • The areas to be disturbed must be specifically and responsibly demarcated to prevent the movement of staff or any individual into the surrounding environments, signs must be put up to enforce this • Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to reptile species and nocturnal mammals. • No trapping, killing, or poisoning of any wildlife is to be allowed and • Signs must be put up to enforce this. Monitoring must take place in this regard. • Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible. • Use environmentally friendly cleaning and dust suppressant products. • The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprints of the roads must be kept to prescribed widths. • 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 entering the site. A location specific waste

				management plan must be put in place to limit the presence of rodents and pests and waste must not be allowed to enter surrounding areas. • A pest control plan must be put in place and implemented; it is imperative that poisons not be used to control pests. • A minimum of one toilet must be provided per 10 persons. Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area. • The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility within every 10 days at least. • Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regards to waste management. Under no circumstances may domestic waste be burned on site or buried on open pits. • Refuse bins will be responsibly emptied and secured. Temporary storage of domestic waste shall be in covered and secured waste skips. Maximum domestic waste storage period will be 10 days. • Speed limits must be put in place to reduce erosion. Soil surfaces must be wetted as necessary to reduce the dust generated by the project activities. Speed bumps and signs must be erected to enforce slow speeds. • Only existing access routes and walking paths may be made use of.

				• Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events etc. • A stormwater management plan must be compiled and implemented.
Avifauna Impact Assessment (Appendix E2)	Collisions with infrastructure associated with the PV Facility	Negative High	Negative Medium	• The design of the proposed solar plant and grid lines must be of a type or similar structure as endorsed by the Eskom-EWT Strategic Partnership on Birds and Energy, considering the mitigation guidelines recommended by Birdlife South Africa. • Infrastructure should be consolidated where possible in order to minimise the amount of ground and air space used. This would involve using existing/approved pylons and associated infrastructure for different lines; • Non-polarising white tape can be used around and/or across panels to minimise reflection (Bennun et al, 2021). This is especially pertinent to waders and aquatic species that may recognise the panel array as water bodies (lake effect as described above) and collide with the panels, causing mortality; • As far as possible power cables within the project area should be thoroughly insulated and preferably buried; and • Infrastructure should be consolidated where possible in order to minimise the amount of ground and air space used.
	Electrocution due to infrastructure associated with the PV Facility	Negative High	Negative Low	• The design of the proposed solar plant and grid lines must be of a type or similar structure as endorsed by the Eskom-EWT Strategic Partnership on Birds and Energy, considering the mitigation guidelines recommended by Birdlife South Africa; • Insulation where energised parts and/or grounded parts are covered with materials appropriate for providing incidental contact protection to birds. It is best to use suspended insulators and vertical disconnectors, if upright insulators or

				horizontal disconnectors are present, these should be covered; • Perch discouragers can be used such as perch guards or spikes. Considerable success achieved by providing artificial bird safe perches, which are placed at a safe distance from the energised parts (Prinsen et al, 2012); and • The lines must be walked on a 4 monthly basis to determine if any electrocuted birds can be found underneath the lines. Should any birds be present the lines and connections must be reinsulated. If any bird carcasses are found they must be reported annually to BirdLife South Africa, EWT and the Department of Environmental Affairs/SANBI (more often if significant incidents occur). Guidelines on carcass searches can be found in the Birds and Wind Best Guidelines (2015).
	Direct mortality from persecution or poaching of avifauna species and collection of eggs	Negative Medium	Negative Low	• All personnel should undergo environmental awareness training that includes educating on not poaching/persecuting avifauna species and collecting eggs; and • Signs must be put up to enforce the restriction of poaching and egg collection.
	Direct mortality by roadkill during maintenance procedures	Negative Medium	Negative Low	• All personnel should undergo environmental induction with regards to awareness about speed limits and roadkill; • All vehicles should adhere to a speed limit of maximum 40 km/h to avoid collisions. Appropriate speed control measures and signs must be erected.
	Encroachment of Invasive Alien Plants into disturbed areas	Negative Very High	Negative Low	• An IAP Management Plan must be written and implemented for the development. The developer must contract a specialist to develop the plan and the developer is responsible for its implementation; • Regular monitoring for IAP encroachment during the operation phase to ensure that no alien invasion problems have developed as result of the disturbance. This should be every 3 months during the first two years of the operation phase and every six months for the life of the project;

				• All IAP species must be removed/controlled using the appropriate techniques as indicated in the IAP management plan; and • A fire management plan must be compiled and implemented.
	Collisions with Powerline and associated infrastructure	Negative Very High	Negative Medium	• The impact and risk of powerlines cannot be mitigated completely as diverters and flappers are some more effective in some classes of species, while being not effective in others. The design recommended here is to reduce the risk to SCCs. • Overhead cables/lines must be fitted with industry standard bird flight diverters in order to make the lines as visible as possible to collision-susceptible species. Shaw et al (2021) demonstrated that large avifauna species mortality was reduced by 51% (95% CI: 23–68%). Recommended bird diverters such as flapping devices (dynamic device) and thickened wire spirals (static device) that increase the visibility of the lines should be fitted 5 m apart. The Inotec BFD88 bird diverter is highly recommended due to its visibility under low light conditions when most species move from roosting to feeding sites.
	Fencing of PV site	Negative Very High	Negative Low	Fencing mitigations: • Top 2 strands must be smooth wire; • Routinely retention loose wires; • Minimum distance between wires is 300 mm; • Place markers on fences; and • Electric lines as the top strands needs to be marked to avoid collisions.
Visual Impact Assessment (Appendix E3)	Visual impact on observers travelling along the roads and residents at homesteads within a 5km radius of the SPP.	Negative Medium	Negative Low	Planning: • Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint. • Where insufficient natural vegetation exists next to the property, a ‘screen’ can be planted using endemic, fast growers that are water efficient.

				Operations: • Maintain general appearance of the facility as a whole.
	Visual impact on observers travelling along the roads and residents at homesteads within a 5-10km radius of the SPP.	Negative Low	Negative Low	Planning: • Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint. • Where insufficient natural vegetation exists next to the property, a 'screen' can be planted using endemic, fast growers that are water efficient. Operations: • Maintain general appearance of the facility as a whole.
	Visual impacts of lighting at night on visual receptors in close proximity to the SPP.	Negative Medium	Negative Low	• Shield the source of light by physical barriers (walls, vegetation etc.) • Limit mounting heights of lighting fixtures, or alternatively use footlights or bollard level lights. • Make use of minimum lumen or wattage in fixtures. • Make use of down-lighters, or shield fixtures. • Make use of low-pressure sodium lighting or other types of low impact lighting. • Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.
	Glint and glare on sensitive visual receptors in close proximity to the proposed facility.	Negative Low	N/A	• No mitigation measures applicable
	Visual impacts on observers travelling along the roads and residents at homesteads in close proximity to the power line structures.	Negative Medium	Negative Medium	• Planning • Retain/re-establish and maintain natural vegetation immediately adjacent to the power line servitude. • Operations • Maintain the general appearance of the servitude as a whole.

	Visual impact and impacts on sense of place	Negative Medium	Negative Low	• The subjectivity towards the project in its entirety can be influenced by creating a "Green Energy" awareness campaign, educating the local community and potentially tourists on the benefits of renewable energy. This can be achieved by also hosting an 'open day' where the local community can have the opportunity to view the completed project which may enlist a sense of pride in the renewable energy project in their area.
Soil and Agricultural Assessment (Appendix E4)	Loss of Land Capability	Negative Low	Negative Low	• Continuously monitor erosion on site
Heritage Impact Assessment (Appendix E5)	Loss or damage to sites, features or objects of cultural heritage significance	Negative Low	Negative Low	• Refer to construction phase mitigation.
Social Impact Assessment (Appendix E7)	Creation of employment opportunities and skills development	Positive Low	Positive Medium	• It is recommended that local employment policy is adopted to maximise the opportunities made available to the local community. • The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. • Vocational training programs should be established to promote the development of skills.
	Development of non-polluting, renewable energy infrastructure	Positive Medium	Positive Medium	• No mitigation measures are proposed
	Loss of agricultural land and overall productivity	Negative Medium	Negative Low	• The proposed mitigation measures for the construction phase should have been implemented at this stage.

				• Mitigation measures from the Agricultural and Soil Compliance Statement, should also be implemented.
	Contribution to Local Economic Development (LED) and social upliftment	Positive Medium	Positive High	• A Community Needs Analysis (CNA) must be conducted to ensure that the LED and social upliftment programmes proposed by the project are meaningful. • Ongoing communication and reporting are required to ensure that maximum benefit is obtained from the programmes identified, and to prevent the possibility for such programmes to be misused. • The programmes should be reviewed on an ongoing basis to ensure that they are best suited to the needs of the community at the time (bearing in mind that these are likely to change over time).
	Potential impacts related to the impact on tourism.	Low Positive / Negative	Low Positive / Negative	• Due to the extent of the project no viable mitigation measures can be implemented to eliminate the visual impact of the PV panels, but the subjectivity towards the PV panels can be influenced by creating a "Green Energy" awareness campaign, educating the local community and tourists on the benefits of renewable energy. Tourists visiting the area should be made aware of South Africa's movement towards renewable energy. This might create a positive feeling of a country moving forward in terms of environmental sustainability. This could be implemented by constructing a visitor's centre on the property allocated to the proposed solar farm which should be open to school fieldtrips, the local community, and tourists.
	Visual impact and impacts on sense of place	Negative Low	Negative Low	• To effectively mitigate the visual impact and the impact on sense of place during the operational phase of the proposed Inyathi SPP, it is suggested that the recommendations made in the Visual Impact Assessment (specialist study) should be followed in this regard.

