



**PROPOSED CARPE DIEM NORTH SOLAR PHOTOVOLTAIC PLANT AND
ASSOCIATED INFRASTRUCTURE ON PORTION 5 OF THE FARM
VARKENSLAAGTE NO. 119 IQ, NEAR CARLETONVILLE, MERAUFONG CITY
MUNICIPALITY, GAUTENG**

FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

June 2025

REF NO: 22026-CDNSPP-FEIR-002

PROJECT DETAILS

TITLE	Proposed Carpe Diem North Solar Photovoltaic Plant and Associated Infrastructure on Portion 5 of the Farm Varkenslaagte No. 119 IQ, near Carletonville, Merafong City Local Municipality, West Rand District Municipality, Gauteng
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The Author / Environmental Assessment Practitioner (EAP) herewith confirms the correctness of the information provided in this Report, including supporting documents and reports, to the best of his/ her knowledge.

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Legacy EMC has no beneficial interest in the outcome of the assessment which is capable of affecting its independence.



Kim Pontac

(Managing Director / Principal Environmental Assessment
Practitioner)

Signature of the Principal Environmental Assessment Practitioner

Legacy Environmental Management Consulting (Pty) Ltd

Name of the Company

June 2025

Date

EA Information Required for Solar Energy Facilities

In the comments provided on the Draft Environmental Impact Assessment Report (DEIAR), the National Department of Environment, Forestry and Fisheries (DFFE) requested that the project facility and infrastructure information be presented in tabulated form:

General Details for the proposed Carpe Diem North SPP Project		
Site Information	Note/ Reference	Section of report in which detail is provided
Descriptions of all affected farm property	Portion 5 of Farm Varkenslaagte No. 119 IQ	Section 1.1
Extent of property	Approximately 290 ha	Section 1.1
21-digit Surveyor General codes of all affected farm portions	T0IQ00000000011900005	-
Copies of deeds of all affected farm portions	A copy of the Title Deed is attached as Appendix 3 to the Application Form.	-
Photos of areas that give a visual perspective of all parts of the site	Refer to the Photosheet in Appendix B.	Appendix B
Photographs from sensitive visual receptors (tourism routes, tourism facilities, etc.)	Refer to the Photo Sheet in Appendix B and the Visual Impact Assessment (Appendix D5).	Appendix B and Appendix D5
Solar plant design specifications including:	Refer to Section 4 of this report and to the Engineering Services Report (Appendix D9)	Section 4 and Appendix D9

Minimum Technical Details of the Proposed Carpe Diem SPP		
Component	Description/Dimension(s)	Section of report in which detail is provided
Surface area to be covered by entire SPP facility i.e., solar arrays, PV panels including associated infrastructure such as roads and fencing	Approximately 160 ha	Section 4.6.1
SPP generation capacity/ Maximum capacity of PV facility	Up to 150 MW	Section 1.3

Capacity of on-site SPP substation	Up to 150 Megavolt-Amperes (MVA)	
Area occupied by on-site substation	Approximately 1.3 ha to 2 ha (comprising a 100 m x 100 m collector station section and a 50 m x 50 m switching station section).	Section 1.4 and 4.7.1
PV panel mounting structure	PV panels ground based solar PV panel support frame and infrastructure	Section 10.1.1
PV panel height/structure height	The minimum ground clearance is 0.5 m above ground (from the 'toe' edge of the panel table when tilted at 60 degrees), which places the middle of the panel (following the posts) at a minimum of 1.5 m to 2 m above ground. At full tilt, the 'head' edge or maximum height of the panel table will not exceed 5 m.	Section 4.6
Surface area to be covered by solar arrays/PV panels and Inverter-transformer stations/Power boxes	At least 85 ha	Section 1.4, 4.6.1 and Appendix J
Type of solar PV technology	Crystalline silicon or thin film technology PV solar panels	Section 6.4.1 and 6.4.2
PV panel structure orientation	The PV panels will be mounted on North-South oriented single axis trackers, so the panels would be facing East or West depending on the time of day and the tilt angle of the tracker. The tracking angle limits are +60/-60 degrees. Refer to Section 4.6 of this report.	Section 4.6
Laydown area dimensions/ Area occupied by both permanent and construction laydown areas	Approximately 4 ha of laydown area will be required for the SPP (the laydown area and on-site SPP BESS footprint will not exceed 5 ha and will be situated within the assessed footprint). Permanent laydown area: the laydown area at the substation will remain permanent SPP laydown area. Temporary laydown area comprises a construction yard/camp and staging/laydown area of around 4 ha, as well as a temporary 'mobile' laydown area during construction which will be located on an area already cleared for the development of a PV power plant/island. This 'mobile' laydown area will occupy approximately 1 ha to 2 ha along the 'working face' of where the PV arrays are being constructed and will move to the next cleared power plant island as construction progresses. It should be noted that no bulk residence of labour will take place on site at the construction camp. The construction camp will consist of temporary canteen/eating facilities, ablution facilities with staff lockers and potable water supply.	Section 1.3
On-site SPP BESS footprint	Up to approximately 1 ha	Section 1.4
On-site BESS technology	Preferred alternative (Alternative 1): Solid State Batteries	Section 6.4

Alternative 2: Fluid or Redox Flow Batteries		
Power lines capacities i.e., overhead power line (OPL) or underground power line (UPL)	132 kV power lines will be used to evacuate electricity into the National Grid.	Section 1.4 and 4.7.5
Power line lengths	The preferred grid connection alternative (Alternative 1) will be a less than 100 m OPL Approximately The next preferred grid connection alternative (Alternative 2) will be a less than 150 m UPL The least preferred grid connection alternative (Alternative 3) will be less than 900 m in length and comprise of approximately 520 m UPL and approximately 360 m OPL.	Section 6.5, Figures 2 to 4 and Appendix K1.
Area occupied by Operation & maintenance buildings/office/ablutions	Approximately 0.3 ha to 1 ha (not more than 1 ha)	Section 1.4, Appendix K1 and Appendix D9
Width of internal roads	4 m to 8 m (note: existing roads, track will be used wherever possible)	Section 1.4 and 4.7.2
Height of fencing	3 m to 3.5 m	Section 1.4 and 4.7.5
Storm water attenuation pond footprint	0.0476 ha	Section 4.2 and Appendix K1

Executive Summary

Legacy Environmental Management Consulting (Pty) Ltd (Legacy EMC), has been appointed by JUWI Renewable Energies (Pty) Ltd (JUWI) as the independent Environmental Assessment Practitioner (EAP)¹ to undertake the application for environmental authorisation (EA) as required by the National Environmental Management Act (Act No. 107 of 1998), as amended (NEMA), and the Environmental Impact Assessment (EIA) Regulations of 2014, as amended, for the proposed development of the Carpe Diem North Solar Photovoltaic Plant (SPP).

Submission and Acceptance of the Final Scoping Report

The Final Scoping Report, which incorporated comments received on the Draft Scoping Report and responses thereto, was submitted to the Competent Authority, the Department of Forestry, Fisheries and the Environment (DFFE), in terms of Regulation 21 of the 2014 EIA Regulations on 06 February 2025. The DFFE accepted the report on 18 March 2025 allowing Legacy EMC to proceed with the tasks outlined in the Plan of Study for Environmental Impact Assessment (EIA).

Introduction

This application to obtain an EA for the proposed Carpe Diem North SPP Facility is in response to the Department of Mineral Resources and Energy (DMRE's) revised Integrated Resource Plan (IRP 2019) strategy to expand South Africa's electricity generation capacity and increase the electricity generated through renewable means, thereby reducing reliance on coal-fired electricity production and the frequency of loadshedding events, while contributing towards achieving the country's climate change / environmental commitments.

Background

The proposed Carpe Diem North SPP is a large-scale photovoltaic (PV) solar electricity generating facility with associated infrastructure, which lies within a Strategic Transmission Corridor. It is located in the area immediately north of, and adjacent to, Eskom's Carmel Main Transmission Substation (MTS), on Portion 5 of the Farm Varkenslaagte No. 119 IQ, near Carletonville, West Rand District Municipality, Gauteng. The development site property extends over approximately 290 hectares (ha) and the proposed development will have an electricity generation capacity of up to 150 megawatts (MW).

The Carpe Diem North SPP and associated infrastructure is located approximately 2 km south of the residential area of Welverdiend and 8.5 km south-west of the town of Carletonville in the Merafong City Municipality, Gauteng. The proposed development footprint is in a rural area i.e. it falls outside of the nearest town's urban edge. The property is zoned Agriculture I but does not require rezoning to Industrial to accommodate the proposed development since the Merafong City Local Municipality's Merafong Land Use Management Document, 2020 states that, *"Renewable Energy Infrastructure is a primary land use right under the zoning of "Agriculture". Therefore, no re-zoning is required as the rights are already allocated, in terms of the scheme"*.

Originally, the Carpe Diem site was viewed as one project made up of two sections viz. Carpe Diem North, on Portion 5 of the Farm Varkenslaagte No. 119 IQ which lies immediately to the north of Eskom's Carmel Main Transmission Substation (MTS) on Portion 23 of the Farm Doornfontein No. 118 IQ, and Carpe Diem South,

¹ Refer to Appendix A for EAPs *Curricula Vitae*

on Portion 27 of the Farm Doornfontein No. 118 IQ which lies immediately to the south of Eskom's Carmel MTS.

At the time, all specialists were appointed to assess the total, 'Carpe Diem', project area. Therefore, some Specialist Reports as appended to this FEIAR, include assessments of both Portion 5 of the Farm Varkenslaagte No. 119 IQ, as well as Portion 27 of the Farm Doornfontein No. 118 IQ, as one combined assessment. Nonetheless, the Specialists' sensitivity mapping/s contained in their respective reports, clearly indicate the site applicability of the respective assessment/s.

In addition, subsequent to the initiation of the original project, JUWI saw the opportunity to take advantage of the then recently adopted Battery Storage Exclusion Norm for the Exclusion of Identified Activities Associated with the Development and Expansion of Battery Storage Facilities from the Requirement to obtain an EA, as per Government Notice No. 4557, published in Gazette No. 50387, 27 March 2024 (the 'Norm'). JUWI then proposed the registration of an independent, stand-alone Battery Energy Storage System (BESS) facility under the Norm i.e., the Carpe Diem North BESS 1 (Pty) Ltd Facility, in the southern section of the Carpe Diem North SPP development property. This stand-alone BESS Facility was not linked to the Carpe Diem SPP in any way but was intended to serve the purpose of storing excess electricity from the National Grid for use during periods of peak demand or when there were shortfalls in National electricity supply. Consequently, some specialist reports indicate the proposed footprint for this stand-alone BESS Facility.

Although registration of the Carpe Diem North BESS 1 (Pty) Ltd Facility (or CDN BESS 1 Facility) was granted, as a completely separate project to the Carpe Diem North SPP development, the stand-alone CDN BESS 1 Facility was not selected as a preferred bidder. The Draft and Final Scoping Reports for the proposed Carpe Diem North SPP development indicated six layout alternatives for the SPP, three of which accommodated the potential development of the Carpe Diem North BESS 1 Facility.

Since the stand-alone BESS Facility was not successful as a preferred bidder, reference to it occupying part of what would have been the Carpe Diem North SPP site development layout, was removed in the Draft Environmental Impact Assessment Report (DEIAR) and this Final Environmental Impact Assessment Report (FEIAR). Therefore, besides the no-go alternative, there are now only three potential Carpe Diem North SPP (layout) alternatives.

Since many of the Specialist reports were compiled before removal of the Carpe Diem North BESS 1 (Pty) Ltd Facility from the scope of the EIA application, the stand-alone BESS footprint may still appear in certain Specialist Report maps of the site. Specialists were instructed to assess stand-alone BESS footprint first in terms of the development of a Solar PV array and then in terms of the stand-alone BESS.

It should be noted that the Carpe Diem North SPP has its own small BESS. This FEIAR has used information from the various Specialist Assessments attached in Appendix D, as is relevant to the Carpe Diem **North SPP** site.

Proposed Development Overview

Based on the various project feasibility studies and site verification assessments, the Applicant, JUWI, ultimately opted to propose the development of the approximately 290 ha Carpe Diem North property as an independent SPP with an electricity generation capacity of up to 150 MW, as well as an on-site SPP substation.

The on-site Carpe Diem North SPP substation and power line grid connection will most likely be a less than 100 meter (m), Loop-in, Loop-out (LiLo) tie-in to an existing 132 kilovolt (kV) Eskom High Voltage (HV) overhead power line (OPL) with runs through the development property. This is the Applicant's most preferred

layout alternative (Alternative 1) for the project and is located entirely on the development site i.e., Portion 5 of the Farm Varkenslaagte No. 119 IQ.

The remaining two layout alternatives have power line corridor footprints which fall partly on the proposed development site and partly on the neighbouring Eskom Carmel Main Transmission Substation property i.e., Portion 23 of the Farm Doornfontein No. 118. The actual Carpe Diem North SPP grid connection route will be confirmed after grid connection negotiations with Eskom are finalised. **All alternatives, including the No-Go Alternative, are discussed in detail in Section 6** of this report.

The generating component of the SPP contains ground-based photovoltaic (PV) panel arrays mounted on either a single or dual-tracking axis system.

The proposed Carpe Diem North SPP development entails permanent and temporary/construction infrastructure development:

- Permanent infrastructure consists of the solar panel array, fencing, 4 m to 8 m wide internal (dirt/gravel) access roads, SPP inverters and transformers, an on-site substation including control rooms, operation and maintenance buildings including offices, ablutions, storage buildings, a conservancy tank, water storage facilities, stormwater management and OPL pylons leading from the on-site substation to a point of connection with the National electricity grid. The on-site substation will comprise a collector station portion and a switching station portion.
- Temporary/construction infrastructure includes lay-down area/s, construction site offices, storage buildings, as well as a batching plant and stockpile area. Construction ablutions would be provided by means of regularly serviced portable toilets and tanker trucks would supply water.

Water supply will be sourced from either neighbouring farms or third-party water suppliers and trucked onto site for storage in above-ground water tanks.

Sewage will be treated via an on-site sewage package plant and conservancy tank which will be serviced (emptied) as required by a registered service provider.

Waste (domestic and hazardous) will be temporarily stored on site in a designated area for periods of not more than and removed to the nearest appropriately registered waste disposal site via contracted service providers.

Electricity will be sourced from the SPP itself.

Access to the site will be via existing public roads which have been assessed by a Traffic Specialist and regarded as adequate to service the needs of the construction and operation phases of the proposed development.

The proposed Carpe Diem North SPP EA application consists of three main portions:

- i. The 150 MW Carpe Diem North SPP panel array with inverter-transformer stations;
- ii. the on-site Carpe Diem North SPP substation which is, in essence, divided into two functional portions viz.
 - a. the IPP 'collector substation' portion where evacuated electricity from the SPP facility will be collected, and
 - b. the 'switching station' substation portion where the evacuated electricity will be stepped up/transformed from 33 kV to 132 kV before it is fed into the national grid;
- iii. the 132 kV overhead power line strung on steel lattice pylons which will conduct electricity towards the point of connection with the national grid at Eskom's adjacent Carmel Substation.

As is common for these types of projects, the bulk of the permanent grid connection infrastructure which connects the project to the national grid via Eskom's Carmel Substation, will be handed over to Eskom once built. Future Eskom infrastructure is the portions ii(b) and iii, as listed above.

The Proponent plans to submit this project in the next Bid Window of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). In the event of an unsuccessful bid, the Proponent intends to bid the project in subsequent REIPPPP bidding windows.

Refer to Sections 1.3 and 4 of this report for a detailed description of the proposed project scope.

The Carpe Diem North SPP application for EA is undergoing a Scoping and EIA process, which complies with the requirements of the NEMA. This FEIAR has been compiled in compliance with Appendix 3 of the 2014 EIA Regulations as amended.

Approach to Environmental Impact Assessment Report

The EAP and specialist team, where applicable, consolidated the development proposal information from the pre-application and Scoping and Draft EIA Phases of this project into this FEIAR, in accordance with the content requirements of Appendix 3 of the 2014 EIA Regulations.

Relevant information from specialist studies, prepared as part of this application, has been incorporated into this report, with updated information provided by the EAP, where required e.g., updated biodiversity mapping, site development plans and latest regulating/guideline documents.

Specific areas of environmental sensitivity identified by independent specialists and the EAP during the Scoping Phase have been avoided and/or addressed by the Proponent in terms of the project development. These sensitivities have been further defined and mitigation measures further refined, in this EIA phase.

Study Area and Proposed Development Layout Alternatives

Besides environmental sensitivities indicated in the DFFE Screening Tool Report (STR), site selection also took into account factors such as geology, land capability, water availability, terrain, solar radiation levels, proximity to Carmel MTS and existing land use before confirming the site suitability for the proposed development. These factors are further expanded upon within this report.

The various sensitivities and technical constraints presented by the proposed development site/study area resulted in three potential layout alternatives for the SPP which, together with the no-go alternative, were considered within this application:

- Alternative 1 (**most preferred alternative**) - SPP development on Portion 5 of the Farm Varkenslaagte No. 119 IQ using all developable land on the property, with a less than 100 m long **LiLo** OPL connection to the existing Eskom 132 kV OPL (refer to Figure 2 and Appendix K1).
- Alternative 2 (next preferred alternative) - SPP using all developable land on the property with a less than 150 m underground power line (**UPL**) connecting to the northern section of Carmel MTS where the UPL becomes an OPL. The UPL will be developed using trenchless excavation i.e., pipe-jacking (refer to Figure 3 and Appendix K1).
- Alternative 3 - (least preferred alternative) - SPP array with a longer grid connection (less than 900 m) comprising an initial underground section (approximately 520 m) which partially follows Alternative 2's UPL route before continuing to run underground along and within the southern boundary of Portion 5

of the Farm Varkenslaagte No. 119 IQ, and surfacing as an OPL (approximately 360 m) skirting around the eastern boundary of the Carmel MTS boundary and connecting to the southern section of the MTS. The UPL becomes an OPL **only after** it has crossed under the existing Eskom HV OPLs which enter Carmel MTS property from the North-east (refer to Figure 4 and Appendix K1).

- **No-go Alternative:** The development does not take place and the *status quo* is maintained.

The above order of Alternative preference is based on securing the most optimal grid connection.

Impact Assessment and Specialist Studies

The EAP and appointed specialist sub-consultants have systematically identified and assessed **potential** environmental impacts associated with the proposed SPP. Cognisance must be taken of the fact that the project development site originally included the neighbouring property to the south of Carmel MTS as explained above and that most of the specialists' studies combined both properties in their reports. This FEIAR has drawn on information relevant to and/or focused on the development footprint on Portion 5 of the Farm Varkenslaagte No. 119 IQ i.e., the Preferred Alternative (Alternative 1). In addition, specific and general measures to avoid and/or mitigate environmental impacts reported on by Specialists have been identified and included in this report.

A summary of the impacts assessed is presented below:

Biophysical Issues/Impacts:

- Impacts on Terrestrial Biodiversity (e.g. loss of vegetation and biodiversity).
- Impacts on Avifauna (e.g. habitat destruction, disturbance of bird roosts and breeding sites; disturbance of foraging behaviour due to noise, dust and lighting).
- Geohydrological Impacts (e.g. potential impact on groundwater quality due to spillage/leakages, groundwater over-abstraction, contamination, reduction in recharge and alteration of flow paths).
- **No-go Alternative** - The agricultural land remains fallow and undeveloped. No impacts as listed above are realised.

Note: According to the Aquatic Biodiversity Specialist, there are no applicable Aquatic Ecosystem impacts related to the development site since there are no natural watercourses or wetland habitats on the property. Consequently, typical Aquatic Ecosystem impacts such as wetland loss, diversion of flow, increased sedimentation and associated erosion, and water quality impairment, do not have relevance to the proposed development site.

Socio-Economic Issues/Impacts:

- Agricultural impacts (e.g. loss of agricultural land);
- Visual impacts (e.g. change to the landscape characteristics and key views caused by the physical presence of project activities);
- Social and economic impacts (e.g. provision of renewable electricity, employment creation, economic benefits, small business opportunity, traffic flow disruption due to heavy vehicle movement, dust and noise, influx of job seekers, local crime, etc.); and
- Traffic impacts (e.g. potential traffic congestion).

- **No-go Alternative** - The agricultural land remains fallow and undeveloped. No impacts as listed above are realised.

Heritage Issues/Impacts:

- Potential impacts on heritage resources (e.g. archaeological and palaeontological).
- **No-go Alternative** - The agricultural land remains fallow and undeveloped. No impacts as listed above are realised.

The following **specialist and technical studies** were commissioned for this project:

- Agricultural Compliance Statement;
- Aquatic Biodiversity Impact Assessment;
- Avifaunal Impact Assessment;
- Geohydrological Impact Assessment;
- Heritage and Archaeological Impact Assessment;
- Socio-Economic Impact Assessment;
- Terrestrial Biodiversity and Plant Species Impact Assessment;
- Traffic Impact Assessment;
- Visual Impact Assessment;
- Engineering Services Report including a Geotechnical Investigation and Stormwater Management Plan;
- Geotechnical Investigation; and
- Glint and Glare Assessment.

The preliminary impact assessment on the identified potential impacts has been discussed in this report, including the baseline receiving environment it may impact on.

The preliminary impact assessment for the construction, operation and decommissioning phases is summarised as follows:

CONSTRUCTION PHASE		
PREFERRED ALTERNATIVE:		
Criteria	Rating Before mitigation	Rating After mitigation
TERRESTRIAL BIODIVERSITY		
Habitat loss and fragmentation		
Status and Nature of the Impact	Negative; High (H)	Negative; Moderate (M)
Loss of SCC		
Status and Nature of the Impact	Negative; High (H)	Negative; Moderate (M)
Increased alien invasive species		

Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Moderate (M)
Increased erosion and soil compaction		
Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Moderate (M)
Littering and general pollution		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
CUMULATIVE IMPACTS		
Loss of vegetation during construction phase		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Moderate (M)
AVIFAUNAL IMPACTS		
Habitat Destruction		
Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Moderate (M)
Disturbance of bird roosts and breeding sites		
Status and Nature of the Impact	Negative; High (H)	Negative; Low (L)
Disturbance due to noise such as machinery movements and maintenance operations		
Status and Nature of the Impact	Negative; High (H)	Negative; Low (L)
CUMULATIVE IMPACTS		
Habitat Loss		
Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Moderate (M)
Collision mortality (vehicle)		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
Collision mortality (infrastructure)		
Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Moderate (M)
VISUAL IMPACTS		
Visual Impacts of the SPP		
Change to the landscape characteristics and key views caused by the physical presence of project activities during the construction phase.		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Moderate (M)
Visual Impacts of the OPL		
Change to the landscape characteristics and key views caused by the physical presence of project activities during the construction phase.		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)
HERITAGE IMPACTS		

Disturbance to unidentified heritage resources		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)
Palaeontological sensitivity impact		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Moderate (M)
SOCIO-ECONOMIC IMPACTS		
PREFERRED ALTERNATIVE		
Economic benefit from local procurement – contribution towards local economic income and employment		
Status and Nature of the Impact	Positive; Moderate (M)	N/A
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Positive; Moderate-High (MH)	N/A
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
Nuisance Factors (Dust and Noise) affecting nearby receptors		
PREFERRED ALTERNATIVE		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Moderate (M)
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
Influx of job seekers increasing employment competition		
PREFERRED ALTERNATIVE		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Moderate (M)
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
Incoming construction workers can disrupt family structures and social networks in local communities		
PREFERRED ALTERNATIVE		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Moderate (M)
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A

Potential increase in local crime		
PREFERRED ALTERNATIVE		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Moderate (M)
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
TRAFFIC IMPACTS		
Increased traffic volume during construction		
Status and Nature of the Impact	Negative; Low (L)	Negligible
CUMULATIVE IMPACTS		
Status and Nature of the Impact	N/A	N/A
GEOHYDROLOGICAL IMPACT		
Potential impact on groundwater quality from accidental oil spills or fuel leakage		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
Impact on groundwater quality due to leakage from BESS		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Very Low (L)
CUMULATIVE IMPACT		
Status and Nature of the Impact	Negative; Low (L)	Negligible

OPERATIONAL PHASE
PREFERRED ALTERNATIVE:

AVIFAUNAL IMPACTS		
Disturbance due to noise such as machinery movements and maintenance operations		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)
Bird Mortalities		
Status and Nature of the Impact	Negative; High (H)	Negative; Moderate (M)
Loss of Bird Foraging Habitat		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)
Disruption of bird migratory pathways		

Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Moderate (M)
Attraction of some novel bird species		
Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Moderate (M)
Chemical Pollution Spills		
Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Low (L)

CUMULATIVE AVIFAUNAL IMPACTS		
Criteria	Rating Before mitigation	Rating After mitigation
Habitat Loss		
Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Moderate (M)
Increased Collision Mortality (Vehicles)		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
Increased Collision Mortality (Infrastructure)		
Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Moderate (M)

TERRESTRIAL BIODIVERSITY		
Terrestrial Biodiversity Impacts		
Loss of species composition and diversity		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Moderate (M)
Increased alien and invasive species		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
Littering and general pollution		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)

GEOHYDROLOGICAL IMPACTS		
Potential impact on groundwater quality due to leakages from BESS.		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Very Low (VL)
Potential impact on groundwater quality due to leakages from cleaning of solar panels.		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)

POTENTIAL POSITIVE SOCIO-ECONOMIC IMPACTS:		
Provision of renewable electricity		
PREFERRED ALTERNATIVE		
Status and Nature of the Impact	Positive; Moderate (M)	N/A

CUMULATIVE IMPACTS		
Status and Nature of the Impact	Positive; High (H)	N/A
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
Contribution towards employment		
PREFERRED ALTERNATIVE		
Status and Nature of the Impact	Positive; Low (L)	N/A
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Positive; Moderate (M)	N/A
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
Contribution towards local economic income		
PREFERRED ALTERNATIVE		
Status and Nature of the Impact	Positive; Moderate (M)	N/A
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Positive; Moderate-High (MH)	N/A
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
POTENTIAL NEGATIVE SOCIO-ECONOMIC IMPACTS		
Sense of Place		
PREFERRED ALTERNATIVE		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Negative; Moderate-High (HM)	Negative; Moderate (M)
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
Local Crime		
PREFERRED ALTERNATIVE		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Very Low (L)
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
Surrounding property values		

PREFERRED ALTERNATIVE		
Status and Nature of the Impact	Negative; Moderate (M)	Positive; Low (L)
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Negative; Moderate (M)	Positive; Low (L)
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A

VISUAL IMPACTS		
Visual Impacts of the SPP		
Change to the landscape characteristics and key views caused by the physical presence of project activities during the operational phase.		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Moderate (M)
Visual Impacts of the OPL Alternatives		
Change to the landscape characteristics and key views caused by the physical presence of project activities during the operational phase.		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)

TRAFFIC IMPACTS		
Increased traffic volume during operation		
Status and Nature of the Impact	Negative; Low (L)	N/A

DECOMMISSIONING PHASE		
TERRESTRIAL BIODIVERSITY IMPACTS		
Loss of habitat		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
Increased alien invasive species		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)

VISUAL IMPACTS		
Visual Impacts of the SPP		
Change to the landscape characteristics and key views caused by the physical presence of Project activities		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)
Visual Impacts of the OPL Alternatives		

Change to the landscape characteristics and key views caused by the physical presence of Project activities

Status and Nature of the Impact

Negative; Low (L)

Negative; Low (L)

In addition to the potential direct and indirect impacts identified above, the cumulative impact assessment for the proposed SPP development and associated infrastructure has been conducted in accordance with applicable guidelines.

The assessment considered the potential combined effects of this project in conjunction with other existing and planned developments within a 30 km radius. Key cumulative impacts identified include the loss of terrestrial and aquatic biodiversity, habitat fragmentation, visual impacts, and socio-economic changes.

Through the implementation of stringent mitigation measures, strategic site planning, and the avoidance of high-sensitivity areas, the cumulative impact significance has been minimized. Where cumulative impacts remain moderate, further mitigation and monitoring strategies have been recommended to ensure that the overall impact is managed in a sustainable manner:

Measures to Avoid, Mitigate and/or Manage Environmental Impacts

Several mitigation measures have been proposed to avoid, reduce and/or manage actual and potential impacts associated with the proposed development.

These measures are elaborated on in Section 9 of this report and have been incorporated into the EMPs for the project (Appendix I).

Public Participation

Potential Interested and Affected Parties (I&APs) were notified of the availability of the Draft Scoping Report (DSR) for at least a 30-day review and comment period:

13 November 2024

- Site notices displayed on boundary fences of the proposed development property (Portion 5 of the Farm Varkenslaagte No. 119 IQ);
- Background information posters and documents placed at the public library in Carletonville.

14 November 2024

- Advertisement placed on 14 November 2024 in the local newspaper i.e., the *Carletonville Herald*;
- DSR-related documents available on the website from 14 November 2024 to 24 January 2025;
- Email notification of all previously registered and potential I&APs and identified Organs of State of availability of DSR and associated documents.

The DSR was made available as a hard copy at the Carletonville Public Library, and electronically, on the following website: www.legacyemc.co.za.

Hard copies of the DSR were also made available to any Organs of State requesting the same.

The Final Scoping Report (FSR) was submitted to the DFFE on 06 February 2025 and comments and acceptance of the FSR and Plan of Study was received from the Department on 18 March 2025.

All comments received during the public participation processes (PPP) to date, were captured and have been responded to in the Comments and Responses Report (C&RR) attached as Appendix C5 and submitted to the Competent Authority. Actual comments as received from I&APs were also submitted to the Competent Authority as Appendix C6.

Since the Scoping Phase of the project's environmental assessment has been concluded, the project is currently in the EIA Phase. During the EIA Phase, I&APs will have an opportunity to comment of the DEIAR and further scrutinise impact assessments and mitigations measures.

The comment period on the DEIAR, ran from 05 May 2025 to 06 June 2025. All comments received during this period were incorporated into the FEIAR, which has now been submitted to the DFFE for an EA decision.

Once an EA decision is issued by the Competent Authority, I&APs will have the further opportunity to participate in the NEMA EIA process through the appeal process, should they wish to contest the decision.

The I&AP database and associated PPP documents was updated through the Scoping and Environmental Impact Assessment (S&EIA) process progresses. I&APs were requested to disclose any direct business, financial, personal or other interests which they may have as relevant to the approval or refusal of an application.

I&APs have been encouraged to disclose any relevant direct business, financial, or personal interests. All comments on the Draft and Final Scoping Reports, DEIAR and/or the Background Information Document (BID) were considered and incorporated into this FEIAR in compliance with the EIA Regulations of 2014 (as amended).

Please note that comments submitted by I&APs may become public information. Legacy EMC respects data privacy and processes personal information in accordance with the Protection of Personal Information Act (No. 4 of 2013), as amended. For more details, please refer to Legacy EMC's Privacy Notice and Privacy Policy available on the website.

Concluding Statement

This FEIAR has identified and preliminarily assessed the actual and potential biophysical and socio-economic impacts associated with the construction, operation and decommissioning of the proposed Carpe Diem North SPP development and associated infrastructure (as indicated in Appendix J1) on Portion 5 of the Farm Varkenslaagte No. 119 IQ, near Carletonville, Merafong City Local Municipality, West Rand District Municipality, Gauteng.

The proposed development will result in positive and negative environmental impacts, although the latter are of relatively limited intensity, given:

- i. the disturbed nature of much of the project area which has largely been transformed through agricultural activities;
- ii. that the avoidance of development in no-go areas, as designated by the respective specialists, will be adhered to;
- iii. that where High/Very High sensitivity rated areas cannot be avoided, the inclusion of mitigation measures as recommended by the Specialists are implemented; and

- iv. that much of the natural environment surrounding the proposed development site has also been largely transformed through high-density residential complexes (to the north), and industrial activities such as mining (to the west and south-east).

The negative environmental impacts during construction, (such as noise, intermittent dust blow-off, or clearance of indigenous vegetation), have been assessed in the respective specialist studies, and will either be completely avoided or, where avoidance is not possible, mitigated by implementing control and management measures.

The potential negative impacts resulting from the operation of the solar PV plant (such as the visual impact and loss of agricultural land) will also be mitigated, where possible, by implementing control and management measures to reduce, or remove, the negative impact.

Consequently, the findings of the specialist studies as summarised in the Scoping and EIA Phase is that none of the anticipated adverse impacts are considered to be unacceptable as they can be managed to tolerable levels through the effective implementation of recommended mitigation measures.

Relative to the national and local socio-economic positive impacts, the proposed Carpe Diem North SPP project will provide socio-economic benefits as a result of the provision of jobs and renewable energy.

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Appendix List

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Appendix B *Photo Sheet*

Appendix C *Public Participation*

- Appendix C1: Proactive I&AP Database
- Appendix C2: Background Information Document
- Appendix C3: Site Notice and Newspaper Advert
- Appendix C4: Proof of I&AP Notification
- Appendix C5: Comments & Responses Report
- Appendix C6: Comments Received

Appendix D *Specialist Studies*

- Appendix D1.1: Agricultural Compliance Statement
- Appendix D2: Aquatic Biodiversity Impact Assessment
- Appendix D3.1: Terrestrial Biodiversity Impact Assessment
- Appendix D3.2: Animal Species Compliance Statement
- Appendix D4.: Avifaunal Impact Assessment
- Appendix D5: Visual Impact Assessment
- Appendix D6.1: Heritage Impact Assessment
- Appendix D6.2: Palaeontological Impact Assessment
- Appendix D7: Socio-Economic Impact Assessment
- Appendix D8: Traffic Impact Assessment
- Appendix D9: Engineering Services Report and Stormwater Management Plan
- Appendix D10: Geohydrological Assessment
- Appendix D11: Geotechnical Investigation
- Appendix D12: Glint and Glare Impact Assessment

Appendix E *DFFE Screening Tool Report (STR)*

Appendix F *Impact Assessment Tables*

Appendix G *Site Sensitivity Verification Report (SSVR)*

Appendix H *EAP and Specialist Declarations*

Appendix I *Environmental Management Programme (EMPr)*

- Appendix I1: Generic EMPr for the OPL
- Appendix I2: Generic EMPr for the Substation
- Appendix I3: Standard EMPr for the SPP project

Appendix J *Site Development Plans/Layouts (all Alternatives)*

- Appendix J1: Alternative 1
- Appendix J2: Alternative 2
- Appendix J3: Alternative 3

Appendix K *Other*

- Appendix K1: Site Layouts & Co-ordinates
- Appendix K2: Final Decision
- Appendix K3: Provincial Gazette No. 390 (West Rand District Municipality Bioregional Plan)
- Appendix K4: Site Layout Map with Sensitivities
- Appendix K5: DWS General Authorisation

Terminology

The following abbreviations are used in this report:

Abbreviations	Description
AADD	Annual average daily demand
AIS	Alien Invasive Species
BESS	Battery Energy Storage System
BID	Background Information Document
BPEO	Best Practical Environmental Option
CA	Competent authority
CARA	Conservation of Agricultural Resources Act, Act 43 of 1983
CBA	Critical Biodiversity Area
CBO	Community Based Organisation
CGS	Council for Geoscience
COP	Conference of the Party
CSP	Concentrated solar power
CVBW	Channelled Valley Bottom Wetland
CWAC	Coordinated Waterbird Counts, a programme of bird censuses at a number of South African wetlands. See http://cwac.adu.org.za for more information.
C-Plan V 3.3	(Gauteng) Conservation Plan Version 3.3
C-Plan V4	(Gauteng) Conservation Plan Version 4.0
C&RT	Comments and Responses Table
DEA	Department of Environmental Affairs (now DFFE)
DFFE	Department of Forestry, Fisheries and the Environment
DoE	Department of Energy
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
DWAF	Department of Water Affairs and Forestry
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMC	Environmental Management Consulting
EMF	Environmental Management Framework

Abbreviations	Description
EMPr	Environmental Management Programme
ESA	Ecological Support Area
EIR	Environmental Impact Report/Reporting
DEIAR	Draft Environmental Impact Assessment Report
FEIAR	Final Environmental Impact Assessment Report
FWRDWA	Far West Rand Dolomitic Water Association
Gauteng C-Plan	Gauteng Conservation Plan
GDARD	Gauteng Department of Agriculture, Rural Development and Environment
GDP	Gross Domestic Product
GGP	Gross Geographic Product
GIFA	Gauteng Infrastructure Financing Agency
GN	Government Notice
GNR	Government Notice Regulation
GPEMF	Gauteng Province Environmental Management Framework
GPS	Global Positioning Satellite
GVA	Gross Value Added
GW	Gigawatts
ha	Hectare
HV	High Voltage
IBA	Important Bird Area
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IEM	Integrated Environmental Management
IFC	International Finance Corporation
IPP	Independent Power Producer
IRP	Integrated Resource Plan
I&APs	Interested and Affected Parties
kV	Kilovolts
LED	Local Economic Development
LiLo	Loop-in, Loop-out
LUPA	Land Use Planning Act, 2014 (Act 3 of 2014), as amended
L/s	Litres per second

Abbreviations	Description
mamsl	Metres above mean sea level
mbgl	Metres below ground level
mS/m	milli-Siemens per metre
MW	Megawatt
MTS	Main Transmission Substation
NEMA	National Environmental Management Act, 1998 (Act No 107 of 1998), as amended
NEM:BA	National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004), as amended
NERSA	National Energy Regulator of South Africa
NFEPA	National Freshwater Ecosystem Priority Area
NGA	National Groundwater Archive
NGO	Non-Governmental Organisation
NHRA	National Heritage Resources Act, 1999 (Act 25 of 1999), as amended
NID	Notification of Intent to Develop
NTCSA	National Transmission Company of South Africa
NVFFA	National Veld and Forest Fire Act, Act No. 101 of 1998
NWA	National Water Act, Act No. 36 of 1998
MVA	Megavolt-Amperes
OHL	Over Head Line
OPL	Overhead Power Line
PA	Project Area (denotes infrastructure footprint)
PAOI	Project Area Of Influence
PES	Present Ecological Estate
PoS	Plan of Study (for EIA)
PPA	Power Purchase Agreement
PSDF	Provincial Spatial Development Framework
PPP	Public Participation Process
PV	Photovoltaic
PWWF	Peak wet weather flow
RD	Registration Division
REIPPPP	Renewable Energy Independent Power Producers Procurement Programme
REDZ	Renewable Energy Development Zone

Abbreviations	Description
REFIT	Renewable Energy Feed-In Tariff
RFP	Request for Proposal
SACAA	South African Civil Aviation Authority
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANS	South African National Standards
SCC	Species of Conservation Concern
SDP	Spatial Development Plan
SEF	Solar Energy Facility
S&EIR	Scoping and Environmental Impact Reporting
SR	Scoping Report
SDF	Spatial Development Framework
SDP	Site Development Plan
SPP	Solar Photovoltaic Plant
SuDS	Sustainable Drainage Systems
SWMP	Stormwater Management Plan
SWSA	Strategic Groundwater Source Area
UNFCCC	United Nations Framework Convention on Climate Change
UPL	Underground Power Line
UVBW	Unchanneled Valley Bottom Wetland
VAC	Visual Absorption Capacity
WARMS	Water use Authorisation and Registration Management System
WES	Wetland Ecosystem Services
WRDM	West Rand District Municipality
WUA	Water Use Authorisation

Glossary

The following terms are used throughout this report, the meaning of which is presented below:

Term	Description
Activity	An activity or operation carried out as part of the proposed project
Baseline	Information gathered at the beginning of the study which describes the receiving environment prior to the commencement of the proposed development, against which predicted impacts are measured.
Biodiversity	Biodiversity includes the diversity or variety, of plants, animals including any other living organism, located in a particular area or region. It also includes diversity in respect of habitat, species and genetics.
Community	Those stakeholders who may be impacted upon by the proposed development. This may include neighbouring landowners, local communities and other occasional users of the area.
Consultation	The process of exchanging views, concerns and suggestions about the proposed development through meaningful discussions and transparent sharing of information.
Cumulative Impacts	Direct and indirect impacts that act together with current or future potential impacts of other or proposed developments in the area/region that affect the same resources and/or receptors.
Ecology	The study of the interrelationships of organisms with and within their environment.
Ecosystem	The interconnected collection of all species populations that occupy a given area and the physical environment with which they interact.
Environment	The external circumstances, conditions and objects that affect the existence and development of an individual, organism or group. These may include the biophysical, social, economic, historical and cultural aspects.
Environmental Authorisation	The authorisation granted by the competent authority in respect of a listed activity in terms of NEMA.
Environmental Impact Assessment (EIA)	The process of evaluating the environmental and socio-economic consequences of a proposed development.
Environmental Impact Assessment Report (EIR)	The report created to communicate the information gathered and assessments undertaken during this process.
Environmental Management Programme (EMPr)	A description of the environmental specifications or mitigation measures proposed for achieving the required environmental objectives and/ or targets as required by the relevant competent authorities, during all phases of a proposed development.
Fauna	The collective animals of a region.

Term	Description
Flora	The collective plants growing in a geographic area.
Impact	A change to the existing environment, either positive or negative in nature, that is directly or indirectly due to the proposed development and its associated activities.
Integrated Environmental Management	The practice of incorporating environmental management into all stages of the proposed development's lifecycle, i.e. planning/ design, construction, operational and decommissioning phases.
Mitigation Measures	Design or management measures that are proposed to avoid and/or minimise or enhance an impact, depending on the desired effect.
Public Participation Process	A process involving the public to identify needs, address concerns, choose options, plan and monitor in terms of a proposed project, program or development.
Scoping	A procedure for determining the extend of and approach to the EIA to ensure that only the significant issues and reasonable alternatives are assessed
Stakeholders	All parties or persons impacted or affected by the proposed development. Including those parties able to influence the proposed development, often those in a position of authority and/or representing others.
Sustainable Development	The integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that the proposed development serves present and future generations.

1 INTRODUCTION

1.1 National Context

South Africa's Integrated Resource Plan 2010-2030 (IRP 2010), promulgated in March 2011, is part of the country's National Development Plan. The IRP 2010 provided a 20-year forecast and strategy to meet electricity demand and reliability of supply needs, whilst aligning with the country's environmental (particularly climate change) commitments, social responsibilities, and economic policies through the introduction of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).

A revised IRP, initiated by the Department of Mineral Resources and Energy (DMRE), was promulgated in 2019 (IRP 2019), and contains energy demand forecasts for the period 2019 to 2030 with reference to electricity generation and expansion programmes where Independent Power Producers (IPPs) are invited to bid under the REIPPPP. The objective is to incorporate new generation capacity from renewable energy sources into the national energy supply mix, thereby supporting the target established by the DMRE for 42% of all newly installed generating capacity to be derived from renewable energy forms. Additionally, the IRP delineates the preferred generation technologies necessary to accommodate anticipated demand growth until 2030. It also aligns with the Government's objectives of ensuring affordable electricity, diversifying electricity generation sources, minimising greenhouse gas emissions, reducing water consumption, and promoting localisation and regional development.

This application to obtain an EA for the proposed Carpe Diem North SPP Facility is in response to the DMRE's IRP 2019 strategy to expand South Africa's electricity generation capacity and increase the electricity generated through renewable means, thereby reducing reliance on coal-fired electricity production and the frequency of loadshedding events, while contributing towards achieving the country's climate change / environmental commitments.

1.2 Background

The Applicant, JUWI Renewable Energies (Pty) Ltd (JUWI), proposes to develop a large-scale Solar Photovoltaic Plant (SPP) / electricity generating facility with associated infrastructure, on Portion 5 of the Farm No. 119 IQ. The two less preferred grid connection alternatives are primarily located on Portion 5 of the Farm No. 119 IQ with a smaller section of the power line length located on Portion 23 of the Farm Doornfontein No. 118 IQ, near Carletonville, Merafong City Local Municipality, West Rand District Municipality, Gauteng (the 'site').

The proposed development site is located within a Strategic Transmission Corridor in the area immediately north of, and adjacent to, Eskom's Carmel Main Transmission Substation (MTS), on Portion 5 of the Farm Varkenslaagte No. 119 IQ, near Carletonville, West Rand District Municipality, Gauteng. The development site property extends over approximately 290 hectares (ha) and the proposed development will have an electricity generation capacity of up to 150 megawatts (MW). Refer to **Figure 1** below for a locality map of the site.

The Carpe Diem North SPP and associated infrastructure is located approximately 2 km south of the residential area of Welverdiend and 8.5 km south-west of the town of Carletonville in the Merafong City Municipality, Gauteng. The proposed development footprint is in a rural area i.e., it falls outside of the nearest town's urban edge. The property is zoned Agriculture I but does not require rezoning to Industrial to accommodate the proposed development since the Merafong City Local Municipality's Merafong Land Use Management Document, 2020 states that, "*Renewable Energy Infrastructure is a primary land use right under the zoning of "Agriculture". Therefore, no re-zoning is required as the rights are already allocated, in terms of the scheme*".