6.2.3 Impacts during the decommissioning phase

The physical environment will benefit from the closure of the solar facility since the site will be restored to its natural state. Table 6.5 provides a summary of the impacts during the decommissioning phase. The decommissioning phase will however potentially result in impacts on soils, pressure on existing service infrastructure and the loss of permanent employment. Skilled staff will be eminently employable, and a number of temporary jobs will also be created in the process. Decommissioning of a PV facility will leave a positive impact on the habitat and biodiversity in the area as the area will be rehabilitated to its natural state.

Table 6.5: Impacts and the mitigation measures during the decommissioning phase

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
Avifauna Assessment (Appendix E2)	Continued habitat degradation due to Invasive Alien Plant encroachment and erosion	Negative Very High	Negative Low	• All personnel should undergo environmental awareness including educating about not harming or collecting species; • Prior to commencing work each day, two individuals should traverse the working area in order to disturb any fauna and so they have a chance to vacate; • Any fauna threatened by the construction activities should be removed safely by an appropriately qualified environmental officer or removal specialist; • All construction vehicles should adhere to a speed limit of maximum 40 km/h to avoid collisions. Appropriate speed control measures and signs must be erected; • All hazardous materials, if any, should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner; and • Any excavations should not be left open for extended periods of time as fauna may fall in and become trapped in them. Excavations should only be dug when they are required and should be used and filled shortly thereafter.
	Continued habitat degradation due to Invasive Alien Plant encroachment and erosion	Negative Very High	Negative Low	• Rehabilitation in accordance with the Rehabilitation Plan for the development must be undertaken in areas disturbed during the decommissioning phase; • Monitoring of the rehabilitated area must be undertaken at quarterly intervals for 3 years after the decommissioning phase;

				• All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques; and • There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous flora.
	Continued bird collisions with PV and Powerlines	Negative Very High	Negative Low	• The infrastructure must all be removed; this includes the removal of the PV, powerline and the associated towers; • Rehabilitation in accordance with the Rehabilitation Plan for the development must be undertaken in areas disturbed during the decommissioning phase; and • There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous flora.
Social Impact Assessment (Appendix E7)	Loss of employment opportunities	Negative Low	Negative Low	• It is not expected that the facility will be decommissioned.

6.3 SUMMARY OF RECOMMENDATIONS FROM SPECIALIST STUDIES

To address the key issues highlighted in the previous section the following specialist studies and processes were commissioned:

- Terrestrial Biodiversity Assessment– The Biodiversity Company (see Appendix E1)
- Avifaunal Impact Assessment – The Biodiversity Company (see Appendix E2)
- Visual Impact Assessment – Phala Environmental Consultants (see Appendix E3)
- Heritage Impact Assessment – JA van Schalkwyk (see Appendix E5)
- Palaeontological Impact Assessment – Banzai Environmental (Pty) Ltd (see Appendix E6)
- Social Impact Assessment – Phala Environmental Consultants (see Appendix E7)
- Traffic Impact Assessment – Bvi Consulting Engineers (see Appendix E8)
- Agricultural Compliance Statement – The Biodiversity Company (see Appendix E4)
- A detailed assessment of the cumulative impacts associated with the proposed development – conducted by the lead consultant, Environamics, in conjunction with the project specialists (refer to Section 7 of this report).

The following sections summarise the main findings from the specialist reports in relation to the key issues raised during the scoping phase.

6.3.1 Heritage and archaeological impacts

South Africa's heritage resources comprise a wide range of sites, features, objects and beliefs. According to Section 27(18) of the National Heritage Resources Act (NHRA), No. 25 of 1999, no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such sites. In accordance with Section 38 of the NHRA, an independent heritage consultant was therefore appoined to conduct a Heritage Impact Assessment (HIA) to determine if any sites, features or objects of cultural heritage significance occur within the proposed site. The main question which needs to be addressed is:

> "Will the proposed development impact on any heritage or archaeological artefacts?"

The Heritage Impact Assessment (Refer to Appendix E5) confirmed the following:

The cultural landscape qualities of the region essentially consist of a rural area in which the human occupation is made up of a limited Stone Age occupation. This was followed much later by Tswana-speaking agro-pasturalist that settled in the larger region. They were soon followed by a colonial (farmer) component, which gave rise to the development of small villages and towns that dot the larger landscape. The final transformation was brought about by the development of infrastructure in the region, such as roads and railway lines, which was extended due to large scale diamond mining activities.

During the survey of the project, including the grid connection infrastructure, no sites or features of cultural or heritage significance have been identified.

6.3.2 Ecological Impacts

The potential impact of the proposed development on threatened flora and fauna known to occur in the North West Province had to be determined. The main question which needs to be addressed is:

"How will the proposed development impact on the ecology?"

The Terrestrial Biodiversity Impact Assessment (refer to Appendix E1) confirmed that the majority of the project area comprised of degraded dolomite grassland, which has been impacted upon by anthropogenic related activities, but still serves as an important greenlands area that supports indigenous flora and fauna, including protected species.

No red listed SCC flora species were recorded, however approximately eight (8) individual *Vachellia erioloba* (Camel Thorn) trees were observed along the powerline corridor and is listed as a nationally protected tree in terms of the National Forests Act, No. 84 of 1998. Additionally, *Euphorbia clavarioides* (Lion Spoor) and *Euphorbia inaequilatera* (Gladde Rooiopslag) were also recorded along the project area and is protected under Schedule 2 of the North West Biodiversity Management Act No 4 (2016). No fauna SCC were recorded, however*, Orycteropus afer* (Aardvark*), Damaliscus pygargus phillipsi* (Blesbok), *Tragelaphus oryx* (Common Eland) and *Pachydactylus capensis* (Cape Thick-toed Gecko) were recorded along the project area and is listed as protected under Schedule 2 of the North West Biodiversity Management Act No 4 (2016). The relevant permit applications, national and provincial, should be submitted for the species mentioned above.

Completion of the terrestrial biodiversity assessment led to a disputing of the 'Very High' classification for the terrestrial biodiversity theme sensitivity as allocated by the National Environmental Screening Tool. The project area is instead assigned an overall sensitivity of 'Medium'.

The project activities will have a negative effect on the natural environment of the area. Anthropogenic activities drive habitat destruction leading to the displacement of fauna and flora and possibly causing direct mortality. Land clearing destroys local wildlife habitat and can lead to the loss of local breeding grounds, foraging and nesting sites, and wildlife movement corridors such as rivers, streams and drainage lines, or other locally important features. The removal of natural vegetation is likely to reduce the habitat available for all types of fauna species and hence reduce animal populations and species compositions within the area.

Potential impacts were evaluated against the data captured during the desktop assessment and field survey to identify associated relevance to the habitats within the project area. The impacts associated with the proposed activities were then subjected to a prescribed impact assessment methodology as provided by the client, which is available on request. The planning, decommissioning and/or rehabilitation phases were not considered based on the nature of the likely activities and the associated negatable impacts expected during these phases. Refer to section **Error! Reference source not found.** below for the full impact assessment.

Present Impacts to Biodiversity

Considering the fact that anthropogenic activities have historically taken place throughout most of the region, and continue to do so, several significantly negative impacts to biodiversity were observed within and adjacent to the project area. These include:

- Historic land modification largely in the form of road and powerline infrastructure, and the associated land clearing and edge effects;
- Livestock grazing;
- Minor and major gravel roads (and associated vehicle traffic and the possibility of wildlife road mortalities);
- Invasive Alien Plant infestations; and
- Fences and the associated infrastructure.

The current anthropogenic influences and impacts on site are indicated in figure 6.1 below.

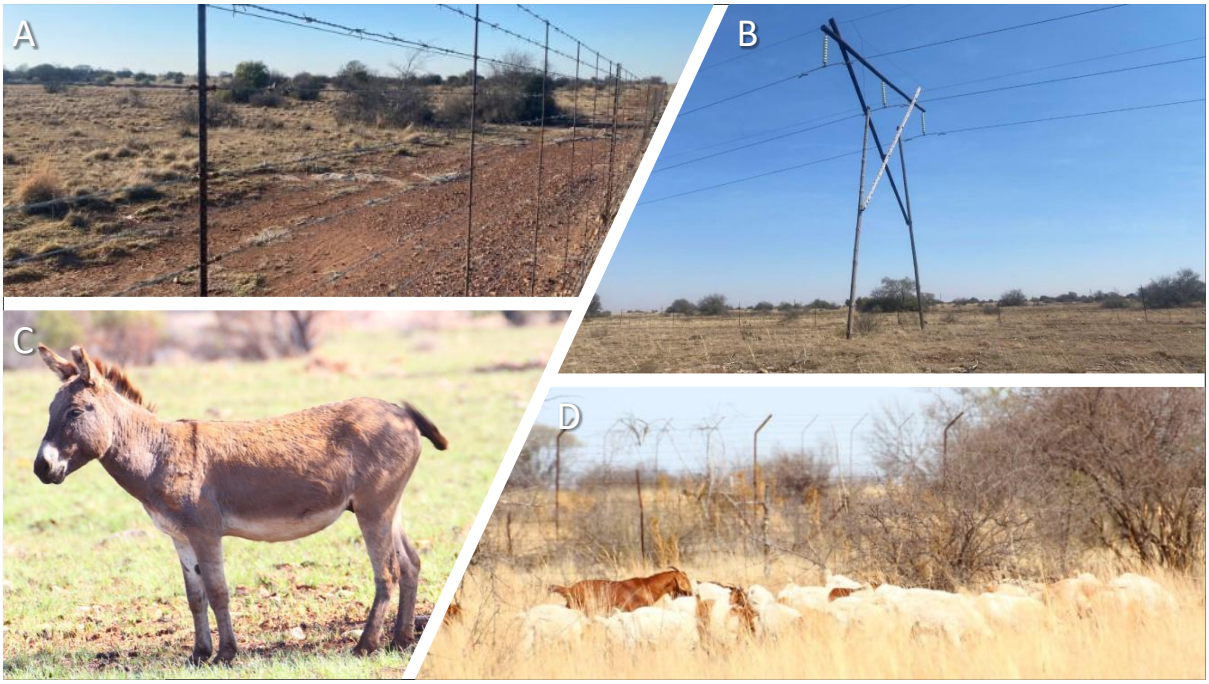


Figure 6.1: Photograph illustrating current negative impacts associated with the project area: A) Fences and the associated infrastructure, B) Powerline infrastructure, C and D) Livestock grazing

Loss of Irreplaceable Resources

The proposed activities are likely to be of a high impact and relatively large footprint, and the careful placement of certain developments is therefore important so as to minimise the damage to natural resources.