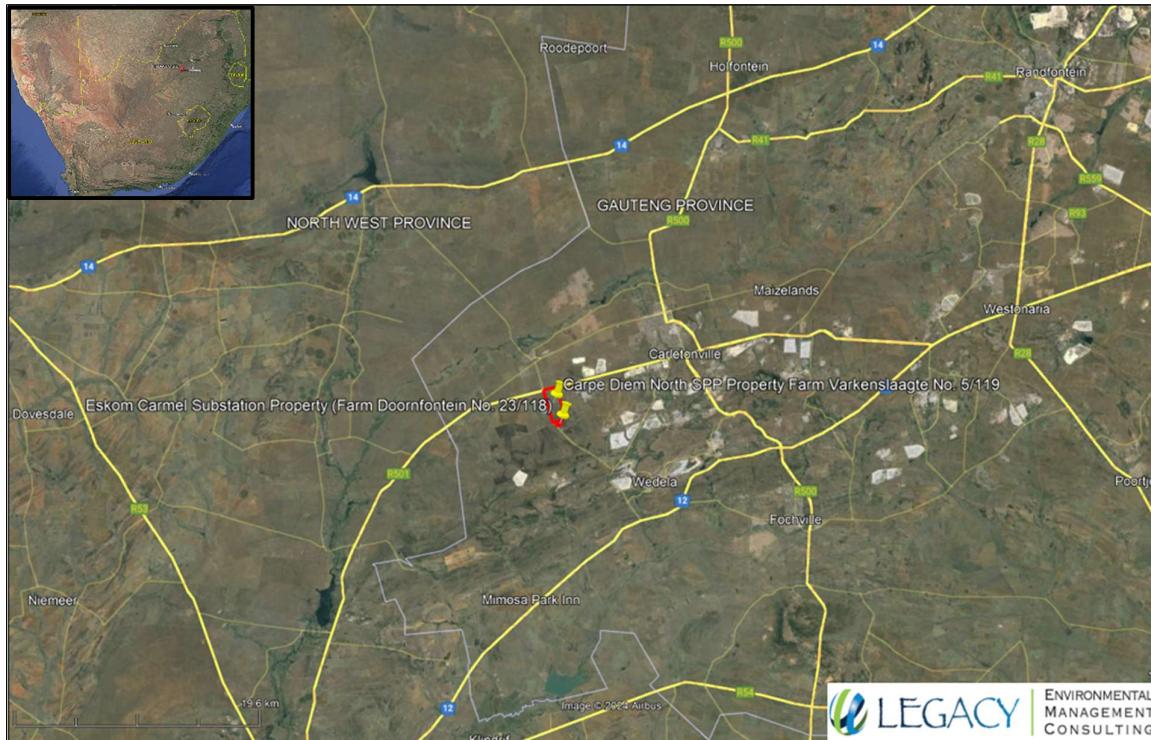


Figure 1: High-level satellite image of the proposed Carpe Diem North Solar Photovoltaic Plant (SPP) on Portion 5 of the Farm Varkenslaagte No. 119 IQ, as well as Eskom's Carmel Substation on Portion 23 of the Farm Doornfontein No. 118 (as indicated by yellow pins), located near Carletonville, Merafong City Local Municipality, Gauteng Province, and relative to National and Regional roads, as well as the Province's western border with the North West Province. The development site is outlined in red.

Originally, the Carpe Diem site was viewed as one project made up of two sections viz. Carpe Diem North, on Portion 5 of the Farm Varkenslaagte No. 119 IQ which lies immediately to the north of Eskom's Carmel Main Transmission Substation (MTS), and Carpe Diem South, on Portion 27 of the Farm Doornfontein No. 118 which lies immediately to the south of Eskom's Carmel MTS.

At the time, all specialists were appointed to assess the total, 'Carpe Diem', project area. Therefore, some Specialist Reports as appended to the DEIAR and this FEIAR, include assessments of both Portion 5 of the Farm Varkenslaagte No. 119 IQ, as well as Portion 27 of the Farm Doornfontein No. 118, as one combined assessment. Nonetheless, the Specialists' sensitivity mapping/s contained in their respective reports, clearly indicate the site applicability of the respective assessment/s.

In addition, subsequent to the initiation of the original project, JUWI saw the opportunity to take advantage of the then recently adopted Battery Storage Exclusion Norm for the Exclusion of Identified Activities Associated with the Development and Expansion of Battery Storage Facilities from the Requirement to obtain an EA, as per Government Notice No. 4557, published in Gazette No. 50387, 27 March 2024 (the 'Norm'). JUWI then proposed the registration of an independent, stand-alone Battery Energy Storage System (BESS) facility under the Norm i.e., the Carpe Diem North BESS 1 (Pty) Ltd Facility, in the southern section of the Carpe Diem North SPP development property. Consequently, some specialist reports indicate the proposed footprint for this stand-alone BESS Facility.

Although registration of the Carpe Diem North BESS 1 (Pty) Ltd Facility was granted, as a completely separate project to the Carpe Diem North SPP development, the stand-alone BESS Facility was not selected as a

preferred bidder. The Draft and Final Scoping Reports for the proposed Carpe Diem North **SPP** development indicated six layout alternatives for the SPP, three of which accommodated the potential development of the Carpe Diem North BESS 1 Facility. Since the stand-alone BESS Facility was not successful as a preferred bidder, the DEIAR and this FEIAR has not included the proposed Carpe Diem North SPP layout alternatives which indicated the stand-alone BESS and were made public for comment during the Scoping Phase of the project. Therefore, besides the no-go alternative, there are now three potential Carpe Diem North SPP (layout) alternatives.

This FEIAR has used information from the various Specialist Assessments attached in Appendix D, as is relevant to the Carpe Diem **North** SPP site.

The Proponent plans to submit this project in the next Bid Window of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). In the event of an unsuccessful bid, the Proponent intends to bid the project in subsequent REIPPPP bidding windows.

1.3 Proposed Description

Based on the various project feasibility studies and site verification assessments, the Applicant, JUWI, ultimately opted to propose the development of the approximately 280 ha Carpe Diem North property as an independent SPP with an electricity generation capacity of up to 150 MW, as well as an on-site SPP substation.

The on-site Carpe Diem North SPP substation and power line grid connection will most likely be a less than 100 meter (m), Loop-in, Loop-out (LiLo) tie-in to an existing 132 kilovolt (kV) Eskom High Voltage (HV) overhead power line (OPL) with runs through the development property. This is the Applicant's most preferred layout alternative (Alternative 1) for the project and is located entirely on the development site i.e., Portion 5 of the Farm Varkenslaagte No. 119 IQ.

The remaining two layout alternatives have power line corridor footprints which fall partly on the proposed development site and partly on the neighbouring Eskom Carmel Main Transmission Substation property i.e., Portion 23 of the Farm Doornfontein No. 118 IQ.

The Carpe Diem North SPP grid connection route will be confirmed after grid connection negotiations with Eskom are finalised.

All alternatives, including the No-Go Alternative, are discussed in detail in Section 6 of this report.

The generating component of the SPP contains ground-based photovoltaic (PV) panel arrays mounted on either a single or dual-tracking axis system.

The proposed Carpe Diem North SPP development entails permanent and temporary/construction infrastructure development:

- Permanent infrastructure consists of the solar panel array, fencing, 4 m to 8 m wide internal (dirt/gravel) access roads, SPP inverters and transformers, an on-site substation including control rooms, operation and maintenance buildings including offices, ablutions, storage buildings, a conservancy tank, water storage facilities, stormwater management and OPL pylons leading from the on-site substation to a point of connection with the National electricity grid. The on-site substation will comprise a collector station portion and a switching station portion.
- Temporary/construction infrastructure includes lay-down area/s, construction site offices, storage buildings, as well as a batching plant and stockpile area. Construction ablutions would be provided by means of regularly serviced portable toilets and tanker trucks would supply water.

Site services and accessibility:

Water supply will be sourced from either neighbouring farms or third-party water suppliers and trucked onto site for storage in above-ground water tanks.

Sewage will be treated via an on-site sewage package plant and conservancy tank which will be serviced (emptied) as required by a registered service provider.

Waste (domestic and hazardous) will be temporarily stored on site in a designated area for periods of not more than and removed to the nearest appropriately registered waste disposal site via contracted service providers.

Electricity will be sourced from the SPP itself.

Access to the site will be via existing public roads which have been assessed by a Traffic Specialist (as per Appendix D8) and regarded as adequate to service the needs of the construction and operation phases of the proposed development.

Figure 2 below indicates the detailed site development plan of the Preferred Alternative (Alternative 1) and as attached as Appendix J1 of this report.

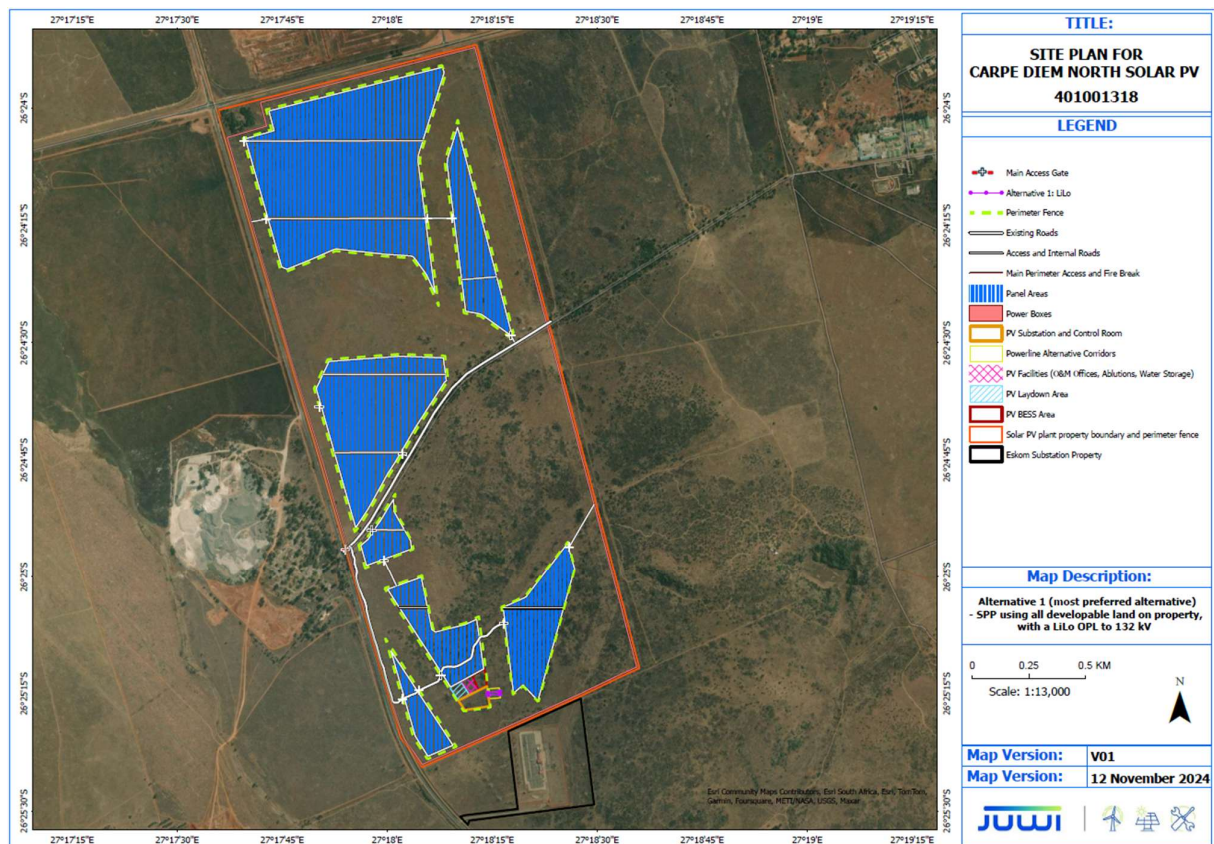


Figure 2: Detailed site layout map of the proposed Carpe Diem North SPP. The site boundary is given by the red polygon. Refer to the key alongside for an indication of the proposed development infrastructure.

Refer to Sections 1.3 and 4 of this report for a detailed description of the proposed project scope.

1.4 Project Components / Scope

The proposed Carpe Diem North SPP development scope consists of three main portions:

- i. The 150 MW Carpe Diem North SPP panel array with inverter-transformer stations;
- ii. the on-site Carpe Diem North SPP substation which is, in essence, divided into two functional portions viz.
 - a. the IPP 'collector substation' portion where evacuated electricity from the SPP facility will be collected, and
 - b. the 'switching station' substation portion where the evacuated electricity will be stepped up/transformed from 33 kV to 132 kV before it is fed into the national grid;
- iii. the 132 kV overhead power line strung on steel lattice pylons which will conduct electricity towards the point of connection with the national grid at Eskom's adjacent Carmel Substation.

As is common for these types of projects, the bulk of the permanent grid connection infrastructure which connects the project to the national grid via Eskom's Carmel Substation, will be handed over to Eskom once built. Future Eskom infrastructure is the portions ii(b) and iii, as listed above.

Furthermore, it is proposed that the SPP contains the following non-exhaustive list of facility components:

- Solar PV panel arrays;
- Operation and maintenance (O&M)/auxiliary buildings with a development footprint of 1 ha, which will entail offices, workshops, possible visitors centre, ablutions, gatehouse security, storage buildings, control centre, 33 kV switch room, hazardous substance store;
- Possible billboards near the northern boundary of the site along the R501;
- Inverter-transformer stations to convert direct current (dc) produced by the PV panels into 33 kV of alternating current (ac);
- Electrical reticulation between the various PV panel 'power plant' areas (otherwise referred to as 'PV islands') will be established through underground cabling;
- On-site SPP BESS with a development footprint of 1 ha;
- Access road and internal dirt access roads network (4 m to 8 m wide);
- Permanent lay-down area which will not exceed 5 ha;
- Water storage facilities (including attenuation pond);
- Sewage treatment package plant with conservancy tank;
- Perimeter fencing with a maximum height of 3 m to 3.5 m and security infrastructure; and
- Possible telemetry network (utilising sub-surface, fibre optic cables) with surface mast at the control room;
- Construction camp, temporary canteen/eating facilities, with portable ablution facilities, staff water and potable water supply;
- Cement batching and stockpile areas (only small/manual cement batching may take place since ready-mix concrete will primarily be used in the construction process);
- Temporary/construction lay-down area within PV island footprint which will not exceed 5 ha.

While the above-mentioned aspects are included, it's important to acknowledge that certain details may only be finalised during the detailed design phase, potentially leading to adjustments in the project scope.

Refer to **Section 4** of this report for a detailed description of project components.

1.5 Approach to EIA Report

Relevant information from specialist studies, prepared as part of this application, has been incorporated into this report, with additional information provided by the EAP, where required e.g., site development plans and latest policy documents.

The EAP and specialist team, where applicable, undertook an initial site visit to inform the Applicant's site selection in terms of the viability of the project. This initial site visit served as a 'ground-truthing' exercise to verify the sensitivities indicated in the DFFE's national web-based screening tool report (STR), as per Appendix J1)². The site sensitivity verification report resulting from the initial and several subsequent site visits undertaken by the EAP and specialists, was used to inform the Scoping and EIA process for Portion 5 of the Farm Varkenslaagte No. 119 IQ. The site was deemed suitable due to its proximity to grid connections, favourable solar radiation levels, ecological factors (as advised by relevant specialists), and predominantly flat terrain, particularly in the northern section of the site.

Specific areas of environmental sensitivity identified by independent specialists during the Scoping Phase will be addressed by the Proponent throughout the remainder of this phase and will be further refined during the Environmental Impact Assessment (EIA) phase. This approach ensures that facility layouts and development plans are designed to be appropriate and considerate of sensitive features, incorporating recommended mitigation measures.

The Carpe Diem North SPP application for EA is undergoing a Scoping and EIA process which complies with the requirements of the NEMA. This Final Environmental Impact Assessment (FEIAR) has been compiled in compliance with Appendix 3 of the 2014 EIA Regulations, as amended.

1.6 Community Benefits

The site falls within the jurisdiction of the Merafong City Local Municipality as well as the West Rand District Municipality of the Gauteng Province.

1.6.1 Provincial Planning Context

The **2016 Gauteng Spatial Development Framework** (SDF) envisages Gauteng in 2030 as "*an integrated, connected space that provides for the needs of all born in or drawn to the province. It aspires to establish a balanced, polycentric spatial network, with strong and resilient nodes enabling mutually beneficial exchanges of goods and services, and movement of people*". Four spatial development strategies were identified to support the establishment of this polycentric form:

- a. Capitalising on proximity, by directing higher densities closer to economic nodes and public transport network, and improving conditions in areas closer to economic opportunities, to ensure even greater benefits for the people and economy of these areas.
- b. Managing new settlement development, to prioritise infill development and densification, rather than expanding residential development outwards, so new settlements are functional and integrated units of the polycentric provincial network and based not only on the availability of land.

² It should be noted that the original STR was updated when the DFFE's national web-based screening tool database was updated. The most recent iteration of the STR has been appended to this report.

- c. Building an economic network through a system of high - order nodes and activity corridors, developing economic clusters that benefit from synergies and unlock the advantages of agglomeration.
- d. Creating a viable and productive hinterland by protecting valuable resources and high potential agricultural land from harmful development and managing water resources fugally and effectively.

Ten high - priority provincial spatial development proposals were outlined, with the following being relevant to the proposed Carpe Diem North SPP:

- Strengthen and enhance agricultural production and agro-processing to optimise the use of high - value agricultural land in the province, create jobs, grow the economy and improve food security.
- Actively manage and protect the environment and eco - systems, including rehabilitating degraded areas and exploring legislating a provincial green belt.

The **2021 Review of the Gauteng Spatial Development Framework 2030** related to Electricity and ICT, indicated that Gauteng receives 89% of its electricity from coal - fired power plants. Gauteng's peak electricity demand was 10.3 GW in 2021, and it is expected to grow by 2.8% per annum to 13.6 GW by 2030. Municipalities and power utilities in the province have begun projects and schemes to address the province's anticipated long - term needs. However, a strategy for alternative, renewable, and long - term energy sources must be developed. Biomass (waste - energy) generation (16.8 MW) has already been integrated into municipal and Eskom distribution networks, but no further significant IPP's alternative energy is planned for Gauteng for the foreseeable future. Electricity demand is expected to rise by 32% by 2030, requiring bulk infrastructure projects to address the anticipated electricity shortages. The West Rand was already operating near capacity in 2021 and requiring upgrades.

The **2014 Gauteng Provincial Environmental Management Framework (EMF)** aims to assist environmental impact management, including EIA processes, spatial planning and sustainable development with the following main objectives:

- To make it efficient for urban development (including associated service infrastructure) to occur in defined selected areas with lower environmental concerns and high development demand to help facilitate the implementation;
- To facilitate the optimal use of current industrial, mining land and other suitable
- derelict land for the development of non - polluting industrial and large commercial developments;
- To protect Critical Biodiversity Areas (CBAs) within urban and rural environments;
- To ensure the proper integration of Ecological Support Areas (ESAs) into rural land use change and development;
- To use ESAs as defined in municipal bioregional plans in spatial planning of urban open space corridors and links within urban areas; and
- To focus on the sustainability of development through the implementation of initiatives such as:
 - energy efficiency programmes, plans and designs;
 - waste minimisation, re - use and recycling;

- green infrastructure in urban areas; and
- Sustainable Drainage Systems (SuDS)

The proposed Carpe Diem North SPP is aligned with the objectives listed in several provincial policies or strategic frameworks that refer to the need for green energy to combat climate change and support and stimulate economic development in the Gauteng Province. Although solar water heaters and energy from landfill gas were identified as the most promising local renewable energy options for Gauteng in the short term, Solar PP offers an attractive alternative to generate renewable energy.

1.6.2 West Rand District Planning Context

The West Rand District Municipality (WRDM) of Gauteng covers the West Rand area (excluding Roodepoort) with its seat in Randfontein. The District Municipalities include the local Municipalities of Mogale City, Merafong City and Rand West City. Major towns in the region include Krugersdorp, Randfontein, Westonaria and Carletonville. Merafong City, is the largest of the three municipalities in the district, has its seat in Carletonville, the mining core of the district, constituting over 50% of Gross Value Add (GVA).

West Rand District is home to the Cradle of the Humankind World Heritage Site and has a rich and diverse landscape with the Magaliesberg Mountains as a backdrop. The West Rand District Municipality Spatial Development Framework (2020) refers to several other policies/strategies that are relevant to the SDF:

The vision of the 2006 WRDM Regional Growth and Development Strategy is to *“develop and sustain an integrated, socio-economically and economically thriving and green environment with a unified society”*. To achieve this vision, the Regional Growth and Development Strategy identified the following critical requirements:

- Ensure the WRDM is connected – with more people enjoying the benefits of flourishing activity centres where shops, jobs, services and recreation are within walking and travelling distance of their homes, with fast and reliable travel to and from local centres and regional opportunities, with a comprehensive, efficient and networked public transport system and pedestrian routes and access to rural and tourism areas.
- Ensure the WRDM is attractive – with quality urban and rural areas that are well-maintained, new developments which comply with high design standards, clean and safe environments and well-preserved heritage and natural areas.
- Ensure the WRDM is sustainable – with resources well managed and planned for, viable and cost-effective service provision; and where the environment is valued as a vital resource and meaningful open space is provided for all.

West Rand District IDP 2022/23 – 2026/27 (West Rand District Municipality, 2022) lists 13 Development Priorities, which include Priority 6 - Affordable clean energy. Although it refers to Independent Power Producers, coordinated efficient energy supply systems and policy implementation, renewable energy, etc., no further detail on specific plans or projects is provided.

A number of Climate Change Adaptation and Mitigation Interventions related to renewable energies were proposed for the WRDM, including building solar parks (i.e., SPPs) that will feed electricity to the National Grid, use Solar in residential areas and industry and promoting the development of “green technology/energy” and incrementally implement the Smart City Concept. The proposed Carpe Diem North SPP supports these objectives by promoting the development of renewable energy plants.

1.6.3 Merafong City Municipal Planning Context

The Merafong Integrated Development Plan (IDP) 2022-2023 (Merafong City Local Municipality, 2022) refers to the Energy Plan to address the 5-year plan for the Municipality and redressing the Government's plan in reducing energy consumption and tackling service backlogs in accordance with the National standards. Different economic focus areas were identified, with Focus Area 1: Agriculture and Agro-Industrial aiming to establish a highly competitive economic cluster in the interrelated areas of intensive agriculture and agro-processing (pg. 106 of the IDP). Vast tracts of high-value agricultural land in Merafong will be released through the Bokamoso-Ba-Rona initiative of Sibanye Stillwater.

The Bokamoso-Ba-Rona (formerly Merafong Bio) project involves the creation of an agro-based circular economy in the West Rand made up of various integrated components, such as Agro-Parks, bioenergy Plant, an agro-processing hub and a market. The project will have technical assistance components and private sector participation to assist the farmers with technological know-how, capacity-building and inputs. In addition, the private sector will provide the necessary off-takes for the produce (p. 296 of the IDP). The Bioenergy Agro-Industrial Park will act as a major catalyst for agriculture and agro-processing development. It will utilise anaerobic digestion to create suitable types of value addition and cost reductions that could attract many industrial and agricultural investors.

The IDP noted that the Municipality is using an outdated Growth Development Strategy and does not have a Local Economic Development (LED) strategy in place that will guide the creation of economic opportunities.

The **Merafong City Draft Annual Report 2021/2022** stated that vast tracks of unproductive agricultural zoned land owned by the mines and the Far West Rand Dolomitic Water Association (FWRDWA) present an opportunity for agricultural production and related industrial development, e.g., the establishment of a Bioenergy Park and Agricultural Parks. The Merafong Bioenergy Agro-Industrial Park is a combined agriculture and industrial project that will include bioenergy generation to maximise opportunities. The project will use existing land, water and infrastructure availed by mining companies to develop a new industrial park aimed at agriculture and agro-processing. Great strides were made with the conceptualization, development, and funding of Merafong City's game-changer projects. The Gauteng Infrastructure Financing Agency (GIFA) concluded the feasibility study for the Bioenergy Eco-Industrial Park. The conceptualization of the project is underway. The African Development Bank and the Gauteng Infrastructure Financing Agency are assisting Merafong to commercialize the project. The African Development Bank has made R 10 million available to bring the project into commercial operation and construction is expected to start within 18 to 24 months.

The proposed SPP addresses several of the renewable energy priorities identified by the Merafong City Local Municipality, who is already investigating a Bioenergy Agro-Industrial Park that will generate solar energy.

1.6.4 Conclusions on the community benefits of the Carpe Diem North SPP

A key factor in the feasibility assessment of a solar facility is the tariff that the National Energy Regulator of South Africa (NERSA) is prepared to pay for the electricity generated by the IPP/operator of the SPP. An agreement is concluded with the landowner to lease a portion of the facility for a period that equates to the economic life of the PV plant. The large capital outlay for the PV panels and the direct and indirect infrastructure costs can only be justified by the tariff obtained for the electricity and the minimum required return for the investors in the project.

It is clear from National, Provincial, District and Local legislation, policies, strategies and action programmes that targets have been set to achieve a greater energy output from renewable energy sources. There is growing

pressure for a stable and reliable provision of electricity generation throughout the country, and Eskom's inability to guarantee constant supply requires investment in alternative and renewable energy sources.

The proposed Carpe Diem North SPP will support the efforts to explore alternative, and renewable, sources of electricity. This PV plant might not supply electricity directly to households or poor communities, but it will contribute to the national and/or provincial electricity grid, which in turn will contribute towards addressing issues such as load shedding.

1.7 Objectives of the EIA Process

The objectives of the EIA process are, through a consultative process, to:

- Identify the relevant policies and legislation applicable to the activity;
- 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 and confirm the preferred activity and technology alternative through an identification of impacts and risks and significance ranking process of said impacts and risks;
- Identify and confirm the preferred site, through a detailed site selection process, which includes the identification of impacts and risks inclusive of the identification of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic and cultural aspects of the environment;
- Identify the key issues to be addressed in the assessment phase;
- Agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration, and probability of the impacts to inform the location of the development footprint within the preferred site; and
- Identify suitable measures to avoid, manage or mitigate identified impacts and determine the extent of the residual risks that need to be managed or monitored.

To comply with the above, the following information is provided in this report:

- The biophysical, socio-economic and heritage characteristics of the project area
- The policy and legislative context applicable to the proposed development
- A detailed description of the proposed development and associated infrastructure
- A consideration of the need and desirability of the project
- The potential issues and/ or impacts (and potential mitigation measures) that have been identified by the EAP and other team members (specialists and industry consultants)
- The methodology for assessing potential impacts that have been identified, including any specialist studies or specialised processes that have/ will be undertaken

In addition, the DEIAR and this FEIAR provides motivation for the preferred development footprint as contemplated in the accepted FSR.

1.8 Structure of the EIA Report

This FEIAR comprises the following chapters:

- **Chapter 1** provides a background to and description of the proposed project and outlines the objectives of the EIA Process;
- **Chapter 2** provides the details of the project team, including the Environmental Assessment Practitioner who compiled this report, and describes the expertise of the EAP to carry out the Scoping and EIA process;
- **Chapter 3** describes the policies, laws and guidance documents that are of relevance to the proposed development and explains how the development complies with and/or responds to the legislative and policy context;
- **Chapter 4** describes the scope of the preferred development alternative, including the preferred location and associated infrastructure;
- **Chapter 5** described the receiving (baseline) environment of the application site and its surrounds;
- **Chapter 6** describes the alternatives considered and motivates the preferred site locality (footprint);
- **Chapter 7** outlines the public participation process undertaken;
- **Chapter 8** motivates the need and desirability of the proposed project
- **Chapter 9**, titled Environmental Impact Assessment, provides a description and assessment of the issues that were identified during the scoping process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures. This chapter also provides a summary of the findings and recommendations of the specialist reports that were undertaken as part of this Scoping and EIA process.
- **Chapter 10** provides a reasoned opinion by the EAP as to whether the activity should or should not be authorised. It also provides an environmental impact statement for the proposed project.

Appendix 3(3) of the NEMA EIA Regulations, 2014 as amended, specifies the information that is to be included in an EIA Report. These information requirements are summarised below in **Table 1** and are cross-referenced with the contents of this report, where relevant.

Table 1: Content of EIA Report as required by Appendix 3 of the NEMA EIA Regulations.

Appendix 3, Regulation 3	Description	Reference in the Report
(a)	Details of (i) the EAP who prepared the report and; (ii) the expertise of the EAP, including a curriculum vitae.	Section 2.2 and Appendix A
(b)	The location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including (i) the 21-digit Surveyor General code of each cadastral land parcel; (ii) where	Section 1.2 to 1 and Figure 1

Appendix 3, Regulation 3	Description	Reference in the Report
	available, the physical address and farm name; (iii) where the required information in terms of 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 to be undertaken; (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Figure 2
(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 associated structures related to the development.	Section 1.3, Section 3.1, Sections 4.2 – 4.3
(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.	Section 3.2
(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 development footprint within the approved site as contemplated in the accepted scoping report.	Section 8 and Section 6.2.2
(g)	A motivation for the preferred development footprint as contemplated in the accepted scoping report.	Sections 6.2 – 6.7
(h)	A full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report including:	Section 6
(h)(i)	Details of the development footprint alternatives considered	Section 6.2, Section 6.3
(h)(ii)	Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs.	Section 7 and Appendix C
(h)(iii)	A summary of 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.	Section 7 and Appendix C5
(h)(iv)	The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.	Section 5, Section 6 and Section 9
(h)(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.	Section 9

Appendix 3, Regulation 3	Description	Reference in the Report
(h)(vi)	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks.	Section 9.2
(h)(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, biological, social, economic, heritage and cultural aspects.	Sections 9
(h)(viii)	The possible mitigation measures that could be applied and level of residual risk.	Section 9 and Appendix D
(h)(ix)	If no alternative development footprints for the activity were investigated, the motivation for not considering such.	Section 6.2.7, Section 6.3 and Section 6.7
(h)(x)	A concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report.	Section 10 (and Figure 1)
(i)	A full description of the process undertaken to identify, assess and rank the impact the activity and associated structure and infrastructure contemplated in the accepted scoping report through the life of the activity, including – (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.	Section 9
(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; 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.	Section 9.3, 9.4 and Appendix F
(k)	Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication of how these findings and recommendations have been included in the final assessment report;	Section 5.2 (findings) and Section 9.3 (findings and recommendations)
(l)	An environmental impact statement which contains – (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts of the proposed activity and identified alternatives.	Section 10
(m)	Based on the assessment, and where applicable, recommendations from specialist reports, the recording of the proposed impact management	Section 9.4.4 and Appendix I (EMPrs)

Appendix 3, Regulation 3	Description	Reference in the Report
	outcomes for the development for inclusion in the EMPs 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.	Section 4 and Figure 1
(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.	Section 10.2 (EAP's opinion)
(p)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed.	Section 9.6
(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	Section 10.2
(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.	N/A
(s)	An undertaking under oath or affirmation by the EAP in relation to (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties.	Appendix H
(t)	Where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts	N/A - <i>This applies to applications for mining and prospecting</i>
(u)	An indication of any deviation from the approved scoping report, including the plan of study, including – (i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii) a motivation for the deviation.	N/A
(v)	Any specific information that may be required by the competent authority.	Appendix C5
(w)	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	N/A
(2)	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to an environmental impact assessment report the requirements as indicated in such notice will apply.	N/A

2 PROJECT TEAM DETAILS

2.1 Client / Proponent Details

In the following section, the details of the applicant/proponent are listed. This is the entity that will be legally responsible for the commissioning of this activity.

Table 2: Client and Proponent Details

Project Applicant	JUWI Renewable Energies (Pty) Ltd
Company Registration No.:	2010 / 017943 / 07
Contact Person:	Ms. Justine Wyngaardt
Physical Address:	4 Christiaan Barnard Street, Foreshore, Cape Town, 8001
Postal Address:	As above
Telephone:	(021) 829 1643
Email:	justine.wyngaardt@juwi.co.za

2.2 Environmental Assessment Practitioner Details

Legacy Environmental Management Consulting (Pty) Ltd (Legacy EMC) has been appointed as the independent EAP to undertake the S&EIA Process for the proposed Carpe Diem North SPP development.

Table 3: Details of EAP and the relevant representative

EAP	Legacy EMC
Company Registration No.:	2017/213820/07
Contact Person:	Mrs Kim Pontac
Postal Address:	PO Box 12410, Die Boord, Stellenbosch, 7613
Telephone:	021 887 4000
Email:	info@legacyemc.co.za / ppp@legacyemc.co.za

The following table summarises the expertise of the main team member(s). The curriculum vitae of the team member(s) and relevant qualifications have been included in **Appendix A**.

Table 4: EAP - Team Members

Kim Pontac		Project Director & Reviewer
		Kim Pontac is the Managing Director of Legacy EMC and Principal Environmental Consultant, who has many years' experience in applying the principles of Integrated Environmental Management (IEM) and the Environmental Impact Assessment Regulations to a number of development projects and initiatives in southern Africa and abroad. She has worked in various sectors which include transport, utilities, social infrastructure and minerals, metals and chemicals, hydrocarbons and nuclear industries. Kim has co-ordinated and managed numerous environmental processes within the public and private sectors for national and international companies. As Principal Consultant, she has successfully conducted a variety of environmental investigations and evaluations for Green and Brown Field projects. Her core experience includes IEM and guiding projects through tendering, design, construction, operational and decommissioning phases. Kim also has experience in environmental and social due diligence (in accordance with IFC Standards and Equator Principles), environmental compliance audits and environmental legal reviews, permitting and/ or licencing, facilitation and training, and environmental construction monitoring.
Relevant Experience	Years of	15+ years
Qualifications	LLM (Environmental Law), University of Cape Town, 2017; BTech (Environmental Management), Cape Peninsula University of Technology, 2008; National Diploma (Oceanography), Cape Peninsula University of Technology, 2004.	
Professional Registration / Memberships	Registered EAP EAPASA (2019/1269); Pr. Nat. Sci. SACNASP (117908). Member: International Association for Impact Assessment South Africa (2762). Member: Institute of Waste Management of Southern Africa (20118035). Member: Environmental Law Association (2016/092/WC).	
Role in Project	Reviewer and Project Director.	
Tayla Hobson		Author of Report
		Tayla Hobson is a rising talent in the realm of environmental consultancy, bringing a wealth of experience and a dynamic skill set to the table. Having immersed herself in the intricacies of South Africa's environmental landscape, Tayla has honed her expertise through hands-on involvement in various projects. Her core expertise includes Project Management of environmental projects, including oversight through the tendering, design, construction, operational and decommissioning phases. Furthermore, Tayla brings invaluable insight into Public Participation Processes, recognizing the importance of engaging stakeholders and fostering dialogue to achieve sustainable outcomes. Her ability to facilitate meaningful engagement serves as a cornerstone in promoting transparency and inclusivity within environmental initiatives. Since joining Legacy EMC in May 2023, Tayla has made significant contributions to the organization's success. Her passion for environmental stewardship, coupled with her dedication to professional growth, positions her as a promising leader in the field. As she continues to expand her knowledge and expertise, Tayla remains committed to driving positive change and shaping a more sustainable future for South Africa's environment.

Tayla Hobson		Author of Report
Relevant Experience	Years of	2 + years
Qualifications	MSc (Environment, Society & Sustainability), University of Cape Town, 2020; BSc Honours (Oceanography), University of Cape Town, 2018; BSc (Oceanography), University of Cape Town, 2017	
Professional Registration / Memberships	Registered Cand EAP (2019/1018) EAPASA. Member: International Association for Impact Assessment South Africa (6923).	
Role in Project	Stakeholder Engagement and Report Preparation.	

2.2.1 Role and Competence of the EAP

The role of the EAP is to manage the NEMA EIA application process on behalf of the Applicant. The EAP must adhere to Regulation 13 of the NEMA EIA Regulations of 2014 (GN. No. R. 982 of 4 December 2014, as amended) and to all other relevant legislation and guidelines and should ensure that all reports and documentation forming part of this Scoping and EIA process contain all the necessary and relevant information required by the Competent Authority (CA) to be able to make an informed decision. It is the responsibility of the EAP to perform all work relating to the application in an objective, appropriate and responsible manner.

Regulation 13 of the NEMA EIA Regulations, 2014 (as amended) describes general requirements for Environmental Assessment Practitioners (EAPs). These requirements include the following:

“An EAP and a specialist appointed in terms of regulation 12(1) or 12(2), must –

- (a) be independent;*
- (b) have expertise in conducting environmental impact assessments or undertaking specialist work as required, including knowledge of the Act, these Regulations and any guidelines that have relevance to the proposed activity;*
- (c) ensure compliance with these Regulations;*
- (d) perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the application;*
- (e) take into account, to the extent possible, the matters referred to in regulation 18 when preparing the application and any report, plan or document relating to the application; and*
- (f) disclose to the proponent or applicant, registered interested and affected parties and the competent authority all material information in the possession of the EAP and, where applicable, the specialist, that reasonably has or may have the potential of influencing-*
 - (i) any decision to be taken with respect to the application by the competent authority in terms of these Regulations; or*
 - (ii) the objectivity of any report, plan or document to be prepared by the EAP or specialist, in terms of these Regulations for submission to the competent authority; unless access to that information is protected by law, in which case it must be indicated that such protected information exists and is only provided to the competent authority.”*

Legacy EMC hereby confirms that the above requirements of the NEMA EIA Regulations, 2014 (as amended), in terms of independence, expertise, knowledge and objectivity are met, and that the company strives to meet these requirements throughout all environmental authorisation processes that are undertaken, as is required by law.

2.3 Competent Authority Details

In terms of the NEMA, the relevant Competent Authority (CA) responsible for the administration of this Act is the National Department of Forestry, Fisheries and the Environment (DFFE).

The contact details of the CA for this project are listed below (**Table 5**).

Table 5: Details of the decision-making/Competent Authority

Department	Department of Forestry, Fisheries and the Environment
Directorate	Integrated Environmental Authorisations
Contact Person:	Ms Constance Musemburi
Physical Address:	Environment House, 473 Steve Biko Road, Arcadia
Telephone:	(011) 399 9416
Email:	CMusemburi@dfpe.gov.za

2.4 Specialist Consultant Details

Several specialist and technical studies have been commissioned to provide input into the S&EIA process. The specialist studies and the names of the relevant specialists are provided in **Table 6** below.

Table 6: Specialist project team members

Specialist Study	Company	Team Members
Agricultural Compliance Statement	Johann Lanz	Johann Lanz
Aquatic Impact Assessment	Delta Ecology	Kimberley van Zyl, Olivia Brunings and Joshua Gericke
Avifaunal Impact Assessment	EnviroInsight	Sam Laurence
Terrestrial Biodiversity Assessment and Animal Species Compliance Statement	EnviroInsight	Luke Verburgt, Corne Niemandt
Heritage Impact Assessment	PGS Heritage	Wouter Fourie, Michelle Sachse
Archaeological Impact Assessment		
Palaeontological Impact Assessment	Banzai Environmental	Elize Butler
Visual Impact Assessment	Graham Young Landscape Architects	Graham Young

Specialist Study	Company	Team Members
Geohydrological Assessment	GEOSS (Pty) Ltd	Louis Jonk
Socio-Economic Impact Assessment	Multipurpose Business Solutions	Jonathan Bloom
Traffic Impact Assessment	Koleko	Ola Andrade, Mazulu Zwane and Avi Menon
Engineering Services Stormwater Management Plan	UDS Africa	Ruaan Siebrits
Glint and Glare Assessment	Aviata Consulting	Brett Williams
Geotechnical Investigation	Geohazard Solutions	Nicole Trollip

3 LEGAL FRAMEWORK

3.1 Introduction

A description of the policy and legal context within which the development is proposed includes the identification of legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to the proposed development. *Please note that this section provides an indication of key pieces of legislation and is not necessarily exhaustive.*

The reader is also referred to Section 3.3 of the Socio-Economic Assessment Report (**Appendix D7**) which considers the compatibility of the proposed project with spatial planning from an economic perspective, and addresses the following key Policies, Plans and Strategies:

- National White Paper on Renewable Energy (2003);
- National Development Plan (2030);
- National Energy Act, 2008 (Act No. 38 of 2008), as amended;
- White Paper on Energy Policy for the Republic of South Africa (2010);
- South Africa's Integrated Resource Plan (2010-2030);
- Strategic Environmental Assessment for Wind and Solar Photovoltaic Energy in South Africa (2015, 2019);
- Gauteng Spatial Development Framework (2016);
- 2021 Review of the Gauteng Spatial Development Framework (2030);
- 2014 Gauteng Provincial Environmental Management Framework;
- 2014 Gauteng Transformation, Modernisation and Re-industrialisation Strategy (TMR);
- 2010 Gauteng Integrated Energy Strategy (GIES);
- 2010 Gauteng Employment, Growth and Development Strategy for 2009 - 2014 (GEGDS);
- 2022 Draft Sector Acceleration Action Plan for Energy;
- West Rand District Municipality Spatial Development Framework (2020);
- 2006 West Rand DM Regional Growth and Development Strategy;
- WRDM Green Economy Programme;
- 2012 West Rand District Municipality Green IQ;
- West Rand District IDP 2022/23 – 2026/27 (West Rand District Municipality, 2022);
- District One Plan: West Rand District 2021 (West Rand District Municipality, 2021a);
- Merafong Integrated Development Plan (IDP) 2022 - 2023 (Merafong City Local Municipality, 2022); and
- Merafong City Draft Annual Report 2021/2022.

The following sections provide a brief description of the laws, guidelines and spatial tools that are applicable to the proposed project.

3.2 Legislative Context

Legislation, policies and guidelines considered applicable in respect to this application are presented below.

3.2.1 The Constitution of the Republic of South Africa (Act 108 of 1996)

The Constitution of South Africa, 1996 (Act No. 108 of 1996), as amended, was adopted by the Constitutional Assembly on 8 May 1996. The Constitution is the supreme law in South Africa and no other law or government action can overrule it or be in conflict with it. The Constitution defines the provisions for environmental protection, the roles of the different spheres of government (national, provincial and local), and the need and mechanisms for co-operative governance.

Land use and land management in South Africa are governed by the “environmental right” clause in the Constitution. The “*environmental right*” clause in the Bill of Rights section of the Constitution of South Africa, Section 24, states that every person shall have the right to the following:

- 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) *prevents pollution and ecological degradation;*
 - (ii) *promotes conservation; and*
 - (iii) *secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.*

The environmental right (Section 24) and the right of access to information and just administrative action (Section 32 and Section 33) of the Constitution were considered and promoted as part of the proposed development.

In addition, the Constitution has placed an obligation on the legislature to enact and give effect to these rights, by providing for reasonable legislative and other measures. In response to this obligation, various additional statutes have been promulgated to manage the various impacts within the realm and objective of the Constitution³. Those applicable to the proposed development are briefly discussed below.

3.2.2 National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA) and the EIA Regulations of 2014, as amended

The National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA), provides for: “*co- operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith*”.

Chapter 2 of the Act titled National Environmental Management Principles, sets out principles that apply throughout the Republic to the actions of all organs of state that may significantly affect the environment. These principles, and how they have been taken into account, are tabulated below (**Table 7**).

³ The framework NEMA was specifically enacted to give effect to the environmental right and is the framework environmental law in South Africa.

Chapter 5 of the Act titled Integrated Environmental Management (IEM), promotes the application of appropriate environmental management tools to ensure integrated environmental management of activities. The general objectives of IEM, and how they have been taken into account, are tabulated below (**Table 8**). To give effect to the general objectives of IEM, the potential consequences for, or impacts on, the environment of listed activities or specified activities must be considered, investigated, assessed and reported to the competent authority. In this regard, the Minister has identified activities that may not commence without EA from the CA.

Table 7 below describes how the National Environmental Management principles as set out in **Section 2** of NEMA have been taken into account. The reader is also referred to **Section 8** of this FEIAR (Need and Desirability), which expands on some of these Section 2 considerations.

Table 7: Considerations as per Section 2 of NEMA

Considerations as per Section 2 of the NEMA	
Section 2 of NEMA, states the following, inter alia: (2) Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.	Interested and affected parties (I&APs), including the general public and relevant organs of state, will be provided with adequate opportunity to partake in the decision-making process concerning the proposed development, and to raise any issues or concerns pertaining to the proposed development. The proposed development is not anticipated to unduly infringe on the physical, psychological, development, cultural or societal needs of the Carletonville communities. Refer to Section 1.6 above which describes the proposed community benefits of the project.
(3) Development must be socially, environmentally and economically sustainable	The development will contribute to the diversification of South Africa's energy mix as called for by the National Development Plan (2030). In addition, South Africa's Integrated Resource Plan (2010 – 2030) called for 17 800 MW of renewable energy to be in place by 2030. EMPrs (as per Appendices I1 to I3) were prepared as part of the EIA Phase for this project which incorporate the recommendations of the EAP and the specialists in respect of the various mitigating actions that need to be undertaken. As such, potential adverse biophysical and social impacts may be avoided, minimised or mitigated, and potential beneficial impacts of the project may be enhanced. Refer to Section 1.6 above, which describes the community benefits of the project. Other socio-economic benefits are outlined in Section 8 and Section 9 of this report.
4(a) Sustainable development requires the consideration of all relevant factors including the following:	

Considerations as per Section 2 of the NEMA

(i) That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;	The development site has been anthropogenically disturbed and transformed over many years by agricultural activities. The site selection process was guided by the opportunities and constraints assessment undertaken for the originally proposed development area. Near-pristine areas were excluded from the original application area and the PV Plant has been well-positioned on areas already predominantly disturbed by previous farming activities, agricultural grazing and disturbed grassland habitats, outside of recommended buffer areas. Refer to Section 6.2 of this report for a description of the site selection process. Various specialist studies have been undertaken and have recommended mitigation measures for implementation. It is not anticipated that the proposed development will result in unacceptable disturbance of ecosystems or the loss of biological diversity. Measures to avoid, minimise and remedy impacts on the biophysical environment has been included in the EMPs (as per Appendices I1 to I3).
(ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;	The proposed development is not expected to cause significant pollution or environmental degradation. Solar power, derived from sunlight or solar heat, is a clean and sustainable form of electricity. Unlike finite fossil fuels, solar energy is renewable and inexhaustible. It is also non-polluting and does not release greenhouse gases during electricity generation.⁴ South Africa's energy primarily relies on coal, constituting over 90% of electricity production and a significant portion of liquid fuel and total energy consumption (DoE, 2016). Introducing renewable energy sources, as proposed in this application, would decrease dependence on coal, which has social and environmental repercussions, including coal mining's adverse impacts. Instead, transitioning to clean energy would reduce the country's carbon footprint and promote environmental sustainability.
(iii) that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or	An integrated heritage impact assessment and visual impact assessment were conducted to

⁴ Source: <https://www.energymatters.com.au/education/>

Considerations as per Section 2 of the NEMA	
where it cannot be altogether avoided, is minimised and remedied;	evaluate potential effects on the landscape and cultural heritage. Furthermore, the site selection process was informed by an assessment of opportunities and constraints for the site, ensuring that sensitive environmental areas were buffered or excluded from the development site.
(iv) that waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;	Refer to (ii) above. Throughout the entire lifecycle of the proposed development, all general waste generated will be directed into the municipal waste stream. Every effort will be made to adhere to the waste hierarchy, prioritising actions such as reduction, reuse, and recycling, to minimise environmental impact and promote sustainable waste management practices. During its operational lifespan, the SPP itself does not generate any waste. However, when the PV panels reach the end of their lifecycle, disposal or recycling will be necessary. It's important to note that while solar panel recycling processes are still in the early stages of development, efforts should be made to recycle them wherever feasible. It's worth emphasizing that the development of the SPP presents a significant advantage in terms of waste production compared to the country's primary power sources. By avoiding the generation of large volumes of harmful waste, the SPP contributes positively to waste management and environmental sustainability.
(v) That the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource.	Solar radiation is a source of energy, which is regarded as non-polluting and renewable. The loss of agricultural land has been assessed and is reversible (on decommissioning of the PV Plant). The project development footprint (fenced area) of the proposed facility has deliberately avoided all areas of verified high agricultural sensitivity.
(vi) That the development, use and exploitation of renewable resources and the ecosystem of which they are part do not exceed the level beyond which their integrity is jeopardized.	Refer to (v) above. The development of a solar energy facility to exploit solar radiation to generate electricity may have impacts on the ecosystem in which it is located. To avoid or minimise the impacts on the environment, specialist assessments have been undertaken to assess these potential impacts and recommend mitigation measures to avoid or minimise the impacts of the activity.

Considerations as per Section 2 of the NEMA

	The EMPs for the project (as per Appendices I1 to I3) include measures that should be taken to protect and limit the use of resources, such as water, and measures to protect the natural resources of the area (e.g., soil).
(vii) that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and	Sustainable development requires the consideration of all relevant factors including that a risk-averse and cautious approach is applied (also called the ' <i>Precautionary Approach</i> '), which takes into account the limits of current knowledge about the consequences of decisions and actions. This report has been informed by specialist and technical studies, which were prepared by experienced practitioners to ensure that any associated risks are mitigated.
(viii) That negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.	This EIA Report has identified potential positive and negative impacts of the proposed development on the environment; as well as measures to avoid, reduce or minimise these impacts. Such mitigation measures are elaborated on in the EMPs for this project (as per Appendices I1 to I3).
(b) Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.	Several specialist studies were commissioned to inform the initial preferred site location and layout of the PV Plant on the application property(ies). Factors such as the agricultural potential, vegetation condition, presence of surface water resources, as well as terrestrial biodiversity and avifaunal constraints were used to inform the preferred site location and layout. Realistic mitigation measures will be proposed to reduce negative or enhance positive impacts. The inputs of a range of specialists are taken into account to pursue the best practicable environmental option (BPEO).
(c) Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.	It is not anticipated that adverse environmental impacts will be realised in such a manner as to unfairly discriminate against any person. The benefit to the local community is described in Section 1.6 above. The public participation process (PPP) will provide an opportunity for I&APs to share knowledge with the project team. During this time, the sharing of local knowledge and experience is encouraged. All comments and inputs received have been and will continue to be considered and addressed by the project team for the respective commenting periods.

Considerations as per Section 2 of the NEMA

	These comments and inputs will also be taken into account by the competent authority when making their decision on the application.
(d) Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.	The proposed project will contribute to the welfare of surrounding communities through social investment initiatives and provision of job opportunities (refer to Section 1.6 above).
(e) Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.	The Applicant will need to take responsibility for the environmental health and safety consequences of the project throughout its life cycle. The Applicant (through the appointed health and safety practitioner) is also to ensure, inter alia, that the working conditions on site adhere to the minimum requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), as amended (OHSA).
(f) The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured.	Refer to Section 7 for information regarding the PPP.
(g) Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognizing all forms of knowledge, including traditional and ordinary knowledge.	Refer to (f) above. During the PPP, I&APs are afforded an opportunity to share knowledge with the project team, through submission of written comments. During this time, the sharing of local knowledge and experience is encouraged. As such, I&APs are afforded an opportunity to express their interests, needs and values. Environmental education and awareness are also promoted throughout the S&EIA Process, as information regarding the proposed development is made available to the local community. All comments received on the proposed development are considered and addressed by the project team. Such comments and the responses thereto are also taken into account by the competent authority when making their decision on the application.

Considerations as per Section 2 of the NEMA	
(h) Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.	As above.
(i) The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.	Refer to Appendix F of the EIA Report where the assessment methodology (as described in Section 9.2) is used to assess the potential impacts associated with the proposed development.
(j) The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.	The EMPs (as per Appendices I1 to I3) will make provision for “Tool Box Talks”, which should be held with all workers on site. The dangers associated with the job as well as their right to refuse work that is harmful to human health, or the environment should be communicated to workers at this time. The Applicant is also to ensure, inter alia, that the working conditions on site adhere to the minimum requirements of the OHSA.
(k) Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.	Registered I&APs will be notified of the DFFE’s decision in respect of this application, as well as the reasons for the decision. Registered I&APs and the Applicant will be afforded an opportunity to review the DFFE’s reasons for the decision and will also be informed of the appeal process in terms of the Appeal Regulations.
(l) There must be intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment.	Sections 1 and 3 of this FEIAR summarises the legal and policy context applicable to the proposed development. A list of organs of state that were notified of the project and availability of the Draft Environmental Impact Assessment Report (DEIAR) is provided in Section 7.4 .
(m) Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures.	The EAP is not aware of current conflicts of interest between organs of state that are required to be resolved.
(n) Global and international responsibilities relating to the environment must be discharged in the national interest.	As signatory to the Kyoto Protocol since 1997, which calls for the reduction of South Africa’s greenhouse gas emissions through proactive means of reducing fossil fuels and/or through utilisation of renewable energy sources. Government has committed itself to the development of a national renewable energy framework. Apart from the reduction of greenhouse gas emissions, the promotion of renewable energy

Considerations as per Section 2 of the NEMA	
	sources is aimed at ensuring energy security through the diversification of supply. The proposed development will enable the increased renewable energy supply to the country and strengthen the commitment made by the country to the Kyoto Protocol.
(o) The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest, and the environment must be protected as the people's common heritage.	Solar radiation is a source of energy which is non-polluting and renewable and is therefore regarded as being in the public interest. However, the development of a PV Plant to exploit solar radiation to generate electricity may have significant impacts on the biophysical and socio-economic environments in which it is located. To avoid or minimise the impact on the environment, specialist assessments have been undertaken to assess these potential impacts and recommend mitigation measures to avoid or minimise the impacts of the activity to within acceptable levels.
(p) The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.	If the provisions of the EMPs (as per Appendices I1 to I3) are adhered to by the Applicant and compliance is monitored by the Environmental Control Officer (ECO), it is not anticipated that persistent pollution or permanent degradation of the environment or adverse human health effects will occur as a result of the proposed development. The Applicant will be responsible for remedying any pollution or environmental degradation (e.g., soil erosion) that may result during the lifetime of the project.
(q) The vital role of women and youth in environmental management and development must be recognised and their full participation therein must be promoted.	A comprehensive PPP will be undertaken as part of the S&EIA Process, which aims to provide a wide range of stakeholders (including women and youth) with an opportunity to comment on the application.
(r) Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.	The development location and layout have taken cognisance of the biophysical opportunities and constraints of the application area. The site selection process is described in Section 6.2.

Table 8 below describes how the general objectives of Integrated Environmental Management (IEM) as set out in section 23 of NEMA have been taken into account.

Table 8: Considerations as per Section 23 of NEMA

Considerations as per Section 23 of the NEMA	
Section 23 of NEMA states the following:	
(2) The general objective of integrated environmental management is to:	
(a) promote the integration of the principles of environmental management set out in section 2 into the making of all decisions which may have a significant effect on the environment;	To promote the principles of environmental management as set out in Section 2 of NEMA, an S&EIA process (inclusive of a comprehensive PPP) is being undertaken. The recommendations of the EAP and specialist practitioners have been incorporated into the project design and mitigation measures are included in the EMPr (as per Appendices I1 to I3). During the S&EIA process, members of the public and the relevant organs of state are provided with an opportunity to comment on reports. Refer to Section 7 for a description of the PPP. Apart from assessing the potential impacts of the proposed project, the specialist practitioners also provide input with regard to mitigation measures to avoid, minimise or reduce the significance of such impacts. In this way, the principles of environmental management are integrated into the making of the decision (i.e., issuing of EA) on the application by the DFFE. Refer to 7 above which described how the Section 2 principles of environmental management are taken into account.
(b) identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with the principles of environmental management set out in section 2;	Impacts associated with the proposed development have been identified, assessed and mitigation measures are proposed. Refer to Section 9 of this FEIAR.
(c) ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them;	The effects (or impacts) of activities are predicted, discussed and assessed as part of the S&EIA Process and the significance of these potential impacts is determined using the assessment methodology described in Section 9.2 . Mitigation measures are also recommended to reduce the significance of these impacts or to enhance positive impacts and are included in the EMPrs, as required (as per Appendices I1 to I3).

Considerations as per Section 23 of the NEMA	
(d) ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment;	The PPP allows for members of the public and relevant organs of state to submit their comments or concerns regarding the proposed development. The comments received are responded to and included in subsequent reports submitted to the DFFE. The results of the PPP will also be used to inform the preferred site layout, if necessary, to reduce unacceptable impacts or enhance positive impacts.
(e) ensure the consideration of environmental attributes in management and decision making which may have a significant effect on the environment; and	The baseline environment is described in Section 5 and has informed the layout of the proposed development on the site. An impact assessment is undertaken as part of the S&EIA Process, the results of which are considered by the EAP when making his/her recommendation to the DFFE. Similarly, the DFFE will refer to the impacts identified and the proposed mitigation measures prior to making a decision on the application.
(f) identify and employ the modes of environmental management best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management set out in section 2.	Table 7 details how the Section 2 principles of environmental management are taken into account. Mitigation measures are proposed for those activities that may impact on the environment. The EMPs (as per Appendices I1 to I3) compiled in the EIA Phase, must be adhered to by the Applicant and monitored by the ECO should the proposed development be authorised. The ECO plays a key role in monitoring the activities on site in accordance with the principles of environmental management as set out in Section 2 of NEMA.

The EIA Regulations, published in terms of Sections 24(5) and 44 NEMA, regulate the procedure and criteria as contemplated in Chapter 5 of the Act relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to environmental impact assessment, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters relating thereto.

Listed Activities in Listing Notices 1, 2 and 3 of the EIA Regulations are triggered by the proposed Carpe Diem North SPP development proposal, and may not commence without an EA from the competent authority. Since activities in Listing Notice 2 are triggered, the investigation, assessment and communication of the potential impact of activities must follow the S&EIA procedure as outlined in Chapter 4 of the EIA Regulations, 2014. Refer to **Table 9**.

Table 9: The identified listed activities in terms of the 2014 NEMA EIA Regulations, as amended

Activity No(s):	Basic Assessment Activity(ies) as set out in Listing Notice 1 (GN R327) (as amended)	Description of the portion of the proposed project to which the applicable listed activity relates.
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9	The development of infrastructure exceeding 1000m in length for the bulk transportation of water or storm water; (ii) with a peak throughput of 120 litres per second or more;	The construction and effective operation of the proposed Carpe Diem North Solar Photovoltaic Plant (SPP) will necessitate regular cleaning and maintenance, including periodic washing of the PV panels. The proposed Carpe Diem North SPP development is located outside of the urban area. Various water source alternatives are currently under investigation for the project, including sourcing from the Applicant's other projects or a third-party service provider and trucking the water to site and/or possible municipal water supply. In either case, reservoirs or tanks are required to store the water from where it may be pumped via a pipeline to service the facility. In addition, it is proposed that uncontaminated stormwater will be transported on site via a pipeline for use in panel washing and/or dust suppression. The above-mentioned pipeline/s will have a diameter of less than 300 mm and be over 1000 m in length.
11	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;	The proposed development is located outside the urban area and includes the construction of an Overhead Power Line (OPL) with a capacity of 132 kV to transmit electricity from the on-site SPP substation and enable National grid connection via tie-in to the existing Eskom High Voltage (HV) powerline which runs south towards Eskom's Carmel Substation.
14	The development 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.	The proposed development will include an on-site SPP Battery Energy Storage System (BESS). The on-site SPP BESS is directly linked to the SPP output and supports the SPP by ensuring reliable power output/supply from the SPP Facility. The SPP BESS is not a stand-alone BESS Facility. The Proponent will use either solid-state or fluid/flow batteries. Batteries may be defined as 'dangerous goods' as per the South African National Standards (SANS) 10234 due to the toxicity of their contents, e.g., vanadium redox or lithium-ion batteries and/or the flammability of the batteries.

24	The development of a road - (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;	Access roads and an internal road network will be established for the proposed Carpe Diem North SPP development to facilitate movement both on and off-site. These roads are anticipated to vary in width, typically falling between 4 to 8 meters. However, there will be instances where certain sections exceed 8 meters in width.
28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	The proposed development footprint exceeds 1 ha and is located outside of the urban area. Furthermore, the property's current zoning designates it for agricultural use.
56	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 –	The proposed development will necessitate widening existing roads to 8 meters and/or extending them by over 1 kilometre to facilitate the passage of heavy vehicles and accommodate cable trenching activities.
Activity No(s):	Scoping and EIR Activity(ies) as set out in Listing Notice 2 (GN R325) (as amended)	Description of the portion of the proposed project to which the applicable listed activity relates.
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 –	The proposed Carpe Diem North SPP development will generate a maximum electricity capacity of up to 150 MW, and therefore triggers the listed thresholds.
15	The clearance of an area of 20 hectares or more of indigenous vegetation	The extent of the developable area across the property is approximately 290 ha and the development footprint to be cleared is approximately 160 ha which includes disturbed (indigenous) vegetation of medium sensitivity which triggers the listed activity thresholds.
Activity No(s):	Basic Assessment Activity(ies) as set out in Listing Notice 3 (GN R324) (as amended)	Description of the portion of the proposed project to which the applicable listed activity relates.
1	The development of billboards exceeding 18 square metres in size outside urban areas, mining areas or industrial complexes. c. Gauteng	The Applicant may erect a billboard along either the western, northern or southern boundary of the site. As activity is triggered since the West Rand District Municipality Bioregional Plan was adopted in September 2015 (Provincial Gazette No. 390) which

	iv. Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans;	makes direct reference to the Gauteng Conservation Plan v4.0 (C-Plan). As per the Gauteng C-Plan, there are critical biodiversity areas (CBAs), and ecological support areas (ESAs) mapped on the property. Refer to Appendix K3 (Gazetted bioregional plan with C-Plan reference).
2	The development of reservoirs, excluding dams, with a capacity of more than 250 cubic metres. c. Gauteng iv. Sites identified as CBAs or ESAs in the Gauteng Conservation Plan or in bioregional plans;	The construction and effective operation of the proposed SPP will require cleaning and maintenance (periodic washing) of the PV panels. Irrespective of the water supply source, water will be stored in reservoirs/tanks on site to service the facility. According to the South African National Biodiversity Institute's (SANBI's) Biodiversity Geographic Information System (BGIS), parts of the proposed development footprint occur within a CBA and an ESA. Refer to Appendix K3 (Gazetted bioregional plan with C-Plan reference).
3	The development of masts or towers of any material or type used for telecommunication broadcasting or radio transmission purposes where the mast or tower - (a) is to be placed on a site not previously used for this purpose; and (b) will exceed 15 metres in height – but excluding attachments to existing buildings and masts on rooftops. c. Gauteng iv. Sites identified as CBAs or ESAs in the Gauteng Conservation Plan or in bioregional plans;	The proposed Carpe Diem North SPP development may require the development of a radio mast of more than 15 m in height. It appears that the site has not previously been utilised for this purpose, and contains CBAs and ESAs as mapped in the Gauteng C-Plan. Refer to Appendix K3 (Gazetted bioregional plan with C-Plan reference).
4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. c. Gauteng iv. Sites identified as CBAs or ESAs in the Gauteng Conservation Plan or in bioregional plans;	Access roads and an internal road network will be developed to facilitate movement both on and off the site. As per the Gauteng C-Plan, there are CBAs and ESAs mapped on the property. The width of these roads is anticipated to range from 4 to 8 m to accommodate various types of vehicles and equipment necessary for the project's construction and operation. Refer to Appendix K3 (Gazetted bioregional plan with C-Plan reference).
10	The development and related operation of facilities or infrastructure for the storage, or	The proposed development will include an on-site SPP Battery Energy Storage System

	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. c. Gauteng iv. Sites identified as CBAs or ESAs in the Gauteng Conservation Plan or in bioregional plans;	(BESS). The on-site SPP BESS is directly linked to the SPP output and supports the SPP by ensuring reliable power output/supply from the SPP Facility. The SPP BESS is not a stand-alone BESS Facility. The Proponent will use either solid-state or fluid/flow batteries. Batteries may be defined as 'dangerous goods' as per the SANS 10234 due to the toxicity of their contents, e.g., vanadium redox or lithium-ion batteries and/or the flammability of the batteries.
12	The clearance of an area of 300 square metres or more of indigenous vegetation c. Gauteng ii. Within CBAs or ESAs in the Gauteng Conservation Plan or in bioregional plans;	The extent of the developable area across the property is approximately 290 ha. Existing roads within CBA or ESA areas (along the property perimeter fence) will be utilised and may need to be widened which would trigger the listed activity threshold.
18	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. c. Gauteng iv. Sites identified as CBAs or ESAs in the Gauteng Conservation Plan or in bioregional plans;	Access roads and an internal road network will be established for the proposed Carpe Diem North SPP, which will necessitate the widening and lengthening of existing roads (which traverse CBAs and ESAs) to facilitate movement both on and off-site. These roads are anticipated to vary in width, typically falling between 4 to 8 meters. However, there will be instances where certain sections exceed 8 meters in width. Refer to Appendix K3 (Gazetted bioregional plan with C-Plan reference).

Chapter 6 of the EIA Regulations of 2014, as amended, titled *Public Participation* outlines the procedure for the public participation process that must be undertaken as part of the application for EA. The PPP is detailed in Section 7 of this report.

3.2.3 National Heritage Resources Act, 1999 (Act No. 25 of 1999), as amended

The National Heritage Resources Act, 1999 (Act No. 25 of 1999), as amended (NHRA), provides for:

“The management of National heritage resources, to set norms and maintain essential National standards for the management of heritage resources in South Africa, and to protect heritage resources of national significance, so that heritage resources may be bequeathed to future generations”.

Section 38(1) of the NHRA requires that any person who intends to undertake certain categories of development (see below) must notify the South African Heritage Resources Agency (SAHRA) at the very earliest stage of initiating such development and must furnish details of the location, nature and extent of the proposed development. Section 38(1) states that:

“Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—

- a. *the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;*
- b. *the construction of a bridge or similar structure exceeding 50 m in length;*
- c. *any development or other activity which will change the character of a site—*
 - (i) *exceeding 5 000 m² in extent; or*
 - (ii) *involving three or more existing erven or subdivisions thereof; or*
 - (iii) *involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
 - (iv) *the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;*
- d. *the re-zoning of a site exceeding 10 000 m² in extent; or*
- e. *any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,*
- f. *must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.”*

In terms of Section 35(4) of the NHRA, SAHRA must immediately be notified in the event of any graves, archaeological or paleontological artefacts being uncovered (e.g., during site establishment or construction).

Graves were recorded on Portion 27 of the Farm Doornfontein No. 118 IQ (the Carpe Diem South property), but not on the proposed Carpe Diem North SPP development site property i.e., Portion 5 of the Farm Varkenslaagte No. 119 IQ.

3.2.4 National Water Act, 1998 (Act 36 of 1998), as amended

The National Water Act, 1998 (Act No. 36 of 1998), as amended (NWA), is the primary statute providing the legal basis for water management in South Africa and aims to promote ecological integrity, economic growth and social equity when managing and using water.

Water uses identified in terms of Section 21 of the NWA include:

- “21(a) taking water from a water resource; 21(b) storing water;*
- 21(c) impeding or diverting the flow of water in a watercourse;*
- 21(d) engaging in a streamflow reduction activity contemplated in Section 36 of the Act;*
- 21(e) engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);*
- 21(f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;*
- 21(g) disposing of waste in a manner which may detrimentally impact on a water resource;*
- 21(h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;*
- 21(i) altering the bed, banks, course or characteristics of a watercourse;*
- 21(j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people;*

21(k) using water for recreational purposes”.

A Water Use License Authorisation (WULA) which may be a General Authorisation (GA) in terms in terms of the NWA, will be required for the proposed development since it triggers the NWA Section 21(g) listed activity and the Department of Water and Sanitation’s risk rating for all impacts were determined to be “Low”.

S&EIA related documentation was submitted to the Gauteng Regional Office of the Department of Water and Sanitation (DWS) as part of the WULA process and a General Authorisation in terms of the NWA, has been issued (refer to Appendix K5).

3.2.5 Other Legislation

Table 119 above and **Table 10** below provide a summary of legislative and other requirements, respectively, as are applicable to the proposed development and which have been considered in this EIA process.

Table 10: Summary of other key national environmental and land-use planning legislation.

Name of Act	Primary Functions	Applicability/ Legal Procedures Required	Responsible Authority
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004), as amended (NEM:BA) • Alien and Invasive Species (AIS) Regulations (GN 598 of 1 August 2014); • AIS Lists (GN 864 of 29 July 2016); • List of threatened Ecosystems (GN No. 47526 of 18 November 2022) • Threatened or Protected Species Regulations, 2007 • List of Critically Endangered (CE), Endangered (E), Vulnerable (V) and Protected Species, 2007	<i>The NEM:BA provides for the management and conservation of South Africa's biodiversity within the framework of the NEMA; the protection of species and ecosystems that warrant national protection; and the sustainable use of indigenous biological resources and the fair and equitable sharing of benefits from bio-prospecting involving indigenous biological resources.</i>	The NEMBA and its regulations need to be considered with respect to restricted activities. Listed ecosystems (i.e., endangered or critically endangered) have environmental authorisation implications in terms of NEMA and the EIA Regulations. • The proposed PV project is situated within an area dominated by anthropogenic activities including mining, industrial structures and residential development. The landscape is thus highly modified and fragmented, with only patches of remaining natural grassland. • Habitats recorded within the proposed development footprint include grassland, rocky grassland and disturbed grassland. The grassland displays variable signs of	DFFE

Name of Act	Primary Functions	Applicability/ Legal Procedures Required	Responsible Authority
Conservation of Agricultural Resources Act, 1983 (No. 43 of 1983) (CARA).	<i>The CARA provides for the control and conservation of the natural agricultural resources of South Africa to promote the conservation of the soil, water sources and vegetation and the combating of weeds and invader plants; and for matters connected therewith.</i>	disturbance but in most areas natural, intact grassland still remains. The study area is located in the Carletonville Dolomite Grassland and a small section towards the southwest of the Gauteng Shale Mountain Bushveld. Neither is considered threatened. CBA Optimal and ESA are also located on-site, mainly owing to the remaining primary grassland and potential red-list birds and orange-list plants. Patches of Primary Grassland are present and two Orange list species⁵, namely <i>Boophone disticha</i> and <i>Hypoxis hemerocallidea</i> have been recorded. Landowners are obliged, by law, to eradicate alien vegetation from their properties. No permitting or licensing requirements arise from this Act. The Act will however apply to the proposed SPP in aspects such as soil conservation and the prevention of soil erosion and weed control.	Comments were requested during the Scoping Phase and DEIAR Phase, regarding the development proposal from the Gauteng Department of Agriculture, Rural Development, Land and Environment (GDARD), and DFFE.

⁵ It must be noted that Gauteng is the only province to refer to Orange List Species. These species are generally declining in the province but are nationally listed as Least Threatened.

Name of Act	Primary Functions	Applicability/ Legal Procedures Required	Responsible Authority
Subdivision of Agricultural Land Act (No. 70 of 1970).	<i>To control the subdivision and, in connection therewith, the use of agricultural land.</i>	In terms of this Act, no lease in respect of agricultural land longer than ten (10) years may be entered into unless the Minister has provided written consent. As such, the lease agreement must be approved by the DFFE and registered with the Deeds Office (i.e., against the Title Deed of the property).	Comments were requested during the Scoping Phase and DEIAR Phase, regarding the development proposal from the GDARD, and DFFE.
National Veld and Forest Fire Act, Act No. 101 of 1998.	<i>The purpose of this Act is to prevent and combat veld, forest and mountain fires throughout the Republic.</i>	In terms of Section 12(1) of the Act, every owner on whose land a veld fire may start or burn or from whose land it may spread must prepare and maintain a firebreak on his or her side of the boundary between his or her land and any adjoining land. In terms of Section 13 of the Act, the firebreak should be wide enough and long enough to have a reasonable chance of preventing a veld fire from spreading, should not cause soil erosion, and should be reasonably free of inflammable material capable of carrying a veld fire across it. No permitting or licensing requirements arise from this Act. The Act will however apply to the operational phase of the proposed solar energy facility, and it is recommended that the	The National Department of Agriculture, Land Reform and Rural Development (DALRRD)

Name of Act	Primary Functions	Applicability/ Legal Procedures Required	Responsible Authority
Hazardous Substances Act, 1973 (Act No. 15 of 1973), as amended	<i>This Act provides for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitising or flammable nature or the generation of pressure thereby in certain circumstances, and for the control of certain electronic products; to provide for the division of such substances or products into groups in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances and products; and to provide for matters connected therewith.</i>	landowner and developer join the local Fire Protection Agency. This legislation may have relevance to the application process by requiring the identification of hazardous substances stored on the site and detailing their operational context of use, storage, or handling. If applicable, obtaining a license from the Department of Health may be necessary.	Department of Health (DoH)
National Environmental Management: Waste Act, Act 59 of 2008 (NEM:WA)	<i>This Act is intended to reform the law regulating waste management to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development;</i>	No waste license is required for the proposed SPP, considering no waste disposal facility will be constructed. However, if waste (both general and hazardous) is to be stored on-site, it must adhere to the Norms and Standards for Waste Storage (GN 926	Hazardous waste is under the jurisdiction of the National DFFE, whereas general waste falls within the competency of the GDARD.

Name of Act	Primary Functions	Applicability/ Legal Procedures Responsible Authority Required
	<i>to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for the licensing and control of waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith.</i> <i>The Minister may by notice in the Gazette, publish/ amend a list of waste management activities that have, or are likely to have, a detrimental effect on the environment.</i>	of November 2013) to ensure compliance.

Table 11: Relevant International policies and plans for the Proposed Carpe Diem North SPP Development.

Name of Policy	Relevance to the Proposed Carpe Diem North SPP Development
The Kyoto Protocol, 1997	The protocol aims to decrease South Africa's greenhouse gas (GHG) emissions by either reactively reducing the use of fossil fuels or proactively increasing the utilization of renewable energy resources. The proposed development supports the implementation and adherence to the Kyoto Protocol by enhancing the capacity for energy evacuation into the renewable energy sector.
The United Nations Framework Convention on Climate Change (UNFCCC) and Conference of the Party (COP)	The COP serves as the highest decision-making body of the UNFCCC and plays a pivotal role in reviewing the Convention's implementation while taking proactive measures to enhance its effectiveness. During COP 21 in Paris in 2015, an agreement was reached among 195 countries to combat global warming. South Africa signed the Agreement in April 2016 and ratified it on 1 November 2016 through the National Assembly. The South African climate change response is further guided by the South African National Climate Change Response Policy (NCCRP), which establishes a framework for adaptation and mitigation actions and formalises the nation's vision for transitioning to a low-carbon economy. This transition is envisioned through the adoption of the 'Peak, Plateau, and Decline' (PPD) greenhouse gas (GHG) emissions trajectory, wherein South Africa's emissions are expected to peak between 2020 and 2025, remain stable for approximately a decade, and then gradually decline in absolute terms. South Africa has committed to reducing emissions by 34% and 42% below Business as Usual (BAU) levels in 2020 and 2025, respectively. Once again, the proposed development contributes to South Africa's trajectory toward a low-carbon economy by bolstering capacity within the renewable energy sector.
International Finance Corporation (IFC) Performance Standards and Environmental and Social Sustainability Relevant Policy (January 2012)	The IFC performance standards are designed to alleviate poverty, prevent harm to people and the environment, combat climate change through the promotion of low-carbon development, uphold human rights, promote gender equality, assess information early in project development, collaborate with and guide project developers to meet these standards and inform countries of any transboundary impacts. These performance standards are relevant to the proposed development at its current stage of assessment: 1. <i>Assessment and Management of Environmental and Social Risks and Impacts;</i> 2. <i>Labour and Working Conditions;</i> 3. <i>Resource Efficiency and Pollution Prevention;</i> 4. <i>Community Health, Safety, and Security;</i> 6. <i>Biodiversity Conservation and Sustainable Management of Living Natural Resources;</i> and 8. <i>Cultural Heritage.</i>

The Equator Principles 4 (October 2020)	The Equator Principles (EPs) 4 is a <i>'financial industry benchmark for determining, assessing and managing environmental and social risks in projects'</i>. Essentially, the EPs provide a minimum standard for due diligence to support responsible risk decision-making, and are applicable to large infrastructure projects and apply globally to all industry sectors. South Africa is a non-designated country in terms of the EPs, and thus the assessment process for projects within the country evaluates compliance with the applicable IFC Performance Standards on Environmental and Social Sustainability and Environmental Health and Safety (EHS) Guidelines. The proposed development is currently being assessed in accordance with the national environmental legislation, which provides for the authorisation process for certain controlled activities. Through this impact assessment process, potential environmental, economic and social risks are identified and assessed – for which appropriate mitigation measures are then identified.
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Informed by international experience, South Africa initiated a process to introduce renewable energy feed-in tariffs (REFIT) into the national grid in 2008 to facilitate the introduction of renewable energy into the power system. Design work for REFIT was accelerated after the country experienced severe electricity shortages in 2008. In 2009, the NERSA published REFITs with proposed tariffs designed to cover generation costs in addition to a substantial 17 % after-tax return on equity. The REFIT system demonstrated South Africa's commitment to introducing renewable energy technologies (RETs) into the country and consequently stimulated market interest and foreign investor interest from across the globe. Practically, the implementation of the REFIT system was undertaken through a competitive tendering system (i.e., the Renewable Energy Independent Power Producer Programme [REIPPP]), through which interested investors are required to tender for renewable energy capacity as granted by the specific bid window. This procurement process first began in August 2011, after which the Department of Energy (now Department of Mineral Resources and Energy [DMRE]) announced the appointment of the first 28 preferred bidders, collectively offering 1 416 MW. There have been rapid achievements for the private sector since then and with each newly established and successfully commissioned plant, additional capacity is steadily added to the national power system.

At the 2011 United Nations Climate Change Conference (COP17) in Durban, the REIPPP was introduced in the country to implement the objectives of the Integrated Resource Plan (IRP) (2010-2030). The IRP is a plan aimed at estimating South Africa's electricity demand. It takes into account how the demand for electricity will be met and the expense of such a demand. The plan refers to electricity generation and expansion programmes. In formulating the National Development Plan⁶, the DMRE gazetted the IRP 2010-2030 in March 2011; this forecasted the energy demand for the 20-year period, ending in 2030. In October 2019, IRP 2019 was gazetted; this updates the energy forecast from 2019 to the year 2030. The stated objectives of the IRP are:

- Make electricity inexpensive;
- Reduce GHG emissions;
- Reduce water usage; and

⁶ The National Development Plan 2030 is an important policy document of the South African government drafted in August 2012 by the National Planning Commission which contains a series of proposals to eliminate poverty and reduce inequality by 2030.

- Electricity generation from different sources.

Other laws and policy documents which are of general relevance are detailed below:

3.2.5.1 Norms and Standards for Storage of Waste, 2013

The Norms and Standards for Storage of Waste, 2013 provides guidelines for the safe and environmentally sound storage of waste generated during the construction, operation, and decommissioning phases. This includes managing hazardous and non-hazardous waste in a manner that prevents pollution, protects human health, and minimizes environmental impacts. Compliance with these standards requires proper design and operation of waste storage facilities, implementation of containment measures, and regular monitoring and record-keeping to ensure that all waste is stored in accordance with legal requirements. Adherence to these standards has been detailed in the EMPs (as per Appendices I1 to I3) to ensure effective waste management throughout the project lifecycle.

3.2.5.2 National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA)

The National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA) regulates activities that may result in atmospheric emissions during the construction, operation, and decommissioning phases. Potential sources of air emissions include dust generation from earthworks, vehicle movement, and emissions from machinery. Compliance with NEM:AQA requires the implementation of dust suppression measures, regular monitoring of air quality, and adherence to emission limits to prevent air pollution and minimize health impacts on surrounding communities. These measures have been incorporated into the EMPs (as per Appendices I1 to I3) to ensure effective air quality management throughout the project.

3.2.5.3 National Dust Control Regulations (GN No. R. 827) of 1 November 2013

The National Dust Control Regulations (GN No. R. 827) of 1 November 2013 regulate dust emissions generated during construction, operation, and decommissioning activities. The regulations set limits for permissible dustfall rates and require the implementation of dust control measures to prevent nuisance impacts and protect the health of surrounding communities. Compliance will involve the use of dust suppression techniques, such as water spraying on exposed surfaces and limiting vehicle speeds on unpaved roads. Regular dustfall monitoring will be conducted to ensure that dust levels remain within permissible limits, and these measures have been detailed in the project's EMPs (as per Appendices I1 to I3).

3.2.5.4 Noise Control Regulations P.N. 627/1998

The Noise Control Regulations P.N. 627/1998 provide guidelines for managing noise emissions during construction, operation, and decommissioning phases. These regulations set permissible noise levels to prevent disturbances and ensure that noise impacts on surrounding communities are minimized. Compliance will involve implementing noise-reducing measures such as limiting construction activities to standard working hours, maintaining machinery to minimize excessive noise, and using barriers where necessary. Standard noise regulations have been referred to/included in the EMPs (as per Appendices I1 to I3) to ensure that noise levels are adhered to during construction, operation, and decommissioning phases.

3.2.5.5 Hazardous Substances Act, 1973 (Act No. 15 of 1973)

The Hazardous Substances Act, 1973 (Act No. 15 of 1973) is applicable to the Carpe Diem North SPP project as it regulates the storage, handling, and disposal of hazardous substances that may be used or generated

during the construction, operation, and decommissioning phases. Compliance with this Act is necessary to prevent harm to human health and the environment. This will involve identifying hazardous substances (e.g., chemicals, oils, or batteries), implementing safe handling procedures, ensuring proper containment and storage, and training personnel in emergency response measures. All management actions related to hazardous substances have been detailed in the EMPs (as per Appendices I1 to I3) to ensure adherence to the Act's requirements.

3.2.5.6 South African Manual for Outdoor Advertising Control (1998) (SAMOAC);

The South African Manual for Outdoor Advertising Control (1998) (SAMOAC) is applicable if any signage or outdoor advertisements are planned for the site. SAMOAC provides guidelines for the placement, size, and type of outdoor advertising to ensure that signage does not negatively impact the visual landscape, road safety, or surrounding communities. Compliance will involve ensuring that all project-related signage is designed and positioned in accordance with the SAMOAC guidelines, taking into account visibility, aesthetics, and safety considerations. The EMPs (as per Appendices I2 and I3) have outlined measures to adhere to these guidelines where applicable.

3.2.5.7 Occupational Health and Safety (OSH) Act, 1993 (Act No. 85 of 1993) as amended by the Occupational Health and Safety Amendment Act, 1993 (Act No. 181 of 1993);

The Occupational Health and Safety (OSH) Act, 1993 (Act No. 85 of 1993), as amended, is applicable to the Carpe Diem North SPP project to ensure the safety and health of all employees and contractors during the construction, operation, and decommissioning phases. Compliance with the OSH Act requires the implementation of safety measures such as proper training, the use of personal protective equipment (PPE), regular safety inspections, and the establishment of emergency response procedures. The project must also ensure that all work environments are free from hazards that could pose risks to the health and safety of personnel. Adherence to the OSH Act's requirements will be incorporated into the Health and Safety Management Plan and EMPs for the project.

3.2.5.8 Basic Conditions of Employment Act, 1997 (Act No. 75 of 1997)

The Basic Conditions of Employment Act, 1997 (Act No. 75 of 1997) sets the minimum standards for employment conditions for all workers involved in the project. This Act governs aspects such as working hours, overtime, leave, and remuneration to ensure fair and equitable treatment of employees. Compliance will require that all contractors and subcontractors adhere to these minimum employment standards, ensuring that all workers are provided with acceptable working conditions throughout the project's lifecycle. The requirements of the Act will be integrated into the project's Employment Management Plan and monitored regularly to ensure full compliance.

3.2.6 Guideline Documents

In addition to the DEAT⁷ (2002) Integrated Environmental Management Information Series documents, **Table 12** below lists the applicable DFFE Guideline Documents, which need to be considered as part of the S&EIA process by the EAP and/or specialist consultants.

Table 12: Applicable Guidelines.

Guideline Document		Document Reference
1. DFFE EIA Guideline for Renewable Energy Projects		
1.1	EIA Guideline for Renewable Energy Projects.	Department of Environmental Affairs (DEA) ¹³ . 2015. EIA Guideline for Renewable Energy Projects. DEA, Pretoria, South Africa. (GN 989 in GG 39297 of 16 October 2015).
2. DFFE Guideline Documents		
2.1	Guideline on Need and Desirability	DEA. 2017. Guideline on Need and Desirability, Department of Environmental Affairs, Pretoria, South Africa, March 2017. (GN. 891 GG No. 38108 of 20 October 2014), as amended.
2.2	Guideline on Public Participation	DEA. 2017. Public Participation guideline in terms of NEMA EIA Regulations, DEA, Pretoria, South Africa. (GN. 807 GG No. 35769 of 10 October 2012), as amended.
2.3	Guideline for Renewable Energy Projects	DEA. 2013. Guideline for Renewable Energy Projects. Draft National Renewable Energy Guideline. DEA, Pretoria, South Africa. 2013.
3. DEA's EIA Integrated Environmental Management Information Series (IEM)		
3.1	IEM Information Series	DEAT (2004) Overview of Integrated Environmental Management, Integrated Environmental Management, Information Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria.
4. Guideline Documents applicable to Avifauna		
4.1	Birds and Solar-Energy Best-Practice Guidelines	Jenkins, A.R., Ralston-Paton, S and Smit-Robinson H.A. 2016. Best-Practice Guidelines for assessing and monitoring the impact of solar power generating facilities on birds in southern Africa. BirdLife South Africa.

Other planning documents which are of general relevance are listed in **Section 1.4** of this FEIAR.

⁷ Now referred to as the DFFE.

3.3 Planning Context

3.3.1 National Development Plan (NDP) (2030)

The NPD 2030 sets out six interlinked priorities that include enabling faster economic growth, higher investment and greater labour absorption. The proposed Carpe Diem North SPP Farm subscribes to the NDP principles by offering renewable resources in an area that requires development to assist employment creation. The proposed site falls outside the International Corridor and the Klerksdorp Renewable Energy Development Zone (REDZ 10) identified for solar energy generation.

3.3.2 Provincial Planning Context

The **2016 Gauteng Spatial Development Framework (SDF)** envisages Gauteng in 2030 as *“an integrated, connected space that provides for the needs of all born in or drawn to the province. It aspires to establish a balanced, polycentric spatial network, with strong and resilient nodes enabling mutually beneficial exchanges of goods and services, and movement of people”*. Four spatial development strategies were identified to support the establishment of this polycentric form:

1. Capitalising on proximity, by directing higher densities closer to economic nodes and public transport networks, and improving conditions in areas closer to economic opportunities, to ensure even greater benefits for the people and economy of these areas.
2. Managing new settlement development, to prioritise infill development and densification, rather than expanding residential development outwards, so new settlements are functional and integrated units of the polycentric provincial network and based not only on the availability of land.
3. Building an economic network through a system of high - order nodes and activity corridors, developing economic clusters that benefit from synergies and unlock the advantages of agglomeration.
4. Creating a viable and productive hinterland by protecting valuable resources and high potential agricultural land from harmful development, and managing water resources frugally and effectively.

Ten high - priority provincial spatial development proposals were outlined, with the following being relevant to the proposed Carpe Diem North SPP:

- Strengthen and enhance agricultural production and agro-processing to optimise the use of high - value agricultural land in the province, create jobs, grow the economy and improve food security.
- Actively manage and protect the environment and ecosystems, including rehabilitating degraded areas and exploring legislating a provincial green belt.

The **2021 Review of the Gauteng Spatial Development Framework 2030** related to Electricity and ICT, indicated that Gauteng receives 89% of its electricity from coal - fired power plants. Gauteng's peak electricity demand was 10.3 GW in 2021, and it is expected to grow by 2.8% per annum to 13.6 GW by 2030. Municipalities and power utilities in the province have begun projects and schemes to address the province's anticipated long - term needs. However, a strategy for alternative, renewable, and long - term energy sources must be developed. Biomass (waste - energy) generation (16.8 MW) has already been integrated into municipal and Eskom distribution networks, but no further significant IPP alternative energy is planned for Gauteng for the foreseeable future. Electricity demand is expected to rise by 32% by 2030, requiring bulk infrastructure projects to address the anticipated electricity shortages. The West Rand was already operating near capacity in 2021, and requiring upgrades.

The **2014 Gauteng Provincial Environmental Management Framework (EMF)** aims to assist environmental impact management, including EIA processes, spatial planning and sustainable development with the following main objectives:

- To make it efficient for urban development (including associated service infrastructure) to occur in defined selected areas with lower environmental concerns and high development demand to help facilitate the implementation;
- To facilitate the optimal use of current industrial, mining land and other suitable
- derelict land for the development of non - polluting industrial and large commercial developments;
- To protect Critical Biodiversity Areas (CBAs) within urban and rural environments;
- To ensure the proper integration of Ecological Support Areas (ESAs) into rural land use change and development;
- To use ESAs as defined in municipal bioregional plans in spatial planning of urban open space corridors and links within urban areas; and
- To focus on the sustainability of development through the implementation of initiatives such as:
 - energy efficiency programmes, plans and designs;
 - waste minimisation, re - use and recycling;
 - green infrastructure in urban areas; and
 - Sustainable Drainage Systems (SuDS).

The following main proposals of the Gauteng EMF are relevant to the West Rand District:

- The existing developed areas are earmarked as Zone 1 Urban Development Zones, where urban activities are streamlined (exempt from environmental assessment requirements), and infill and densification are promoted with the aim of minimising urban sprawl into rural areas.
- Large sections of the study area are earmarked as Zone 4 Normal Control Zone (outside the urban edge), where agricultural uses outside the urban development zone are protected.
- In all parts of the study area, there are areas earmarked as Zone 3 High Rural Control Zones, where sensitive areas should be protected.
- There are two large areas set aside for Agri-Hubs, where more sustainable and productive agricultural activities should be established.

The proposed Carpe Diem North SPP is aligned with the objectives listed in several provincial policies or strategic frameworks that refer to the need for green energy to combat climate change and support and stimulate economic development in the Gauteng Province. Although solar water heaters and energy from landfill gas were identified as the most promising local renewable energy options for Gauteng in the short term, Solar PP offers an attractive alternative to generate renewable energy.

3.3.3 West Rand District Planning Context

The West Rand District Municipality (WRDM) of Gauteng, which encompasses the municipalities of Mogale City, Merafong City, and Rand West City, plays a pivotal role in the region's economic and environmental landscape. Merafong City, where the proposed Carletonville Solar Photovoltaic Plant (SPP) is located, is the largest municipality within the district and serves as its mining core, contributing over 50% of the District's Gross Value Added (GVA). The district's strategic development vision, as outlined in the WRDM Regional Growth and Development Strategy (2006), aims to create a socio-economically thriving and environmentally

sustainable region. This vision aligns directly with the proposed SPP, which supports the goal of transitioning to a greener economy.

The West Rand District Municipality Spatial Development Framework (2020) and the West Rand District Integrated Development Plan (IDP) 2022/23 – 2026/27 identify key developmental priorities that emphasize sustainability, quality urban development, and affordable clean energy. Specifically, Priority 6 – Affordable Clean Energy highlights the need for coordinated and efficient energy supply systems, the promotion of renewable energy, and the development of green technologies. The Carpe Diem North SPP, as a renewable energy project, directly aligns with these priorities by providing clean energy to the national grid and supporting the region's energy transition objectives.

Furthermore, several climate change adaptation and mitigation interventions recommended for the WRDM include building solar parks to supply electricity to the national grid, incorporating solar power into residential and industrial areas, and promoting green energy technologies. The proposed Carpe Diem North SPP is designed to fulfil these interventions by establishing a solar energy facility that contributes to sustainable energy generation, supporting the WRDM's vision for a connected, attractive, and sustainable region.

The location of the Carpe Diem North SPP, within Merafong City, and its focus on renewable energy generation, aligns with the District's strategic goals to reduce environmental impacts and enhance socio-economic development. By implementing a project that complements the existing land use and regional planning frameworks, the Carpe Diem North SPP will contribute to the overall growth and sustainability of the West Rand District Municipality.

3.3.4 Merafong City Municipal Planning Context

The Merafong Integrated Development Plan (IDP) 2022-2023 highlights the Municipality's strategic focus on reducing energy consumption and addressing service backlogs in line with national energy standards. One of the key economic focus areas identified is Focus Area 1: Agriculture and Agro-Industrial Development, aimed at establishing a competitive economic cluster through initiatives such as the Bokamoso-Ba-Rona project. This initiative involves creating an agro-based circular economy in the West Rand, integrating components such as Agro-Parks, a bioenergy plant, an agro-processing hub, and a market, thereby promoting agricultural development and renewable energy production. The IDP also emphasizes the potential for a Bioenergy Agro-Industrial Park, which will utilize anaerobic digestion for bioenergy production, providing opportunities for agricultural and industrial investors. This aligns with the Municipality's vision for leveraging underutilized agricultural land owned by mines and the Far West Rand Dolomitic Water Association (FWRDWA) to boost agricultural and industrial activities.

The proposed Carpe Diem North SPP directly supports these renewable energy priorities by contributing to the Municipality's goals of expanding clean energy generation and enhancing local energy security. The SPP will provide a reliable supply of renewable energy, which is crucial for supporting the energy demands of energy-intensive components within the Bioenergy Agro-Industrial Park and other related facilities. By establishing a solar energy facility in Merafong, the SPP aligns with the Municipality's broader objectives for sustainable economic growth and clean energy production, complementing ongoing initiatives like the Bioenergy Agro-Industrial Park.