The proposed activities will be conducted over portions of the project area that are comprised of degraded dolomite grassland and wetland areas and these sections encompass indigenous vegetation that may be considered functional in nature. Thus, any irresponsible and/or medium to high impact activities will likely result in the loss of the following resources:

- Critical Biodiversity Areas / Ecological Support Areas;
- Wetland areas providing important foraging resources;

- Protected flora;
- Protected fauna species (through direct mortality during clearing and construction activities, or through indirect mortality via the inappropriate control of waste material); and
- Foraging and traversing routes, and/or nesting sites, relevant to the wide diversity of fauna that will occasionally make use of the areas.

As certain areas are in a functional state, the loss of these resources would be considered significant. Therefore, mitigations must be put in place and implemented to prevent the total and widespread destruction of valuable natural resources.

Unplanned Events

The planned activities will have anticipated impacts as discussed above; however, unplanned events may occur on any project, and these could lead to potential impacts which will require appropriate management and response.

Table 6.6 is a summary of the findings of an unplanned event assessment conducted from a terrestrial ecology perspective. Note that not all potential unplanned events may be captured herein, and this process must therefore be managed throughout all phases and according to events that take place or have a high likelihood of taking place.

Table 6.6: Summary of unplanned events, potential impacts and mitigations

Unplanned Event	Potential Impact	Mitigation
Spills into the surrounding environment	Contamination of habitat as well as water resources associated with a spillage.	A spill response kit must be available at all times. The incident must be reported on, and if necessary, a biodiversity specialist must investigate the extent of the impact and provide rehabilitation recommendations.
Fire	Uncontrolled/unmanaged fire that spreads to the surrounding natural savannah.	An appropriate fire management plan needs to be compiled and implemented.
Erosion caused by water runoff from the surface	Erosion on the side of the roads and cleared areas.	A storm water management plan must be compiled and implemented.

Anticipated Impacts

The main impacts that may be expected to occur, as a result of the proposed activities, include the following:

- Direct habitat loss and fragmentation (including the loss of ESA1 areas);
- Degradation of surrounding habitat;
- Disturbance and displacement of SCC/protected fauna (including direct mortality of fauna); and
- Introduction and further spreading of IAP and weed species.

All mitigation measures as described in this report must be implemented so as to reduce the significance of all anticipated impacts to an acceptable level (from 'Medium' – 'High' to 'Medium-

Low'). The cumulative impact of the project, taking into account the transformation of surrounding land, is rated as 'High' and as such it is important to consider careful regional spatial planning and management in order to maintain the functionality of the remaining corridors of habitat.

Considering the assessment findings, no fatal flaws are evident for the proposed project. It is the opinion of the specialists that the project may be favourably considered, on condition that all prescribed mitigation measures are implemented.

6.3.3 Avifaunal Impacts

The potential impact of the proposed development on birds known to occur in North West Province had to be determined. The main question which needs to be addressed is:

"How will the proposed development impact on the avifauna?"

According to the Avifaunal Impact Assessment (Appendix E2) the latest available ecologically relevant spatial data the following information is pertinent to the PAOI:

- It overlaps with a Critical Biodiversity Area 2, Ecological Support Area 1 and ESA 2;
- It is located within an NPAES area;
- A wetland classified as CR can be found in the southern portion of the powerline. CR tributary of the Harts river is also found to the south of project area.; and
- The Terrestrial Biodiversity Theme Sensitivity was rated as 'Very High' according to the Environmental Screening Tool.

The avifauna community recorded within the PAOI could be regarded as relatively diverse with 101 species recorded, accounting for approximately 43% of the total number of expected species. One SCC White-backed Vulture (Gyps africanus) and twelve priority (risk) species were recorded in the project area. No nests of the White-backed Vulture were observed but based on the large trees in the project area, it is likely that they might breed there.

The main impacts identified were the risk of electrocutions, collisions with both the PV and powerlines and loss of habitat. These impacts can all be reduced to a moderate or low level.

The main expected impacts of the proposed PV and associated infrastructure will include the following:

- Habitat loss and fragmentation;
- Electrocutions; and
- Collisions.

Mitigation measures as described in this report can be implemented to reduce the significance of the risk to an acceptable residual risk level. Considering the above-mentioned information and that a portion of the facility has been approved, it is the opinion of the specialist that the project may be favourably considered, on condition that all the mitigation and recommendations provided in this report and other specialist reports are implemented.

6.3.4 Visual Impacts

Due to the extent of the proposed photovoltaic solar plant it is expected that the plant will result in potential visual impacts. The main question which needs to be addressed is:

"To what extent will the proposed development be visible to observers and to will the landscape provides any significant visual absorption capacity"

The Visual Impact Assessment (Refer to Appendix E3) concluded that the post mitigation impact is a "*Negative Low"* impact during the construction, decommissioning and operational phases. The only receptors likely to be impacted by the proposed development are the nearby property owners and road users on nearby roads. The visual landscape is already degraded due to the large number of mines and Eskom electricity infrastructure in the area.

The construction and operational phases of the Inyathi SPP and its associated infrastructure, may have a visual impact on the area, especially within (but not restricted to) a 5km radius of the proposed SPP. The visual impact will differ amongst places, depending on the distance of the SPP.

Due to the height of the power line (32m) and extent of the project, no viable mitigation measures can be implemented to eliminate the visual impact of the PV facility and power lines, but the possible visual impacts can be reduced. A number of mitigation measures have however been proposed regardless of whether or not mitigation measures will reduce the significance of the of the anticipated impacts, they are considered good practice and should be implemented and maintained throughout the construction, operational and decommissioning phases of the project.

In terms of possible landscape degradation, the landscape does not appear to have any specific protection or importance and is characterised by agricultural activities. No buffer areas or areas to be avoided are applicable for this development.

Taking into account all positive factors of such a development including economic factors, social factors and sustainability factors, especially in an arid country, and the industrialised and degraded landscape, the visual impact of this proposed development will be insignificant and is suggested that the development commence, from a visual impact point of view. The specialist recommends that the details of the power line be submitted with the South African Civil Aviation Authority (SACAA).

The specialist recommends that the project be approved from a visual perspective.

6.3.5 Agricultural / impacts on the soil

In order to determine the potential impacts that the proposed development will have on agricultural production, the soil forms and current land capability of the area where the proposed project will be situated a soil survey has been conducted. The main question which needs to be addressed is:

"How will the proposed development impact on agricultural resources and the soil?"

The Soil and Agricultural Assessment (Appendix E4) impact assessment indicated a "Low" post-mitigation significance score ratings for the proposed Inyathi SPP and Powerline infrastructure. It is therefore clear that the proposed activities are expected to have a low impact on land potential resources. It is worth noting that some "High and Very High" sensitivity crop field areas identified by

means of the DEA Screening tool (2022) are traversed by existing powerlines. It is recommended stakeholder engagement must be undertaken during the expansion phase on the current powerlines to compensate landowners for the high and very high sensitivity crop field land use areas where necessary.

The main sensitive soil forms identified within the assessment area include the Hutton and Ermelo soil forms. The land capability sensitivities (DAFF, 2017) indicate land capabilities with "Low" and "Moderate" sensitivities, with small patches of sensitivities ranging characterised with "Very low" and "Moderate high", which correlates with the findings from the baseline assessment. The assessment area land potential falls within "Low" sensitivities which also concur with the DAFF (2017) sensitivities.

The assessment area is associated with non-arable soils. The available climatic conditions of low annual rainfall and high evapotranspiration potential severely limits crop production significantly resulting in land capabilities with "Low" and "Moderate high" sensitivities. The land capabilities associated with the assessment area are suitable for livestock grazing and game farms, which corresponds with the current land use.

It is the specialist's opinion that the proposed Inyathi SPP project will have an overall low residual impact on the agricultural production ability of the land. The proposed activities will result in the segregation of some high production agricultural land. However, the planned development will occur on already established infrastructure with minimal impacts to the land potential of these crop fields. Such high agricultural areas can be preserved with migration measures. In areas where these crop fields are still under high production, stakeholder engagement must be undertaken to compensate landowners for high crop field land use where necessary.