Furthermore, the Carpe Diem North SPP will facilitate the region's transition to a green economy by promoting the use of renewable energy sources, reducing dependence on non-renewable energy, and minimizing carbon emissions. This project can serve as a catalyst for additional green energy projects and innovations, enhancing Merafong's position as a leader in sustainable development within the West Rand District.

The SPP will also optimize the use of underproductive or marginally viable agricultural land, transforming these areas into valuable economic assets, in line with Merafong's vision. The project supports strategic land-use planning and minimizes impacts on high-value agricultural land, thus aligning with the regional development objectives.

Additionally, the Carpe Diem North SPP will contribute to job creation and skills development during its construction and operational phases, supporting the IDP's goals of local employment and socio-economic upliftment. The project will also offer opportunities for training in renewable energy technologies, which is crucial for building local capacity and enhancing the region's human capital.

In terms of energy security, the SPP will add capacity to the local energy grid, creating a more resilient energy supply that is essential for the planned growth of the agriculture and industrial sectors in Merafong. By contributing to renewable energy generation, the project aligns with Merafong's climate change adaptation and mitigation strategies, helping the region meet national and regional targets for reducing greenhouse gas emissions.

The Carpe Diem North SPP's alignment with these strategic goals, its integration into the larger framework of renewable energy and agro-industrial initiatives, and its contribution to local socio-economic development and environmental sustainability make it a key contributor to the long-term growth and resilience of Merafong City and the West Rand District.

3.4 Conservation Planning Initiatives

The following land use planning initiatives are of specific relevance to the Carpe Diem North SPP proposed development site (as taken *verbatim* from respective Specialists' Scoping Phase reports/input, bar the Specialists' reference to Figures and Tables, which are instead, numbered in sequential according to this FEIAR, and footnotes which have also been included for further clarification which were not provided by the Specialist).

3.4.1 Protected Areas and Important Birds Areas⁸

The proposed Carpe Diem SEF⁹ is located approximately 4km south of an Important Bird Area (IBA) or protected area, i.e., the expansive Abe Bailey Nature Reserve. The Abe Bailey Nature Reserve comprises wetlands, bushveld and grassy savannahs. Each of these provides a different habitat for a unique combination of birds, and other flora and fauna.

Avifaunal species present include barbets (black-collared, pied and crested), bulbuls, African fish eagles, mousebirds (speckled, red-faced and white-backed), goliath herons, paradise flycatchers, yellow-billed storks, Diedericks cuckoos, blue waxbills, black-throated canaries, Black-chested Prinia, little bitterns and black crakes. During the winter months (June to August), fairy flycatchers may also be seen. Although Figure 3¹⁰ shows some proximity to protected areas and IBAs, the PA¹¹ shows no ecological linkage to these habitats. The impacts that preclude this ecological linkage includes Figure 3;

- Agricultural expansion: from timber crops, livestock ranching and aquaculture resulting in the afforestation of natural grasslands and wetlands, and human encroachment.

⁸ Source: Avifaunal Assessment: EIA Report for the Proposed Carpe Diem Solar PV Facility (Enviro-Insight, June 2025)

⁹ Some specialists refer to the SPP as a Solar Energy Facility (SEF)

¹⁰ Figure 3-1 in the of the Avifaunal Scoping and Impact Assessment Report (Enviro-Insight, June 2025)

¹¹ Project Area (PA)

- Energy production and mining: oil and gas drilling, mining, quarrying, and power production, resulting in air, water, light and noise pollution, destruction of habitat, and human encroachment.
- Human intrusions and disturbance: both recreational and work-related activities such as fishing, solid waste removal, sewerage, development of dams and deliberate fire creations or suppressions, and the above-mentioned activities, resulting in the depletion of natural habitats, Species or Conservation Concern (SCC) food sources, and breeding opportunities.
- Residential and commercial development: housing, tourism, roads and railways, resulting in the destruction of natural habitat and displacement of SCCs.

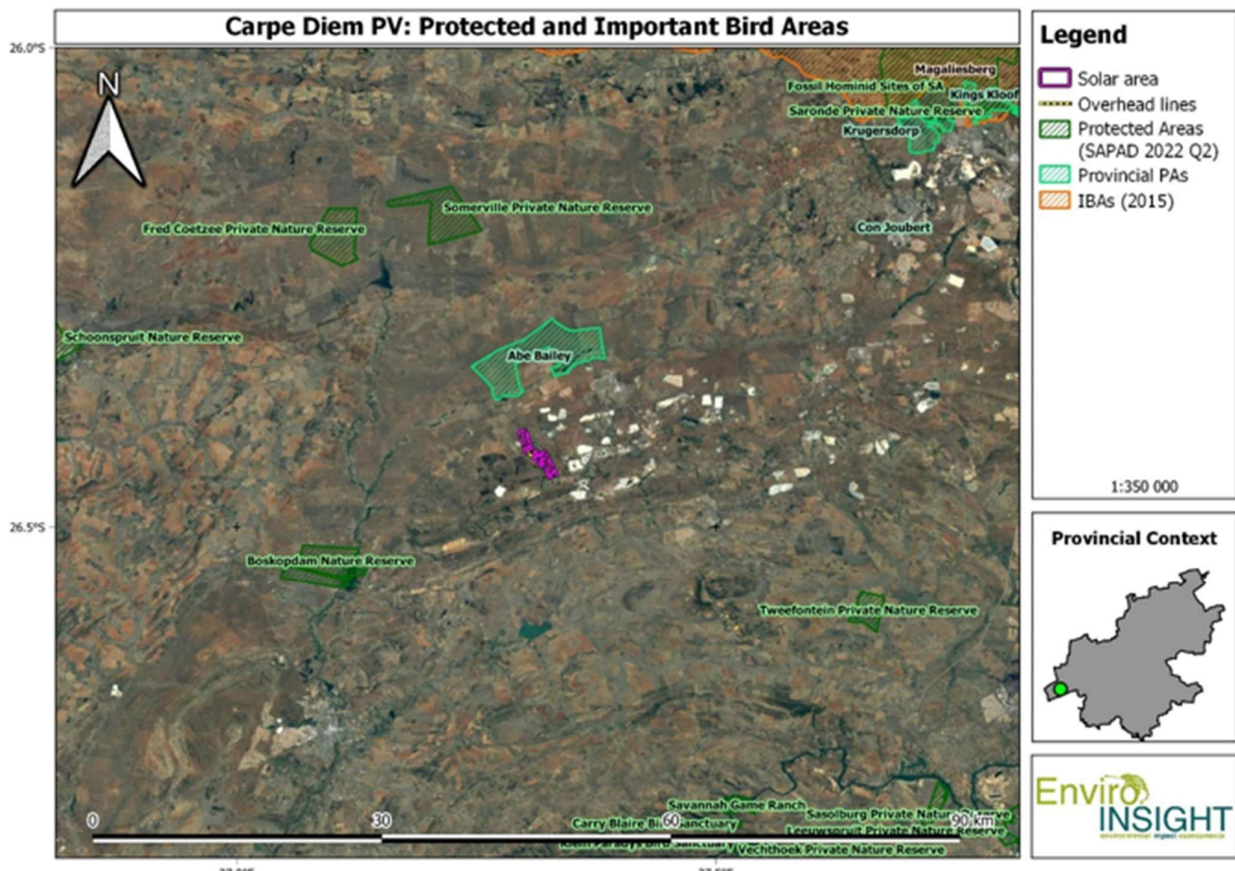


Figure 3: Carpe Diem SEF¹² Cluster in relation to PA and regional IBAs.

3.4.2 Gauteng Provincial Environmental Management Framework¹³

The proposed grid connection also crosses over Zone 3: High control zone (outside the urban development zone) and Zone 4: Normal control zone.

Zone 3: High control zone (outside the urban development zone)

Special control zones are sensitive areas outside the urban development zone. These areas are sensitive to development activities and in several cases also have specific values that need to be protected. The protection of Critical Biodiversity Areas and Ecological Support Areas is the primary objective in this zone and no new

¹² Some Specialists refer to the SPP as a Solar Energy Facility (SEF)

¹³ Source: Terrestrial Biodiversity Impact Assessment Report (Enviro-Insight, June 2025) – refer to **Appendix D3.1**.

residential, retail, business, commercial, industrial, mining or any other land use, with the exception of unavoidable linear service infrastructure, may be allowed in this area, with the exception of tourism hospitality facilities that adhere to SuDS¹⁴ and green infrastructure principles. Land uses that are conditionally compatible with the intention of this zone include electricity network.

Zone 4: Normal control zone

This zone is dominated by agricultural uses outside the urban development zone as defined in the Gauteng Spatial Development Framework. No listed activities may be excluded from environmental assessment requirements in this zone.

Land uses that are compatible with the intention of this zone include electricity network.

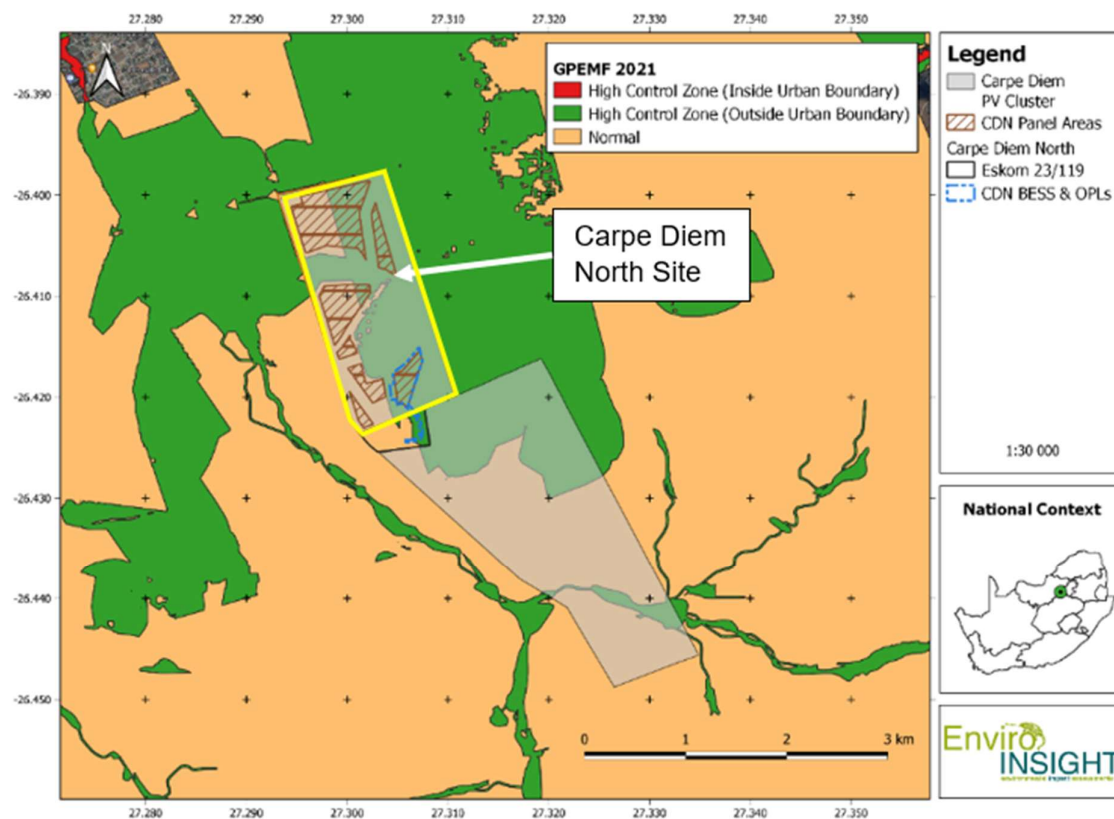


Figure 4: Location of the proposed SPP in relation to the GPEMF¹⁵. Note: for clarity, a yellow development site boundary line has been added to original map as provided by specialist.

¹⁴ Sustainable Drainage Systems (green infrastructure is infrastructure that can improve water quality, reduce air pollution, and lower air temperatures)

¹⁵ Gauteng Province Environmental Management Framework (GPEMF). Source: Figure 4-3, Terrestrial Biodiversity Impact Assessment Report (Enviro-Insight, June 2025) – refer to **Appendix D3.1** of this FEIAR.

3.4.3 2024 Gauteng Conservation Plan v4.0 (C-Plan)¹⁶

The following CBA information has been extracted and mapped Verbatim from the Enviro-Insight Terrestrial Biodiversity survey conducted as part of the application process. CBAs and ESAs are terrestrial and aquatic features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services. The primary purpose of CBA's is to inform land-use planning in order to promote sustainable development and protection of important natural habitat and landscapes. Biodiversity priority areas are described as follows:

- **CBAs** are areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. In other words, if these areas are not maintained in a natural or near-natural state then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses. For CBA's the impact on biodiversity of a change in land-use that results in a change from the desired ecological state is most significant locally at the point of impact through the direct loss of a biodiversity feature (e.g. loss of a populations or habitat).
- **ESAs** are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree of restriction on land use and resource use in these areas may be lower than that recommended for critical biodiversity areas. For ESA's a change from the desired ecological state is most significant elsewhere in the landscape through the indirect loss of biodiversity due to a breakdown, interruption or loss of an ecological process pathway (e.g., removing a corridor result in a population going extinct elsewhere). All natural non-FEPA wetlands and larger rivers have a minimum category of ESA.

A map of the study in relation to the 2024 Gauteng CBA's is presented in Figure 5 below, indicates that the study area is located primarily in a CBA 2 (Important) and ESA.

CBA 2 are indicated based on Primary Grassland, Red Listed Bird habitat and potential Orange List plant species.

The study site is situated within the Carletonville Dolomite Grassland and in the Gauteng Shale Mountain Bushveld (Mucinan& Rutherford, 2006 – as amended). Both are listed as Least Threatened.

Carletonville Dolomite Grassland (Gh 15)

Distribution: Carletonville Dolomite Grasslands are predominantly found in the North West Province, in the regions round Potchefstroom, Ventersdorp and Carletonville.

Critical biodiversity areas (CBAs) are terrestrial and aquatic features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services. The primary purpose of

¹⁶ Source: Avifaunal Scoping and Impact Assessment Report (Enviro-Insight, June 2025) – refer to **Appendix D4** of this FEIAR. **Note:** a more detailed C-Plan v4.0. Map was provided by the Terrestrial Biodiversity Impact Assessment Specialist (Enviro-Insight, June 2025) – refer to **Appendix D3.1** of this FEIAR and is provided in Figure 47 below.

CBA is to inform land use planning in order to promote sustainable development and protection of important natural habitats and landscapes.

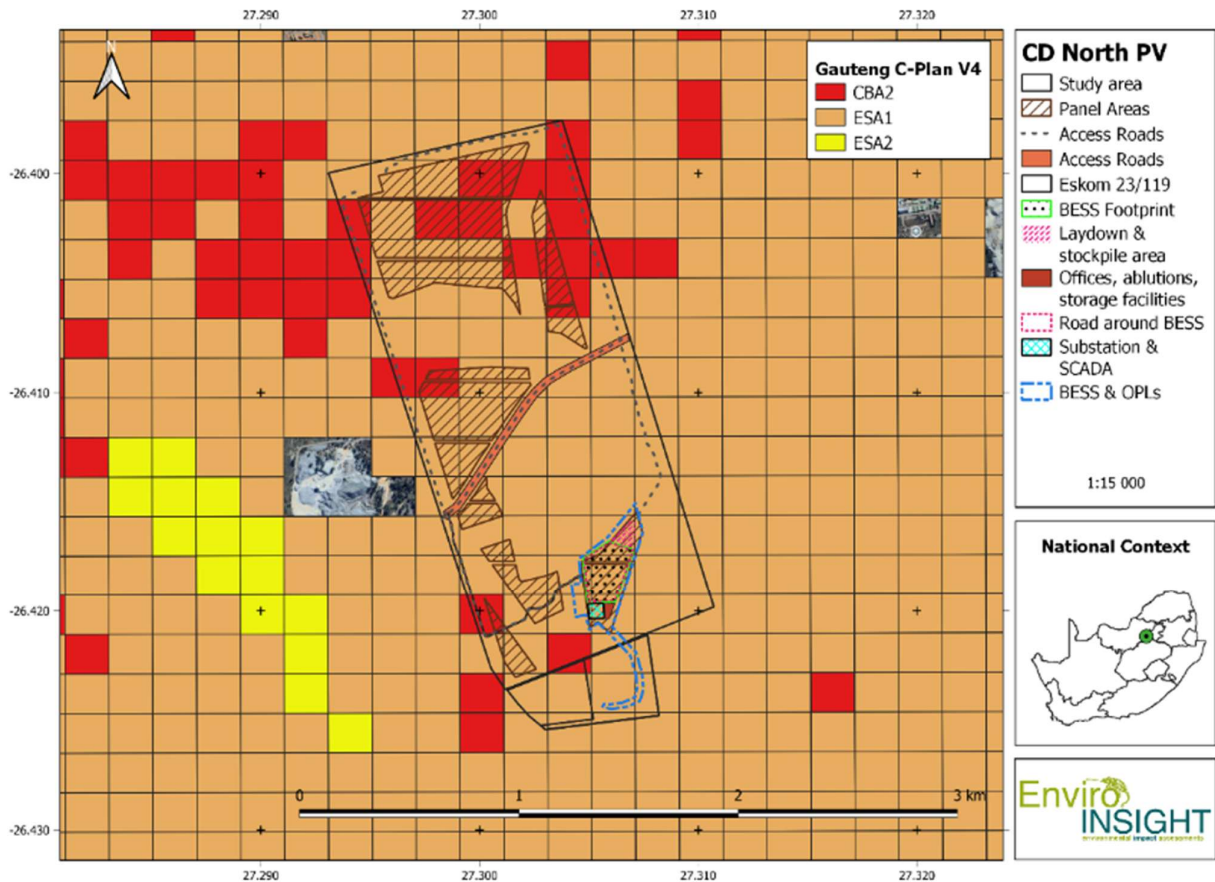


Figure 5: The proposed Carpe Diem SEF in relation to the Gauteng C-Plan v4.0.

Gauteng Shale Mountain Bushveld (SVcb 10)

Distribution: Gauteng Shale Mountain Bushveld occurs in a narrow band along a series of ridges from Carletonville to Westonaria to Lenasia as well as on low, rocky ridges of varying steepness. Vegetation is characterised by short, semi-open thicket which comprises a variety of fine- and broad-leaf woody species. The field layer is normally dominated by grasses (Mucina and Rutherford, 2006). The underlying geology comprises shale with some coarser clastic sediments and andesite from the Pretoria Group. Soils are shallow to deep Mispah.

Biodiversity priority areas are described as follows:

- CBA's are areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. In other words, if these areas are not maintained in a natural or near-natural state then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses. For CBA the impact on biodiversity of a change in land use that results in a change from the desired ecological state is most significant locally at the point of impact through the direct loss of a biodiversity feature (e.g. loss of a population

or habitat). All FEPA-prioritised wetlands and rivers have a minimum category of CBA 1, while all FEPA-prioritised wetland clusters have a minimum category of CBA 2.

- Ecological support areas (ESA) are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or delivery of ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree of restriction on land use and resources used in this specific ESA is most significant elsewhere in the landscape through the indirect loss of biodiversity due to a breakdown, interruption or loss of an ecological process pathway (e.g. removing a corridor results in a population going extinct elsewhere or a new plantation locally results in a reduction in stream flow at the exit to the catchment which affects downstream biodiversity). All natural non-FEPA wetlands and larger rivers have a minimum category of ESA.

A map of the study in relation to the 2024 Gauteng C-Plan v4.0 is presented in Figure 5 indicating that the northern section of the study area is located in a CBA2 (Important) and sections in the middle and southwards in an ESA. CBA2 are indicated based on Primary Grassland and potential orange list plant species¹⁷. The ESA is mainly owing to Class 1 and 2 ridges, ecological corridors and secondary grassland. Several orange list plant species have been recorded, and some of the grassland patches are still natural and intact.

Table 13 below contains explanatory definitions of the Gauteng C-Plan Categories.

Table 13: Gauteng Conservation Plan Categories

CBA Category	ONA	ESA2
CBA Name	Other Natural Areas	Ecological Support Area 2: Restore from other land use
CBA definition	Areas not currently identified as a priority, but retain most of their natural character and perform a range of biodiversity and ecological infrastructure functions. Although not prioritised, they are still an important part of the natural ecosystem.	Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of protected areas (PAs) or CBAs and are often vital for delivering ecosystem services.
Objective / General Guidelines	Minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning. Offers flexibility in permissible land-uses, but some authorisation may still be required for high-impact land-uses	Restore and/or manage to minimize impact on ecological processes and ecological infrastructure functioning, especially soil and water-related services, and to allow for faunal movement.
Specific Guidelines	These areas have the greatest flexibility in terms of management objectives and permissible land uses. Where possible, avoid modifying any remaining natural habitat by locating land	These are areas which may already have some form of development (cultivation, mining or even buildings and infrastructure) but which should be providing ecosystem services. Where possible the current land

¹⁷ Gauteng is the only province to refer to Orange List Species which are species generally declining provincially but nationally, are listed as Least Threatened

CBA Category	ONA	ESA2
	uses, including cultivation and plantations, in already-modified areas. Authorisation may be required for high-impact land uses (such as intensive industry or urban development) and standard application of EIA Regulations and other planning procedures is required. Note: these areas may still contain species of conservation concern (SCC) but either have not yet been surveyed, or the data was not available for incorporation into the Gauteng C-Plan. The presence of absence of SCC should always be established through site visits before proceeding with a land use change. Recommendations of an appropriately qualified specialist must be followed in this regard.	uses should be withdrawn and rehabilitation should be undertaken. Best practice should apply in areas where land uses other than conservation is present e.g., agriculture. These areas should be targeted for habitat rehabilitation and restoration activities e.g., alien clearing.
Features	Watercourses, Koppie and primary Wetland grassland	

4 SCOPE OF THE PROPOSED ACTIVITY

The following sections describe the locality of the proposed site and provide a description of the proposed project's main components and infrastructure.

The scope of the proposed Carpe Diem North SPP development consists of three main components:

- SPP panel array;
- SPP substation, which includes the IPP Collector Substation and Switching Station Substation; and
- Grid connection.

These main components are discussed in more detail below.

4.1 Site Locality

The proposed development is located on Portion 5 of the Farm No. 119 IQ with less preferred grid connection alternatives located on Portion 23 of the Farm Doornfontein No. 118 IQ, near Carletonville, Merafong City Local Municipality, West Rand District Municipality, Gauteng.

The development property extends approximately 290 ha and is located directly west of Carletonville off the R 501 Regional public road, and immediately north of the Eskom Carmel Main Transmission Substation. Access to the site will be off the tar D92-1020, the public District Road (refer to Figure 43 below), which runs along the western boundary of the proposed development property.

The site is located within Merafong City Municipality in Gauteng, which is excluded from any promulgated Renewable Energy Development Zones (REDZ).

The property is currently zoned for agricultural purposes. According the Merafong Land Use Management Document, 2020, renewable energy infrastructure is a primary land use right under the zoning of 'Agriculture' in the Merafong City Local Municipality and, therefore, no re-zoning is required since the rights are already allocated under the respective scheme.

4.2 Project Coordinates (for various Layout Alternatives):

The various environmental sensitivities, and resultant opportunities and constraints presented by the proposed development site/study area gave rise to three potential layout alternatives for the SPP. These three layout alternatives, together with the no-go alternative, (as detailed below), were considered within this application:

- 4.2.1 Alternative 1 (most preferred alternative)** - SPP development on Portion 5 of the Farm Varkenslaagte No. 119 IQ using all developable land on property, with a LiLo OPL connection to the existing Eskom 132 kV OPL. Refer to Appendix J1 and Figure 19 (with Table 27) below.
- 4.2.2 Alternative 2** - SPP using all developable land on property with a less than 150 m UPL connecting to the northern section of Carmel MTS on Portion 23 of the Farm Doornfontein No. 118 IQ, where the subsurface power line becomes an OPL. The UPL will be developed using trenchless excavation i.e., pipe-jacking. Refer to Appendix J2 and Figure 20 (with Table 28) below.
- 4.2.3 Alternative 3** - SPP array with a longer grid connection (less than 900 m) comprising an initial underground section (approximately 520 m) which partially follows Alternative 1's UPL route before continuing to run underground along and within the southern boundary of Portion 5 of the Farm

Varkenslaagte No. 119 IQ, and surfacing as an OPL (approximately 360 m) skirting around the eastern boundary of the Carmel MTS boundary on Portion 23 of the Farm Doornfontein No. 118 IQ, and connecting to the southern section of the MTS. The UPL becomes an OPL only after it has crossed under the existing Eskom HV OPLs which enter Carmel MTS property from the North-east. Refer to Appendix J3 and Figure 21 (with Table 29) below.

4.2.4 No-go Alternative - The development does not take place and the *status quo* is maintained.

The order of development Alternative preference presented above is based on securing the most optimal grid connection for the proposed development with no grid connection (due to the No-go Alternative) being the least preferred alternative.

Bar the No-go Alternative, it is evident from the three layout alternatives described above, that the only difference between each site development plan is whether power line connection Alternative 1, 2, or 3 is utilised for connection to the National grid.

The power-generating areas, or 'PV islands', that comprise the Carpe Diem North SPP have been sequentially numbered, as shown in Figure 6, to simplify the identification of corner and bend-point coordinates. The image illustrates the corner coordinates of the proposed Carpe Diem North SPP property, specifically Portion 5 of the Farm Varkenslaagte No. 119 IQ, where the SPP footprint is located. Property corners are marked with yellow pins, and electricity-generating areas (PV islands) are sequentially numbered. The existing internal perimeter fence road/track within the development site boundary is depicted as a white line.

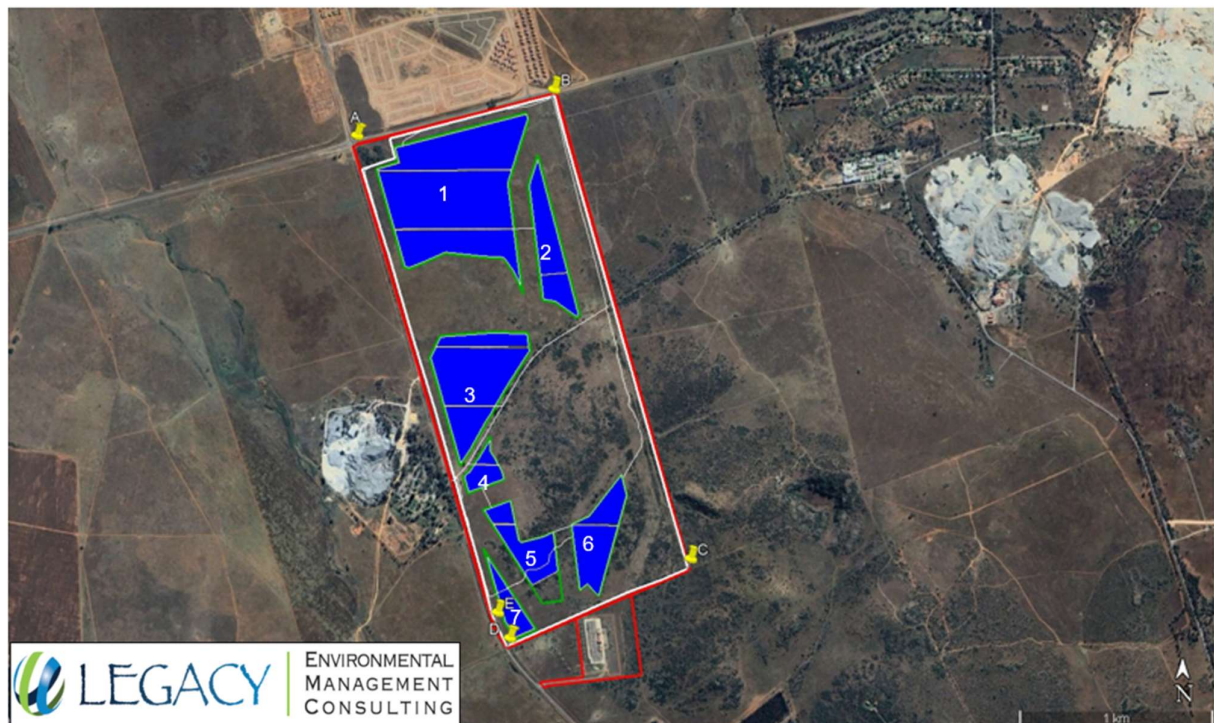


Figure 6: Satellite image depicting corner co-ordinates of proposed Carpe Diem North SPP property i.e., Portion 5 of the Farm Varkenslaagte No. 119 IQ.

Table 14 below contains co-ordinates for the site boundary corner points indicated by the yellow markers in Figure 6 above. This table outlines the coordinates for **Portion 5 of Farm Varkenslaagte No. 119**, which encompasses the project boundary of the proposed Carpe Diem North SPP development. It highlights both

the property boundary and the most likely preferred alternative for the project. Refer to Figure 6 for the corresponding corner or bend markers.

Table 14: GPS Coordinates for the Total SPP Property Boundary

Portion 5 of Farm Varkenslaagte No. 119 Property Boundary:						
CORNER / BEND POINT	LATITUDE (S)			LONGITUDE (E)		
	DEG	MIN	SEC	DEG	MIN	SEC
A	26°	23'	59.95"	27°	17'	35.33"
B	26°	23'	52.26"	27°	18'	12.61"
C	26°	25'	11.15"	27°	18'	38.20"
D	26°	25'	24.89"	27°	18'	4.27"
E	26°	25'	20.56"	27°	18'	1.96"

The following individual images in Figures 7 to 20 and associated tables (Tables 14 to 27), depict the location of individual features of the proposed Carpe Diem North SPP with corresponding Global Positioning Satellite (GPS) co-ordinates.



Figure 7: Satellite image depicting corner co-ordinates of proposed Carpe Diem North SPP panel array (power plant) island 1. Development feature's corners/bend points indicated with yellow markers/'dropped pins' in image above.

Table 15 below contains GPS co-ordinates which correspond to alpha-numeric dropped pins in **Figure 7** above.

Table 15: GPS co-ordinates for proposed Carpe Diem North SPP panel array (power plant) island 1. Refer to Figure 7 above for corresponding corner/bend point markers/pins.

Corner co-ordinates for proposed Carpe Diem North SPP panel array (power plant) island 1 footprint:						
CORNER / BEND POINT	LATITUDE (S)			LONGITUDE (E)		
	DEG	MIN	SEC	DEG	MIN	SEC
A.1	26°	24'	0.60"	27°	17'	43.20"
B.1	26°	23'	54.96"	27°	18'	7.81"
C.1	26°	23'	55.63"	27°	18'	8.17"
D.1	26°	24'	5.98"	27°	18'	4.52"
E.1	26°	24'	23.60"	27°	18'	6.73"
F.1	26°	24'	21.36"	27°	18'	5.58"
G.1	26°	24'	19.02"	27°	18'	3.56"
H.1	26°	24'	17.92"	27°	17'	52.68"
I.1	26°	24'	20.62"	27°	17'	45.67"
J.1	26°	24'	20.26"	27°	17'	44.95"
K.1	26°	24'	4.04"	27°	17'	39.77"

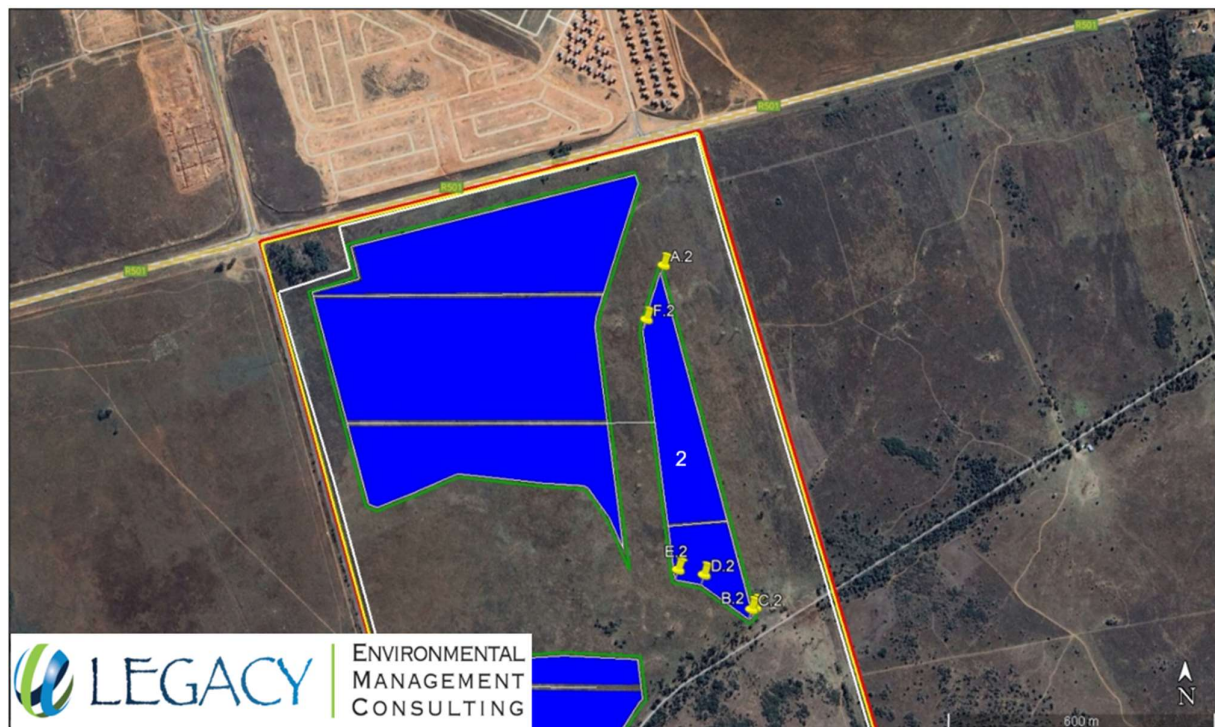


Figure 8: Satellite image depicting corner co-ordinates of proposed Carpe Diem North SPP panel array (power plant) island 2 on Portion 5 of the Farm Varkenslaagte No. 119 IQ. Development feature corners/bend points indicated with yellow 'dropped pins' in image above.

Table 16 below contains GPS co-ordinates which correspond to alpha-numeric dropped pins in **Figure 8** above.

Table 16: GPS co-ordinates for proposed Carpe Diem North SPP panel array (power plant) island 2. Refer to Figure 8 above for corresponding corner/bend point markers/pins.

Corner co-ordinates for proposed Carpe Diem North SPP panel array (power plant) island 2 footprint:						
CORNER / BEND POINT	LATITUDE (S)			LONGITUDE (E)		
	DEG	MIN	SEC	DEG	MIN	SEC
A.2	26°	24'	2.70"	27°	18'	10.10"
B.2	26°	24'	28.76"	27°	18'	17.69"
C.2	26°	24'	28.93"	27°	18'	17.37"
D.2	26°	24'	26.37"	27°	18'	13.41"
E.2	26°	24'	26.01"	27°	18'	11.22"
F.2	26°	24'	6.92"	27°	18'	8.60"

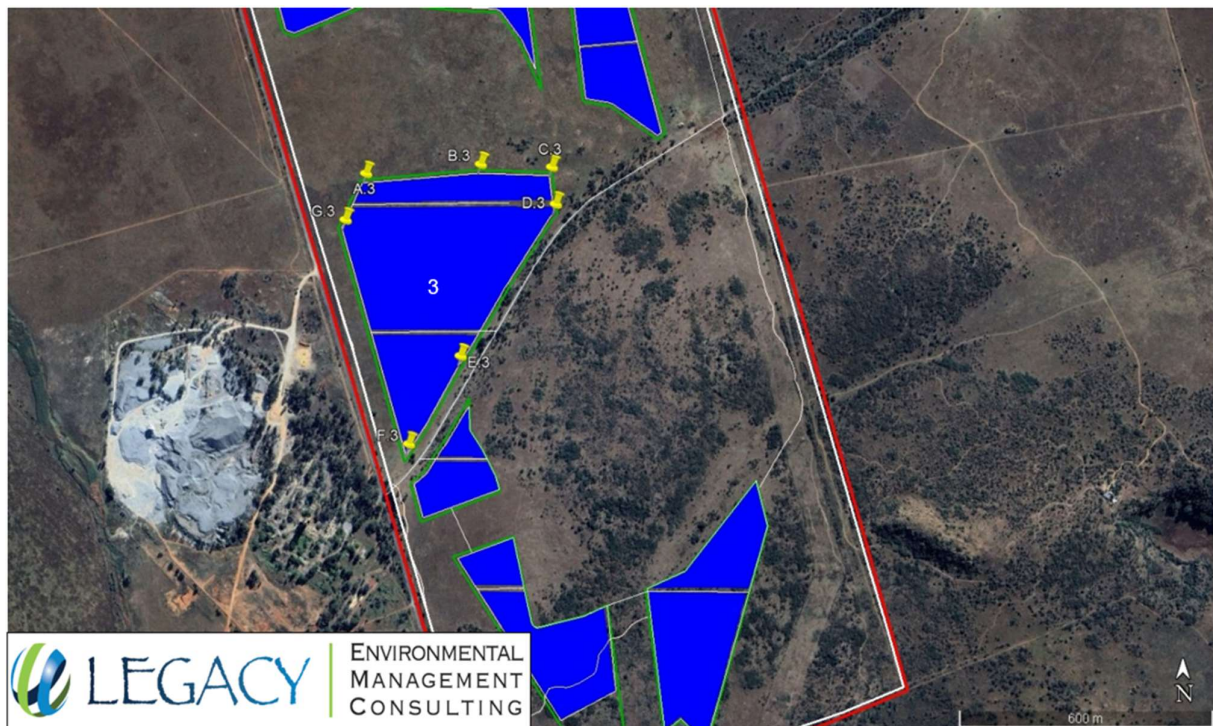


Figure 9: Satellite image depicting corner co-ordinates of proposed Carpe Diem North SPP panel array (power plant) island 3 on Portion 5 of the Farm Varkenslaagte No. 119 IQ. Development feature corners/bend points indicated with yellow 'dropped pins' in image above.

Table 17 below contains GPS co-ordinates which correspond to alpha-numeric dropped pins in **Figure 9** above.

Table 17: GPS co-ordinates for proposed Carpe Diem North SPP panel array (power plant) island 3. Refer to Figure 9 above for corresponding corner/bend point markers/pins.

Corner co-ordinates for proposed Carpe Diem North SPP panel array (power plant) island 3:						
CORNER / BEND POINT	LATITUDE (S)			LONGITUDE (E)		
	MIN	SEC	MIN	SEC	MIN	SEC

A.3	26°	24'	32.43"	27°	17'	51.78"
B.3	26°	24'	31.80"	27°	18'	1.84"
C.3	26°	24'	32.08"	27°	18'	8.04"
D.3	26°	24'	34.95"	27°	18'	8.37"
E.3	26°	24'	46.70"	27°	18'	0.08"
F.3	26°	24'	53.57"	27°	17'	55.54"
G.3	26°	24'	52.97"	27°	17'	58.93"



Figure 10: Satellite image depicting corner co-ordinates of proposed Carpe Diem North SPP panel array (power plant) island 4 on Portion 5 of the Farm Varkenslaagte No. 119 IQ. Development feature corners/bend points indicated with yellow 'dropped pins' in the image above.

Table 18 below contains GPS co-ordinates which correspond to alpha-numeric dropped pins in Figure 10 above.

Table 18: GPS co-ordinates for proposed Carpe Diem North SPP panel array (power plant) island 4. Refer to Figure 10 above for corresponding corner/bend point markers/pins.

Corner co-ordinates for proposed Carpe Diem North SPP panel array (power plant) island 4:						
CORNER BEND POINT	LATITUDE (S)			LONGITUDE (E)		
	MIN	SEC	MIN	SEC	MIN	SEC
A.4	26°	24'	50.04"	27°	18'	1.11"
B.4	26°	24'	51.78"	27°	18'	1.15"
C.4	26°	24'	55.36"	27°	18'	3.44"
D.4	26°	24'	56.30"	27°	18'	3.72"

E.4	26°	24'	58.51"	27°	17'	57.05"
F.4	26°	25'	55.94"	27°	17'	56.31"
G.4	26°	24'	55.13"	27°	17'	57.42"
H.4	26°	25'	52.79"	27°	17'	59.14"

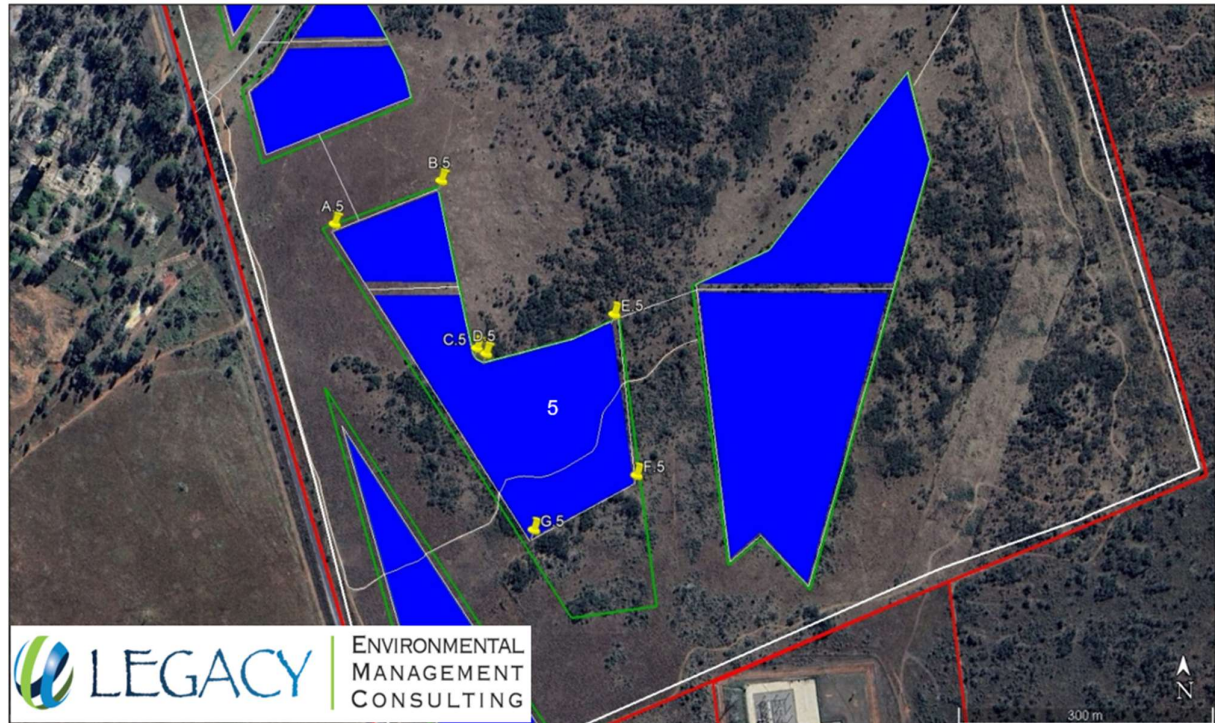


Figure 11: Satellite image depicting corner co-ordinates of proposed Carpe Diem North SPP panel array (power plant) island 5 on Portion 5 of the Farm Varkenslaagte No. 119 IQ. Development feature corners/bend points indicated with yellow 'dropped pins' in the image above.

Table 19 below contains GPS co-ordinates which correspond to alpha-numeric dropped pins in Figure 11 above.

Table 19: GPS co-ordinates for proposed Carpe Diem North SPP panel array (power plant) island 5. Refer to Figure 11 above for corresponding corner/bend point markers/pins.

Corner co-ordinates for proposed Carpe Diem North SPP panel array (power plant) island 5:						
CORNER / BEND POINT	LATITUDE (S)			LONGITUDE (E)		
	MIN	SEC	MIN	SEC	MIN	SEC
A.5	26°	25'	1.75"	27°	18'	0.09"
B.5	26°	25'	0.05"	27°	18'	4.98"
C.5	26°	25'	6.79"	27°	18'	6.58"
D.5	26°	25'	7.01"	27°	18'	6.99"
E.5	26°	25'	5.44"	27°	18'	12.76"
F.5	26°	25'	11.89"	27°	18'	13.76"
G.5	26°	25'	14.11"	27°	18'	9.14"

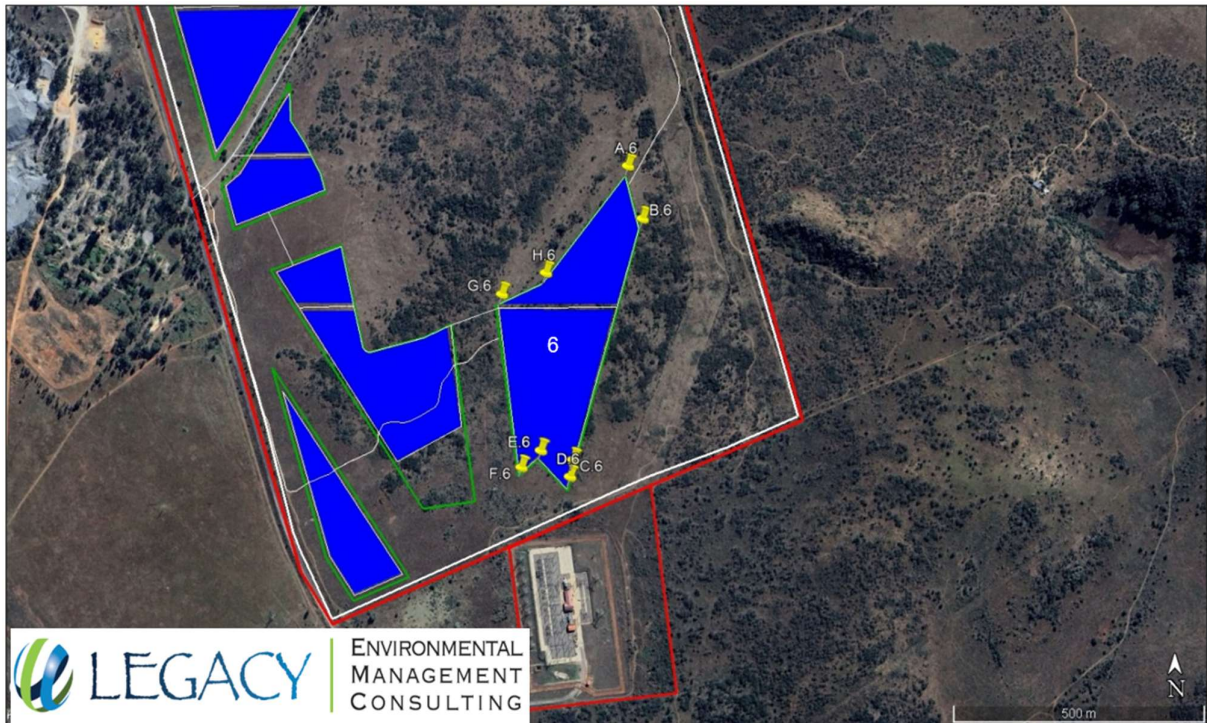


Figure 12: Satellite image depicting corner co-ordinates of proposed Carpe Diem North SPP panel array (power plant) island 6 on Portion 5 of the Farm Varkenslaagte No. 119 IQ. Development feature corners/bend points indicated with yellow 'dropped pins' in the image above.