It is, therefore, the specialist`s recommendation that the proposed Inyathi SPP and powerline project may be favourably considered for development with no significant impacts expected to occur. indicated that the site has low agricultural potential because of soil constraints. Soils are predominantly shallow on underlying bedrock. As a result of the soil constraints, the agricultural footprint of the solar power plant is unsuitable for cultivation, and agricultural land use is limited to grazing.

6.3.6 Socio-economic impacts

A Social Impact Assessment has been compiled in order to provide a description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed facility; to provide a description and assessment of the potential social issues associated with the proposed facility; and the identification of enhancement and mitigation aimed at maximizing opportunities and avoiding and or reducing negative impacts (refer to Appendix E7). The main question which needs to be addressed is:

"How will the proposed development impact on the socio-economic environment?"

The findings of the SIA (Refer to Appendix E7) indicate that there are some vulnerable communities within the area that may be affected by the development of the Inyathi SPP and its associated infrastructure. Traditionally, the construction phase of a SPP is associated with most social impacts. Many of the social impacts are unavoidable and will take place to some extent but can be managed through the careful planning and implementation of appropriate mitigation measures. Several

potential positive and negative social impacts have been identified for the project, however an assessment of the potential social impacts indicated that there are no perceived negative impacts that are sufficiently significant to allow them to be classified as “fatal flaws.

The potential negative social impacts associated with the construction phase are typical of construction related projects and not just focussed on the construction of solar PV projects(these relate to an influx of non-local workforce and jobseekers, intrusion, and disturbance impacts (i.e., noise and dust, wear and tear on roads) and safety and security risks) and could be reduced with the implementation of the mitigation measures proposed. The significance of such impacts on the local communities can therefore be mitigated

The development will introduce employment opportunities during the construction phase(temporary employment) and a limited number of permanent employment opportunities during operation phase.

The proposed project could assist the local economy in creating entrepreneurial growth and opportunities, especially if local business is involved in the provision of general material, goods and services during the construction and operational phases.

The proposed development also represents an investment in infrastructure for the generation of non-polluting, Renewable Energy, which, when compared to energy generated because of burning polluting fossil fuels, represents a positive social benefit for society.

It should be noted that the perceived benefits associated with the project, which include Renewable Energy generation and local economic and social development, outweigh the perceived negative impacts associated with the project.

The specialist concludes that the project, and its associated infrastructure, will be unlikely to result in permanent damaging social impacts, and therefore from a social perspective the project can be development subject to the implementation of the recommended mitigation measures.

6.3.7 Paleontological Impacts

South Africa’s heritage resources comprise a wide range of sites, features, objects and beliefs. According to Section 27(18) of the National Heritage Resources Act (NHRA), No. 25 of 1999, no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such site. The main question which needs to be addressed is:

“How will the proposed development impact on the Palaeontological resources?”

According to the Palaeontological Impact Assessment (Appendix E6) indicates that the proposed Inyathi Solar Power Plant is underlain by the Precambrian dolomites and associated marine sedimentary rocks of the Malmani Subgroup (Chuniespoort Group, Transvaal Supergroup). According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) the Palaeontological Sensitivity of the Malmani Subgroup (Chuniespoort Group, Transvaal Supergroup) is Very High (Almond et al, 2013; SAHRIS website). In the Palaeotechnical report of the Northwest Groenewald et al (2014) allocated a High Sensitivity to the Malmani Subgroup.

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on 30 July 2022. Outcrops of weathered to fairly well-preserved stromatolites were discovered on the development. Mitigation of a sample of well-preserved stromatolites is thus recommended. By implementing mitigation measures the significance of the impact will be reduced to low. Mitigation should take place after initial vegetation is cleared away but before the ground is levelled for construction. These recommendations should be included in the Environmental Management Plan of the Inyathi Solar Power Plant. The recommendations include:

- The ECO must be made aware that fossils (stromatolites) of the Malmani (Chuniespoort Group, Transvaal Supergroup) has a High to Very High Palaeontological Significance.
- If a well-preserved stromatolite outcrop s is uncovered in the development footprint (after vegetation clearance) the stromatolites may be cordoned off and a buffer of 30m may be placed around the outcrop or a reprehensive example should be removed and placed near the offices of the PV as an informative example of fossils in the area.

It is the opinion that the specialist that the development of the Inyathi Solar Power Plant be favourable considered.

6.3.8 Traffic Impacts

Large developments are normally associated with an increase in construction vehicle traffic. The main question which needs to be addressed is:

"How will the proposed development impact on the traffic on main delivery routes to the site?"

According to the Traffic Impact Assessment (Appendix E8) The major traffic impact occurs during the construction phase of the project. The impact of the construction trip generation, on the predicted 2026 (estimated time of construction) traffic volumes on the local and the regional transportation routes are expected to be low. No mitigation measures for these routes will be necessary. The photovoltaic (PV) components will be delivered to site from two possible ports, either from Durban Harbour over a distance of 870 km or from Saldanha Bay Harbour over a distance of 1 420 km. The regional routes indicated in the analysis would need to be confirmed by freight carriers as suitable for the sensitive normal loads. The final decision on the selected route would be based on a combination of cost, distance and road condition at the time of transport.

Transformer and substation components will be transported via abnormal loads. An abnormal load will necessitate an application to the Department of Transport and Public Works for a permit. A permit is required for each province that the transportation route traverses. Only 1-2 abnormal load trips is expected for Inyathi SPP. Abnormal load transportation is therefore considered to be isolated and would have a negligible impact on traffic over the construction phase of the project.

Two alternative routes have been presented for site access roads from the R505. The first alternative links to the south-west of the site but needs to navigate Eskom infrastructure and crosses adjacent farms. The second alternative links to the northwest of the site but covers a slightly longer but more direct route. It is proposed that the access roads in close proximity to the site be investigated for rehabilitation prior to construction and be maintained during construction in order to mitigate against the possibility of damaged goods due to poor road infrastructure.

The formalisation of the site access point will likely be a requirement as part of the wayleave approval of the local and provincial roads authorities. Adequate traffic accommodation signage must be erected and maintained on either side of the access throughout the construction period of the project.

The construction and provision of internal roads that cross the Eskom servitude need to be according to Eskom wayleave requirements. The regional construction trips will be insignificant when compared to the existing Average Daily Traffic (ADT) and projected ADT without the development. It has been noted that one section that has been analysed on the N7 between Moorreesburgand Piketberg (Station ID 5014) may experience a degradation of Level of Service (LOS) with only normal traffic growth over the analysis period. This is, however, not due to the additional traffic of the development. It is also noted that this road section falls under a regional route from Saldanha Bay Harbour. In terms of estimated traffic volumes, no mitigation measures will be necessary. Mitigation measures, such as staggered trips and reduced peak time travel are proposed if needed.

The development of the Inyathi SPP on Portion 5 (Portion of Portion 2) of the Farm Zamenkomst No. near Lichtenburg in the North West Province can therefore be supported from a traffic engineering perspective.

6.3.9 Risk Assessment for battery storage system

Battery storage facilities are a relatively new technology, particularly in South Africa. Batteries, as with most electrical equipment, can be dangerous and may catch fire, explode or leak dangerous pollutants if damaged, possibly injuring people working at the facility or polluting the environment. Common failure scenarios of Li-ion batteries include: electrical, mechanical, and thermal. The potential hazards associated with them are fire with consequent emission of gas and explosion. The major risks include thermal runaway, difficulty of fighting battery fires, failure of control systems and the sensitivity of Li-ion batteries to mechanical damage and electrical transients.

As with any fire or explosion, a potential consequence of Li-ion battery fires is the endangerment of life and property. These consequences are assessed based on their severity and likelihood. First, the severity of this consequence changes based on the quantity of cells in a system, as well as the system's proximity to people and property. Therefore, the size and location of the installation should be taken into consideration. For the Inyathi SPP the location of the BESS and the fact that the area is sparsely populated will reduce the risk associated with toxic chemicals, flammability and overpressure from explosions. The risk level is seen to be of a low risk that is unlikely to occur with the proper safety measures taken as mitigation. Provided that the facility is designed and managed properly, and the batteries are handled in the manner prescribed by the manufacturer, an incident is unlikely to happen. However, because of the risk special management actions are recommended in the EMPr to reduce the risk of an incident and manage an incident should one ever occur.

6.4 SENSITIVITY ANALYSIS

The sensitivity analysis undertaken as part of the EIA Report focusses on providing an understanding of the environmentally sensitive areas and features identified within the SPP site, as well as the grid connection corridor alternatives. This section considers the findings of each of the independent specialist studies undertaken for the development and describes the sensitive features and areas identified, including the location, the sensitivity rating of the features or areas as well as the associated

buffers recommended by the specialist (where a buffer is considered to be relevant). The sensitive areas and features identified are also displayed on the sensitivity map included as Figure H1-H6 of this EIA Report.

The following points below provide the sensitivity analysis for the Inyathi SPP:

Terrestrial Biodiversity:

From a Terrestrial Biodiversity perspective (Terrestrial Biodiversity Impact Assessment, Appendix E1) no area have been identified as no-go for the development of the SPP and the associated infrastructure.

Wetlands:

From the Wetland Baseline and Risk Assessment (Appendix E1) no areas have been identified as no-go for the development footprint of the SPP. Unchanneled valley bottom wetlands have been identified within the grid connection corridor that must be avoided.

Avifauna:

No specific areas of sensitivity have been identified from an avifauna perspective (Avifauna Impact Assessment, Appendix E2). Therefore, from an avifauna perspective, no areas have been identified as no-go for the development of the SPP and associated infrastructure.