Table 20 below contains GPS co-ordinates which correspond to alpha-numeric dropped pins in Figure 12 above.

Table 20: GPS co-ordinates for proposed Carpe Diem North SPP panel array (power plant) island 6. Refer to Figure 12 above for corresponding corner/bend point markers/pins.

Corner co-ordinates for proposed Carpe Diem North SPP panel array (power plant) island 6:						
CORNER / BEND POINT	LATITUDE (S)			LONGITUDE (E)		
	MIN	SEC	MIN	SEC	MIN	SEC
A.6	26°	24'	55.53"	27°	18'	25.81"
B.6	26°	24'	58.96"	27°	18'	26.87"
C.6	26°	25'	14.66"	27°	18'	21.58"
D.6	26°	25'	15.77"	27°	18'	26.41"
E.6	26°	25'	14.06"	27°	18'	19.44"
F.6	26°	25'	15.17"	27°	18'	18.01"
G.6	26°	25'	3.83"	27°	18'	16.60"
H.6	26°	25'	2.44"	27°	18'	19.83"

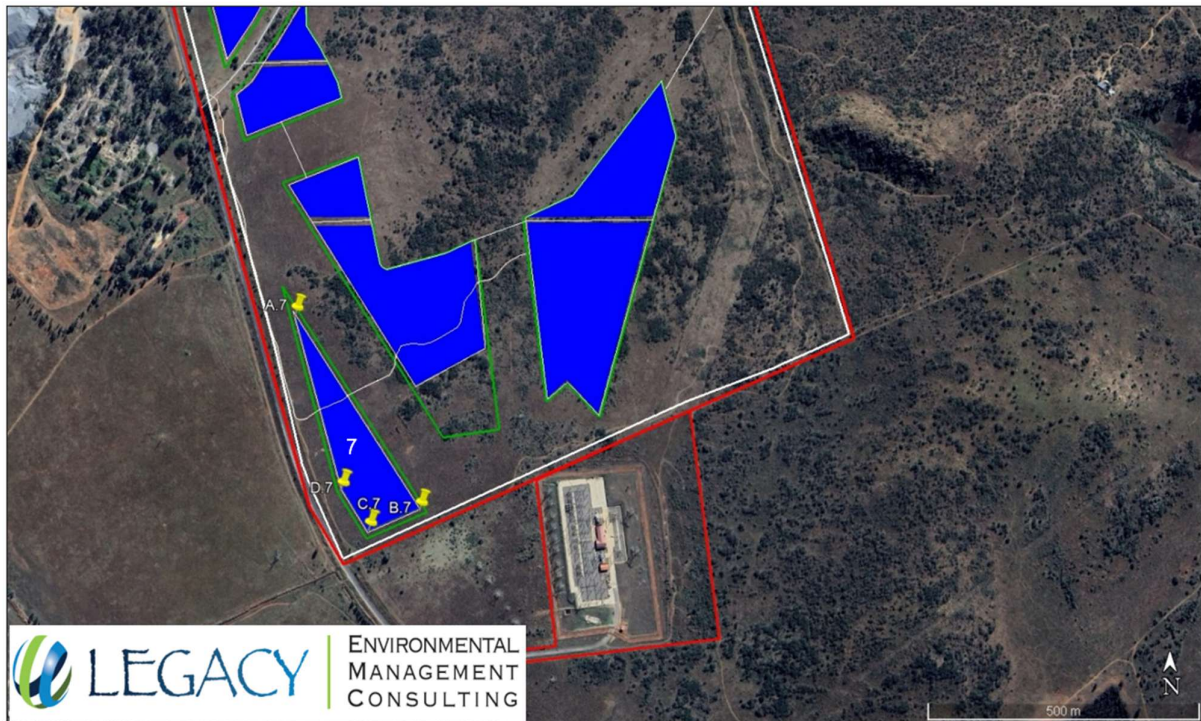


Figure 13: Satellite image depicting corner co-ordinates of proposed Carpe Diem North SPP panel array (power plant) island 7, on Portion 5 of the Farm Varkenslaagte No. 119 IQ. Development feature corners/bend points indicated with yellow 'dropped pins' in the image above.

Table 21 below contains GPS co-ordinates which correspond to alpha-numeric dropped pins in **Figure 13** above.

Table 21: GPS co-ordinates for proposed Carpe Diem North SPP panel array (power plant) island 7. Refer to **Figure 13** above for corresponding corner/bend point markers/pins.

Co-ordinates of SPP panel array (power plant) island 7:						
CORNER / BEND POINT	LATITUDE (S)			LONGITUDE (E)		
	MIN	SEC	MIN	SEC	MIN	SEC
A.7	26°	25'	9.82"	27°	18'	0.67"
B.7	26°	25'	21.73"	27°	18'	9.35"
C.7	26°	25'	22.95"	27°	18'	5.88"
D.7	26°	25'	20.54"	27°	18'	3.98"

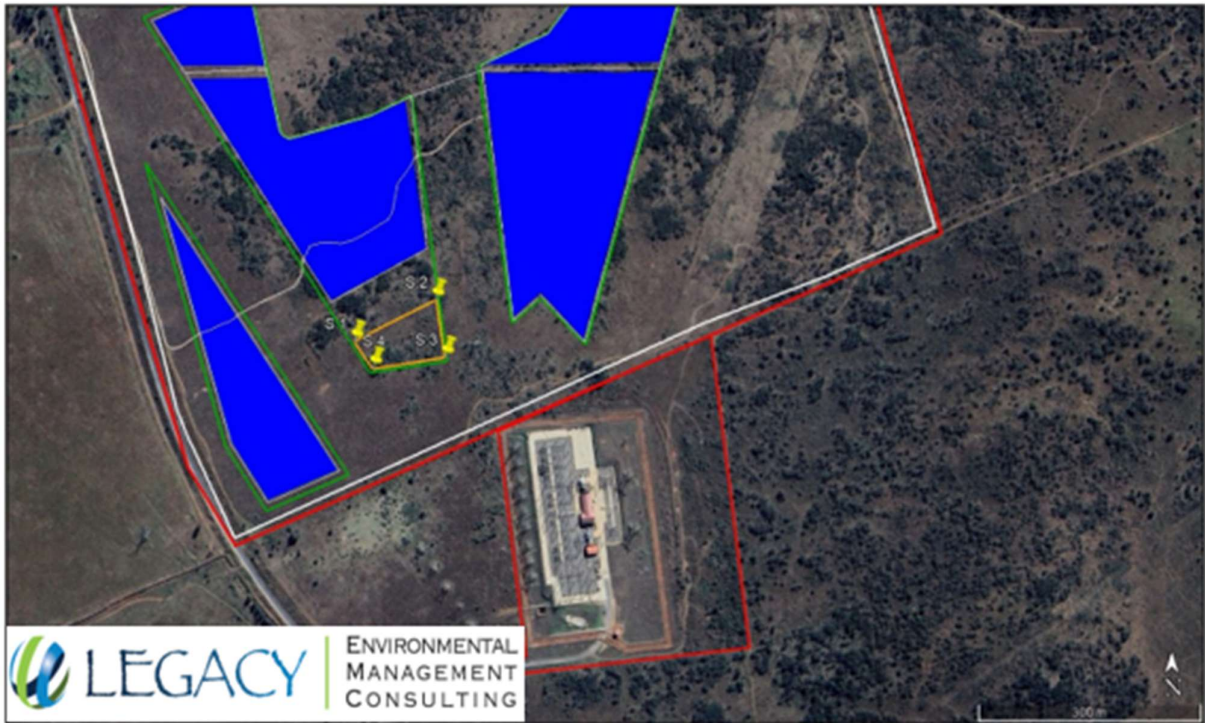


Figure 14: Satellite image depicting corner co-ordinates of proposed Carpe Diem North on-site substation (represented by the orange polygon) to enable the stepping-up of medium voltage electricity to high voltage (132 kV) for grid connection tie-in.

Table 22 below contains GPS co-ordinates which correspond to alpha-numeric dropped pins in **Figure 14** above for the on-site SPP substation which comprises an IPP Collector Station, and future Eskom Switching Station.

Table 22: GPS co-ordinates for proposed Carpe Diem North SPP on-site substation footprint. Refer to Figure 14 above for corresponding corner/bend point markers/pins.

Carpe Diem North SPP On-site Substation Footprint on Portion 5 of Farm Varkenslaagte No. 119 (excluding grid connection corridor/s):						
CORNER / BEND POINT	LATITUDE (S)			LONGITUDE (E)		
	DEG	MIN	SEC	DEG	MIN	SEC
S.1	26°	25'	15.92"	27°	18'	10.22"
S.2	26°	25'	14.10"	27°	18'	14.23"
S.3	26°	25'	16.63"	27°	18'	14.69"
S.4	26°	25'	17.09"	27°	18'	11.14"



Figure 15: Satellite image depicting corner co-ordinates of proposed Carpe Diem North SPP for proposed PV laydown/staging area (represented by the light blue polygon).

Table 23 below contains GPS co-ordinates which correspond to alpha-numeric dropped pins in Figure 15 above.

Table 23: GPS co-ordinates of proposed Carpe Diem North SPP permanent laydown/staging area. Refer to Figure 15 above for corresponding corner/bend point markers/pins.

Carpe Diem North SPP Facility Permanent Laydown/Staging Area:						
CORNER / BEND POINT	LATITUDE (S)			LONGITUDE (E)		
	DEG	MIN	SEC	DEG	MIN	SEC
L.1	26°	25'	14.16"	27°	18'	9.14"
L.2	26°	25'	13.47"	27°	18'	10.60"
L.3	26°	25'	15.06"	27°	18'	11.77"
L.4	26°	25'	15.83"	27°	18'	10.22"

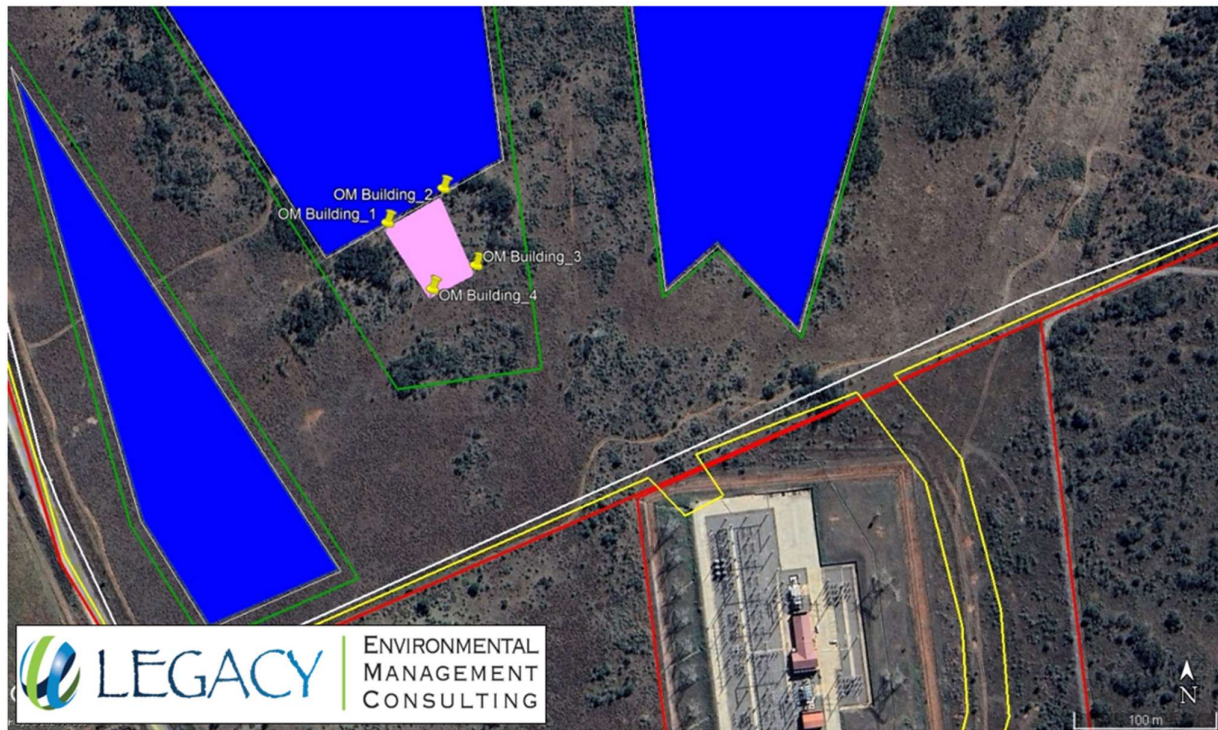


Figure 16: Satellite image depicting corner co-ordinates for proposed on-site office/workshop /ablution area (indicated by the pink polygon) within Carpe Diem SPP.

Table 24 below contains GPS co-ordinates which correspond to alpha-numeric dropped pins in Figure 16 above.

Table 24: GPS co-ordinates for proposed Carpe Diem North SPP Operational and Maintenance Buildings (offices, control rooms, workshops, ablutions, change rooms, etc.). Refer to Figure 16 above for corresponding corner/bend point markers/pins.

Carpe Diem North SPP Facility Operation & Maintenance Buildings (with ablutions, workshops, etc.) footprint:						
CORNER / BEND POINT	LATITUDE (S)			LONGITUDE (E)		
	DEG	MIN	SEC	DEG	MIN	SEC
OM.1	26°	25'	13.45"	27°	18'	10.65"
OM.2	26°	25'	12.72"	27°	18'	12.13"
OM.3	26°	25'	14.56"	27°	18'	13.01"
OM.4	26°	25'	15.06"	27°	18'	11.83"

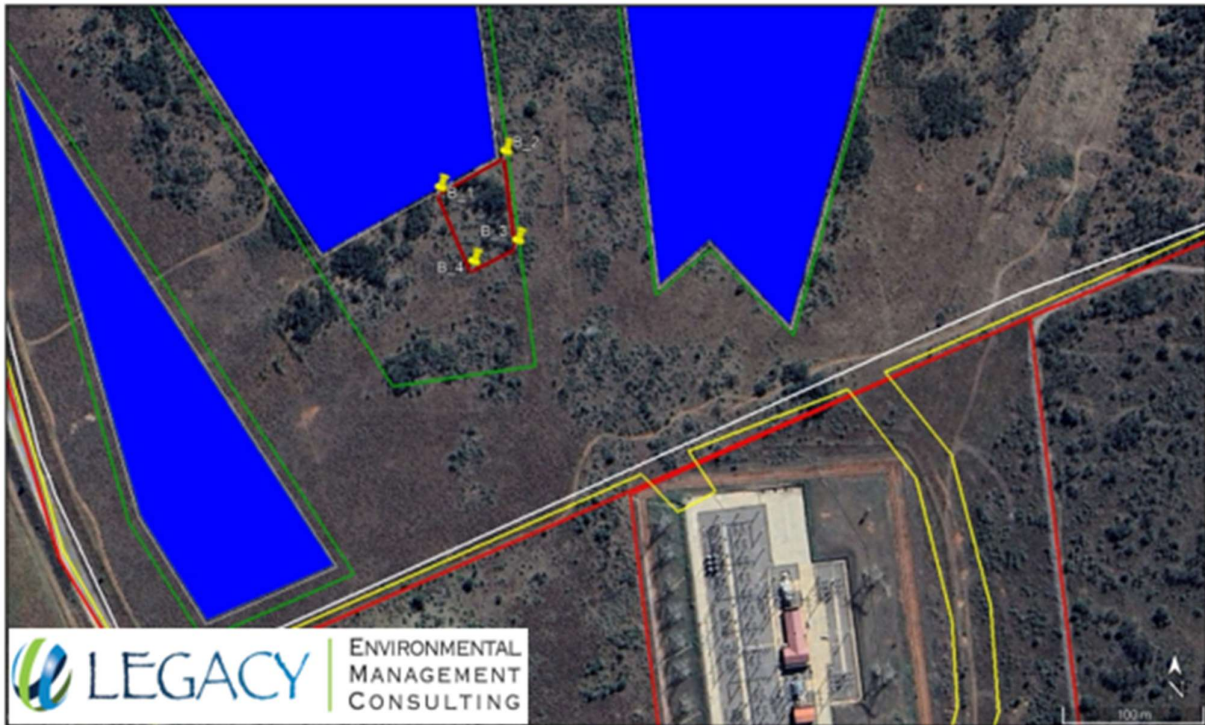


Figure 17: Satellite image depicting corner co-ordinates for proposed on-site SPP BESS area (indicated by the maroon block) within Carpe Diem SPP.

Table 25 below contains GPS co-ordinates which correspond to alpha-numeric dropped pins in Figure 17 above.

Table 25: GPS co-ordinates for proposed Carpe Diem North SPP On-site BESS Footprint. Refer to Figure 17 above for corresponding corner/bend point markers/pins.

Carpe Diem North On-site SPP BESS footprint:						
CORNER / BEND POINT	LATITUDE (S)			LONGITUDE (E)		
	DEG	MIN	SEC	DEG	MIN	SEC
B.1	26°	25'	12.74"	27°	18'	12.20"
B.2	26°	25'	11.89"	27°	18'	13.94"
B.3	26°	25'	14.00"	27°	18'	14.26"
B.4	26°	25'	14.49"	27°	18'	13.09"

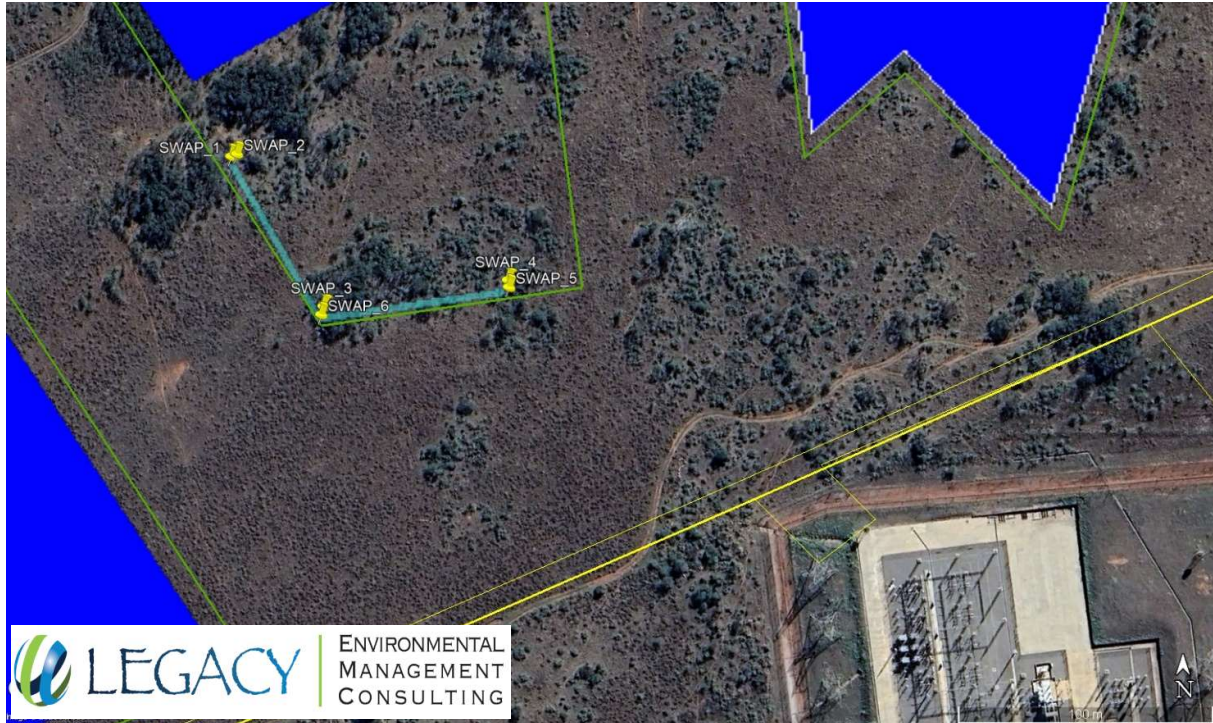


Figure 18: Satellite image depicting corner co-ordinates for proposed storm water attenuation pond area (indicated by the light blue L-shaped polygon) within Carpe Diem SPP.

Table 26 below contains GPS co-ordinates that correspond to alpha-numeric dropped pins in **Figure 18** above.

Table 26: GPS co-ordinates for proposed Carpe Diem North SPP Storm Water Attenuation Pond. Refer to Figure 18 above for corresponding corner/bend point markers/pins.

Carpe Diem North SPP Facility Storm Water Attenuation Pond footprint:						
CORNER / BEND POINT	LATITUDE (S)			LONGITUDE (E)		
	DEG	MIN	SEC	DEG	MIN	SEC
SWAP_1	26°	25'	15.16"	27°	18'	9.62"
SWAP_2	26°	25'	15.12"	27°	18'	9.7"
SWAP_3	26°	25'	17.12"	27°	18'	10.96"
SWAP_4	26°	25'	16.78"	27°	18'	13.67"
SWAP_5	26°	25'	16.87"	27°	18'	13.69"
SWAP_6	26°	25'	17.23"	27°	18'	10.93"

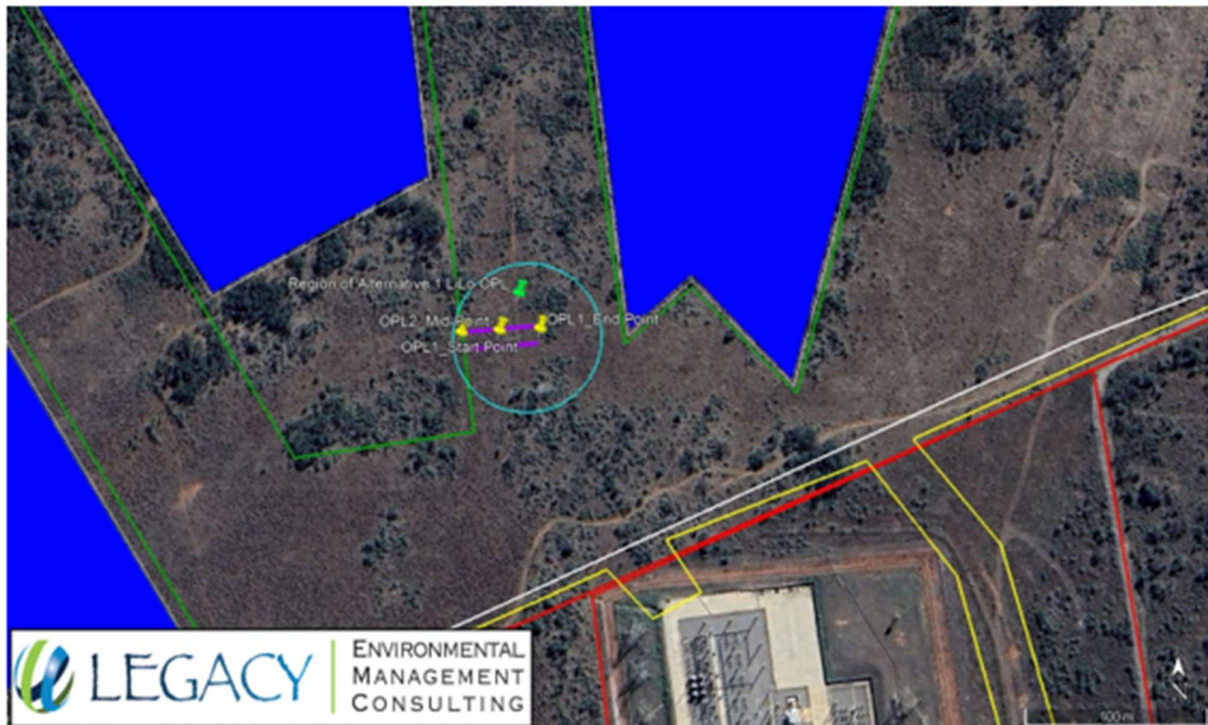


Figure 19: Satellite image depicting the centre of corridor co-ordinates for the start, mid- and end points of the preferred OPL corridor (referred to as 'OPL Alternative 1'), i.e., the most preferred 132 kV LiLo grid connection. The blue circle represents the region of OPL Alternative LiLo grid connection with existing Eskom high voltage lines.

Table 27 below contains GPS co-ordinates which correspond to alpha-numeric dropped pins in Figure 19 above.

Table 27: GPS co-ordinates for Carpe Diem North SPP Alternative 1 LiLo OPL footprint, on Portion 5 of the Farm Varkenslaagte No. 119 IQ. Refer to Figure 19 above for corresponding corner/bend point markers/pins.

Carpe Diem North SPP LiLo OPL footprint for Layout Alternative 1 on Portion 5 of Farm Varkenslaagte No. 119 (taken as a line in the centre of OPL corridor and excluding grid connection corridor/s):						
CORNER / BEND POINT	LATITUDE (S)			LONGITUDE (E)		
	DEG	MIN	SEC	DEG	MIN	SEC
OPL Alternative 1: OPL LiLo						
OPL 1_Start Point	26°	24'	56.57"	27°	18'	24.24"
OPL 1_Mid Point	26°	24'	57.12"	27°	18'	26.04"
OPL 1_End Point	26°	25'	1.86"	27°	18'	25.78"



Figure 20: Satellite image depicting the centre of corridor co-ordinates for the start, mid- and end points of the second preferred OPL corridor (referred to as 'Alternative 2') for the proposed development, i.e., direct grid connection to the Carmel Substation at its north-western corner.

Table 28 below contains GPS co-ordinates which correspond to alpha-numeric dropped pins in **Figure 20** above. Co-ordinates have been taken as for a power line located in the centre of the proposed 100 m wide corridor, and are not for the corridor width itself.

Table 28: GPS co-ordinates for Carpe Diem North SPP Alternative 2 power line footprint on Portion 5 of the Farm Varkenslaagte No. 119 IQ and Portion 23 of the Farm Doornfontein No.118 IQ. Refer to Figure 20 above for corresponding corner/bend point markers/pins.

Carpe Diem North SPP power line footprint for Layout Alternative 2 on Portion 5 of Farm Varkenslaagte No. 119 (excluding grid connection corridor/s):						
CORNER / BEND POINT	LATITUDE (S)			LONGITUDE (E)		
	DEG	MIN	DEG	MIN	DEG	MIN
OPL Alternative 3: UPL and OPL						
OPL 2_Start Point	26°	25'	13.52"	27°	18'	17.80"
OPL 2_Mid Point	26°	25'	3.14"	27°	18'	16.70"
OPL 2_End Point	26°	25'	0.19"	27°	18'	21.05"



Figure 21: Satellite image depicting the centre of corridor co-ordinates for the start, significant bend and end points of the least preferred power line corridor (referred to as 'Alternative 3') for the proposed development, i.e., underground grid connection to the Carmel Substation at its south-western corner.

Table 29 below contains GPS co-ordinates which correspond to alpha-numeric dropped pins in Figure 21.

Table 29: GPS co-ordinates for Carpe Diem North SPP Alternative 3 power line footprint on Portion 5 of the Farm Varkenslaagte No. 119 IQ and Portion 23 of the Farm Doornfontein No.118 IQ. Refer to Figure 21 above for corresponding corner/bend point markers/pins.

Carpe Diem North SPP power line footprint for Least Preferred Alternative 3 on Portion 5 of Farm Varkenslaagte No. 119 (excluding grid connection corridor/s):						
CORNER / BEND POINT	CORNER / BEND POINT			CORNER / BEND POINT		
	DEG	MIN	DEG	MIN	DEG	MIN
OPL Alternative 3: UPL and OPL						
OPL 3_Start Point	26°	25'	13.52"	27°	18'	17.80"
OPL 3_Bend Point 1	26°	25'	19.18"	27°	18'	17.69"
OPL 3_Bend Point 2	26°	25'	16.94"	27°	18'	23.27"
OPL 3_Bend Point 3	26°	25'	19.07"	27°	18'	25.32"
OPL 3_Bend Point 4	26°	25'	22.54"	27°	18'	26.32"
OPL 3_Bend Point 5	26°	25'	24.90"	27°	18'	26.50"
OPL 3_Bend Point 6	26°	25'	26.49"	27°	18'	26.02"

OPL 3_Bend Point 7	26°	25'	27.47"	27°	18'	24.08"
OPL 3_Bend Point 8	26°	25'	27.82"	27°	18'	21.48"
OPL 3_End Point	26°	25'	27.54"	27°	18'	20.36"

The Applicant's most preferred layout alternative (Alternative 1) for the project and is located entirely on the development site, Portion 5 of the Farm Varkenslaagte No. 119 IQ.

The remaining two layout alternatives have power line corridor footprints, which fall partly on the proposed development site and partly on the neighbouring Eskom Carmel MTS property i.e., Portion 23 of the Farm Doornfontein No. 118 IQ. The actual Carpe Diem North SPP grid connection route will be confirmed after grid connection negotiations with Eskom are finalised.

In terms of actual corner and bend point markers indicating the co-ordinates of the various project features, refer to Appendix K1 for a more detailed mapping of the individual features within the site layout.

4.3 Electricity from Solar Energy

South Africa experiences some of the highest levels of solar radiation in the world (between 4.5 and 6.5 Wh/m²) and therefore, possesses considerable resource potential for solar photovoltaic (PV) and concentrated solar power (CSP) electricity generation, ranging from small- to medium-scale stand-alone applications, to large-scale grid-connected applications¹⁸.

In an effort to promote the expansion of solar power in their client countries, The World Bank and the International Finance Corporation i.e., The World Bank Group, have made a Global Solar Atlas freely available to facilitate quick and easy access to global solar resources and photovoltaic power potential data. The initiative is funded by the Energy Sector Management Assistance Program (ESMAP), a multi-donor trust fund supported by various official donors, and administered by The World Bank. The map aids in informed decision-making and efficient resource allocation.

Figure 22 depicts South Africa's PV solar power potential as supplied by The World Bank Group's Global Solar Atlas, and Figure 23 provides a site-specific indication of the Global Tilted Irradiation at Optimum Angle. Irradiation occurs when solar panels are exposed to the sun's radiation and moving particles i.e., sun-emitted photons, which results in ionisation. Solar irradiation is a measure of the energy per square metre of incident solar radiation on a surface during a period of time – it measures radiant exposure. The unit of measurement is Watt hour per square metre (Wh/m²).

As evident from Figures 22 and 23 below, the proposed development site is well located in terms of irradiation (Figure 22) and the Global Tilted Irradiation at Optimum Angle of approximately 2286.5 kWh/m² (Figure 23).

¹⁸ Source: DEA renewable Energy Guideline, 2015

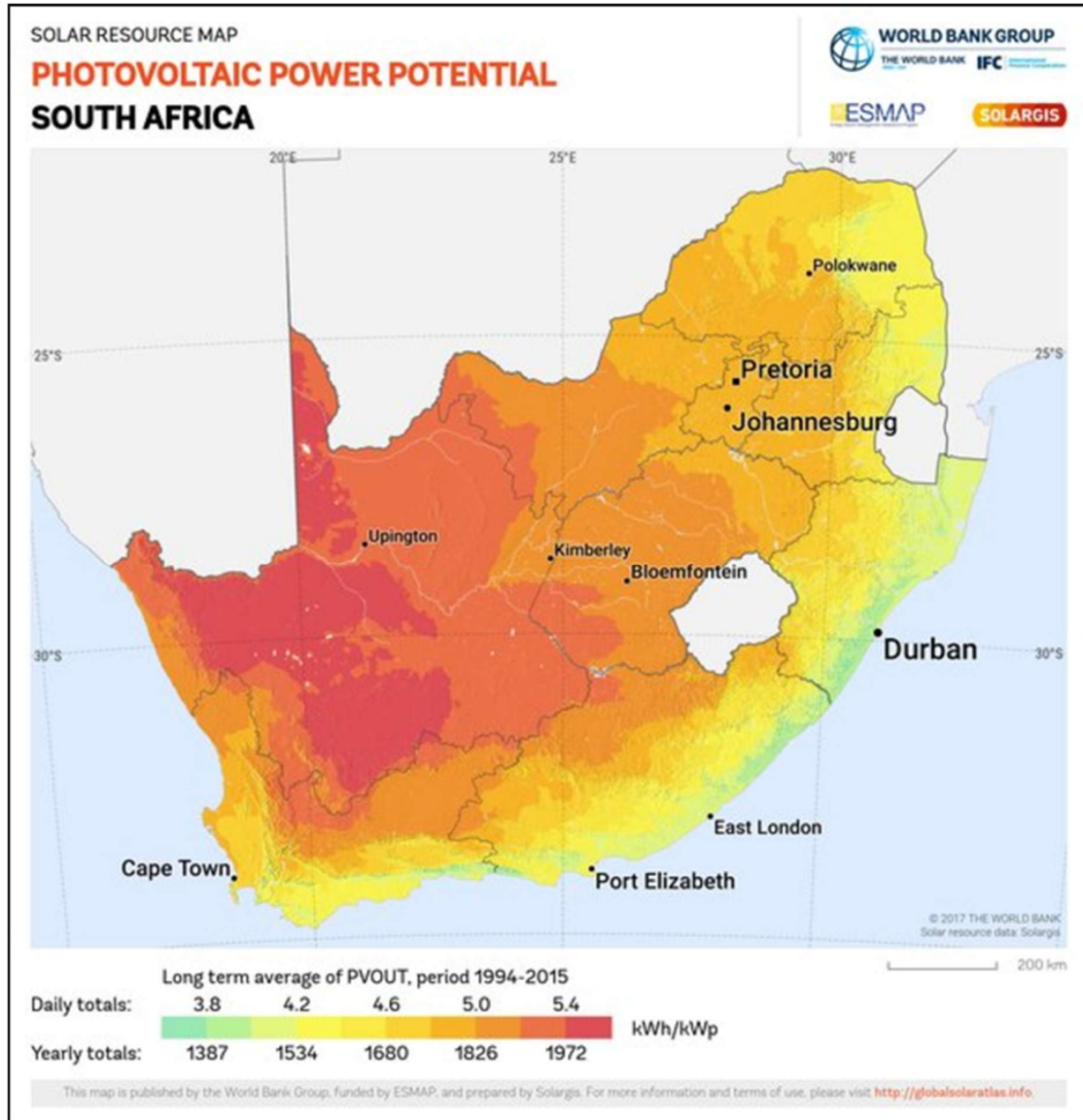


Figure 22: Map published by The World Bank Group¹⁹ depicting the PV power potential in South Africa.

¹⁹ Source: <https://sessa.org.za/wp-content/uploads/2022/08/roi-1.png> - map is published by the World Bank Group funded by ESMAP and prepared by Solargis

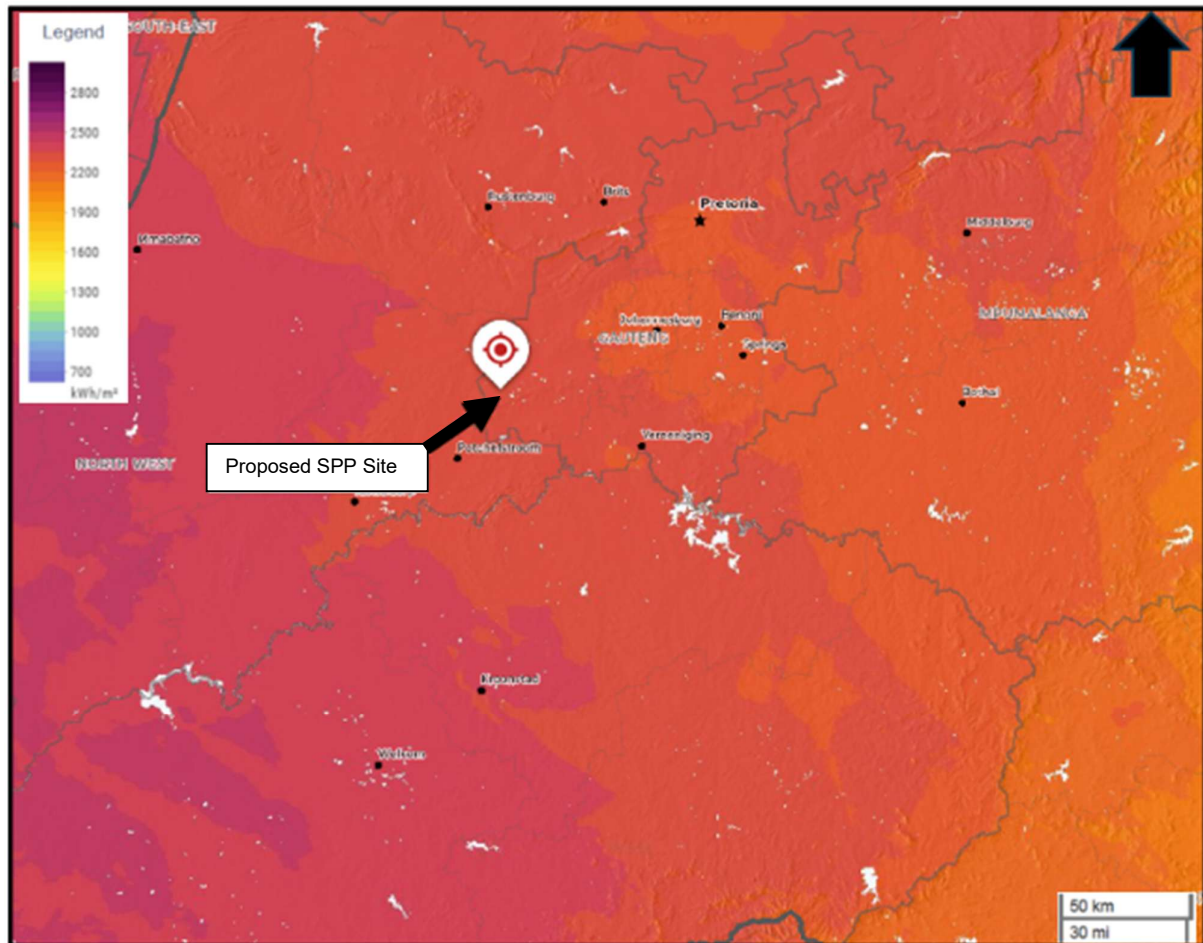


Figure 23: Map generated using the Global Solar Atlas published by The World Bank Group²⁰ depicting the PV power potential in South Africa

4.4 Solar Panel Technology Overview

4.4.1.1 Photovoltaic (PV) vs. Concentrated Solar Power (CSP)

The greatest difference between CSP and PV is the way in which electricity is produced. CSP systems reflect the sun's energy and concentrate the sunlight onto a receiver, usually through the use of mirrors, which in turn heats a high-temperature fluid in the receiver. The heated fluid then spins a turbine or powers an engine to produce electrical power. Whereas PV solar panels simply contain photocells that absorb the sun's light, rather than its energy, and directly convert light into electricity through stimulation of electrons to produce current by the 'photoelectric effect'²¹. The current produced by the electrons in photocells is called 'Direct Current' (DC), which then gets converted to Alternating Current (AC) using inverters so that this current can be distributed to a power network.

²⁰ Source: <https://sessa.org.za/wp-content/uploads/2022/08/roi-1.png> - map is published by the World Bank Group funded by ESMAP and prepared by Solargis

²¹ The photoelectric effect is the emission of electrons from a material caused by electromagnetic radiation such as ultraviolet light. Electrons emitted in this manner are called photoelectrons.

CSPs store energy through various Thermal Energy Storage technologies (TES), so that power can be utilised when there isn't enough sunlight, which is an advantage over PV solar panels. However, battery energy storage systems (BESS) that capture energy from different sources and store this energy in rechargeable batteries for later use can be utilised alongside PV solar panels to facilitate the role of TES. The disadvantages of CSP include its increased technological complexity, its reduced reliability, the need for large areas to operate and its great demand for water to drive steam turbines and to cool thermochemical reactors. Instead, PV solar panels require much less technologically complex equipment, making this means of energy production more economically favoured, and demanding of much less water supply to operate.

4.4.1.2 PV Solar Panel System

PV systems are widely applied in South Africa for powering niche applications such as telecommunications, microwave links, navigational aids and meteorology stations, where PV is well established as the best practical option. PV is also applied in small-scale remote power supplies for domestic use, game farms and community water pumping schemes.

PV cells are made from semi-conductor materials that are able to release electrons when exposed to solar radiation by using the photo-electric effect. Electrons from several PV cells are gathered together through conductors to make up the generation capacity of one module and many modules can be connected together to produce power in large quantities. The cost of manufacturing solar panels has plummeted dramatically in the past decade, making them not only affordable but often the cheapest form of electricity generation.

PV is one of the fastest-growing renewable power generation technologies and maintains an increasingly important role in the global energy transformation. The total installed capacity of solar PV reached 710 GW globally at the end of 2020. About 125 GW of new solar PV capacity was added in 2020, the largest capacity addition of any renewable energy source.²²

4.5 Development of the Site Location and Layout of the Proposed SPP

The preferred site location and layout, on Portion 5 of the Farm No. 119 IQ with less preferred grid connection alternatives located on Portion 23 of the Farm Doornfontein No. 118 IQ, near Carletonville, Merafong City Local Municipality, West Rand District Municipality, Gauteng (also referred to as 'the site'), being considered in the scoping phase is considered to be the most reasonable and feasible layout on the application area. Refer to Figures 1 and 2 for the proposed locality and layout of the Carpe Diem North SPP on the site.

The SPP facility will accommodate ground-based PV panel arrays, an on-site substation, and MTS and an on-site SPP battery energy storage system (BESS) facility in a once-off construction process. The proposed development also contains grid connection/overhead power line (OPL) infrastructure to enable connection to the national grid.

Grid connection will be achieved through a direct or LiLo tie-in to Eskom's existing 132 kV HV OPL located directly east of, and not more than 100 m away from, the SPP on-site substation. The Carpe Diem North SPP OPL for the most preferred route, Alternative 1, is approximately 70 m long.

Alternative 2's power line length is not more than 150 m and connects directly to the northern section of Carmel MTS. Alternative 2 is planned to be an underground power line (UPL) which will be developed using

²² Sourced from <https://www.irena.org/Energy-Transition/Technology/Solar-energy> on 22/11/2023.

trenchless excavation i.e., pipe-jacking, so that minimal disturbance of surface biodiversity, or interference with existing HV OPLs, occurs.

The power line for Alternative 3 is much longer grid connections but is still less than 900 m in length. This Alternative comprises an initial underground section (approximately 430 m) which partially follows Alternative 2's UPL route before continuing to run underground along and within the southern boundary of Portion 5 of the Farm Varkenslaagte No. 119 IQ, until it joins the OPL corridor of the registered CDN BESS, from where it becomes an OPL (approximately 450 m) connecting to the southern section of Carmel MTS.

4.6 Construction of Solar Panels

The solar panels will be supported by ground-based, galvanised steel support structures and will probably be fitted with at least a single-axis solar tracking system.

It is estimated that approximately 250,000 solar PV panels will be used for this development. A panel size is approximately 1000 mm x 2000 mm. The panels will be positioned north-facing at a defined angle of tilt from the horizontal and 5 m above the ground at most. The tracking angle limits are +60/-60 degrees. The minimum ground clearance is 0.5m (from the edge of the panel when tilted at 60 degrees), which places the middle of the panel (following the posts) at a minimum of 1.5 m to 2 m above ground, not exceeding at most 3 m. 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 otherwise tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture the most sun. Or the panels will be double-axis tracking where they are mounted in a north-south orientation, tracking from east to west. The panels will also either be made of crystalline silicon or thin-film technology (this will be determined at a later stage in the project).

Approximately 4 ha of laydown area will be required for the SPP (the laydown area and BESS footprint will not exceed 5 ha and will be situated within the assessed footprint). There will be two designated laydown areas for the site during construction:

- a permanent laydown area adjacent to the on-site substation in the south-western quadrant of the property which will remain for the life of the SPP (refer to Figure 2 above and Appendix J1), and
- a second, temporary laydown area in the northern half of the site, in an area already cleared for the development of a PV power plant/island. Due to the constraint on developable space within the site (after environmental sensitive no-go areas have been taken into account), it is necessary that this temporary laydown area be, in essence, a 'mobile' laydown area during construction and will be located on an area already cleared for the development of a PV power plant/island. The 'mobile' laydown area will occupy approximately 1 ha to 2 ha along the 'working face' of where the PV arrays are being constructed and will move to the next cleared power plant island as construction progresses. This reduces vehicle emissions to and from a distant laydown area, and also reduces construction handling time and the probability of vehicle incidents/accidents.

4.6.1 Area Occupied by Proposed Infrastructure

The total developable area of the application site is about 280 ha. Of this, the proposed development footprint for the various PV power plant/island areas and built structures on site (together with the widening of existing roads on site and development of new internal gravel/dirt roads, as well as improvement of the existing boundary fence and establishment of additional internal fencing around the PV islands, will only occupy approximately 160 ha, which equals around 55 % of the total site (application site). The built structures, besides

the PV islands, that will cover the site include the SPP substation, operation and maintenance buildings (such as workshops, offices, ablutions), laydown and storage area/s, the on-site SPP BESS and water and sewage storage areas, all equate to approximately 7 ha.

4.6.2 Proposed Solar PV Technology to be used

The Applicant proposes to use crystalline silicon or thin-film technology photovoltaic solar panels to generate electricity. The SPP will comprise several photovoltaic panels that will convert solar irradiation into electrical energy. It is proposed that the PV panels be mounted on either a horizontal single-axis tracker frame or with double-axis tracking, which will enable the panels to track the apparent motion of the sun throughout the day.