Visual:

No specific areas of sensitivity have been identified from a visual perspective (Visual Impact Assessment, Appendix E3). Therefore, from a visual perspective, no areas have been identified as no-go for the development of the SPP and associated infrastructure.

Heritage:

From a heritage (archaeological) perspective (Heritage Impact Assessment, Appendix E5), no sites or features with cultural significance have been identified.

Palaeontology:

The palaeontological sensitivity of the SPP, and grid connection corridor have been confirmed as being of a **low** sensitivity (Palaeontological Impact Assessment, Appendix E6). No palaeontological no-go areas or fossil sites have been identified for the project. Therefore, from a palaeontological perspective, no areas have been identified as no-go for the development of the SPP and associated infrastructure.

Social:

No specific areas of sensitivity have been identified from a social perspective (Social Impact Assessment, Appendix E7). Therefore, from a social perspective, no areas have been identified as no-go for the development of the SPP and associated infrastructure.

Traffic:

No specific areas of sensitivity have been identified from a traffic perspective (Traffic Impact Assessment, Appendix E8). Therefore, from a traffic perspective, no areas/road aspects have been identified as no-go for the development of the SPP and associated infrastructure.

Agriculture:

From an agricultural perspective, no areas have been identified as no-go for the development of the SPP and associated infrastructure.

6.5 METHOD OF ENVIRONMENTAL ASSESSMENT

The environmental assessment aims to identify the various possible environmental impacts that could results from the proposed activity. Different impacts need to be evaluated in terms of its significance and in doing so highlight the most critical issues to be addressed.

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in Table 6.6.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

6.5.1 Impact Rating System

Impact assessment must take account of the nature, scale and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the project phases:

- planning
- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance should also be included. The rating system is applied to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact, the following criteria is used:

Table 6.6: The rating system

NATURE

Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).

3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.
INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/ component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
REVERSIBILITY		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.

3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects
SIGNIFICANCE		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity. The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.		
Points	Impact significance rating	Description

6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.

7 CUMULATIVE EFFECTS ASSESSMENT

This section aims to address the requirements of Section 2 of the NEMA to consider cumulative impacts as part of any environmental assessment process.

7.1 Introduction

The EIA Regulations (as amended in 2017) determine that cumulative impacts, "in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities." Cumulative impacts can be incremental, interactive, sequential or synergistic. EIAs have traditionally failed to come to terms with such impacts, largely as a result of the following considerations:

- Cumulative effects may be local, regional or global in scale and dealing with such impacts requires coordinated institutional arrangements;
- Complexity - dependent on numerous fluctuating influencing factors which may be completely independent of the controllable actions of the proponent or communities; and
- Project level investigations are ill-equipped to deal with broader biophysical, social and economic considerations.

Despite these challenges, cumulative impacts have been afforded increased attention in this draft EIR and for each impact a separate section has been added which discusses any cumulative issues, and where applicable, draws attention to other issues that may contextualise or add value to the interpretation of the impact. This chapter analyses the proposed project's potential cumulative impacts in more detail by: (1) defining the geographic area considered for the cumulative effects analysis; (2) providing an overview of relevant past and present actions in the project vicinity that may affect cumulative impacts; (3) presenting the reasonably foreseeable actions in the geographic area of consideration; and (4) determining whether there are adverse cumulative effects associated with the resource areas analysed.

The term "Cumulative Effect" has for the purpose of this report been defined as: the summation of effects over time which can be attributed to the operation of the Project itself, and the overall effects on the ecosystem of the SPP site that can be attributed to the Project and other existing and planned future projects.

7.2 Geographic Area of Evaluation

The geographic area of evaluation is the spatial boundary in which the cumulative effects analysis was undertaken. The spatial boundary evaluated in this cumulative effects analysis generally includes an area of a 30km radius surrounding the proposed development – refer to Figure 7.1 below.

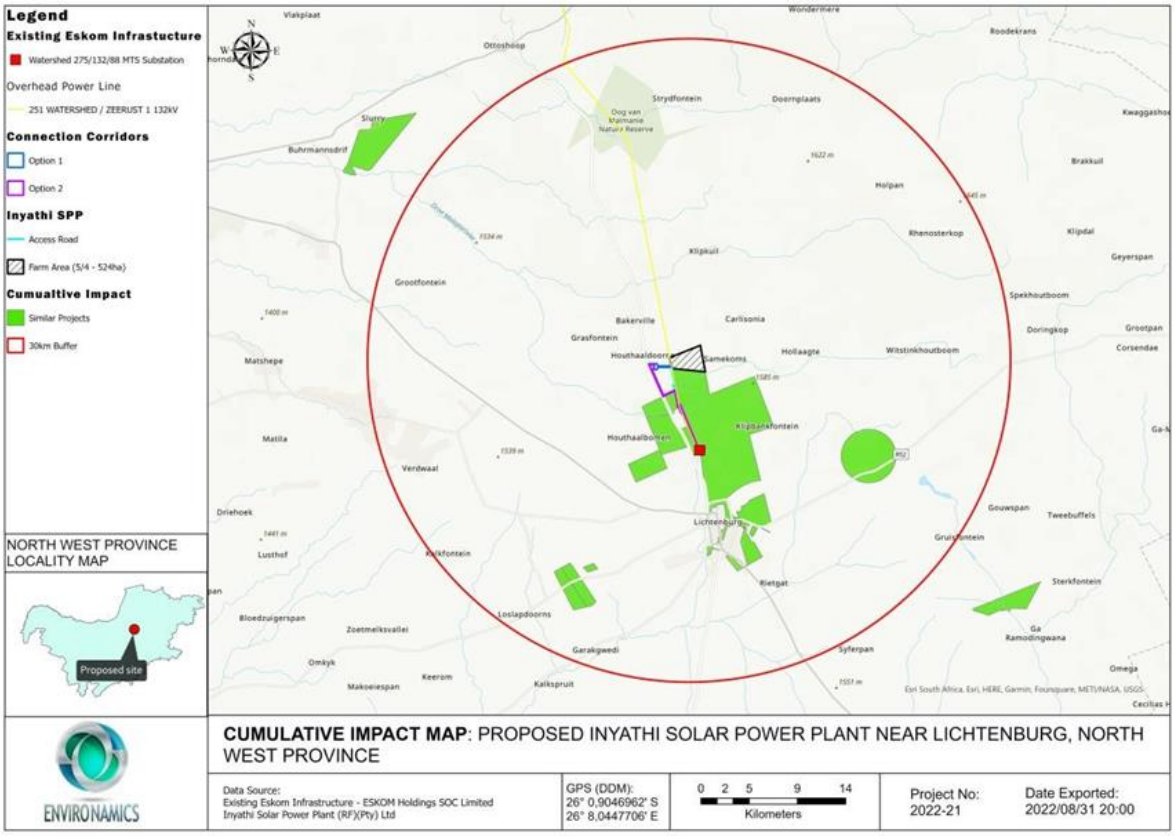


Figure 7.1: Geographic area of evaluation with utility-scale renewable energy generation sites and power lines

The geographic spread of PV solar projects, administrative boundaries and any environmental features (the nature of the landscape) were considered when determining the geographic area of investigation. It was argued that a radius of 30km would generally confine the potential for cumulative effects within this particular environmental landscape. The geographic area includes projects located within the North West Province. A larger geographic area may be used to analyse cumulative impacts based on the specific temporal or spatial impacts of a resource. For example, the socioeconomic cumulative analysis may include a larger area, as the construction workforce may draw from a much wider area. The geographic area of analysis is specified in the discussion of the cumulative impacts for that resource where it differs from the general area of evaluation described above.

7.3 Temporal Boundary of Evaluation

A temporal boundary is the timeframe during which the cumulative effects are reasonably expected to occur. The temporal parameters for this cumulative effects analysis are the anticipated lifespan of the proposed project, beginning in 2024 and extending out at least 20 years, which is the minimum expected project life of the proposed project. Where appropriate, particular focus is on near-term cumulative impacts of overlapping construction schedules for proposed projects in the area of evaluation.

7.4 Other Projects in the Area

The following section provides details on existing and proposed projects in the geographical area of evaluation.

7.4.1 Existing projects in the area

According to the DFFE's database twelve (12) PV solar plant applications have been submitted to the Department within the geographic area of investigation – refer to table 7.1. As part of the SEA for Wind and Solar Energy in South Africa, the CSIR and the DFFE mapped the location of all EIA applications submitted within South Africa. According to this database approximately 12 applications have been submitted for renewable energy projects within the geographical area of investigation. The majority of these projects are located in close proximity to Lichtenburg.

Table 7.1: A summary of related projects, that may have a cumulative impact, in a 30 km radius of the study area

Site name	Distance from study area	Proposed generating capacity	DEFF reference	EIA process	Project status
Boitumelo SPP[3]	0.1 km	150 MW	14/12/16/3/3/2/2083	Scoping andEIA	Approved
Lerato SPP	0.1 km	150 MW	14/12/16/3/3/2/2084	Scoping andEIA	Approved
Kutlwano SPP	0.1 km	150 MW	14/12/16/3/3/2/2085	Scoping andEIA	Approved
Hibernia solar Energy Facility	23.3 km	-	14/12/16/3/3/2/1062	Scoping andEIA	Approved
ACSA PV	20.3 km	3 MW	12/12/20/2149	BAR	Approved
Lichtenburg 1 solar PV energy	1.6 km	100 MW	14/12/16/3/3/2/1091	Scoping andEIA	Approved
Lichtenburg 2 solar PV energy	1.7 km	100 MW	14/12/16/3/3/2/1092	Scoping andEIA	Approved
Lichtenburg 3 solar PV energy	2 km	100 MW	14/12/16/3/3/2/1093	Scoping andEIA	Approved
Lichtenburg Solar Park	10 km	70 MW	14/12/16/3/3/2/270	Scoping andEIA	Approved
Tlisitseng PV1 SEF	8 km	75 MW	14/12/16/3/3/2/974	Scoping andEIA	Approved
Tlisitseng PV2 SEF	8.5 km	75 MW	14/12/16/3/3/2/975	Scoping andEIA	Approved

[3] Environamics was the EAP responsible for the Boitumelo, Lerato and Kutlwano SPPs

Watershed Solar Energy Facility	11 km	75 MW	14/12/16/3/3/2/557	Scoping andEIA	Approved

It is unclear whether other projects not related to renewable energy is or has been or will be constructed in this area. In general, development activity in the area is focused on agriculture. Agriculture in the area is primarily associated with cattle grazing. The next section of this report will aim to evaluate the potential for solar projects for this area in the foreseeable future.

7.5 SPECIALIST INFORMATION ON CUMULATIVE EFFECTS

In line with the Terms of Reference (ToR) specialists were requested to, where possible, take into consideration the cumulative effects associated with the proposed development and other projects which are either developed or in the process of being developed in the local area – refer to Figure 7.2 for process flow. The following sections present their findings.

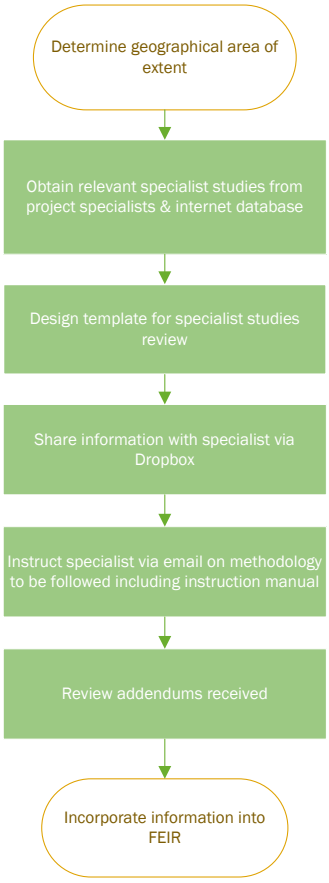


Figure 7.2: Process flow diagram for determining cumulative effects

7.5.1 Soil, Land Capability and Agricultural Potential

In quantifying the cumulative impact, the Soil and Agricultural Assessment (Appendix E4) indicated that the cumulative impacts have been scored "Low," indicating that the potential incremental,

interactive, sequential, and synergistic cumulative impacts. It is probable that the impact will result in spatial and temporal cumulative change.

Table 7.2: Impact assessment related to the loss of land capability due to cumulative impacts of the proposed Inyathi project.

Nature: Loss of land capability		
	Without mitigation	With mitigation
Extent	Low (2)	Very Low (1)
Duration	Short term (2)	Very Short term (1)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (12)**	**Low (8)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Residual Impacts:		
Limited residual impacts will be associated with these activities, assuming that all prescribed mitigation measures be strictly adhered to.		

In order for South Africa to achieve its renewable energy generation goals, agriculturally zoned land will need to be used for renewable energy generation. It is far more preferable to incur a cumulative loss of agricultural land in a region such as the one being assessed, which has very little cultivation potential, than to lose agricultural land that has a higher potential, and that is much scarcer, to renewable energy development elsewhere in the country. The limits of acceptable agricultural land loss are far higher in this region than in regions with higher agricultural potential.

Furthermore, there are no significant other land uses, apart from renewable energy, that are competing for agricultural land in the area, and so the total cumulative loss of agricultural land from all competing land uses is not significantly higher than what has been considered above. Due to all of the considerations discussed above, the cumulative impact of loss of agricultural land use will not have an unacceptable negative impact on the agricultural production capability of the area. The proposed development is therefore acceptable in terms of cumulative impact, and it is therefore recommended that it is approved.

7.5.2 Ecology

The Terrestrial Biodiversity (refer to Appendix E1) states that the impacts of projects are often assessed by comparing the post-project situation to a pre-existing baseline. Where projects can be considered in isolation this provides a good method of assessing a project's impact. However, in areas where baselines have already been affected, or where future development will continue to add to the impacts pre-existing in an area or region, it is appropriate to consider the cumulative effects of development or disturbance activities. This is similar to the concept of shifting baselines, which describes how the environmental baseline at a specific point in time may actually represent a

significant change from the original state of the system. This section describes the potential cumulative impacts of the project on local fauna and flora specifically.

Cumulative impacts are assessed within the context of the extent of the proposed project area, other similar developments and activities in the area (existing and in-process), and general habitat loss and transformation resulting from any other activities in the area. Localised cumulative impacts include those from operations that are close enough (within 30 km) to potentially cause additive effects on the local environment or any sensitive receptors (relevant operations include nearby large road networks, other solar PV facilities, and power infrastructure). Relevant impacts include the overall reduction of foraging and nesting habitat, dust deposition, noise and vibration, disruption of functional corridors of habitat important for movement and migration, disruption of waterways, groundwater drawdown, and groundwater and surface water quality depletion.

Long-term cumulative impacts associated with the site development activities can lead to the loss of endemic and threatened species, including natural habitat and vegetation types, and these impacts can even lead to the degradation of conserved areas such as the adjacent game parks and reserves.

In order to spatially quantify the cumulative effects of the proposed development, the project in isolation is compared with the overall effects of surrounding development (including total transformation and transformation as a result of new and proposed developments of a similar type, i.e., solar).

According to the 2018 National Biodiversity Assessment, the total amount of Carletonville Dolomite Grassland habitat within 30 km of the project amounts to 228 110 ha, but when considering the transformation that has taken place within this radius – only 159 900 ha remains. Therefore, the area within 30 km of the project has experienced approximately 30% loss in natural habitat. Considering this context, the project footprint is 727 ha (assuming the total extent of the project area is developed), and sixteen (16) additional similar project exists in the 30 km region measuring a maximum of 39 190 ha (as per the latest South African Renewable Energy EIA Application Database). This means that the total amount of remaining habitat lost as a result of solar projects in the region amounts to 24,96% (the sum of all related developments as a percentage of the total remaining habitat). Table 7.3Table 7.3 outlines the calculation procedure for the spatial assessment of cumulative impacts.

Table 7.3 Loss of Carletonville Dolomite Grassland habitat within a 30 km radius of the project

	Total Habitat (ha)	Tot. Remaining Habitat (ha)	Total Historical Loss	Project Footprint (ha)	Similar Projects (ha)	Cumulative Habitat Lost
Solar development cumulative effects (Spatial)	228 110	159 900	**30%**	727	39 190	**24,96%**

Approximately 30% of the Carletonville Dolomite Grassland vegetation type has been lost, and as discussed the proposed development will result in a further loss of approximately 24,96 % from only similar developments (Solar) in the area, as such the cumulative impact from the proposed development is rated as “high”. This means that the careful spatial management and planning of the entire region must be a priority, and existing large infrastructure projects must be carefully monitored over the long term.

7.5.3 Avifaunal

The area is not within an IBA, however it has been identified as 'High Avian Sensitivity' by DFFE's screening tool. The resident avifaunal community is diverse, with moderate-low species richness and abundances. Some priority and endemic species are expected to be recorded on the site. The panels are reported to either be built with fixed inclinations or to be built with variable inclination so as to track the sun movement. At times, these panels will be horizontal, potentially attracting birds through the 'lake effect'. At other times, the panels may be horizontal, and, during the day, they may create a mirror effect and result in bird collisions, or, at night, may result in collisions with migrating birds. The displacement of priority or resident avifauna through increased disturbance. Loss of avian habitat and possible collisions with PV panels leading to injury or loss of avian life are considered as a cumulative impact due to the large number of planned solar development in a 30 km radius.

Electrocutions when perched on power line infrastructure and collisions with power line infrastructure leading to injury or loss of avian life are considered to be cumulative impacts due to the large number of planned solar developments and power lines in a 30 km radius.

The cumulative impact for Avifauna can be linked to the cumulative impact with the loss of suitable habitat. Therefore, due to the loss of vegetation as indicated in section 7.5.2, the cumulative impact for Avifauna can be considered to be Medium to High negative.

7.5.4 Social Impact Assessment

Inyathi SPP and the establishment of other solar power projects within the area has the potential to result in significant positive cumulative impacts, specifically with regards to the creation of a number of socio-economic opportunities for the region, which in turn, can result in positive social benefits. The positive cumulative impacts include creation of employment, skills development and training opportunities, and downstream business opportunities. The cumulative benefits to the local, regional, and national economy through employment and procurement of services are more considerable than that of Inyathi SPP alone.

While the development of a single solar power project may not result in a major influx of people into an area, the development of several projects may have a cumulative impact on the in-migration and movement of people. In addition, the fact that the project is proposed within an area characterised by good levels of solar irradiation suitable for the development of commercial solar energy facilities implies that the surrounding area is likely to be subject to considerable future applications for PV energy facilities. Levels of unemployment, and the low level of earning potential may attract individuals to the area in search of better employment opportunities and higher standards of living.

It is exceedingly difficult to control an influx of people into an area, especially in a country where unemployment rates are high. It is therefore important that the project proponent implement and maintain strict adherence with a local employment policy in order to reduce the potential of such an impact occurring.