Single-axis horizontal trackers comprise a long horizontal tube that is supported on bearings mounted upon pylons or frames. The axis of the tube will be on a north-south line. Panels will be mounted on the tube, and the tube will rotate on its axis to track the motion of the sun through the day, where the orientation of the panel varies according to the time of the day, as the sun moves from east to west. Otherwise, the single-axis tracking will be tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture the most sun. Field layouts with horizontal single-axis trackers are very flexible. The simple geometry means that keeping all of the axes of rotation parallel to one another is all that is required to appropriately position the trackers with respect to one another.

Double-axis tracking comprises solar panels mounted in a north-south orientation, tracking from east to west. Double-axis tracking panels function on two axes, hence why they are referred to as 'dual-axis', whereby the one axis enables the panels to move from east to west and the other axis helps the panel move from north to south. Dual-axis trackers are known to generate up to 40 % more energy than fixed/single-axis trackers.

Appropriate spacing can maximize the ratio of energy production to cost, this being dependent upon local terrain and shading conditions and the time-of-day value of the energy produced.

4.7 Associated Infrastructure and Services

Infrastructure and services associated with the proposed project will include the following:

- Access road and internal network of dirt/gravel access roads
- Offices, Laydown and Storage Areas (inclusive of cement batching areas and stockpile areas)
- Operating and Maintenance (O&M) Building
- Billboard
- On-site SPP BESS
- SPP Substation
- Perimeter fence
- Electrical reticulation
- Water storage facilities and reticulation
- Conservancy Tank/s.

4.7.1 SPP Substation and Grid Connection

The on-site Carpe Diem North SPP Substation comprises two distinct functional segments:

- (i) the IPP 'Collector Substation' where evacuated electricity from the SPP facility will be collected, and
- (ii) the future Eskom 'Switching Substation' where the evacuated electricity will be stepped up/transformed from 33 kV to 132 kV before it is fed into Eskom HV power lines.

The SPP Substation will be situated in the south-western quadrant of the site to the south of PV power plant/island number 5. Electricity generated by the proposed SPP will be fed from the switching station part of the on-site substation into the 132 kV Eskom HV OPL via a LiLo connection.

The on-site SPP Substation will cover just over approximately 1 ha (refer to **Figure 24** below), with the IPP section measuring approximately 100 m x 100 m, and the future Eskom Switching station section covering around 50 m x 50 m. This layout is designed to facilitate the efficient transmission of power from the SPP facility to the Eskom 132 kV HV power lines.

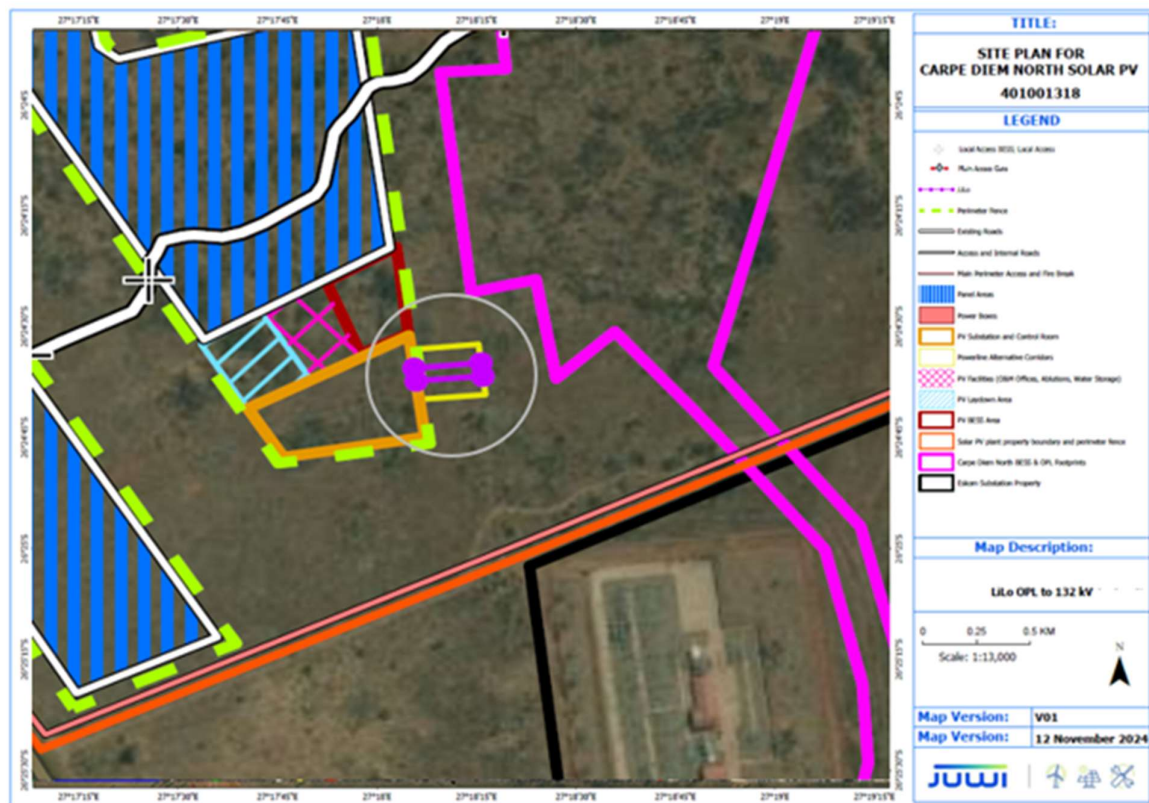


Figure 24: Preferred Alternative layout map of the proposed Carpe Diem North SPP OPL LiLo grid connection represented by the purple lines traversing east away from the on-site substation area. Region of LiLo is indicated by the grey circle (100 m diameter) in image above.

4.7.2 Access and Internal Roads

Access will be off the D92-1020 (refer to **Figure 25** below) which is the public District Road which runs along the western boundary of the proposed development site. There will be one main (internal) access road onto the property itself which is an existing tar road which traverses the property obliquely from west to east. On the western end of this main (internal) access road, the point of intersection of the main access road with the D92-1020 has been excavated so that vehicles cannot drive onto the D92-1020 directly. Vegetation (notably

large *Eucalyptus spp* trees) also block the access to the D92-1020. This section of the road will need to be repaired so that the intersection with the D92-1020 is restored. This road ends on the eastern boundary fence where there is already an existing gate to exit to the east, although no through-fare takes place. The current entrance main entrance point where this tar road intersects with the limited availability of space for the large extent of the site and a number of access points are proposed. Bar the main access road internal to the proposed development property, all other existing roads internal to the development site are single carriage dirt/gravel roads or tracks²³ and will be utilised as far as possible to prevent excessive destruction of biodiversity where access is required across a potentially sensitive area. It is proposed that all internal roads are gravel and will range from 5 m to 8 m wide. Cut-off (earthen) drains will be provided on either side of the road to accommodate drainage.

All internal roads to the proposed development must comply with the minimum specification as given in the “Red Book - Guidelines for Human Settlement Planning and Design” and the municipal standards from Merafong City Municipality.

To accommodate the proposed development, there will be a need to widen the existing access roads as well as to extend these roads to the edge of the development site, where necessary. Additionally, an internal access road network must be constructed. These access roads will typically range from 4 m to 8 m in width. However, in certain instances, specific sections may exceed the 8 m width.



Figure 25: View of existing access to the Carpe Diem North SPP, from within the proposed development site (image on the left) and from the D92-1020 (image on the right).

4.7.3 Construction Yard and Laydown Area

During the construction period, the laydown areas will encompass approximately 4 ha of temporary laydown areas within the approximately 280 ha development footprint (refer to Figure 2 and Appendix J1). There will be two laydown areas for the site, one adjacent to the on-site substation which will eventually become the permanent laydown area, and the second, will be a ‘mobile’ laydown area (of around 1 ha to 2 ha in extent), located within the already cleared footprint of the PV power plant/island at the ‘working face’ where the PV array is being constructed.

4.7.4 Billboard/s

The Applicant chooses to retain the option of establishing an on-site billboard/s along the northern boundary of the development property facing either the R501 or D92-1020 public road. This will be developed in an area

²³ Some parts of the development site are accessible through dirt/earthen farm roads, commonly referred to as “tweespoor tracks”

where the predominant shadow cast by the billboard has the least impact on the receiving faces of the PV panel array e.g., towards the north-western corner of the property.

4.7.5 Perimeter Fencing

For safety and security reasons, it will be necessary to control access to the proposed SPP site and fence it off from the surrounding area. The current perimeter (property boundary) fence will be replaced with a more robust fence with a maximum height of about 3 m to 3.5 m.

It's important to consider avifaunal mitigation measures, which include specific recommendations for fencing. In areas where service roads intersect with semi-natural or natural habitats, especially around areas requiring intensified mitigation measures, any constructed fences must be set back at least 75 m from the edge of every service road. This setback allows vulnerable species such as coursers and buttonquails to obtain adequate height after being flushed by vehicle traffic.

As an alternative mitigation measure, if a 75-m buffer is not feasible, new fences must be set back no more than 2 m (directly adjacent) from the edge of service roads. These measures aim to minimize disturbance to avifaunal species while maintaining safety and security around the facility.

4.7.6 Electrical Reticulation (On-site)

Electricity supply for the offices and SPP, will be sourced from the facility itself. The electrical reticulation will be an underground/sub-surface installation, as far as possible within trenches. However, where it is not possible to connect the respective PV islands through sub-surface reticulation, overhead power lines will need to be used. Upon entering the collector portion of the on-site substation, this reticulation will comprise of an OPL until the evacuated power is fed into the national grid at the LiLo point of connection.

The grid connection between the future Eskom side of the on-site substation and the existing Eskom HV lines, which lie directly to the east of the SPP on-site substation, will be established via a single or double circuit overhead powerline, capable of transmitting 132 kV. The Carpe Diem North SPP OPL component for the most preferred OPL route (Alternative 1), as well as for Alternative 2 (the next preferred OPL route), will be contained within an approximately 30 to 45 m wide corridor, will probably be less than 100 m in length but will definitely not be longer than 150 m in length. Alternative 1's OPL route is situated entirely on Portion 5 of the Farm Varkenslaagte No. 119 IQ. The region in which the LiLo tie-in/grid connection is proposed has been allocated a corridor of approximately 100 m (indicated in Figure 18 as a 100 m diameter circle).

The facility will incorporate inverter stations, transformers, switchgear, and an internal electrical reticulation in cable trenches or with the potential requirement for trenchless, sub-surface/underground cabling in certain areas such as to connect sections of the PV array across roads. There may be instances where cable trenches/sub-surface electrical reticulation is not possible. If this occurs, a short connecting OPL may be utilised, but this will only occur if the short OPL does not create a vertical obstruction to the local airfield.

To minimise environmental impacts and facilitate maintenance access, the cables will be routed along the sides of the proposed on-site road network whenever feasible.

To protect the SPP from interference and fire risk, lightning conductors will be installed in the plant.

4.8 Water

Water will initially be used during the construction phase (e.g., concrete to fix panel frames and fencing poles to the ground) and during the operational phase to clean the PV panels to ensure maximum exposure to sunlight and optimum energy generation efficiency as well as to provide for domestic water demands of on-site staff. The water requirements for the proposed PV Plant are as follows (refer to **Appendix D9**):

Construction Period

It is anticipated that for construction purposes the daily water demand will be 40 000 l/day, for a period of 12 to 18 months. This water will mainly be used for human consumption, as ready-mix concrete will be used in the construction process, and minimal water will be needed for construction purposes (mainly for dust suppression).

Operational Period ($\pm$ 20 years)

The water demand will consist of two parts:

- The daily usage of the workers, and
- The usage of cleaning the panels.

It is envisaged that approximately 40 personnel will be required during the operational phase, resulting in an annual average daily demand (AADD) of 2 400 l/d.

In addition to the domestic water demand, the PV panels will be washed a minimum of two times per year to a maximum of four times per year. The washing of a PV panel will use approximately 2 litres, thereby amounting to 1 000 m³ per washing cycle, totalling 4 000 m³ per annum.

Currently, the Merafong City Municipal Area is experiencing several issues with the existing water supply network. This is largely due to the formation of sinkholes affecting water supply in the municipal area. At the time of this report, the project engineers were still awaiting feedback regarding the availability of water from the municipal water network.

It was proposed that groundwater be extracted by means of a borehole to supply water for the construction as well as the operational phase of the solar facility. Taking into consideration a 24-hour extraction period, the required yield would need to be 0.463 l/s during the construction phase and 0.155 l/s during the operation phase of the facility. However, the Applicant has decided to source water supply for the project from other means instead of borehole abstraction.

The alternative would be to cart water to the PV facility from the closest municipal standpipe or local farms and store it in Jo-Jo tanks for domestic use.

4.9 Sewage

The only sewage effluent that will be generated from this project will be domestic effluent generated by the workers. It is estimated that a peak wet weather flow (PWWF) of 0.115 l/s will be generated.

Portable chemical toilets will be provided on-site during the construction phase and will be maintained and serviced regularly.

During the operational phase, it is proposed that sewage is treated on-site by means of a sewage package plant. The sewage/final effluent will be treated to the legislated limits as determined by the DWS.

Final effluent will be stored in an on-site conservancy tank which will be routinely pumped empty by a registered service provider. The final effluent will be disposed of as per legislated requirements.

4.10 Solid Waste

Construction period

With an average of 180 workers, it is estimated that approximately 17.3 m³ of solid waste will be generated each month. This solid waste will be temporarily stored on-site in weatherproof bins and skips at a designated area close to the entrance of the site. Arrangements will need to be made with the Merafong City Municipality for the collection of the refuse.

Operational Period (± 20 years)

Considering an average of 40 staff members, it is estimated that approximately 3.5 m³ of solid waste will be generated each month. The proposal suggests collecting and storing the solid waste at a designated area near the site entrance. Arrangements will be made with a private service provider for the regular collection of the refuse.

4.11 Development Phases

The proposed development can be divided into four logical phases viz.:

- pre-construction;
- construction;
- operation and maintenance; and
- decommissioning.

The project is currently in the **pre-construction** phase. This phase includes the application processes for the required authorisations (permits) from the relevant competent authorities in order to implement the proposed Carpe Diem North SPP development. This phase also involves planning for the required engineering services and preparing/ refining the Site Development Plan (if necessary) for the proposed development.

The **construction** phase will include the establishment of the construction yard, development of access roads and hard surfaces followed by the erection of solar panels and the OPL, as well as the laying of the internal reticulation etc.

This phase may only commence once all the required approvals have been issued. Construction must commence within the validity period specified on the EA issued by DFFE and the land use planning approval issued by the Merafong City Local Municipality, to prevent these authorisations from lapsing. Both these approvals may, however, be extended on application to the relevant authority. Construction of this project is anticipated to be undertaken within the 5-year validity period of the EA (which will be applied for).

The **operational and maintenance** phase will officially commence once construction of all components of the PV plant has been completed, such as the installation of PV panels, step-up substation, water pipeline etc. This phase includes scheduled and unscheduled maintenance of the PV plant infrastructure and access roads between the panels.

The construction and operational phase mitigation measures prescribed for this proposed development are aimed at optimising the sustainability of the development to ensure an operational lifetime of approximately 20 – 25 years.

At the end of the 20-year power purchase agreement (PPA) with the off-taker (e.g., Eskom), it is likely that a new PPA will be sought and entered into by the Applicant. The aim would be to maximise the civil and electrical investments (i.e., solar panels, OPL and on-site substation) and only replace or upgrade relevant components that may have been improved at the time.

The **decommissioning** phase of the Carpe Diem North SPP will only occur if the need for a PV plant at this particular site has become obsolete and if new technology cannot be employed to prolong the operational phase of the SPP. Decommissioning will include removing all electrical infrastructure, removing all solar panel components and breaking up the foundations on ground level, re-contouring the surface, and re-vegetating the foundations and hardstand areas. In the case of decommissioning, mitigation measures, where required, have been included in the EMPs (as per Appendices I1 to I3), for the removal of all PV plant infrastructure and the safe disposal of any material from the PV plant footprint.

5 RECEIVING ENVIRONMENT

5.1 Introduction

This section provides a description of the baseline environment for the study area, which may be affected by the proposed project. The receiving environment is described in terms of biophysical and socio-economic environmental factors, those which could potentially be directly or indirectly affected by the project, or which could conversely, affect the proposed project. This information was extracted from readily available information for the study area.

5.2 Biophysical Environment

The biophysical characteristics of the development site, situated in the Gauteng province, and the surrounding area are described below in terms of its climate, topography, geology, soils and agricultural potential, vegetation and animals, and its surface water features.

5.2.1 Climate

The Carpe Diem North SPP and surrounding area experience a continental climate of hot summers with scattered rains and cold dry winters. Figure 26 depicts the monthly average range of air temperatures, and Figure 277 shows the monthly average rainfall and evaporation distribution for the Carpe Diem SPP and the surrounding region (Schulze, 2009). The long-term (1950 – 2000) mean annual precipitation for the region is 465 mm/a. The evaporation rates typically exceed the rainfall throughout the year.

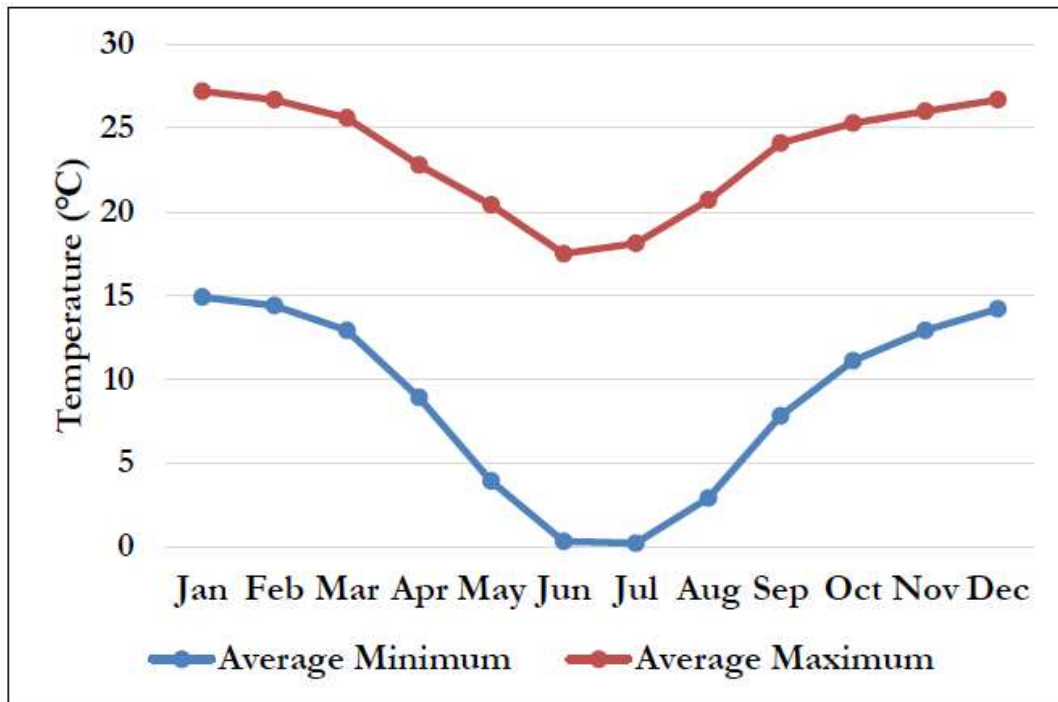


Figure 26: Monthly average air temperature for the Carletonville area (Schulze, 2009).

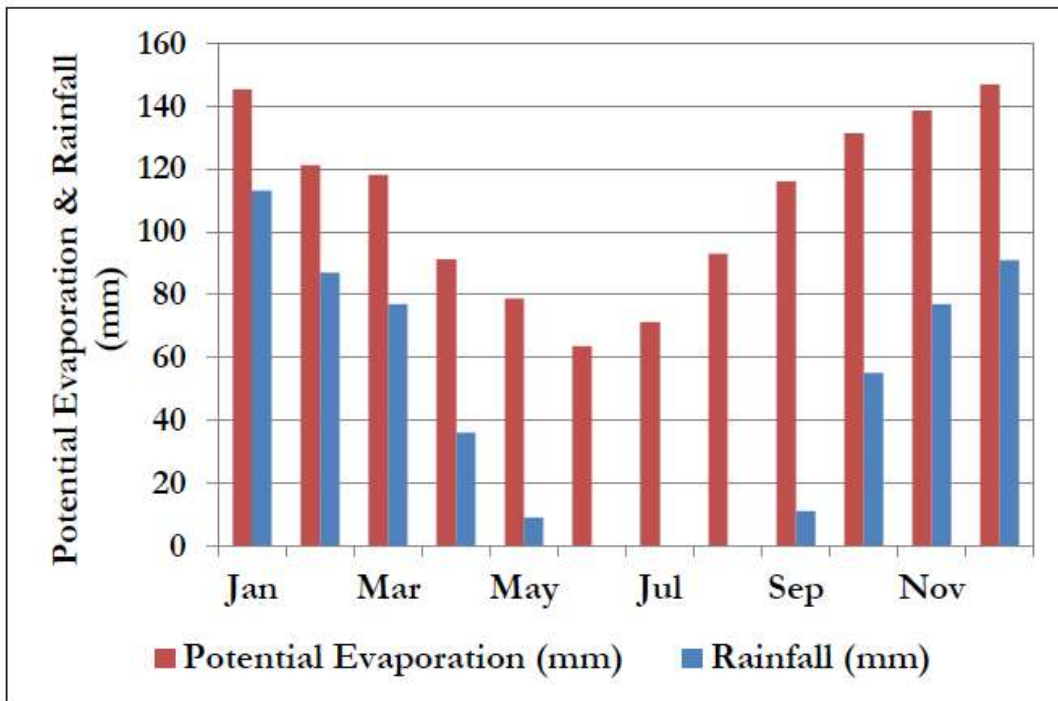


Figure 27: Monthly average rainfall and potential evaporation for the Carletonville area (Schulze, 2009).

5.2.2 Current Land Use

The proposed development area is located on Portion 5 of the Farm No. 119 IQ with less preferred grid connection alternatives located on Portion 23 of the Farm Doornfontein No. 118 IQ, near Carletonville, the majority of which is currently unused. The site is located close to the town of Carletonville, Gauteng Province, and shows signs of historical and current degradation.

Much of the site was observed by the EAP and Specialists to be in a disturbed state, largely due to current and historical agricultural and mining-related activities. A tarred Class 3 road is typically the classification for a minor tarred public road, but it clearly is not used as a public road since the road has been excavated at the point of connection with the public D92-1020 Class 2 road which runs along the western boundary of the proposed development property (refer to Figure 25 above, and Figure 28 below). The R501 traverses along the northern boundary of the proposed site with evidence of littering inside the property boundary. An excavated area exists within the property in the north-western corner.

5.2.3 Surrounding land Use

The surrounding land use is predominantly agriculture, mining, residential and light industrial. Immediately opposite the northern boundary of the site on the opposite side of the R501 public road, are currently unoccupied residential apartments. To the immediate east, agricultural land use occurs with light industry to the far east. Mining activities are evident to the south east and south (active) and west (historical). Residential areas lie to the far south west and north west of the proposed development property.

A few of the surrounding land uses are briefly described below and their relative locations are indicated in Figure 28.



Figure 28: Proposed site location for the Carpe Diem North SPP (outlined in red) relative to surrounding land uses and existing main access roads. Figure 43 below also illustrates surrounding land uses, as well as existing external and internal access roads.

- Carletonville is the seat of the Merafong City Local Municipality in the West Rand District Municipality in Gauteng, just north of the richest gold mining area in the world. There are several privately owned gold - mining township villages and contractor labour quarters established on mining grounds owned by the various mining houses operating in the area. The villages are located to the South of the R501 provincial road that forms the southern boundary of Carletonville. While the mining companies themselves have changed hands, or amalgamated and changed names, the mine villages situated to the south are known as Blyvooruitzicht, (the oldest) Western Deep and Elandsrand. To the west and south-west, is Doornfontein and Deelkraal and to the east is East Village at East Driefontein. The Town of Carletonville serves as the major shopping centre for the mine village townships
- Khutsong is a township in the northwestern part of Carletonville, and the scene of widespread unrest in 2006. In 2017/18 thousands of mine workers lost their jobs due to mines shutting down. With a history of violence and gangsterism, high poverty rates, municipality mismanagement and corruption and the lack of employment/job-creating opportunities caused crime rates to spike from 2011 until late 2019. The older part of the township was built on dolomite - rich land that is prone to sinkholes, with ageing infrastructure that leads to sporadic pipe bursts and water leakages that “activate new sinkholes”. More recent extensions of the Khutsong area have migrated further south and along the R501, directly opposite the Carpe Diem North site.
- Welverdiend is a small community that is located to the north-west of the Carpe Diem SPP development property. The town is primarily residential with 858 households and a population of approximately 2700 at the last census.
- The Abe Bailey Nature Reserve is a protected area of about 4 200 ha on the far side of Khutsong, relative to the Carpe Diem SPP site. The Reserve comprises wetlands, bushveld and grassy savannahs that provide different habitats for a unique combination of flora and fauna. Despite being relatively small, it is home to more than 220 different bird species that can be viewed from various walking trails through the reserve. The Reserve also offers a picnic site under the trees, ablutions and lecture facilities.
- Johannesburg Skydiving Club Johannesburg Skydiving Club, located in Carletonville, Gauteng, is an award-winning skydiving club.
- Alano Concrete provides Quality Ready Mix Concrete within the North West Province to the building, mining and civil construction industries.
- Blyvooruitzicht Gold Mine is a gold mine and associated village about 5 km south of central Carletonville. At the height of its operations, Blyvooruitzicht was one of the most lucrative gold mines in the country. However, large-scale mining ceased when the mine declared insolvency in August 2013. In 2019, it was announced that Blyvoor Gold will resume gold production at the Number 5 shaft, with a new treatment plant and modern mining techniques to target higher-grade gold, the company intends to halve the production costs.
- Western Deep, also known as the TauTona Mine or Western Deep No. 3 Shaft, was home to the world's second-deepest mining operation (3.9 km) but was closed in 2018. The mine was one of the West Wits Goldfield's three Western Deep Levels mines outside Carletonville. TauTona neighbours the Mponeng and Savuka mines. AngloGold Ashanti owned all three until Savuka was closed in 2017, TauTona in 2018, and Mponeng was purchased by Harmony Gold in 2020.
- Eskom's Carmel MTS (on Portion 23 of the Farm Doornfontein No. 118 IQ) is one of the immediate southern neighbours to Portion 5 of the Farm Varkenslaagte No. 119 IQ. The substation has several HV OPLs for the ingress and egress of electricity. Figures 29 to 32 indicate the surrounding Eskom infrastructure relevant to the proposed SPP site.



Figure 29: Eskom's HV OPLs near the south-western corner of the proposed development site. Note the historical mine shaft headgear in the middle background of the image.



Figure 30: Eskom's HV OPL steel lattice pylons entering Carmel MTS from the west. The proposed development site is on the left-hand side background of the image.



Figure 31: Eskom's HV OPLs at the south-western boundary of Carmel MTS.



Figure 32: View of Carmel MTS from the east/south-eastern corner of the substation. Infrastructure lies immediately to the south of the proposed development site.

5.2.4 Existing Impacts

The EAP and terrestrial biodiversity specialist (**Appendix D3.1 and D3.2**) identified the following existing impacts on the site, as depicted in Figures 33 to 38 below:

- Alien invasive plants;
- Weedy indigenous plants;
- Concrete plinths (most likely historic conveyor belt support infrastructure) traverse the proposed development site leading to the mine on the opposite (western) side of the D92-1020;
- Cattle grazing;
- Litter;

- Excavated trench/water canal (old);
- Built infrastructure (tar road, HV OPL pylons, concrete culverts and structure remnants)



Figure 33: Eskom HV OPLs traversing the length of the development property from the north/north-east towards Carmel MTS in the south/south-west.



Figure 34: The original intersection of the public D92-1020 tar road running along the western boundary of the property (in the foreground of picture) with the main access tar road (indicated with red arrow) which crosses the development property from west to east. Actual entrance point not clearly visible from the D92-1020 due to excavation in the road reserve and vegetation growth.



Figure 35: The original intersection of the main access tar road (outlined in red) and the public D92-1020 tar road (indicated with yellow arrows), viewed from within the development site. The intersection will have to be re-established/repaired.

In the above figures, there is a water canal running vertically within the site, extending from the northern boundary southwards along the gravel road. The Figure also depicts the water canal as it runs horizontally across the site in the west-east direction. This photo was taken just outside of the site within the OPL corridors.



Figure 36: Evidence of concrete plinths (indicated with yellow arrows) which probably supported a conveyor belt or large pipeline leading to the mine dump to the immediate west of the proposed development site. Note the alien invasive trees (left of image) and plants (foreground), as well as the existing Eskom HV pylon (indicated with a purple arrow) which runs through the property.



Figure 37: Damaged concrete culvert (left), and old open trenches on the proposed development site.



Figure 38: Concrete and brick structure on proposed development site (partially demolished).

5.2.5 Topography

The topography of the Portion 5 of the Farm Varkenslaagte No. 119, ranges from relatively flat in the north to elevated hill/ridge features towards the central east and south/south-east. The general slope of the property is from the south-east to north-west, with slopes from approximately 1598 m.a.s.l in the southeast corner to 1527 m.a.s.l in the northwest portion with an average gradient of 3-12% across the majority of the site.

5.2.6 Soils and Geology

According to the Geohydrological Specialist, *"The soils in this region consist of shallow Mispah soil forms with limited pedological development. Deeper, red to yellow soil forms may occur sporadically in the northern portion of the site which could hinder the detection of mottling if present. The soil is derived from, and underlain by, dolomite, shale and chert of the Chuniespoort Group, and some coarser clastic sediments and significant andesite from the Pretoria Group (Mucina and Rutherford, 2006). The majority of the site falls within soil group 6 which is characterised as carbonate or gypsum-enriched soils while the northernmost portion has soils of group 2 which are characterised by humus enrichment (Fey, 2010).*

The regional geology around the site is comprised of numerous geological units from the Dominion and West Rand Groups, and the Pretoria and Chuniespoort groups from the Transvaal Supergroup.

The oldest units in the region belong to the dominantly metamorphosed volcanic and clastic sequences of the Dominion Group. Dated at approximately 3074 Ma (Marsh, 2006) Small outcrops of the Dominion Group occur relatively far to the north of the site and consist of basaltic andesites, quartz-feldspar porphyries, tuffs, conglomerates, and quartzites. Co-occurring with the Dominion group to the far north of the site are outcrops of the Orange Grove Formation of the West Rand Group of the world-famous Witwatersrand Supergroup. This formation represents one of the basal-most units of the West Rand Group and consists of fine to medium-grained quartzites and shales.

The most extensively outcropping units within the area belong to the Malmani Subgroup of the Transvaal Supergroup. The Neoarchean-aged Malmani Subgroup is a thick (up to 2000 m) succession of dolomites, subordinate chert, carbonaceous shales, limestone, and quartzites. Mapped units within the Malmani Subgroup in the study area include the dolomitic Oaktree Formation, which lies conformably on the interbedded quartzites, shales, and conglomerates of the Black Reef Formation (Van der Neut et al., 2012). The Black Reef Formation, in turn, preserves an unconformable contact with the underlying West Rand and Dominion groups (Eriksson et al, 2006; Van der Neut et al., 2012).

Overlying the Dolomites of the Malmani Subgroup are the laterally discontinuous conglomeratic units of the Rooihooft Formation of the Pretoria Group. Due to the undulating contact and variable internal facies relationships, it is believed that the Rooihooft Formation deposited within a deeply weathered karstic palaeotopography developed on the carbonates of the Chuniespoort Group (Eriksson et al, 2006; Van der Neut et al., 2012).

Located south of the project area is a region of elevated topography which exposes nearly the entirety of the Pretoria Group. This includes units of interbedded mudstones, fine-grained sandstones, arkosic quartzite, subgreywacke and siltstones of the Timeball Hill and Boshoeck formations, which are overlain by the andesitic lavas and pyroclastic flows of the Hekpoort Formation. The upper part of the Pretoria Group in the area is in turn, defined by interbedded shales and subordinate siltstone, thick quartzite units, and interbedded shales and minor quartzite of the Strubenkop, Daspoort, and Silverton formations (Eriksson et al; Van der Neut et al., 2012).

Prominent features within the region are the north-to-south trending syenite dykes which stratigraphically transect the Transvaal Supergroup and older units. These dykes are typically between 6 and 60 meters thick and impervious to groundwater movement (Kleywegt and Enslin, 1973). These syenite dykes form the youngest non-Cenozoic units in the area, dating to 1310 Ma, and are thought to be related to the intrusion of the Pilanesberg Alkaline Complex (Van Niekerk, 1962). The two closest dykes to the study area are named the Oberholzer and Bank dykes and respectively define the western and eastern borders of the Oberholzer groundwater compartment (Van der Neut et al., 2012).

Finally, Cenozoic deposits within the area surrounding the proposed development include successions (50 - 100 m in thickness) of residual and transported soils derived from material of the Chuniespoort Group, coarse river alluvium associated with the Wonderfontein spruit to the north of the site, and locally developed ferricretes (Kleywegt and Pike, 1982; Van der Neut et al., 2012).

Structurally, the site lies on the southern limb of an east-to-west trending mega anticline, with sediments of the Pretoria Group to the south of the site generally dipping southwards at approximately 15 degrees. Furthermore, several northwest-southeast trending strike-slip and dip-slip fault structures are present within the Pretoria group sequence to the south of the proposed development (Council for Geoscience, 1986)"²⁴.

5.2.7 Geohydrology

The region around the Carpe Diem SPP is located within quaternary attachment C23E of the Upper Vaal WMA and is shown to be underlain by two main aquifers according to the Department of Water Affairs and Forestry (DWAF) 1:500 000 hydrological map. The northern aquifer is classified by the DWAF as a karst aquifer, while the southern aquifer is classified as an intergranular and fractured aquifer. An intergranular aquifer is one where groundwater flows in spaces between grains or weathered rock, while a fractured aquifer is one where water flows in joints, fissures, cracks and fractures within the rock. A karstic aquifer is an aquifer where water flows through, and accumulates in cavities leached out of soluble limestone and dolomitic rocks. In the Case of the Chuniespoort aquifer, Kleywegt and Enslin (1973) suggested that groundwater is specifically stored within the highly leached zones of the Chuniespoort Group dolomites which can extend between 50 to 200 meters below the water table. The northern karst aquifer is estimated to have a borehole yield potential of more than 5.0 L/s, while the southern intergranular and fractured aquifer is estimated to have a borehole yield potential of 0.1 to 0.5 L/s.

The karstic aquifer directly underlying the site effectively constitutes the main local hydrogeological aquifer of interest due to the high average borehole yield and proximity to the proposed development site. This aquifer is separated into multiple blocks by north-to-south trending impermeable syenite dykes, which hydrologically isolate the blocks from each other (Kleywegt and Enslin, 1973; Van der Neut et al., 2012; Hobbs et al., 2013). This natural compartmentalisation of the aquifer has enabled the surrounding gold mines in the area to selectively dewater specific blocks in an effort to control groundwater ingress into the deeply developed mines (Van der Neut et al., 2012).

The Oberholzer block constitutes the groundwater compartment which directly underlies the proposed development. This block was previously highly productive in terms of groundwater as evidenced by springs such as the Oberholzer eye, which had a long-term mean discharge of 55 ML/d. This eye has subsequently dried up due to extensive dewatering of the Oberholzer block from the late 1950s till the present (Hobbs et al., 2013). According to Fleisher (1981), the mean groundwater abstraction for the Oberholzer block due to mining activities is approximately 19 million m³ per annum (602.5 L/s). It is, however, important to note that

²⁴ Source: Geohydrological Impact Assessment: Carpe Diem North Solar PV Facility, near Carletonville (GEOSS, May 2024).

compartments are only de-watered to match the amount of water entering the mine workings. The compartments are, as such, never completely de-watered (Van der Neut et al., 2012).

According to regional hydrogeological mapping (DWAF, 2000), the electrical conductivity of the groundwater in the area predominantly ranges between 0 and 300 mS/m, which is considered "good to moderate" in terms of drinking water standards. The quality notably degrades to a singular point towards the southwest, with electrical conductivities of 300 to more than 1000 mS/m, which is considered to be of "marginal to poor" quality (Map 5). Although the average EC values reported by DWA (2000) indicate generally good quality, standard deviations values of elements such as sulphate, chloride, and nitrate suggest a distinct impact from poorer water sources on the karst aquifer (Hobbs et al., 2013). Furthermore, long-term monitoring of the Gerhard Minnebron Eye indicates a continuously degrading water quality over the last four decades (Winder and Stoch, 2010). This deterioration has been directly attributed to long-term groundwater pollution due to gold mining further upstream (DWAF, 2005).

Although the regional groundwater quality is considered marginal to good at the current stage, unplanned or environmentally unsuitable mine closures in future could drastically decrease water quality to dangerous levels (Winder and Stoch, 2010).

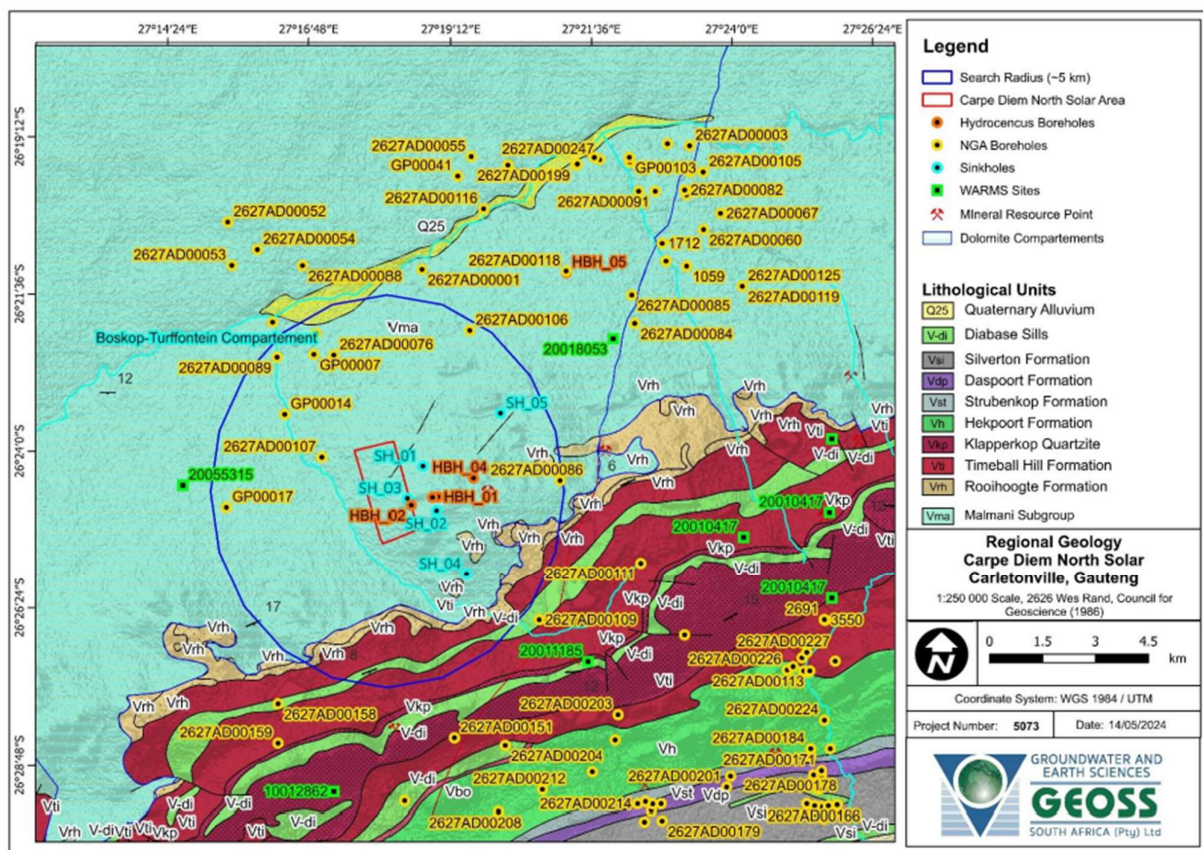


Figure 39: The geological setting of the Carpe Diem North Solar PV Facility, near Carletonville. 1: 250 000 scale 2626 West Rand (Council for Geoscience [CGS], 1987).²⁵

²⁵ Extract from Map 4 of the Geohydrological Assessment conducted by GEOSS (May 2024) – refer to **Appendix D10**.

5.2.8 Soil Suitability for Crop Production

The cropping potential of the site is limited predominantly by the shallow soils. There is no cropping done in the surrounding area. Although rain-fed cropping may have been done in the past, such production is no longer economically viable. The marginal agricultural potential of the site limits its agricultural use to grazing only.

It should be noted that cropping potential changes with a changing agricultural economy over time. Poorer soils that may have been cropped with economic viability in the past, are abandoned as cropland because they become too marginal for viable crop production in a more challenging agricultural economy, with increased input costs.

Cropping potential is determined by the scarcity of arable crop production land in South Africa and the relative abundance of land that is only good enough to be used for grazing. If land can support viable and sustainable crop production, then it is considered to be above the threshold and is a priority for being conserved as agricultural production land. If the land is unable to support viable and sustainable crop production, then it is considered to be below the threshold and of much lower priority for being conserved.

In this case, the total footprint of land that will be lost, which will be lost for the lifetime of the development, is approximately 385 hectares. The production potential of that land is limited to only being suitable as grazing land. The loss of grazing land, of which there is no particular scarcity in the country, represents a minimal loss of agricultural production potential in terms of national food security and for the affected farm.

5.2.9 Flora (Vegetation)

The study site is mainly situated within the Carletonville Dolomite Grassland, and a small section towards the south-west in the Gauteng Shale Mountain Bushveld (according to Mucina and Rutherford, 2006, as amended (refer to Figure 40 below).

5.2.9.1 Carletonville Dolomite Grassland (Gh 15):

Distribution: Carletonville Dolomite Grasslands are predominantly found in the North West Province, in the regions around Potchefstroom, Ventersdorp and Carletonville.

Vegetation and Landscape features: Carletonville Dolomite Grassland is characterised by slightly undulating plains dissected by prominent rocky chert ridges. Species-rich grasslands form a complex mosaic pattern dominated by many species but are mainly characterised by important taxa such as *Aristida congesta*, *Heteropogon contortus*, *Crabbea angustifolia*, and *Elephantorrhiza elephantina*. The geology is mostly dolomite and chert of the Malmani Subgroup.

Important Plant Taxa

- **Grasses:** *Aristida congesta*, *Brachiaria serrata*, *Cynodon dactylon*, *Digitaria tricholaenoides*, *Diheteropogon amplexans*, *Eragrostis chloromelas*, *E. racemosa*, *Heteropogon contortus*, *Loudetia simplex*, *Schizachyrium sanguineum*, *Setaria sphacelata*, *Themeda triandra* and *Alloteropsis semialata*.
- **Herbs:** *Acalypha angusta*, *Barleria macrostegia*, *Chamaecrista mimosoides*, *Chamaesyce inaequilatera*, *Crabbea angustifolia*, *Dianthus mooiensis*, *Dicoma anomala*, *Helichrysum caespititium*, *H. miconiifolium*, *H. nudifolium*, *Ipomoea ommaneyi*, *Kyphocarpa angustifolia* and *Senecio coronatus*.
- **Shrubs:** *Anthospermum rigidum*, *Indigofera comosa*, *Pygmaeothamnus zeyheri*, *Englerophytum magalismontana*, *Tylosema esculentum* and *Ziziphus zeyheriana*.

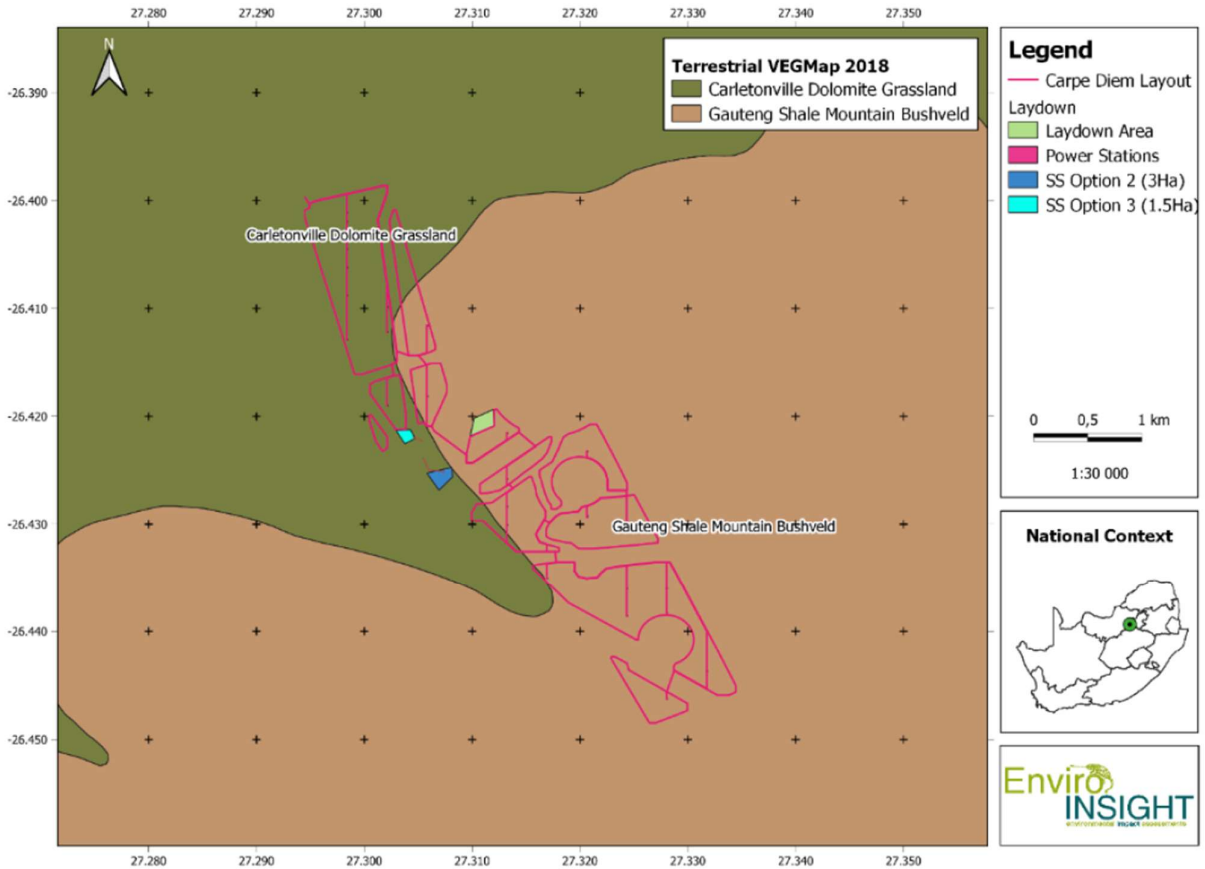


Figure 40: The vegetation types as per Mucina and Rutherford (2006, as amended) in relation to the proposed Carpe Diem Solar PV Facility.²⁶

Conservation: Only a small extent conserved in statutory reserves (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 has already been transformed for cultivation, by urban sprawl. Erosion is very low (84%) and low (15%).