7.5.5 Visual Impact Assessment

The anticipated cumulative visual impact of the proposed SPP is expected to include the change in sense of place, as well as the precedent being set for SPP in the area where currently there is only a

precedent predominantly for agricultural. Due to the abundance of natural vegetation in the area, the scenic quality of the region is high, further construction and operation of the SPP in the area is likely to have a negative impact. The potential for cumulative impacts to occur as a result of the projects is therefore likely.

7.5.6 Heritage Impact Assessment

It was determined that the Inyathi project is located in an area with a very low presence of heritage sites and features. The cultural heritage profile of the larger region is very limited. Most frequently found are farmsteads, formal and informal burial sites and sites relating to diamond mining activities. For this consideration, heritage sites located in urban areas have been excluded.

Heritage resources are sparsely distributed on the wider landscape with highly significant (Grade 1) sites being rare. Because of the low likelihood of finding further significant heritage resources in the area of the proposed for development and the generally low density of sites in the wider landscape the overall impacts to heritage are expected to be of generally low significance before mitigation.

7.5.7 Palaeontology

Based on the SAHRIS website, palaeontological heritage assessments (PIAs) for this review by (Almond 2013), Rubidge (2012), Groenewald (2015, 2016, 2017a, 2017b) and Bamford (2019) are available. Combined desktop and field-based studies have been conducted for the adjoining proposed Inyathi, Lerato and Kutlwano SPPs on Portion 4 of the Farm Houthaaldoorns 2 (Almond in prep., 2021). It is noted that (1) several of the available PIA reports are desktop studies with no field-based ground truthing and (2) a LOW palaeontological impact significance is inferred for all the projects concerned, including those involving Precambrian stromatolitic bedrocks comparable to those mapped in the present project area except where there is reasonable potential for Caenozoic karstic bone breccias (See Groenewald 2017a, 2017b). In the author's opinion:

- Palaeontological impact significances inferred for renewable energy projects, where these are assessed at all, may well reflect different assessment approaches rather than contrasting palaeontological sensitivities and impact levels;
- Meaningful cumulative impact assessments require comprehensive data on all major developments within a region, not just those involving renewable energy, as well as an understanding of the extent to which recommended mitigation measures are followed through;
- Trying to assess cumulative impacts on different fossil assemblages from different stratigraphic units (for example, Precambrian stromatolites from 2.6 billion years ago versus Pleistocene alluvial deposits less than 2.5 million years old) has limited value.

Given (1) the comparatively small combined footprint of the renewable energy projects under consideration compared with the very extensive outcrop areas of Malmani Group stromatolitic carbonate bedrocks as well as (2) the probable (albeit unconfirmed) rarity of scientifically valuable, unique or unusual occurrences of well-preserved stromatolites within flat-lying terrain preferred for solar energy projects, the cumulative impact of the proposed or authorized Solar Power Plant developments in the Lichtenburg region is assessed as Medium (negative) without mitigation,

potentially falling to Low (negative) with full mitigation. There are therefore no objections on palaeontological grounds to authorization of this project.

7.5.8 Traffic Impact Assessment

The construction of the Solar Power Plants proposed within the 30 km radius will not only have an impact on transportation routes but will also affect the local traffic and surrounding communities. The Traffic Impact Study summarised the expected trips generated by the development of the above-mentioned solar PV plants, along with the background traffic on each of the major roadways. It was found that the cumulative additional trips will not greatly influence the immediate or wider road network. On both transportation routes, the maximum ADT of the major roadways are not exceeded and the cumulative additional trips will not initiate a change in the LOS. It must be noted, however, that on the Durban route the LOS of the N5 (near Bethlehem) is likely to change from LOS B to LOS C. However, the roadway will still continue to operate at an acceptable level of service and therefore no mitigation measures are required due to the short period of impact. The concurrent construction of 12 other solar farms in a 30 km radius of the site has also been considered and is deemed to have a low impact. Mitigation measures that may be considered, should concurrent construction occur, include the staggering of trips at the site and the implementation of a roads maintenance programme.

Considering the above, a low cumulative impact is expected from a traffic perspective.

7.6 IMPACT ASSESSMENT

Following the definitions of the term, the “residual effects on the environment”, i.e., effects after mitigation measures have been put in place, combined with the environmental effects of past, present and future projects and activities will be considered in this assessment. Also, a “combination of different individual environmental effects of the project acting on the same environmental component” can result in cumulative effects.

7.6.1 Potential Cumulative Effects

The receptors (hereafter referred to as Valued Ecosystem Components (VECs) presented in Section 6 (refer to the matrix analysis) have been examined alongside other past, present and future projects for potential adverse cumulative effects. A summary of the cumulative effects discussed are summarized in Table 7.4. There have been 22 specific VECs identified with reference to the Inyathi Solar Power Plant (Table 6.2), which relates to the biophysical and socio-economic environments. Table 7.4 indicates the potential cumulative effects VECs and the rationale for inclusion/exclusion.

Table 7.4: Potential Cumulative Effects for the proposed project

	Valued Ecosystem Components (VECs)	Rationale for Inclusion / Exclusion	Level of Cumulative Effect
	Construction Phase		
Terrestrial Biodiversity	Loss of habitat, and disruption of surrounding ecological corridors. As well as the influences of pollution (water, noise, air, etc.).	Approximately 30% of the Carletonville Dolomite Grassland vegetation type has been lost, and as discussed above the proposed development will result in a further loss of approximately 24,96 % from only similar developments (Solar) in the area, as such the cumulative impact from the proposed development is rated as "high". This means that the careful spatial management and planning of the entire region must be a priority, and existing large infrastructure projects must be carefully monitored over the long term.	- High
Avifaunal Impact Assessment	Loss of habitat, and disruption of surrounding ecological corridors. As well as the influences of pollution (water, noise, air, etc.).	The development of the Solar Power Plant will result in the loss of suitable habitat for Avifauna within the PAOI. Therefore, the loss of habitat will result in a negative high cumulative impact. However, with the implementation of the mitigation measures it can be reduced to a possible negative medium.	- High
Agricultural and Soils Impact Assessment	Loss of agricultural land	There are no significant other land uses, apart from renewable energy, that are competing for agricultural land in the area, and so the total cumulative loss of agricultural land from all competing land uses is not significantly higher than what has been considered above. Limited residual impacts will be associated with these activities, assuming that all prescribed mitigation measures be strictly adhered to.	- Low

Heritage Impact Assessment	Loss or damage to sites, features or objects of cultural heritage significance	It was determined that the Inyathi project is located in an area with a very low presence of heritage sites and features. Because of the low likelihood of finding further significant heritage resources in the area of the proposed for development and the generally low density of sites in the wider landscape the overall impacts to heritage are expected to be of generally low significance before mitigation.	- Low
Palaeontological Impact Assessment	Disturbance, damage or destruction of legally-protected fossil heritage within the development footprints during the construction phase (impacts on well-preserved and / or rare fossils of scientific and conservation value)	The general Palaeontological Sensitivity of the area is Low to Very High according to the SAHRIS Palaeomap. However, it is important to note that the quality of preservation of these different sites will most probably vary and it is thus difficult to allocate a Cumulative Sensitivity to the projects. If all the mitigation measures are carried out, a conservative estimate of the Cumulative impacts on fossil Heritage will vary between Low and Medium.	- Low
Social Impact Assessment	Impacts of employment opportunities, business opportunities and skills development	Inyathi SPP and the establishment of other solar power projects within the area has the potential to result in significant positive cumulative impacts, specifically with regards to the creation of a number of socio-economic opportunities for the region, which in turn, can result in positive social benefits. The cumulative benefits to the local, regional, and national economy through employment and procurement of services are more considerable than that of Inyathi SPP alone.	+ Medium
	Impact with large-scale in-migration of people	The development of several projects may have a cumulative impact on the in-migration and movement of people. Levels of unemployment, and the low level of earning potential may attract individuals to the area in search of better employment opportunities and higher standards of living.	- Medium

Traffic Impact Study	Increase in construction vehicles	The construction of the solar power plants will have a minimal impact on the current traffic volumes for long distance transportation routes. The chances of local traffic being adversely affected by the construction traffic is considered extremely low. The construction of the solar power plants will have a definite positive impact on communities of the surrounding towns. As the construction of the solar power plants is of short-term duration, the impacts on the surrounding area will only be temporary. All of the impacts are completely reversible, as the project is of short duration. The significance of the above-mentioned impacts is low, as they are only temporary and extend over a short time period.	- Low
Operational Phase			
Terrestrial Biodiversity	Influences of pollution (water, noise, air, etc.).	Overall emissions and pollutants from solar plants are limited when operational. During the operational phase cumulative impacts to the pollution of soils could happen. Rubble or waste could lead to infiltration of unwanted pollutants into the soil. Spilling of petroleum fuels and unwanted chemicals onto the soils that infiltrate these soils could lead to pollution of soils and if this happens at a number of solar plants in an area, the cumulative effect could be detrimental to the local environment.	- Low
Visual Impact Assessment	Visual impacts related to the SPP and power line	The anticipated cumulative visual impact of the proposed SPP is expected to include the change in sense of place, as well as the precedent being set for SPP in the area where currently there is only a precedent predominantly for agricultural. Due to the abundance of natural vegetation in the area, the scenic quality of the region is high, further construction and operation of the SPP in the area is likely to have a negative impact.	- Medium
	Decommissioning Phase		

Visual Impact Assessment	Visual Intrusion	The decommissioning of the PV plant and 132kV power line may increase the cumulative visual impact together with farming activities and people using the existing gravel roads Inyathi PV adjacent to site increasing the amount of dust generated. Dust control and housekeeping will be the main factors to take into account.	- Low
Other	Generation of waste	An additional demand on municipal services could result in significant cumulative impacts with regards to the availability of landfill space.	- Medium

7.7 CONCLUSION

This chapter of the draft EIR addressed the cumulative environmental effects of the construction, operation and decommissioning project phases. The information to date has shown that no significant adverse residual impacts are likely. However, cumulative impacts could arise as other similar projects are constructed in the area.

The potential most significant cumulative impacts relate to:

- Cumulative effects during construction phase:
  - Loss of habitat, and disruption of surrounding ecological corridors. As well as the influences of pollution (water, noise, air, etc.). (- High)
  - Loss of agricultural land (- Low)
  - Loss or damage to sites, features, or objects of cultural heritage significance (-Low)
  - Disturbance, damage or destruction of legally protected fossil heritage within the development footprints during the construction phase (impacts on well-preserved and / or rare fossils of scientific and conservation value) (-Low)
  - Impacts of employment opportunities, business opportunities and skills development (+ Medium)
  - Impact with large-scale in-migration of people (-Medium)
  - Increase in construction vehicles (-Low)

- Cumulative effects during the operational phase:
  - Influences of pollution (water, noise, air, etc.). (- Low)
  - Visual impacts related to the SPP and power line (- Medium)
- Cumulative effects during the decommissioning phase:
  - Visual intrusion (- Low
  - Generation of waste (- Medium)

The cumulative impact for the proposed development is high to low and no unacceptable impacts related to the project are expected. Considering the extent of the project and information presented in Section 7 of this report, it can be concluded that the cumulative impacts will not result in large scale changes and impacts on the environment. Photovoltaic solar energy technology is a clean technology

which contributes toward a better-quality environment. The proposed project will contribute to local economic growth by supporting industry development in line with provincial and regional goals and ensuring advanced skills are drawn to the North West Province. No cumulative impacts with a high residual risk have been identified. In terms of the desirability of the development of renewable energy, it may be preferable to incur a higher cumulative loss in such a region as this one, than to lose land with a higher environmental value elsewhere in the country. Also, the low acceptable cumulative impacts expected will not result in a whole-scale change of the environment and therefore are considered to be acceptable, and considering the associated positive impacts associated with the development of solar energy facilities the proposed facility is considered desirable.

8 ENVIRONMENTAL IMPACT STATEMENT

This section aims to address the following requirements of the regulations:

Appendix 3. (3) An EIR (...) must include-

(I) 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;

(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;

(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;

(q) 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 conditions that should be made in respect of that authorisation;

8.1 SUMMARY OF KEY FINDINGS AND ASSESSMENT RESULTS

Based on the contents of the report the following key environmental issues were identified, which were addressed in this EIA report:

- Impacts during construction phase:
- Impacts on the fauna and flora (- Medium and- Low)
- Impacts to avifauna (- High and -Medium)
- Impacts on soil and agriculture (- Low)
- Visual impacts (-Medium and- Low)
- Impacts on wetland (-Medium and -Low)
- Social impacts (+Low and + Medium)
- Impacts on heritage resources (-Low)
- Impacts on palaeontology (- medium)
- Traffic impacts (- Low)
- Impacts during the operational phase:
- Impacts on the fauna and flora (- Medium and Low)
- Impacts to avifauna (-High and - Medium)

- Impacts associated with the soil and agriculture (- Low)
- Visual impacts (- Medium and Low)
- Social impacts (-+Low and +Medium)
- Impacts on heritage resources (- Low)

➢ Impacts during the decommissioning phase:

- Impacts on the fauna and flora (+ Medium and +Low)
- Impacts to avifauna (-Low)
- Impacts associated with the soil and agriculture (-Low)
- Impacts on heritage resources (- Low)

Cumulative biophysical impacts resulting from similar development in close proximity to the proposed activity are expected to occur, however the cumulative impact assessment included in Section 7 of this report has indicated that all cumulative impacts will be of a medium or low significance, with no impacts expected to be of a high and unacceptable significance.

8.2 SENSITIVITY ANALYSIS SUMMARY AND SITE-SPECIFIC CONDITIONS

The sensitivity analysis has guided the developer in optimising the final layout of the Inyathi Solar Power Plant through identifying specific environmental areas and features present within the site which needs to be avoided through the careful placement of infrastructure as part of the development footprint. Refer to Section 6.4 for the complete sensitivity analysis and Figure G for the final layout map which avoids the areas required to be conserved.

The main features to be avoided are related to the wetlands located within the grid connection corridor can therefore be avoided through careful placement of the power line infrastructure (i.e. pylons and service road).

Further mitigation measures for the development, as recommended by the independent specialists, have been included in the EMPr(s) for the project as per Appendix F1-F4.

8.3 TECHNICAL DETAILS OF THE PROPOSED INFRASTRUCTURE TO BE AUTHORISED

- PV Panel Array - To produce up to 150MW, the proposed facility will require numerous linked cells placed behind a protective glass sheet to form a panel. Multiple panels will be required to form the solar PV arrays which will comprise the PV facility. The PV panels will be tilted at a northern angle in order to capture the most sun.
- Wiring to Central Inverters - Sections of the PV array will be wired to central inverters. The inverter is a pulse width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency.
- Connection to the grid - Connecting the array to the electrical grid requires transformation of the voltage from 480V to 33kV to 132kV. The normal components and dimensions of a distribution rated electrical substation will be required. Output voltage from the inverter is 480V and this is fed into step up transformers to 132kV. An onsite substation will be required on the site to step the voltage up to 132kV, after which the power will be evacuated into the national grid. Whilst Inyathi Solar Power Plant (RF) (Pty) Ltd has not yet received a cost estimate letter from Eskom, it is expected that generation from the facility will tie in with

Watershed 275/132/88 MTS Substation. The Project will inject up to 100MW into the National Grid. The installed capacity will be approximately 150MW.

- Electrical reticulation network – An internal electrical reticulation network will be required and will be lain ~2-4m underground as far as practically possible.
- Supporting Infrastructure – The following auxiliary buildings with basic services including water and electricity will be required on site:

  - Office (~200 m²);
  - Switch gear and relay room (~400 m²);
  - Staff lockers and changing room (~200 m²); and
  - Security control (~60 m²)

- Battery Energy Storage System – A Battery Storage Facility with a maximum height of 8m and a maximum volume of 1,740 m^3 of batteries and associated operational, safety and control infrastructure.
- Roads – Access will be obtained from the R505 Regional Road onto a proposed existing gravel access road situated adjacent the development footprint where direct access will be obtained to the facility. An internal site road network will also be required to provide access to the solar field and associated infrastructure. The access and internal roads will be constructed within a 25-meter corridor.
- Fencing - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding properties. Fencing with a height of 2.5 meters will be used.

8.4 RECOMMENDATION OF EAP

The final recommendation by the EAP considered firstly if the legal requirements for the EIA process had been met and secondly the validity and reliability of the substance of the information contained in the EIA report. In terms of the legal requirements it is concluded that:

- The scoping phase complied with the agreement and specification set out in Regulation 21 and Appendix 2 EIA Regulations (as amended in 2017) – already approved by the environmental authority.
- All key consultees have been consulted as required by Chapter 6 of the EIA Regulations (as amended in 2017) and the public participation plant - already approved by the environmental authority.
- The EIA process has been conducted as required by the EIA Regulations (as amended in 2017), Regulations 23 and Appendix 3.
- The EMPr has been compiled in accordance with Appendix 4 of the EIA Regulations (as amended in 2017).
- The proposed mitigation measures will be sufficient to mitigate the identified impacts to an acceptable level.
- No additional specialist studies are proposed on any environmental issue raised and therefore, no terms of reference are provided for such studies.

In terms of the contents and substance of the EIA report the EAP is confident that:

- All key environmental issues were identified during the scoping phase. These key issues were adequately assessed during the EIA phase to provide the environmental authority with sufficient information to allow them to make an informed decision.

The final recommendation of the EAP is that:

It is the opinion of the independent EAP that the proposed development will have a net positive impact for the area and will subsequently ensure the optimal utilisation of resources. All negative environmental impacts can further be effectively mitigated through the proposed mitigation measures and avoidance of certain areas within the site as recommended by the specialists. Based on the contents of the report it is proposed that an environmental authorisation be issued, which states (amongst other general conditions) that the Inyathi Solar Plant and associated infrastructure, Registration Division IP, North West Province be approved subject to the following conditions:

- Implementation of the proposed mitigation measures set out in the EMPrs (Appendix F1-F4).
- Implementation of the proposed mitigation measures set out in the specialist studies.
- The proposed solar facility must comply with all relevant national environmental laws and regulations.
- All actions and tasks allocated in the EMPr should not be neglected and a copy of the EMPr should be made available onsite at all times.
- Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.
- The required biodiversity walk-throughs must be undertaken prior to construction.
- The period for which the Environmental Authorisation is required is between 7 and 10 years. This is based on the fact that the project is proposed to be bid as part of the DMRE REIPPP Programme, with there being uncertainty regarding the announcement of the next bidding rounds, and the need for a valid Environmental Authorisation.

We trust that the department find the report in order and await your final decision in this regard.

Ms Lisa Opperman

Environamics Environmental Consultants

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