5.2.9.2 Gauteng Shale Mountain Bushveld (SVcb 10)

Gauteng Shale Mountain Bushveld occurs in a narrow band along a series of ridges from Carletonville-Westonaria-Lenasia as well as on low, rocky ridges of varying steepness. Vegetation is characterised by short, semi-open thicket consisting of a variety of fine- and broad-leaf woody species. The field layer is normally dominated by grasses (Mucina and Rutherford, 2006). The underlying geology comprises shale with some coarser clastic sediments and andesite from the Pretoria Group. Soils are shallow to deep Mispah.

Important Plant Taxa

Based on Mucina and Rutherford (2006) vegetation classification, important plant taxa are those species that have a high abundance, a frequent occurrence (not being particularly abundant) or are prominent in the landscape within a particular vegetation type. They recognise the following species as important taxa in Gauteng Shale Mountain Bushveld:

²⁶ Extracted from Figure 4-1 of the Terrestrial Biodiversity Assessment (Appendix D3.1).

- **Trees:** *Dombeya rotundifolia*, *Celtis africana*, *Combretum molle*, *Cussonia spicata*, *Englerophytum magalismontanum*, *Protea caffra*, *Searsia leptodictya*, *Vangueria infausta*, *Vachellia caffra*, *V. karroo*, *Zanthoxylum capense* and *Ziziphus mucronata*.
- **Shrubs:** *Asparagus laricinus*, *Canthium gilfillanii*, *Chrysanthemoides monilifera*, *Dichrostachys cinerea*, *Diospyros austro-africana*, *Diospyros lycioides* subsp. *lycioides*, *Ehretia rigida* subsp. *rigida*, *Grewia occidentalis*, *Gymnosporia polyacantha* and *Olea europaea*.
- **Grasses:** *Hyparrhenia dregeana*, *Cymbopogon caesius*, *Digitaria eriantha* and *Eragrostis curvula*.
- **Herbs:** *Dicoma zeyheri*, *Helichrysum nudifolium*, *H. rugulosum*, *Hermannia lancifolia*, *Selaginella dregei*, *Senecio venosus*, *Vernonia natalensis*, *Vernonia oligocephala*, *Cheilanthes hirta*, *Pellaea calomelanos* and *Scadoxus puniceus*.

5.2.10 Areas of Important Biodiversity for Conservation

A map of the proposed development site in relation to the Gauteng Province Environmental Management Framework (GPEMF) and the most recent revision of the Gauteng Conservation Plan (C-Plan) v4.0 are presented above in Figures 4 and 5, respectively. The study site contains CBAs and ESAs discussed in detail in Sections 3.3.3 above and 6.2.12.1 below.

As explained in the Terrestrial Biodiversity Report attached as Appendix D3.1, the GPEMF map indicates that the proposed grid connection also crosses over Zone 3: A high control zone (outside the urban development zone) and Zone 4: A normal control zone, which is explained below.

Zone 3: High control zone (outside the urban development zone)

Special control zones are sensitive areas outside the urban development zone. These areas are sensitive to development activities and in several cases also have specific values that need to be protected. The protection of CBAs and ESAs is the primary objective in this zone and no new residential, retail, business, commercial, industrial, mining or any other land use, with the exception of unavoidable linear service infrastructure, may be allowed in this area, with the exception of tourism hospitality facilities that adhere to sustainable drainage systems and green infrastructure principles. Land uses that are conditionally compatible with the intention of this zone include an electricity network.

Zone 4: Normal control zone

This zone is dominated by agricultural uses outside the urban development zone as defined in the Gauteng SDF. No listed activities may be excluded from environmental assessment requirements in this zone. Land uses that are compatible with the intention of this zone include an electricity network.

5.2.11 Habitats and Species Composition

Habitats were manually mapped by the Terrestrial Biodiversity Specialist within the Project Area of Influence (PAOI) and surrounding areas as structural units that would be utilised differently by herpetofauna / mammals or represent distinct habitats to flora (geology, watercourses, vegetation density) as determined from satellite imagery and on the ground verification. This mapping exercise was achieved through a combination of habitat characterisation performed during physical fieldwork; vegetation communities identified by botany fieldwork; the digital elevation model (obtained from Shuttle Radar Topography Mission); and the most recent satellite imagery (such as from Google Earth).

The species diversity is generally moderate with diversity increasing in natural grassland. Five main habitats were identified on the total Carpe Diem (North and South) sites, based on species composition and structure as well as transformed areas where no or limited vegetation remains. The habitats include Grassland, Disturbed Grassland, Watercourse, Bushveld and Alien Invasive Species stands. Of these habitats, only Grassland, Disturbed Grassland and Bushveld habitats are present on the Carpe Diem North Site.

5.2.11.1 Grassland

Grassland habitats include dry terrestrial grassland and moist grassland. Species recorded during the survey (alien species indicated with *):

- Grasses: *Aristida congesta subsp. congesta*, *Eragrostis capensis*, *Cynodon dactylon*, *Heteropogon contortus*, *Tristachya leucothrix*, *Eragrostis gummiflua*, *Hyparrhenia hirta*, *Pogonarthria squarrosa*, *Schizachyrium sanguineum*, *Tristachya rehmannii*, *Themeda triandra*, *Trachypogon spicatus*
- Forbs and Geophytes: *Albuca virens*, *Gladiolus crassifolius*, *Dicoma anomala subsp. anomala*, *Afroaster serrulatus*, *Bulbine abyssinica*, *Eriosema salignum*, *Gerbera viridifolia*, *G. piloselloides*, *Hilliardiella elaeagnoides*, *Hypoxis hemerocallidea*, *H. rigidula*, *Helichrysum nudifolium*, *H. rugulosum*, *Indigofera comosa*, *Ledebouria luteola*, *Ocimum obovatum*, *Monsonia angustifolia*, *Hermannia transvaalensis*, *Senecio inaequidens*, *Chlorophytum saundersiae*, *Barleria macrostegia*, *Senecio coronatus*, *Solanum sisymbriifolium*, *Sphenostylis angustifolia*, *Tagetes minuta**, and *Zinnia peruviana**

The multi-stemmed shrub *Asparagus laricin* and the smaller *Seriphium plumosum* are prevalent in areas that have been heavily grazed in the past and continuing today. In terms of larger woody taxa, scattered *Vachellia karroo* trees are present throughout the drier grassland habitats.

Some provincially important species include *Aloe greatheadii*, *Boophone disticha*, *Hypoxis hemerocallidea*, *Eucomis autumnalis*.

5.2.11.2 Disturbed Grassland

The Disturbed Grassland comprises secondary grassland (have been subject to historic overgrazing, alien species encroachment, and other forms of physical disturbances) with alien invasive plant species still present, dominating in some areas.

Weedy forbs, such as *Bidens pilosa*, *Verbena bonariensis* and *Tagetes minuta* are common in areas that have been physically disturbed. Other alien invasive species include *Acacia dealbata*, *Eucalyptus camaldulensis* and *Lantana camara*. Indigenous species include *Themeda triandra*, *Hyparrhenia hirta*, *Melinis repens*, *Cynodon dactylon* and *Eragrostis spp.*

Although some sections are situated in a CBA, owing to its disturbed nature and is heavily modified in some places, it is not deemed highly sensitive. This is due to land use changes in the last 8-10 years which have seen an increase in cattle grazing, mowing of grass to be used as fodder, the spread of alien invasive species due to mismanagement and owing to edge effects from surrounding land uses, including transformation of indigenous vegetation.

5.2.11.3 Rocky Grassland

Dispersed between the other grassland habitats are rocky outcrops which harbour specific species not located elsewhere on site. These areas are usually more sensitive and harbour a range of small mammals and reptiles.

Dominant species include: *Eragrostis gummiflua*, *Hyparrhenia hirta*, *Cynodon dactylon*, *Lessertia frutescens*, *Albucca setosa*, *Anacampseros subnuda*, *Barleria macrostegia*, *Protea welwitschia*, *Hypoxis hemerocallidea*, *Kalanchoe thyrsiflora*, *Xerophyta retinervis*, *Leonotis leonurus*, *Oldenlandia herbacea*, *Stapelia gigantea*, *Aloe transvaalensis*, *Hereroa glenensis*, *Boophone disticha*, *Pellaea calomelanos*, *Senecio oxyriifolius* subsp. *oxyriifolius*, *Pygmaeothamnus zeyheri* var. *zeyheri*, *Searsia magalismontana*, *Elephantorrhiza elephantina*, *Dichrostachys cinerea*, *Striga gesnerioides*.

Some provincially important species include *Eulophia ovalis* var. *ovalis*, *Boophone disticha*, *Hypoxis hemerocallidea*.

5.2.11.4 Transformed

Areas where infrastructure has been erected or owing to agricultural practices. Some herbaceous species and grasses occur along the edges of roads and channels and underneath areas where infrastructure such as power lines are located such as *Cymbopogon pospischilii*, *Campuloclinium macrocephalum*, *Plantago lanceolata*, *Gomphocarpus fruticosus*, *Solanum lichtensteinii*, *Solanum pseudocapsicum*, *Solanum sisymbriifolium*, *Ursinia nana*, *Zinnia elegans*, *Erigeron bonariensis* and *Erigeron canadensis*.

5.2.12 Fauna (Animals)

The presence of the small rocky outcrop embedded in the natural grassland is notable, as in Gauteng Province, rocky ridges are recognised as important biodiversity features. Pfab (2001) notes that the interplay of several factors, including topography, aspect, slope, parent material, local climatic variations and hydrological conditions have resulted in ridge systems evolving a high floral diversity and a corresponding richness in associated faunal communities. They also provide important habitat refuges for sensitive biota. Subsequently, the sensitivity of the Rocky Grassland has been rated as 'High' by the terrestrial biodiversity specialist.

In addition to the importance of the rocky habitats for the existence of faunal communities, watercourses are recognised to be nationally important owing to the vital role they play in ecosystems, especially since they are critically important for maintaining the quantity and quality of water entering downstream rivers, streams and aquifers and support a high level of biodiversity.

Based on the DFFE Screening Tool Report generated for the project (**Appendix J.1**) the Animal Combined Sensitivity Theme is indicated as a combination of Medium and High (low surface area) sensitivity in areas that are said to contain the following sensitive species (excluding avifaunal species as captured in **section 5.2.13** below):

5.2.12.1 Spotted-necked Otter (*Hydricitis maculicollis*; IUCN Vulnerable B2ab(ii, iii, iv))

Although these otters have a large extent of occurrence, they are restricted to areas of permanent fresh water, offering good shoreline cover and an abundant prey base, which means the area of occupancy is substantially smaller and difficult to quantify (Reed-Smith et al., 2015). Overall, the population may be declining as river habitat is lost to development and infestations of alien species in riparian areas, and riverside vegetation degradation from overgrazing. Habitat loss and degradation are exacerbated by human disturbance, including both direct and indirect persecution and/or hunting, reduction of denning sites and diminishment of the species (Ponsonby et al., 2016).

Adequate riparian vegetation, in the form of long grass, reeds, or bushes, is also essential to provide cover (Perrin and d'Inzillo Carranza 2000b), especially during periods of inactivity (Perrin and d'Inzillo Carranza

2000a). Spotted-necked Otters are thought to inhabit freshwater habitats where water is not silt-laden, and is unpolluted, and rich in small fishes (Perrin and Carugati 2000a; d'Inzillo Carranza and Rowe-Rowe 2013). However, anecdotal observations suggest they can occur, and can be common, in relatively polluted rivers, such as the Braamfontainspruit, Jukskei River and Blesbokspruit, Gauteng Province (Ponsonby, thesis, in prep.) and the Vaal River (Power 2014). More surveys are needed to determine at what threshold of water quality otter densities decline. As no suitable habitat (riparian vegetation) is present for the species, the terrestrial biodiversity specialist confirmed that the proposed development will not impact the species.

Note: As per the Aquatic Biodiversity Specialist's Report attached as Appendix D2.1, there are no permanent watercourses (wetlands, rivers or streams) on the proposed Carpe Diem North SPP site. The property does not provide the most ideal habitat for the faunal species in question, whereas the proposed future Carpe Diem South SPP property does have freshwater habitats with adequate riparian vegetation.

5.2.12.2 Uvarov's Clonia (*Clonia uvarovi*, IUCN Vulnerable B1ab(i,iii))

The threat status of Uvarov's Clonia is Vulnerable under criterion B1. Its extent of occurrence is relatively small (~5,000 km²), it has only been recorded in five locations, and the area, extent and quality of its habitat are expected to be in decline due to grazing pressure, cultivation, urban development, invasive alien plants and climate change. Furthermore, this species is not known to occur in any protected areas. The species inhabits tall woodland savannah and is endemic to the highveld region of South Africa and has only been recorded from Gauteng and North-West Provinces.

This species occurs in tall, woodland savannah in areas that are under intensive grazing pressure by livestock and wildlife, cultivation with non-timber crops, urban development, and invasion by alien plant species such as Lantana spp., bugweed (*S. mauritanum*) and other non-native weed species. Furthermore, climate change is already causing increasingly frequent extreme weather events in these regions, which is liable to drastically affect the distribution of grasses, the katydid's food plant.

It may be present in the Bushveld habitat, and accordingly, development within this area must be reduced. The proposed OPL, however, will have minimal impacts on the species habitat. Active rehabilitation of the habitat post-construction is required to promote and enhance the bushveld habitat. This includes the removal of alien invasive species and limiting cattle grazing.

5.2.12.3 Potchefstroom Blue (*Lepidochrysops procera*, Regionally Rare)

This species is endemic to South Africa, and occurring over a large area (Extent of Occurrence 93,799 km²). However, it occupies a very small portion of this area. The taxon is a rare habitat specialist with relatively few known locations, several of which are under some degree of threat. However, such threats are not thought to be significant currently and the taxon is listed as 'Least Concern'.

It occurs in rocky areas in grassland (and grassy areas in savanna), where its larval host plant, *Ocimum obovatum*, occurs. The early stages are unrecorded, but the presence of the host ant (probably a Camponotus species) will be an additional requisite. The species has been recorded between Carletonville and Fochville, as well as in the vicinity of Westonaria. Since it is a rare habitat specialist, and the presence of the host plant is required, the presence of the species is difficult to confirm. The proposed OPL will, however, have minimal impacts on the species' habitat, and active rehabilitation and planting of *B. obovatum* could enhance the species' habitat, if present in the area.

5.2.13 Avifauna

The proposed Carpe Diem North SPP is not located in an Important Bird Area (IBA) or protected area but borders the expansive Abe Bailey Nature Reserve²⁷. The Abe Bailey Nature Reserve comprises wetlands, bushveld and grassy savannahs. Each of these provides a different habitat for a unique combination of birds, and other flora and fauna.

Avifaunal species present include barbets (black-collared, pied and crested), bulbuls, African fish eagles, mousebirds (speckled, red-faced and white-backed), goliath herons, paradise flycatchers, yellow-billed storks, Diedericks cuckoos, blue waxbills, black-throated canaries, black-chested prinia, little bitterns and black crakes. During the winter months (June to August), fairy flycatchers may also be seen. Although Figure 3 above shows some proximity to protected areas and IBAs, the project area shows no ecological linkage to these habitats. The impacts that preclude this ecological linkage include:

- Agricultural expansion: from timber crops, livestock ranching and aquaculture resulting in the afforestation of natural grasslands and wetlands, and human encroachment.
- Energy production and mining: oil and gas drilling, mining, quarrying, and power production, resulting in air, water, light and noise pollution, destruction of habitat, and human encroachment.
- Human intrusions and disturbance: both recreational and work-related activities such as fishing, solid waste removal, sewerage, development of dams and deliberate fire creations or suppressions, and the above-mentioned activities, resulting in the depletion of natural habitats, SCC food sources, and breeding opportunities.
- Residential and commercial development: housing, tourism, roads and railways, resulting in the destruction of natural habitat and displacement of SCCs.

It must be noted that three main habitats have been delineated by the Avifaunal Specialist, as per Appendix D4, and based on species composition and structure as well as transformed areas where no or limited vegetation remains. The three habitats include Grassland, Disturbed Grassland, and Rocky Grassland as described in section 5.2.11 above.

According to the Avifaunal Specialist, *“The PA is located in a region dominated by some natural but mostly disturbed grasslands and stands of alien invasive trees. The density and diversity of Priority Species was low and most of these species were common and widespread and largely synanthropic (water and natural grassland associates excluded) and the density and diversity of SCC was very low. The proposed PV project is situated within an area dominated by anthropogenic activities including mining, industrial structures and residential development. The landscape is thus highly modified and fragmented, with only patches of remaining natural grassland. Habitats recorded within the proposed development footprint include grassland, rocky grassland and disturbed grassland. The study area is located in the Carpe Diem Dolomite Grassland, and a small section towards the southwest in the Gauteng Shale Mountain Bushveld. Neither are considered threatened”*.

The Specialist's Opinion further states that, *“The sensitivity of these habitat types was evaluated according to “avifaunal value”, which relates to species diversity, endemism and the presence of topographical features or primary habitat units with the intrinsic ability to sustain certain avifaunal assemblages (with specific reference to SCC), their food supply and breeding habits, with specific relation to solar energy infrastructure and activities. It is apparent throughout the PA that very few of the habitats are capable of supporting a wide range of general avifaunal species and Red-Listed / SCC and some habitats are more generic in nature and therefore*

²⁷ The Abe Bailey Nature Reserve is within close proximity (5 km) of the proposed development footprint but does not immediately border the site

the presence/ absence of SCC is more easily predicted. Due to the low diversity and density of the SCC recorded during the avifaunal specialists' survey, (including regionally and globally listed Endangered and Vulnerable birds), the Project Area of Influence (PAOI) as a whole is not considered an area of avifaunal importance by the Avifaunal Specialist, although the impact assessment must follow avoidance mitigation".

5.2.14 Surface Water

There are no watercourses or wetlands delineated on the proposed development site (Portion 5 of the Farm Varkenslaagte No. 119 IQ) during site sensitivity verification undertaken by the Aquatic Biodiversity Specialist (refer to Figure 41 below).

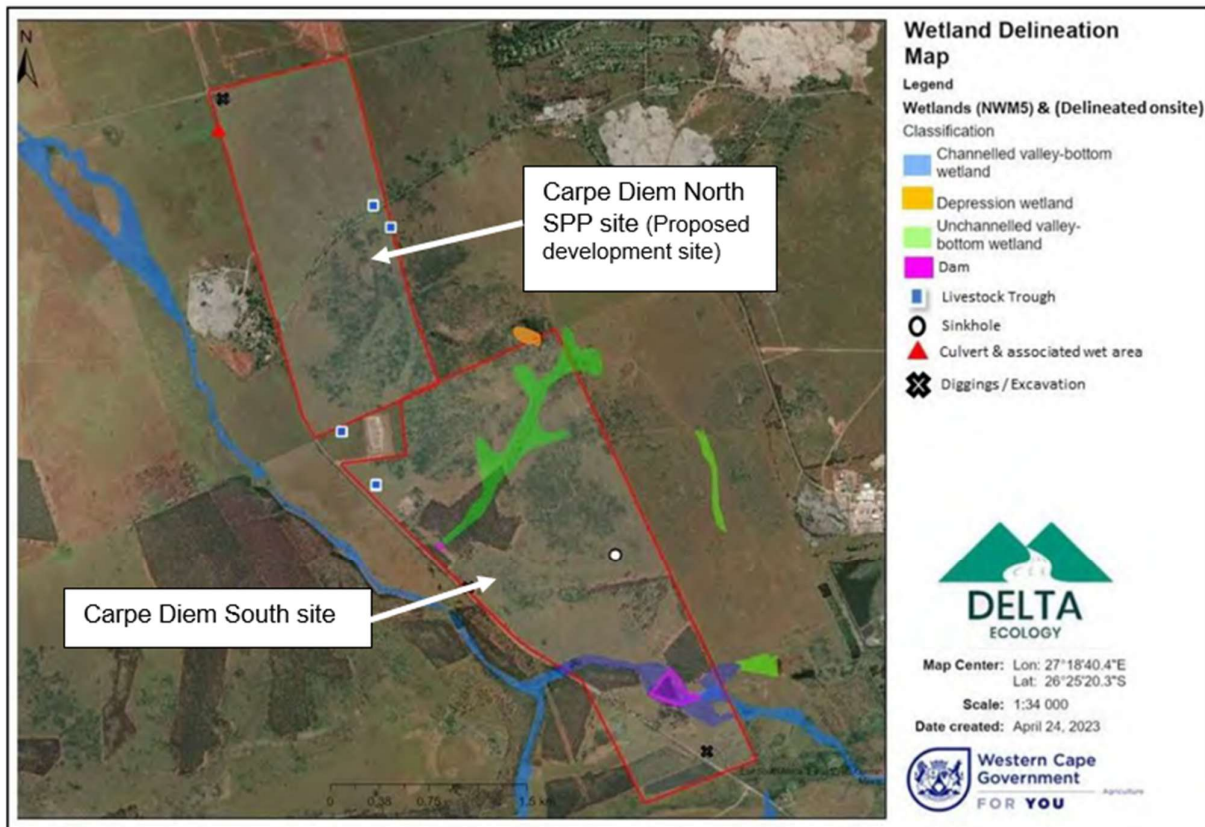


Figure 41: Wetland delineation map pertinent to the proposed development site of Carpe Diem North and Carpe Diem South as verified and delineated on site by the Aquatic Specialist.

A very small section of the south-western corner of the Carpe Diem North SPP site falls within a '500 m of a wetland' Zone of Regulation (ZoR) under the National Water Act, (Act No. 36 of 1998), Regulation 509. However, according to the Aquatic Specialist, there would be no trigger for a water use license if no development were to take place within the few meters where the ZoR overlaps with the site.

No new development is planned for the south-western corner of the proposed development site (the region of slight overlap with the ZoR for the wetlands to the west of the proposed development site (off-site), as this area has been designated a no-go/no-development visual screening buffer strip of about 50 m all along the western boundary of the proposed site. Since this area was already proactively being treated as a visually sensitive region, the precautionary principle was applied, and the buffer was designated a no-go to development. Hence, no new development within the 500 m ZoR will take place. Refer to Figure 41 above.

Although there are no natural watercourses or wetlands on the Carpe Diem North SPP site, the Gauteng Conservation Plan (GDARD, 2014) indicates several CBAs and ESAs located immediately adjacent to, and on, the proposed site which fall within the regulated 500 m proximity of neighbouring watercourses/ wetlands.

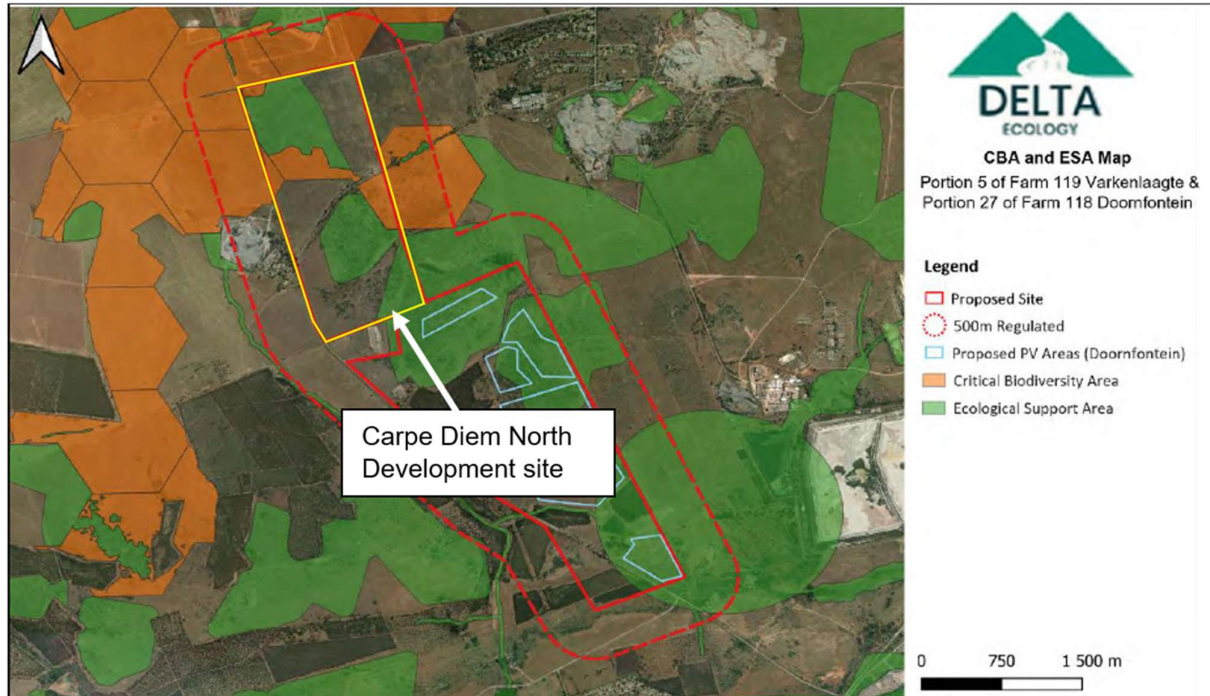


Figure 42: CBAs and ESAs mapped within the development site (GDARD, 2014). Carpe Diem North site outlined in yellow.

The verified legislated ESAs and CBAs on the Carpe Diem North site (including buffer areas as recommended by the Specialists) have been avoided in terms of new development footprints.

5.2.15 Ground Water

The water requirements (as provided by the Applicant) for the proposed Carpe Diem North SPP are as follows:

- Construction phase 14 400 m³/a (0.46 L/s); and
- Operational phase: 4 200 m³/a (0.13 L/s).

After considering preliminary groundwater investigations and attempting liaison with the Local Municipality to ascertain the potential for water supply, three potential options to meet the required construction and operational water supply demands of the proposed development were proposed by the Applicant, viz.:

- i. Source water from a registered third party supplier in the surrounding region (such as a neighbouring farmer with a registered and licensed borehole, or independent water supply company), and truck the water supply onto site for storage in above-ground tanks;
- ii. Source water from a borehole on the development site itself by either re-establishing an old or sinking a new groundwater abstraction borehole. This would require registration of any borehole on site under the WULAA process with DWS to ensure lawful water supply; or

- iii. Source water from an adjacent SPP owned by the same Applicant such as the Carletonville SPP (to either fully supply the Carpe Diem North SPP or to augment water supply received from option 'i' above, and truck the water supply onto site for storage in above-ground tanks.

Subsequent to the preliminary desktop geohydrological investigation, the Specialist was tasked to undertake a hydrocensus and full geohydrological assessment to investigate options 'i' and 'ii' above, respectively. It should be noted that Option 'iii' was only added to the potential water supply scenarios after the Geohydrological Specialist had completed the full site verification and Geohydrological Impact Assessment but that the Applicant has subsequently decided not to potentially source water from the Carletonville SPP development.

The following summary of key findings made by the Specialist for options 'i' and 'ii' above are discussed in detail in Section 6.2.12 below:

- Option i - A representative hydrocensus was conducted from the 11 to 15 March 2024 on the farm portions on which the Carpe Diem SPP and Carletonville SPP proposed to be constructed, as well as on the surrounding properties in the area, where access was available.

The hydrocensus took into account existing registered boreholes as per the National Groundwater archive (NGA) and Water use Authorisation and Registration Management System (WARMS), as well as any registered or boreholes with the potential to be registered on neighbouring farms. Figure 49 depicts the result of the hydrocensus relative to the study site.

During the hydrocensus, data such as borehole depth, water level (WL), total dissolved solids (TDS) and electrical conductivity (EC) was measured. According to the Geohydrological Specialist Report, due to the anomalously deep regional water table, there were very few accessible boreholes which could be measured. Nonetheless, two potentially viable groundwater sources were identified.

- Option ii - The anticipated water supply demands of the Carpe Diem North SPP i.e., 0.06 L/s to 0.19 L/s, are less than the regional yield potential of the underlying aquifer which is > 5 L/s.

Although the drilling of new boreholes is a potential option, the deep (120 m to 150 m deep) water levels in the region, represent a significant capital expenditure to establish a viable borehole. The Geohydrological Specialist confirmed that the hydrological depression cone induced by dewatering activities (primarily by mines in the area) would result in resting groundwater levels of depth of > 100m and recommended a borehole drill depth of 150 m to 200 m.

Any new borehole will need to be yield tested according to the SANS 10299_4-2003, to determine the safe yield of the borehole. A WULAA will then need to be undertaken for the new borehole before groundwater may be lawfully abstracted from it. In addition, any new borehole will require input from a Geotechnical Specialist to determine the potential for sinkhole formation due to water abstraction.

The study site has been classified as overlying a high yielding aquifer with a groundwater vulnerability classification of 'High' (based on regional data and not accounting for the attenuation effect of the overlying thick quarternary sediments or the artificially lowered table).

Figure 49 below, maps the registered NGA and WARMS boreholes as well as registered and non-registered boreholes not on any database. The maps also depict the location of current sinkholes on and near the proposed development site.

It should be noted that the option to source water from an on-site borehole was decided against by the Applicant. Therefore, the General Authorisation (GA) received from the DWS (as per Appendix K5) does not include groundwater abstraction from an on-site borehole.

5.3 Socio-Economic Environment

The following sections provide a short history of the towns and communities found in the vicinity of the project area and describe the socio-economic characteristics and demography of these communities.

The application site is located within the Gauteng Province, which lies in the north-eastern part of South Africa. The site is located directly northeast of the existing Eskom Carmel Substation and about 6 km west of Carletonville Extensions 8 and 9 (refer to **Figure 1** above), with the R501 bordering the northern portion of the site.

According to the DFFE Screening Tool Report, the sites are located within areas identified within the Gauteng Province Environmental Management Framework (GPEMF) for future development. The 2019 - 2020 Merafong SDF indicates that the site has been earmarked for agricultural use.

5.3.1 Overview of the Municipal and District Economies

As per the Socio-Economic study (**Appendix D7**), the Merafong Municipal economy contributed approximately 24,54% to the economy of the West Rand District in 2021. In terms of absolute numbers, the Merafong economy generated R 68 741 million in Gross Value Added (GVA) at constant prices²⁸, relative to R280 084 million recorded for the West Rand District. The GVA contribution of the Merafong economy to the West Rand District increased from 20,84 % in 2005 to 24,54 % in 2021. The Merafong economy grew off a solid base by 9,68 % per annum from 2005 to 2021.

An assessment of the larger sectors in the Merafong economy suggests that the contribution of the Wholesale and Retail, Finance, Insurance, Real Estate and Business Services sectors increased their contribution to the economy, while the contribution of the Manufacturing and Mining and Quarrying sectors decreased slightly over the period. Finance, Insurance, Real Estate and Business Services increased its contribution to GVA of the Merafong economy by 29,47 % over the period. The contribution of the manufacturing sector declined from 18,19 % in 2005 to 17,25 % in 2021. A similar pattern is found in the district economy from 2005 to 2021. The contribution of the sectors to GVA in the Merafong area and the West Rand District remained more or less in the same proportions whether the sector contribution increased or declined, except for mining and quarrying whose contribution to the district increased, but slightly declined for the local municipality.

The primary sectors of the economy include *Agriculture, Hunting, Forestry and Fishing activity and Mining and Quarrying*. The primary sector contributed 40,91 % to the GVA of the Merafong economy in 2021, which is slightly down from 42,44 % in 2005. Mining and Quarrying is the largest contributor to the GVA of the primary sector with a sector contribution of 96,87 % in 2005 that increased to 97,49 % in 2021. The secondary sector of the economy includes *Manufacturing, Construction and Electricity, Gas and Water Supply*. The secondary sector contributed 23,01 % to the GVA of the Merafong economy in 2005, while the contribution to GVA decreased to 21,74 % in 2021. The contribution of the Manufacturing sector to the secondary sector GVA remained constant over the period at 79 %. The tertiary sector of the economy includes *Trade, Repairs and*

²⁸ GVA and Gross Geographic Product (GGP) or Gross Regional Product (GRP) are very similarly related concepts. GVA excludes taxation and subsidies, whereas GDP includes the items. GVA is analysed using current prices. GVA is the value that producers have added to the goods and services they have bought. When they sell their wares, producers' income should be more than their costs, and the difference between the two is the value they have added. GDP is a monetary measure of the market value of all the final goods and services produced and rendered in a specific time period by a country or countries.

Hospitality, Financial Institutions, Real Estate and Business Services; Community, Social and Personal Services; and Government Services. The tertiary sector contributed 34,55 % to the GVA of the Merafong economy in 2005, which increased to 37,35 % in 2021. Government Services are included as part of the tertiary sector for the analysis. The analysis suggests that the contribution of Government Services to the GVA of the tertiary sector of the Merafong economy decreased from 10,19% in 2005 to 7,23% in 2021.

5.3.2 Socio-Economic and Demographic Profile of the population in the study area

The approach adopted by the Socio-Economic study (**Appendix D7**) for the preparation of the socio-economic and demographic profile of communities surrounding the proposed development entailed the specification of concentric circles representing areas within 5 km and 10 km from the centre point of the site designated for the project. This approach was used due to the need to ascertain the relative proximity of communities to the development site to understand the geographical impact of the location on residents in the study area. The choice of 5 km and 10 km radii is based on our observations of population distribution, economic activities and likely procurement sources in the areas surrounding the proposed development. The socio-economic specialists reasoned that this approach would offer a more realistic sociodemographic and economic profile of the population most likely to be affected by the proposed development.

The following socio - demographic profile of the study area is based on data from the 2011 National Population Census Survey (Statistics South Africa, 2013):

- An analysis based on the specified concentric zones suggests that 33,67 % of the population residing in the area (i.e., within 10 km of the proposed site) live within 5 km of the site proposed for development. An assessment based on the population groups suggests that 76,95 % of the population that reside within 5 km of the site are Black African, 21,32 % are White and 1,41 % are Coloured or Indian. Within the 10 km zone, 87,7 % of the total population are Black African and 11 % are White residents.
- An analysis of education levels in the study area for 2011 is provided. The results indicate that 5,24 % of persons living within 5 km of the site had no schooling (including those under school age), whereas 5,58 % of the population within 10 km had no schooling in 2011. The assessment further suggests that 88,75 % of persons living within 10 km of the site received Grade 1 to Grade 12 schooling, whereas 5,67 % obtained Matric with a higher diploma or degree qualification.
- An analysis of the age levels among the population within 5 km and 10 km is intended to indicate the population that could be considered economically active, i.e., persons between the ages of 15 and 65. The analysis that follows provides a broad indication of age categories for 2011. 23,16 % of the population within 5 km of the development site is below 15 years of age, which represents 24,07 % of all persons under 15 years of age within 10 km of the site. Our analysis also suggests that 72,62 % of the population within 5 km of the site are in the working-age category between 15 and 65 years of age, while the working group within 10 km of the site represents 72,32 % of the total population. The assessment indicates that every 2,65 persons who would generally be considered economically active (i.e. between 15 and 65 years of age), could support another person who is not economically active within 5 km of the site. The latter is slightly higher than the dependency ratio of 2,61 for the population residing within 10 km of the site.
- A more detailed assessment suggests that the Black African and White population groups younger than 15 years represent 24,97 % and 20,26 % of the respective population groups living within 10 km of the site. The dependency ratios suggest that among the Black African population within 10 km of the site, every 2,64 potential economically active persons could support another person younger than 15 or older than 65. The dependency ratio for the White residents was 2,39.

- An analysis of the household income ranges as defined by the specified 5 km and 10 km radii from the centre of the proposed development is provided. Note that not all the respondents disclosed their income. For those that disclosed their income, 14,03 % of the households residing within 5 km of the proposed development had no income, and 52,10 % earned less than R 76 401 per annum (excluding households with no income). Within 10 km of the site, 15,40 % of the households did not have an income, 62,60 % of the households had an annual income of less than R 76 401, whereas 1,07 % of households declared an income of more than R 614 400 per annum.
- A perspective of employment for the different zones is provided with specific reference to the number of employed, unemployed and not - economically active persons per population group. The analysis indicates that 51,94 % of the total population residing within 5 km of the site is employed, while 47,03 % within 10 km are employed. The proportion of employed for the Black African and White groups are 46,06 % and 54,73 % of the total population group within 10 km, respectively.
- An assessment of the dependency ratios for the zones is based on the premise that for each person who is employed, a factor of people is unemployed or economically inactive. The findings of the research for each of the zones suggest a dependency ratio of 1,08 and 0,89 for the total population within 5 km and 10 km, respectively. This implies that every employed resident has to support one unemployed or economically inactive person. The ratio for the Black African and White population groups within 10 km of the site is 0,85 and 1,21 respectively.
- A further assessment of employment levels is provided by the economic sector and by population group for the population residing within 5 km and 10 km from the proposed site. The findings presented – whereby the formal sector employs 85,50 % of the economically active population within 5 km of the site, followed by private households with 8,09 %. The assessment also indicates that 83,81 % of the people within 10 km of the site are employed in the formal sector, whereas 8,13 % are employed by private households.

Based on the above statistics and the national and provincial directives on job creation, the municipality uses all capital projects, infrastructure projects, and environmental and social partner projects for massive job creation within the municipality.

5.4 Heritage and Cultural Resources

Various areas of interest were identified by the heritage specialists (refer to **Appendix D6**) and visited during the site visit, as identified from the desktop assessment work to inform the Heritage Resources Impact Assessment. Palaeontological fieldwork has been conducted by a palaeontological specialist whose findings and recommendations will be included in the draft EIA report.

5.4.1 Heritage Features

During the fieldwork conducted by the heritage specialists in March 2023, no archaeological sites or burial grounds and graves were identified on Portion 5 of the Farm Varkenslaagte No. 119 IQ.

According to the Palaeosensitivity Map available on the South African Heritage Resources Information System database (SAHRIS), the Palaeontological Sensitivity of the proposed development areas is rated as 'Very High' (Almond and Pether 2008, SAHRIS website). A field assessment as part of a field-based Phase 1 palaeontological assessment was required and completed (refer to as per Appendix D6.2).

Despite an intensive walkthrough of the footprint area for the proposed project by the heritage specialists, no evidence for any archaeological or heritage sites could be identified within the environs of the study area. As

a result, no objection to the proposed construction was given, under the condition that a walkdown of the final approved footprints be conducted before construction commences.

5.4.2 Visual Characteristics

Impacts on views are the highest when viewers are sensitive to change in the landscape, and the view is focused on and dominated by the change. The project's visual impact will cause changes in the landscape that are noticeable to people viewing the landscape from the public road immediately west of the site, and the residential areas nearby.

PV solar projects typically include medium to large-scale infrastructure that can cause change to the fabric and character of an area and possible visual intrusion in sensitive landscapes due to their physical presence.

In addition to these common visual and aesthetic issues, the potential of glint and glare can be of concern. PV panel surfaces are designed to absorb the sunlight, therefore substantially reducing the potential for glint and glare. The glass layer covering the PV modules is made of high-transmission tempered glass with an anti-reflective (AR) coating. Consequently, the percentage of the reflected light from PV modules can vary from 2 % to 30 % depending on the angle of incidence (PagerPower 2020, pg. 24). However, published guidance shows that the intensity of solar reflections from solar panels is equal to or less than those from water. It also shows that reflections from solar panels are significantly less intense than other reflective surfaces, which are common in an outdoor environment (PagerPower 2020, pg. 24). By comparison, a mirror can reflect a percentage of the incident light above 98 % (Tata 2015, pg. 3).

However, the panels and other components reflect light that may result in glinting (but only at minimal angles), and glare depending on panel orientation, sun angle, viewing angle, viewer distance, and other visibility factors (USDI 2013, pg. 77) - where the arrays can vary in colour from black, to blue, to a bright silvery sheen (worst case scenario). The result can also be distributed across a single project site when differing sky conditions exist. The effect of glint (a sharp focus of light) is not generally associated with PV arrays; however, glare can occur with certain climatic and orientation conditions.

The South African Civil Aviation Authority (SACAA) obstacle notice 3/20202 Additional Requirements for Solar Project Applications states that a Glint and Glare Assessment would be required if the SPP is within a 3 km radius of the aerodrome (Part 139.01.30 (3)3). Even though the nearest aerodrome, the Johannesburg Skydiving Club, is approximately 6.5 km away from the Carpe Diem North SPP, a full Glint and Glare Assessment has been undertaken for the project (Appendix D12).

5.4.2.1 Landscape Character and Nature of the Study Area

The topography of the Carpe Diem North SPP site is relatively flat in the north but does increase in slope towards the mid-eastern section of the site in what appears to be a Class 2 ridge, before dipping down again towards the southern section and gently rising in altitude towards the south/south-eastern boundary of Portion 5 of the Farm Varkenslaagte No. 119 IQ. Much of the elevated landscape falls within ESA no-go areas and will not be developed. Although, it should be noted that several Eskom HV OPLs run through and over the crest of the hills/ridges causing these elevated areas.

To the south/south west of the proposed development site lies Eskom's Carmel Main Transmission substation with significant existing infrastructure as per Figures 29 to 32 above.

Active and historical mine workings are evident to the far east/south-east and immediate west of the property

Portion 5 of the Farm Varkenslaagte No. 119 IQ, is covered by varying conditions of grasslands associated with the Carletonville Dolomite Grassland habitat, used mainly for grazing livestock. There is a section of Gauteng Shale Mountain Bushveld habitat on the southern slopes of the ridge mentioned above. Along the site's western border is a row of tall *Eucalyptus spp* (Blue gum) trees and towards the north western corner is a historically excavated area infested with alien vegetation including Blue gum and Black Wattle trees. Littering (rubbish dumping) within this excavated area was evident.

5.4.3 Glint and Glare

The Carletonville airstrip (ICAO: FACR) is a small-scale aerodrome primarily utilized by the Johannesburg Skydiving Club for conducting skydiving operations. The aerodrome features a single runway identified as Runway 13/31, positioned in an East-West configuration. Situated within the Johannesburg Area South-West FAJA ACC Airspace, the aerodrome lacks an Air Traffic Control Tower (ATCT), thus making the aircraft approach paths the sole focus of this glint and glare assessment. These 2-mile approach paths are as follows:

- 2 Mile Approach Path to Runway 13 describes the aviation receptors when the aircraft is approaching the runway from the West.
- 2 Mile Approach Path to Runway 31 describes the aviation receptors when the aircraft is approaching the runway from the East.

The proposed Carpe Diem North SPP falls within 8 km of the Carletonville airstrip and was rated as a 'Medium' sensitivity due to this. The Glint and Glare Assessment was conducted by Future Impact on appointment by Aviata Consulting (**Appendix D12**) with the objective of determining how 'glint' and 'glare' will affect aviation receptors such as pilots on the final approach to the airport. If the 'glint' and 'glare' effects are strong enough, it has the potential to cause temporary flash blindness in the receptors and hinder their abilities to conduct their operations. The glare is rated in three categories, namely green, yellow, and red with red being the highest risk from an aviation perspective as a permanent afterimage could occur.

Three Solar PV configurations were assessed for the proposed Carpe Diem North SPP as the developers have not yet finalized the design specifications for the proposed project. This will aid the developers in making an informed decision, from an aviation glint and glare perspective, when confirming the final design of the SPP.

Table 30: Modelling results of the three separate glint and glare configurations.

Configuration	Green Glare (mins)	Yellow Glare (mins)	Red Glare (mins)
Fixed Tilt (at 22°)	146 000	7 331	0
Single Axis Tracking	35 006	0	0
Double Axis Tracking	116 279	2 632	0

As seen in **Table 30** above, the single-axis tracking system would be the preferred configuration to implement as it will have the lowest impact from a glint and glare perspective. However, according to the FAA Guidelines, the glint and glare impacts of all three configurations are acceptable for the following reasons:

- The receptors on the approach paths are not exposed to red glare, which has the potential to cause a permanent after-image to the receptor.
- No ATCT is present (if an ATCT is present, it should not be exposed to any glare).

The Glint and Glare Specialist, therefore, recommended that the project obtain authorisation from the SACAA regarding glint and glare concerns.

5.4.4 Roads and Site Access

The initial proposed site layout during the feasibility (opportunities and constraints) phase of the project proposed two main accesses to the site viz. one off the R501 accessing the site from the north near the intersection with the D92-1020, and the other, further south on the D92-1020 closer to Carmel MTS, accessing the site from the west.

According to the Traffic Specialist, while the R501 can accommodate abnormal loads, making it suitable for heavy vehicles during the construction phase, as a Class 2 Road, the minimum spacing distance between intersections is 5 km. This is required to meet the Committee of Transport Officials (COTO), Technical Recommendations for Highways (TRH) 262 Standards for a Class 2 road²⁹.

Figure 43 below depicts the proposed site layout, including the classification of roads, which is crucial for evaluating whether the proposed development aligns with the appropriate design standards and identifying the need for any modifications or improvements.

The original two accesses proposed were rejected by the Traffic Specialist since they did not provide sufficient spacing from an intersection and /or a (blind) curve on the public access road. It was suggested that the Applicant consider the alternative option of relocating the main access point to the previously existing intersection off the D92-1020 (which is classified as a Class 3 road), with the previous main access road within the site.

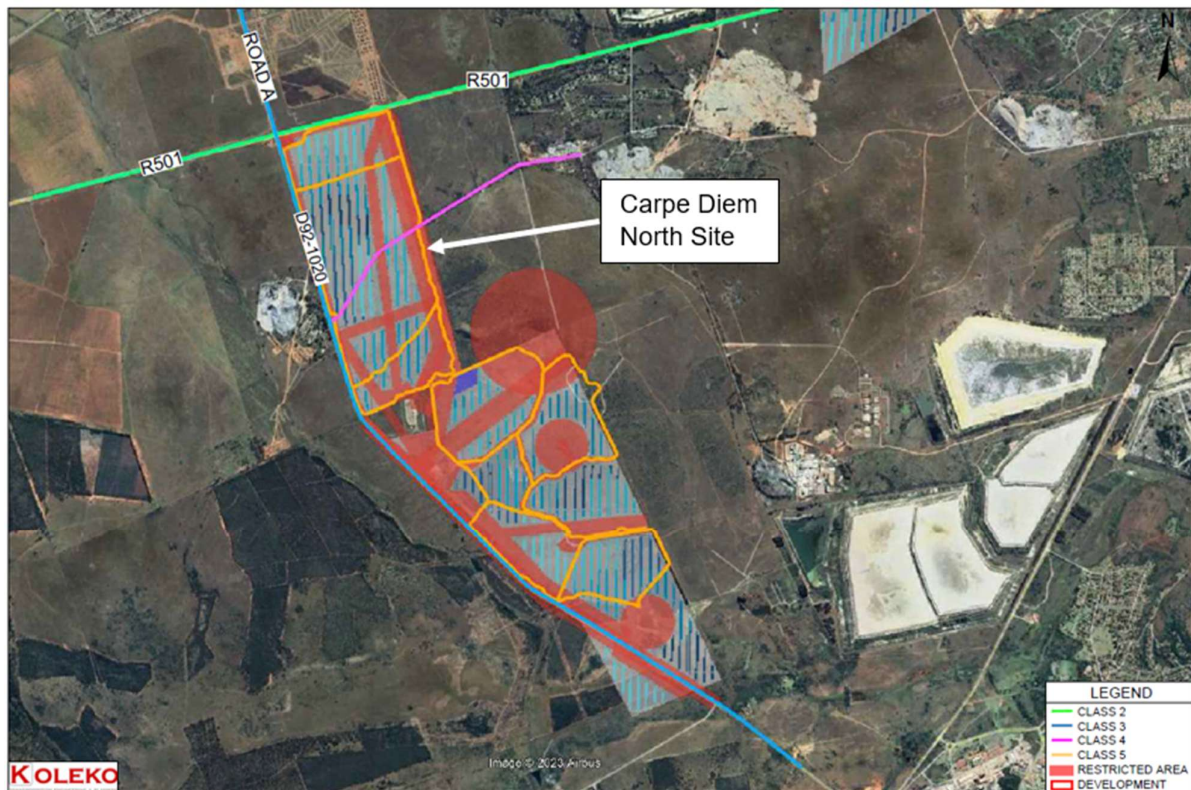


Figure 43: The proposed Site Layout including the classification of roads.³⁰

²⁹ COTO, TRH26, South African Road Classification and Access Management Manual, Version 1.0, August 2012

³⁰ Extracted from Figure 14 of the Traffic Impact Assessment (Appendix D8)

5.4.4.1 Existing cross-sections and surface conditions

The following roads are likely to be impacted by the trips that will be generated from the proposed development:

- **R501:** This is a Class 2 South African National Roads Agency Limited (SANRAL) -owned, paved road. This road has one lane per direction and is oriented in the east-west direction. The road aligns on the northern side of the proposed development. It also intersects with several gravel roads that lead to private developments. At the time when the site assessment was conducted, the road pavement was in good condition. There is no need for any road surface upgrades. There are two comprehensive traffic observation (CTO) stations situated along this road that can be used to predict the 2019 average daily traffic volumes. These are the Driefontein 19231, and Begonia 19232 stations and they are situated on the far eastern side of the proposed development.
- **D92-1020:** This is a paved road with 1 lane in each direction. This road is on the west/southwest side of the property. The road passes through a small portion of the proposed development boundary. This road functions as a class 3 road and has a posted speed limit of 100. The road pavement is in a fair condition for vehicles to travel along safely and does not need any surface upgrades.

5.4.5 Existing traffic volumes

A site visit was conducted on the 27th of October 2022 and the 28th of June 2023. The site visit focused on observing the general road network layout, road conditions, modes of transport available in the area, traffic safety, and some land-use aspects that were relevant to this study.

Traffic counts were carried out on the 16th of February 2023. The counts were conducted for 6-hour AM and PM peak periods, and the following peak hours were noted:

1. AM peak: between 6:30 - 7:30; and
2. PM peak: between 15:45 - 16:45.

The following intersections were surveyed during the mentioned periods:

- A. R501/Onyx Drive Intersection; and
- B. R501/Road 3 Intersection.

Based on the findings of this study, the following conclusions were made:

- The proposed development has a Gross Leasable Area (GLA), for Carpe Diem North and South, of 6,247,400 m² – specialists were originally contracted to assess the site as one project.
- Based on the information provided by the client, during operation, there is an expected 3 vehicles per hour IN and OUT of the facility. During construction, there is an expected 10 vehicles per hour IN and OUT of the facility of which 5 are trucks.
- Traffic counts were conducted at three intersections adjacent to the development.
- All the intersections operated under capacity and with an acceptable level of service (LOS A) for the existing and future scenarios.
- No road upgrades were found to be required to accommodate the traffic generated from the development both during the construction and operational phases.
- This parking generation rate was used to calculate the expected parking requirements at the proposed development, based on the GLA of each site.

From the traffic engineering perspective, the proposed development on the site is expected to have a minimal traffic impact on the current surrounding road network. Hence it is recommended that the development be approved from a traffic engineering perspective.

5.5 Site Sensitivity Verification

Environmental site screening is a systematic tool that assists in identifying the various licence application processes that need to be adhered to, the specialist studies that require commissioning, and the potential environmental fatal flaws of the proposed project at a planning stage.

Table 31 below summarises information and findings derived from relevant specialist studies identified in the DFFE Screening Tool Report (STR) and prepared by Legacy EMC for both the SPP project and the Grid Connection project, as well as the site visits conducted by Legacy EMC on 09 and 10 April 2024. Refer to the table below for the site sensitivity verification given for the respective project.

Table 31: Specialist Studies required, and motivation where the study will not be undertaken for the proposed development.

Theme	DFFE Screening Tool Sensitivity	Verified Site Sensitivity	Specialist Study	SSV included	Specialist Study Conducted? (Y/N)
Agricultural	High	Medium	The STR determined a 'High Sensitivity' for the Agriculture Theme. However, after SSV the Agricultural Specialist disputed the 'High Sensitivity' rating and verified that the site is, in fact a 'Medium Sensitivity'. An Agricultural Compliance Statement was therefore provided for the project. Furthermore, the Specialist report (attached as Appendix D1 of the DEIAR and FEIAR) states that the STR rating of the agricultural sensitivity of the assessment area is mostly 'Medium' but it includes small areas of high sensitivity. Based on the site verified assessment of cropping potential, the development site was allocated a physically verified land capability classification of 7 i.e., Medium (unsuitable for cropping). This assessment therefore disputes the high sensitivity rating by the STR and verifies the entire assessment area as being of 'Medium' agricultural sensitivity. According to the Agricultural Specialist, "The cropping potential of the site is limited predominantly by the shallow soils. The site is not suitable for rain-fed crop production. The limited agricultural potential of the site limits its agricultural use to grazing only".	Agricultural Compliance Statement (Appendix D1)	Y
Animal Species	High	Medium	The STR list of animals warranting a 'Medium' rating for the site, bar avifaunal species mentioned below, are the 'Vulnerable' Bush cricket (<i>Clonia uvaroi</i>), the 'Least Concern' Potchefstroom blue butterfly (<i>Lepidochrysops procera</i>) and the 'Vulnerable' Spotted-necked otter (<i>Hydrictis maculicollis</i>). An Animal Species Compliance Statement, which has been attached as Appendix D3.2 of the DEIAR and FEIAR (as relevant to the Carpe Diem North	Animal Species Compliance Statement (Appendix D3.2), as well as the Avifaunal Impact Assessment for the	Y

Theme	DFFE Screening Tool Sensitivity	Verified Site Sensitivity	Specialist Study	SSV included	Specialist Study Conducted? (Y/N)
			site), states that, “<i>Uvarov's Clonia</i>, <i>Lepidochrysops praeterita</i> and <i>Lepidochrysops procera</i> will be all but unaffected by the proposed development especially in context with the prevailing current impacts on site. The likelihood of occurrence of the species is marginal at best but given the moderate to high impact development footprint on the species, avoidance of the bushveld habitat is the only option here”. All areas indicated as 'High' sensitivity no-go areas (including buffers provided by the Specialist) have been avoided. Bushveld habitat associated with the ridge/sloped terrain falls within the Ecological Support Area (ESA) which is also a no-go area and has been avoided. The Animal Species Compliance Statement further states that, “<i>Both the Maquassie Musk Shrew (Crocidura maquassiensis; IUCN Vulnerable) and Spotted-neck Otter (Hydricis maculicollis; IUCN Vulnerable) are considered (under the precautionary principle) to occur within the watercourse habitats in the study area. The presence of these species elevates the site ecological importance (SEI) of the river/riparian/wetland habitats to HIGH. Habitats with a High SEI should be avoided by development infrastructure and activities (SANBI 2020)</i>”. There are no watercourses within the Carpe Diem North SPP Facility site (see Aquatic Specialist Report attached as Appendix D2 of the DEIAR and FEIAR), and it appears that the statement concerning these mammals is more relevant to the Carpe Diem South site, which does have watercourses/wetland habitats. With specific reference to the <i>Maquassie Musk Shrew</i>, it should be noted that the Compliance Statement also states that, “... it is assumed that the species is present in the wetland habitats	SPP (Appendix D4)	

Theme	DFFE Screening Tool Sensitivity	Verified Site Sensitivity	Specialist Study	SSV included	Specialist Study Conducted? (Y/N)
			<i>within the Project Area of Influence but not within the affected development footprint".</i> The STR indicates that there are three species of bird (the African marsh harrier, the African grass owl and the White-bellied bustard). The STR indicates that there are three species of bird viz. the African marsh harrier (<i>Aves-Circus ranivorus</i>), the African grass owl (<i>Aves-Tyto capensis</i>) and the White-bellied bustard (<i>Aves-Eupodotis senegalensis</i>). The African grass owl is classified as a 'Vulnerable' species and the other two bird species as classified as species of 'Least Concern' in terms of Conservation Status. The STR lists the African marsh harrier has a 'High' sensitivity rating, while the African grass owl and the White-bellied bustard both have medium sensitivity ratings. The Avifaunal Specialist Report (Appendix D4 of the DEIAR and FEIAR) and discussed in detail below, states that, "<i>The PAOI [Project Area of Interest] as a whole is not considered an area of avifaunal importance, although the impact assessment must follow avoidance mitigation</i>".		
Aquatic Biodiversity	Low	Low	According to the DFFE STR generated for the proposed Carpe Diem North SPP site, the Combined Aquatic Biodiversity Theme Sensitivity is classified as 'Low'. This site sensitivity rating is not disputed since there are no aquatic features prevalent on the proposed SPP and associated infrastructure footprint. The Carpe Diem North site does not traverse any watercourses as indicated in the Aquatic Biodiversity Specialist Report which states that, "Desktop	See the Aquatic Biodiversity (Appendix D2).	Y

Theme	DFFE Screening Tool Sensitivity	Verified Site Sensitivity	Specialist Study	SSV included	Specialist Study Conducted? (Y/N)
			resources indicate no aquatic features within Portion 5 of Farm Varkenslaagte No. 119 which was confirmed during the site assessment”. It must be noted that since the original SSV was undertaken for the <u>combined properties</u> of the now Carpe Diem North site viz. Portion 5 of the Farm Varkenslaagte No. 119, and the Carpe Diem South site viz. Portion 27 of the Farm Doornfontein No. 118, the Specialist report refers to the original STR used for preliminary screening which indicated a ‘Very High’ Aquatic sensitivity. According to the Aquatic Specialist the “<i>Combined Aquatic Biodiversity Theme Sensitivity is classified as ‘Very High’ (DFFE, 2022). The classification trigger is the location of the proposed development area within a Strategic Groundwater Source Area (SWSA) for Groundwater (Far West Karst Region), as well as the presence of aquatic Critical Biodiversity Areas (CBAs) and watercourses within the proposed development area. After the field assessment conducted on the 27th and 28th of October 2022; as well as the 16th and 17th of February 2023, the majority of the development area was determined to be of “Low” aquatic sensitivity, apart from areas where the proposed activities traverse wetland areas which were subsequently deemed to be of “Very High” aquatic sensitivity</i>”.		
Archaeological and Cultural Heritage	Very High	Low	A full Heritage Impact Assessment including a Palaeontological Assessment was undertaken in a combined report for the Carpe Diem North and Carpe Diem South sites.	Heritage Impact Assessment (Appendix D6.1) and Palaeontological	Y
Palaeontology	Very High	Low			Y

Theme	DFFE Screening Tool Sensitivity	Verified Site Sensitivity	Specialist Study	SSV included	Specialist Study Conducted? (Y/N)
			As captured in the 'Final Decision' received from the SAHRA based on the Specialists reports for the site: - fieldwork identified no archaeological sites or burial grounds, and - graves, and fossil heritage of scientific and cnservational interest in the development site is rare. The heritage specialists therefore assessed that the overall impact of the proposed development on heritage resources would be 'Low' provided that the general mitigation measures given in the Heritage Impact Assessment (Appendix D6.1) are adhered to. According to the Palaeosensitivity Map available on the South African Heritage Resources Information System database (SAHRIS), the Palaeontological Sensitivity of the proposed development areas is rated as 'Very High' for the site (Almond and Pether 2008, SAHRIS website). However, despite an intensive walkthrough of the footprint area for the proposed project, no evidence for any archaeological or heritage sites could be identified within the environs of the study area. As a result, no impact is expected from the proposed development on Palaeontological heritage. Hence, the 'Very High' and 'High' sensitivities for the Archaeological/Cultural Heritage and for the Palaeontological themes, respectively, are disputed by the heritage specialists and should be classified as 'Low' for the entire Carpe Diem North site.	Impact Assessment. (Appendix D6.2)	

Theme	DFFE Screening Tool Sensitivity	Verified Site Sensitivity	Specialist Study	SSV included	Specialist Study Conducted? (Y/N)
Avian	High	Medium	Based on the DFFE STR generated for the project, the Animal Combined Sensitivity Theme for the project area of influence (PAOI) is indicated as a combination of 'Low' and 'High' sensitivity. Site verification indicated that the <u>region</u> is said to contain the following Species of Conservation Concern (SCC): • High Aves-<i>Circus ranivorus</i> (African Marsh Harrier) • Medium Aves-<i>Tyto alba</i> (African Grass Owl) • Medium Aves- <i>Hydroprogne caspia</i> (Caspian Tern) • Medium Aves-<i>Eupodotis senegalensis</i> (White-bellied Bustard) The Avifaunal Specialist was of the opinion that the DFFE STR, for the actual Carpe Diem North SPP project area (PA) footprint was 'Medium' Sensitivity and that the STR did not take into account the supposed proximity to Cape Vulture roosting habitat related to OPLs, which was activated for a separate proposed development within Carletonville (about 8 km away) in which the Avifaunal Specialist is involved. Nonetheless, the Avifaunal Specialist stated that, "The proposed Carpe Diem SEF³¹ is not located in an Important Bird Area (IBA) or protected area,". The proposed development site is located within 5 km of the expansive Abe Bailey Nature Reserve. However, the Avifaunal Specialist	Avifaunal Impact Assessment for the SPP (Appendix D4)	Y

³¹ Specialist refers to the SPP as a Solar Energy Facility (SEF)

Theme	DFFE Screening Tool Sensitivity	Verified Site Sensitivity	Specialist Study	SSV included	Specialist Study Conducted? (Y/N)
			Report states that although the PA “shows some proximity to protected areas and IBAs, the PA shows no ecological linkage to these habitats”. The report further states that, “Due to the moderate diversity and density of the above-mentioned SCC recorded during the survey, (including regionally and globally listed Endangered and Vulnerable birds), the PAOI is not considered an area of Critical avifaunal importance, although the impact assessment must follow avoidance mitigation due to regional high avifaunal sensitivity. No nests were confirmed to be present after the completion of the 6-month pre-construction monitoring. Any establishment of nests that arise during or post construction will be subject to mitigation measures referring to the above guidelines described as well as the mitigation measures characterised in the Impact Analysis below. The presence of Cape Vultures within the PAOI has no bearing on the site layout for the Carpe Diem SEF”.		
Civil Aviation (Solar)	Medium	Medium	The STRs indicate a ‘Medium’ sensitivity rating for the proposed Carpe Diem North SPP Facility due to its location within 8 km of a civil aviation aerodrome. The Carletonville Aerodrome lies about 5 km to the north-east from the northern most corner of the Carpe Diem North SPP Facility. Although only a specialist Compliance Statement was required due to the ‘Medium’ rating, a Specialist Glint and Glare Study (as per Annexure D12 attached) and a separate Obstacle Evaluation report in line with the International Civil Aviation Organization (ICAO) Annex 14 requirements to be	N/A	Y

Theme	DFFE Screening Tool Sensitivity	Verified Site Sensitivity	Specialist Study	SSV included	Specialist Study Conducted? (Y/N)
			submitted to the South African Civil Aviation Authority (SACAA), was commission to evaluate the potential Civil Aviation impacts. The Specialist reports states that “The Carletonville Airstrip (ICAO: FACR) is a small-scale aerodrome primarily utilized by the Johannesburg Skydiving Club for conducting skydiving operations. The aerodrome features a single runway identified as Runway 13/31, positioned in an East-West configuration”, and further recommends (after assessment of the potential impacts of the proposed development on the operation off the Aerodrome), that “the project receive authorisation from the Civil Aviation Authority from a glint and glare perspective”. In terms of vertical obstacles, the proposed Carpe Diem North SPP Facility is surrounded by HV pylons to the east and west and Carmel MTS to the south/south-west. In addition, the topography of the landscape towards the north/north-easterly direction from the proposed SPP Facility includes a hill (to the immediate north-east) and several mine tailings dams/dumps of more than 10 m in height. Although the exact height of any telecommunication mast is not known, should an 11 m to 15 m telecommunications mast be installed as part infrastructure required for the project, it is not anticipated that the structure would cause additional vertical obstruction to the Carletonville Aerodrome traffic, than the vertical obstructions currently in the area.		
Defence	Low	Low	The DFFE STR allocates a ‘Low’ Sensitivity for the Defence Theme. Therefore, in terms of the DFFE Protocol, a low sensitivity rating indicates	N/A	N

Theme	DFFE Screening Tool Sensitivity	Verified Site Sensitivity	Specialist Study	SSV included	Specialist Study Conducted? (Y/N)
			that 'no negative impacts on defence installations are expected'. No further assessment requirements were identified or undertaken.		
Relative Landscape (Solar)	Very High	Low	A high sensitivity rating indicates that a specialist assessment must be undertaken but the STR did not identify any specialist study/assessment for inclusion in the SSV or impact assessment report, neither are any protocols provided for such an assessment. Nonetheless various specialist reports which address the sensitivity requirements have been undertaken as indicated below: 'High' sensitivity due to Slope between 1:4 and 1:10 – a Visual Impact Assessment was undertaken (Appendix D5). Additionally, a Glint and Glare Assessment as well as a Vertical Obstruction Assessment were undertaken (Appendix D12). Areas of increased slope fall within designated no-go regions which will not be developed with solar arrays. 'High' sensitivity due to the development property being within 500 m of a watercourse (and 'Medium' sensitivity due development property being within 1000 m of a wetland) – the only area which potentially falls within 500 m of a watercourse, as verified by the Aquatic Specialist, is the south-western corner of the development site property. The area of land which actually falls within the 500 m zone of regulation for watercourses (under the National Water Act, No. 36 of 1998) is designated as a no-go area and will be left free of development to allow for a visual buffer. An Aquatic Biodiversity Specialist Assessment has been undertaken (Appendix D2).	See the Visual Impact Assessment (Appendix D5) and Figure 48 of the DEIAR and FEIAR.	Y

Theme	DFFE Screening Tool Sensitivity	Verified Site Sensitivity	Specialist Study	SSV included	Specialist Study Conducted? (Y/N)
			'Medium' sensitivity due to the development property being within 2 km of a town or village – a baseline Socio-economic Assessment (Appendix D7). Medium Sensitivity due to the development property being within 1000 m of a wetland – an Aquatic Biodiversity Specialist Assessment, has been undertaken (Appendix D2 of the DEIAR and FEIAR). 'Very High' sensitivity due to mountain tops and high ridges – The only ridges identified near the development site is a Class 2 ridges on two adjacent properties which lie to the east and south of the proposed SPP. Both ridges fall outside Carpe Diem North SPP Facility's development footprint. Nonetheless, the ridge to the south was highlighted in the Terrestrial Biodiversity Assessment (Appendix D3.1), the entire ridge has been designated as a no-go area and no development is proposed on or near the ridge. The ridge located on the property to the east of the proposed development site, forms part of a Class 2 Ecological Support Area (ESA 2) and the hill which falls within this ESA 2 and lies within the proposed development site has been designated a no-go area (refer to Figure 48, below or Appendix K4 – Sensitivities Map).		
Radio Frequency Interference (RFI)	Low	Low	In terms of the DFFE Protocol, a low sensitivity rating indicates that 'no negative impacts in terms of RFI are expected'. No further assessment requirements were identified or undertaken.	N/A	N
Plant Species	Medium	High			Y

Theme	DFFE Screening Tool Sensitivity	Verified Site Sensitivity	Specialist Study	SSV included	Specialist Study Conducted? (Y/N)
Terrestrial Biodiversity	Very High	High	The STR identified the Carpe Diem North SPP Facility as having a 'Very High' sensitivity rating. A Terrestrial Biodiversity Assessment (Appendix D3.1) with attention to flora/plant species was undertaken. The proposed Carpe Diem North SPP Facility has been deliberately positioned in an areas of 'Low'/'Medium' sensitivity and takes cognisance of the Terrestrial Biodiversity Specialist's <u>verified</u> ESAs and CBAs. In addition, the Gauteng C-Plan v.3.3 (since this application occurred before 1 April 2025, when v.4.0 of the C-Plan became applicable), as well as v4.0 (post site assessment) was taken in account for the site itself and verified/ground-truthed by the Specialist. Refer to Site Development Layout with Environmental Sensitivities Overlay indicated in Figure 48 below or in Appendix K4. The presence and abundance of alien invasive species are high with several other impacts including roads, waterways, agricultural land, secondary grassland (previously ploughed) and rubbish dumping. The Terrestrial Biodiversity sensitivity rating has given the Rocky Grassland and Watercourses as 'High' sensitivity and the Grassland, which is a combination of natural and disturbed habitat, as 'Moderate' sensitive. Hence, the DFFE sensitivity rating for these two themes is disputed but the verified 'High' sensitivity areas have been avoided as designated a no-go areas (indicated in Figure 48, below and in Appendix K4).	Y - Refer to the Terrestrial Biodiversity Assessment (Appendix D3.1) and Figure 48 the DEIAR and FEIAR.	Y

Theme	DFFE Screening Tool Sensitivity	Verified Site Sensitivity	Specialist Study	SSV included	Specialist Study Conducted? (Y/N)
Geotechnical	Required in the proposed SPP STR but not given a sensitivity rating.		A preliminary dolomite risk assessment (refer to Appendix D11) was undertaken by JUWI for Portion 5 of the Farm Varkenslaagte No. 119 (Appendix D11). Since no significance rating was allocated to this theme, the equivalent of a Compliance Statement i.e., a preliminary geotechnical risk assessment (as per Appendix D11) was undertaken.	Y – refer to the preliminary risk assessment (Appendix D11)	Y (preliminary risk assessment)
Other Studies Undertaken (in addition to STR requirement):					
Geohydrological	Not required by the STR.	Very Low to Low	A full geohydrological assessment with a hydrocensus of neighbouring properties to ascertain potential water supply to any development in the area (be it the original SPP Facility or the proposed SPP Facility) was undertaken. Water supply will probably be sourced from a neighbouring water supply entity and trucked on to site for storage in 20 000l tanks on the site.	Y	Y
Visual	Not required by the STR.	Moderate to Low	A Visual Impact Assessment was undertaken (Appendix D5) and stated that during the construction phase impacts on the visual environment were “assessed to have a ‘Low’ intensity over a localized area and would occur over the short-term (less than five years). The significance of the unmitigated impact would be localized but extend beyond the site boundary (to at least 3 km in some areas) and is predicted to be Moderate. The implementation of mitigation measures would not significantly reduce the anticipated impact, which would remain ‘Moderate’. The impact on the visual environment during the operational phase is assessed to have a ‘Moderate’ intensity and would occur over the long-term (anticipated to be thirty years). The unmitigated impact would be localized but	Y	Y

Theme	DFFE Screening Tool Sensitivity	Verified Site Sensitivity	Specialist Study	SSV included	Specialist Study Conducted? (Y/N)
			extend beyond the site boundary (to at least 3 km) and is assessed to be 'Moderate'. The significance of a moderate impact is that it should have an influence on the decision and the impact will not be avoided unless it is mitigated. With effective mitigation the impact could reduce to 'Low'. At decommissioning the impact is expected to have a 'Low' intensity over a localized area and would occur over the short-term (less than five years). The significance of the unmitigated impact would be localised but extend beyond the site boundary (to at least 3 km in some areas) and is predicted to be 'Low'. The implementation of mitigation measures would not significantly reduce the anticipated impact during this phase and would remain 'Low'."		
Traffic	Not required by the STR.	Low	Due to the scale of the site, a comprehensive Traffic Impact Assessment was undertaken for the proposed development. However, the cumulative impact of traffic generated by the proposed project is projected to be 'Low' since the activity is localized, and any cumulative effect will mostly be negligible. From a traffic engineering perspective, the proposed development is expected to have a minimal traffic impact on the current surrounding road network as concluded within the study (Appendix D8). Hence it was recommended by the traffic specialist that the development be approved from a traffic engineering perspective.	Traffic Impact Assessment (Appendix D8).	

6 CONSIDERATION OF ALTERNATIVES

6.1 Introduction

“Alternatives” are defined in the NEMA EIA Regulations of 2014, as different means of meeting the general purpose and requirements of the activity, which may include alternatives to –

- a) *the property on which or location where it is proposed to undertake the activity;*
- b) *the type of activity to be undertaken;*
- c) *the design or layout of the activity;*
- d) *the technology to be used in the activity;*
- e) *the operational aspects of the activity; and*
- f) *includes the option of not implementing the activity.*

The consideration of alternatives is a key component of an EIA process. While an EIA process should investigate and comparatively consider all alternatives that have been identified, only those found to be “feasible” and “reasonable” must be comparatively assessed, in terms of the advantages and disadvantages that the proposed activity and alternatives will have on the environment and on the community that may be affected by the activity.

The “feasibility” and “reasonability” of an alternative are measured by:

- a) *the general purpose and requirements of the activity;*
- b) *the need and desirability of the activity;*
- c) *opportunity costs;*
- d) *the need to avoid and/or minimise negative impacts;*
- e) *the need to maximise benefits; and*
- f) *how it impacts the community that may be affected by the activity.*

Different types of alternatives can be considered as part of an EIA process and include the following: activity alternatives, location alternatives, design or layout alternatives, technology alternatives, routing alternatives, scheduling and timing alternatives, scale and magnitude alternatives, and of course the “no-go option”.

The following sections describe those alternative development options that have been considered (i.e., identified and investigated) to date, and which are deemed to be “feasible” and “reasonable”. This EIA Report will provide a comparative assessment of the advantages and disadvantages of the “feasible” and “reasonable” alternatives.

6.2 Site Selection

The EAP undertook an initial ‘opportunities and constraints’ or feasibility site verification investigation on 27 and 28 October 2022 to determine the site conditions and physically verify or ‘ground truth’ the environmental opportunities and constraints of the proposed development site with respect to the potential development of a PV Plant.

The core business of the Proponent, JUWI Renewable Energies (Pty) Ltd, is to harness renewable energy sources to combat energy poverty and deliver essential energy services in a sustainable manner. Hence, the Applicant's focus on renewable energy has guided the site selection process, as detailed below, and the identification of the preferred technology (i.e., solar PV arrays), as elaborated below.

JUWI has secured Land Owner consents for the properties immediately adjacent to Eskom's Carmel MTS (to the north and south) for the purpose of developing Solar Photovoltaic Plants (SPPs) to bid under the REIPPPP. The proposed Carpe Diem North SPP immediately adjacent to Eskom's Carmel MTS, is desirable since it lies in close proximity to Carmel MTS, thereby minimising environmental impacts for OPL connection, as well as reducing power losses which occur when electricity is conducted via lengthy cables/power lines.

Pre-negotiated Landowner Consent Forms have been obtained for the most preferred alternative, Alternative 1, of the proposed development since the proposed LiLo power line corridor for Alternative 1 falls within the same property as the SPP. This property contains Eskom infrastructure which forms part of the Electricity Grid Infrastructure (EGI) and falls within a Strategic Transmission Corridor.

The recently formed National Transmission Company South Africa (NTCSA), previously known as Eskom's Transmission Division, has supplied accessibility consent letters for development within close proximity to Carmel MTS and will be approached to provide completed Land Owner Consent Forms, should the Competent Authority decide that Alternatives 2 or 3 (not preferred by the Applicant) are deemed appropriate to the application.

The following factors were taken into account by the Applicant, EAP and specialist consultants during the site selection process:

6.2.1 Favourable Solar Radiation and Grid Access

Based on available solar radiation data for the area and the proximity to the Eskom HV power lines and the Eskom Carmel Substation, the development site is regarded as being conducive to a SPP development. These factors were the major informants for the original initial identification of the site.

6.2.2 Access, Road Network and Proximity to Carletonville

The proposed PV Plant site has easy access to the existing road networks, which runs along the northern and western perimeter of the site. Access to the Carpe Diem North SPP facility will be via the D92-1020 public road. The town of Carletonville is within 8 km of the proposed development and is accessible via the Region R501 public road.

6.2.3 Suitable Terrain and Land Availability

The topography of the development property ranges from relatively flat in the north to elevated hill/ridge features towards the central east and south/south-east. The general slope of the property is from east to west. The Applicant has determined that from a construction point of view, the site is suitable for the development of a SPP.

The landowner on whose property the PV plant is proposed has consented to the application being lodged and has indicated their willingness to enter into long-term lease agreements with the Applicant, subject to the required approvals being obtained for the proposed project.

6.2.4 Socio-Economic Benefits

The proposed development is considered to be a beneficial development for the Carletonville area. The PV plant development will bolster the electricity supply for the area and offer job opportunities and therefore social upliftment, in an area where it is deemed to be needed (refer to the socio-economic review of the application area presented in **Section 5.3** above).

6.2.5 Avifaunal Sensitivity

Delineated habitats and other features which are important for avifauna such as powerline infrastructure, were evaluated by the Avifaunal Specialist in relation to the risk to priority species occurring in these habitats/features from the placement of SEF infrastructure. It was stated that there is neither the highly likely predicted presence of SCC, nor the 39 priority species recorded, in the PA. Most of these birds are common and widespread through the region.

The sensitivities for the Carpe Diem SPP consist of grassland and disturbed habitat in the proposed project footprint. The natural vegetation within the PA provides potential foraging habitat for bird species such as, storks, korhaan, and possibly includes foraging habitat for species such as larger raptors. According to the Specialist Report Attached as Appendix D4, Figure 44 below indicates that the entire Carpe Diem North SPP PA is of mostly moderate avifaunal sensitivity.

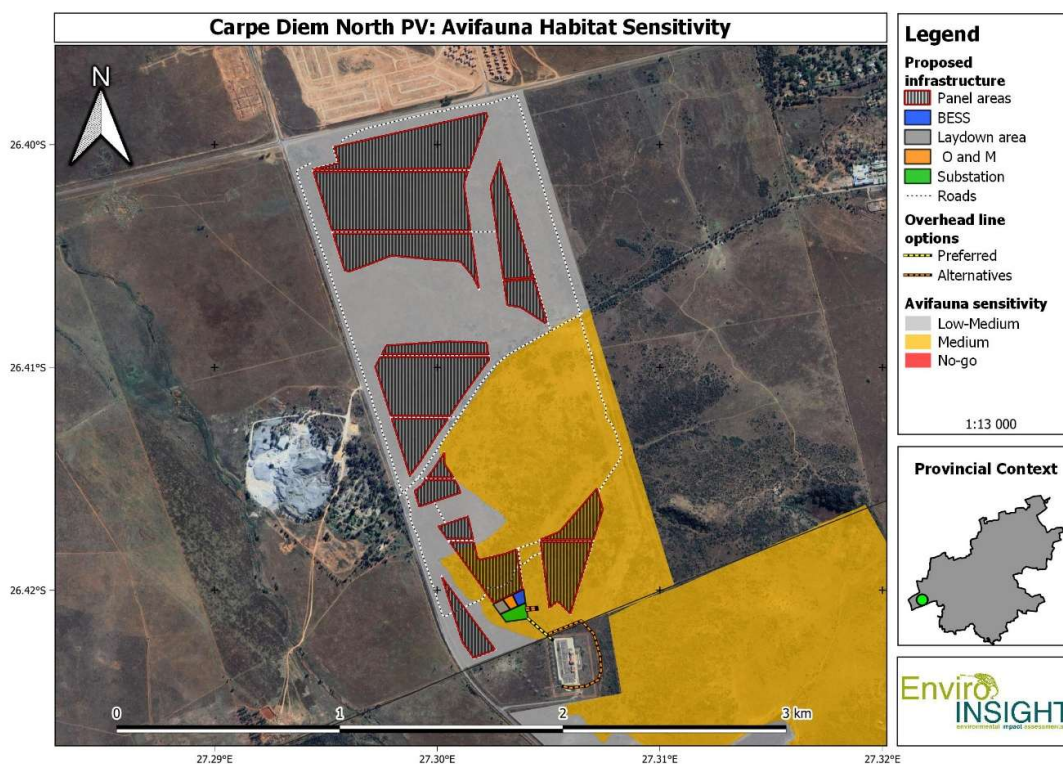


Figure 44: Avifaunal Habitat Sensitivity of the Carpe Diem North SPP site (outlined in white)³².

³² Map extracted from Figure 7-1 of the Avifaunal Scoping and Impact Assessment Report (Enviro-Insight, April 2025) – refer to **Appendix D4**.

Several raptors utilise habitats within the region and the PAOI, some of them are priority species and/or of conservation concern, such as the Cape Vulture, Verreaux's Eagle, Long-crested Eagle, Brown Snake Eagle, Black-chested Snake Eagle, Jackal Buzzard, African Harrier Hawk, Pale-chanting Goshawk and Black-winged Kite. The development of infrastructure on primary grasslands/ grassland ridges and near impoundments/ drainage lines, which are vital to maintaining populations of habitat obligate sensitive species would result usually in a high probability of displacement for such SCC.

However, according to the Avifaunal Specialist, these species are fairly ubiquitous in the region with the exception of primary grassland species which is an extremely threatened biome within South Africa. Consequently, avoidance mitigation is required for such habitats when siting panels. Due to the preliminary layout, some buffering was applied around these habitat features although most habitats are not classified as No-Go where no panels and associated infrastructure may be located.

6.2.6 Aquatic Biodiversity Sensitivity

No wetlands, rivers, or drainage lines were identified as present on the proposed site by the Aquatic Biodiversity Specialist, therefore, no aquatic sensitivities were raised by the Specialist for the proposed development site. Refer to Figure 45 below for specialist verified mapping indicating lack of wetlands on proposed development site. Although, two wetland systems downslope of the proposed development property i.e., off-site of Portion 5 of the Farm Varkenslaagte No. 119 IQ, were mapped in wetland databases.

The National Wetland Map version 5 (NWM5) indicates an off-site wetland to the west of the proposed development property. In addition, the National Freshwater Ecosystem Priority Area (NFEPA) wetlands map indicates an off-site artificial seep wetland located to the southwest of Portion 5 of the Farm Varkenslaagte No.119. Both off-site wetlands are located on the opposite side of the D92-1020 District Road to that of the proposed development site.

For both these off-site wetlands, a small portion of the development property occurs just within the 500 m regulated proximity in terms of the National Water Act, Act No. 36 of 1998. However, when reporting on the total Carpe Diem site (North and South) it was determined by the Aquatic Specialist that given the nature of the proposed activities, aquatic features located more than 150 m from the proposed development site will not be impacted significantly by the development.

According to the Aquatic Specialist Report attached as Appendix D2, hydromorphic soil indicators were absent from the proposed site and grassland vegetation present in the north of the site, included *Cynodon dactylon* (Bermuda Grass), *Elephantorrhiza elephantina* (Eland's wattle), invasive weed *Tagetes minuta* (Khaki bush), *Seriphium plumosum* (Bankrupt bush), and *Themeda triandra* (Red Grass) as indicated in Figure 5-1 of the Aquatic Specialist Report. The bushveld vegetation towards the south-east of the site was dominated by *Senegalia caffra* (Hook-Thorn) as indicated in Figure 5-4 of the Aquatic Specialist Report. Although several of these plants can occur in wetland temporary zones, the composition of the vegetation communities was not indicative of wetlands.

The site slopes from approximately 1598 m.a.s.l in the southeast corner to 1527 m.a.s.l in the northwest portion. The site was noted to be disturbed by agricultural activities including livestock grazing, particularly in the central and northern portions of the site. Several livestock feeding and watering troughs are located within and adjacent to the proposed site (as per Figure 5-5 of the Specialist Report). Located in the north-western corner of the proposed site is an area which has previously been excavated, and a concrete culvert is located along the road bordering the west of the proposed site, which likely receives stormwater from the road and runoff from rill erosion occurring in the northwest of the proposed site as per in Figures 5-7 and 5-8 of the Aquatic Specialist Report (refer to Appendix D2). However, the Aquatic Specialist confirmed that no wetland

or riparian indicators were observed to be present within these areas which were assessed during the site visits.

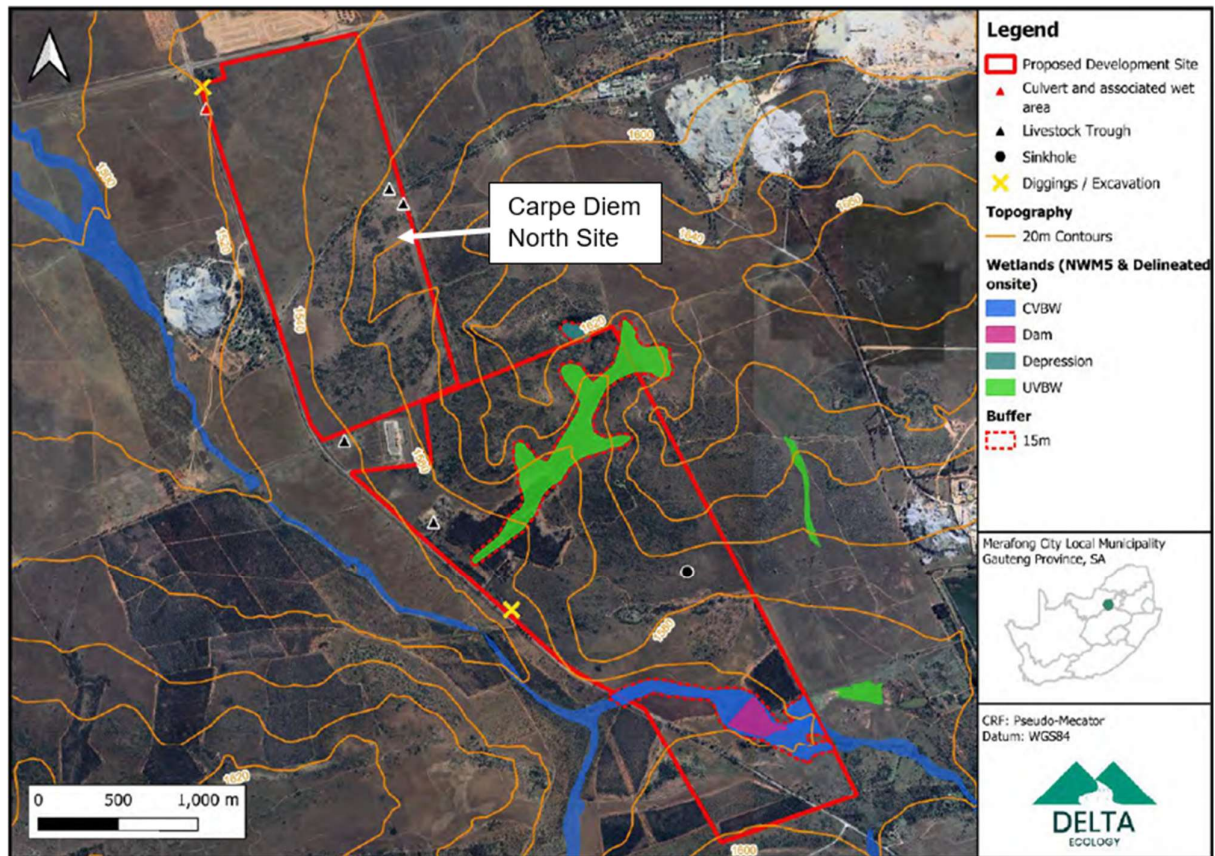


Figure 45: Freshwater specialists delineated wetlands map with 15 m buffers³³. No aquatic site sensitivities are mapped for the Carpe Diem North SPP proposed development site.

6.2.7 Landscape / Visual Sensitivity

The existing visual condition of the landscape that may be affected by the proposed Carpe Diem North SPP has been described by the visual specialist. The study area's scenic quality has been rated 'Low' to 'Moderate' to 'High' within the context of the sub-region. Sensitive viewing areas have been identified and mapped, indicating potential sensitivity to the project, mainly for new residential areas (not yet occupied) to the immediate north of the proposed SPP, for residences of Oberholzer, east of the site, residents of Khotsong South, north of the site and for users of the Johannesburg Skydiving Club.

6.2.8 Heritage Sensitivity

Despite an intensive walkthrough of the footprint area for the proposed project by the Heritage Specialist, no evidence for any archaeological or heritage sites could be identified within the environs of the proposed Carpe Diem North SPP study area and the possible preconstruction impacts calculated on the tangible cultural

³³ Extract from Figure 8-1 of the Aquatic Biodiversity Impact Assessment (Delta Ecology, June 2025) – refer to **Appendix D2**.

heritage resources were rated as an overall Medium Negative, which could be mitigated to a Low Negative impact rating.

It must be noted that there were two heritage sites identified within the future proposed Carpe Diem South SPP property which resulted in a separate Palaeontological Study being undertaken, as attached as Appendix D.6.2. These sites are a burial ground (rated as having 'High' heritage significance) and a historical stone wall structure (rated as having low heritage significance) and are referenced as site CTV01 and site CTV02, in the Heritage Report. However, these sites do not have relevance to the proposed Carpe Diem North SPP property and consequently, the SAHRA approved the proposed Carpe Diem North Development and closed the case (as per Appendix K2).

6.2.9 Agricultural Potential

The cropping potential of the site is limited predominantly by the shallow soils. There is no cropping done in the surrounding area. Although rain-fed cropping may have been done in the past, such production is no longer economically viable. The marginal agricultural potential of the site limits its agricultural use to grazing only.

The total footprint of land that will be lost, which will be lost for the lifetime of the development, is approximately 385 ha. The production potential of that land is limited to only being suitable as grazing land. The loss of grazing land, of which there is no particular scarcity in the country, represents a minimal loss of agricultural production potential in terms of national food security and for the affected farm.

6.2.10 Faunal sensitivity

Clonia uvarovi and *Lepidochrysops procera* are unlikely to be affected by the proposed OPL grid connection, especially in context with the prevailing current impacts on the site. The likelihood of occurrence of the species is marginal at best but given the low impact the development footprint will pose on the species, these species have been confirmed absolved from further analysis by the terrestrial biodiversity specialist. The Spotted-neck Otter (*Hydrictis maculicollis*; IUCN Vulnerable) is not considered (under *the precautionary principle*) to occur within the study area owing to a lack of suitable habitat.

6.2.11 Terrestrial Biodiversity Sensitivity

The habitat sensitivity of the site is mapped in Figure 46 below. The Primary Grassland on the Carpe Diem North site is indicated as High sensitivity and falls within a CBA 2. Therefore, a 15 m buffer has been included to protect it from the proposed SPP development.

The presence of the small rocky outcrop embedded in the natural grassland is notable, as in Gauteng Province, rocky ridges are recognised as important biodiversity features. Pfab (2001) notes that the interplay of several factors, including topography, aspect, slope, parent material, local climatic variations and hydrological conditions have resulted in ridge systems evolving a high floral diversity and a corresponding richness in associated faunal communities. They also provide important habitat refuges for sensitive biota. Subsequently, the sensitivity of the Rocky Grassland is high.

The Grassland consist mainly of semi-natural grassland, which is not considered threatened. The CBA2 located on site is due to remaining Primary Grassland and Red List Birds, the latter not applicable to this assessment. The Grasslands are a combination of natural and disturbed, and collectively are rated as high and moderate sensitivity, respectively.

All other areas not indicated on the map are considered low sensitivity as they are either highly degraded or transformed. The presence and abundance of alien invasive species are high with several other impacts including roads, agricultural land, and secondary grassland (previously ploughed).

The Grassland mainly consists of the Carletonville Dolomite Grassland, which is not considered threatened. The CBA 2 located on site is due to remaining Primary Grassland and Red List Birds. The Grasslands are a combination of natural and disturbed areas, collectively rated as having moderate sensitivity for linear infrastructure such as the proposed OPL.

All other areas not indicated on the map are considered to have 'Low' sensitivity since they are either highly degraded or transformed. The presence and abundance of alien invasive species are high, with several other impacts including roads, waterways, agricultural land, secondary grassland (previously ploughed), and dumping of solid waste.

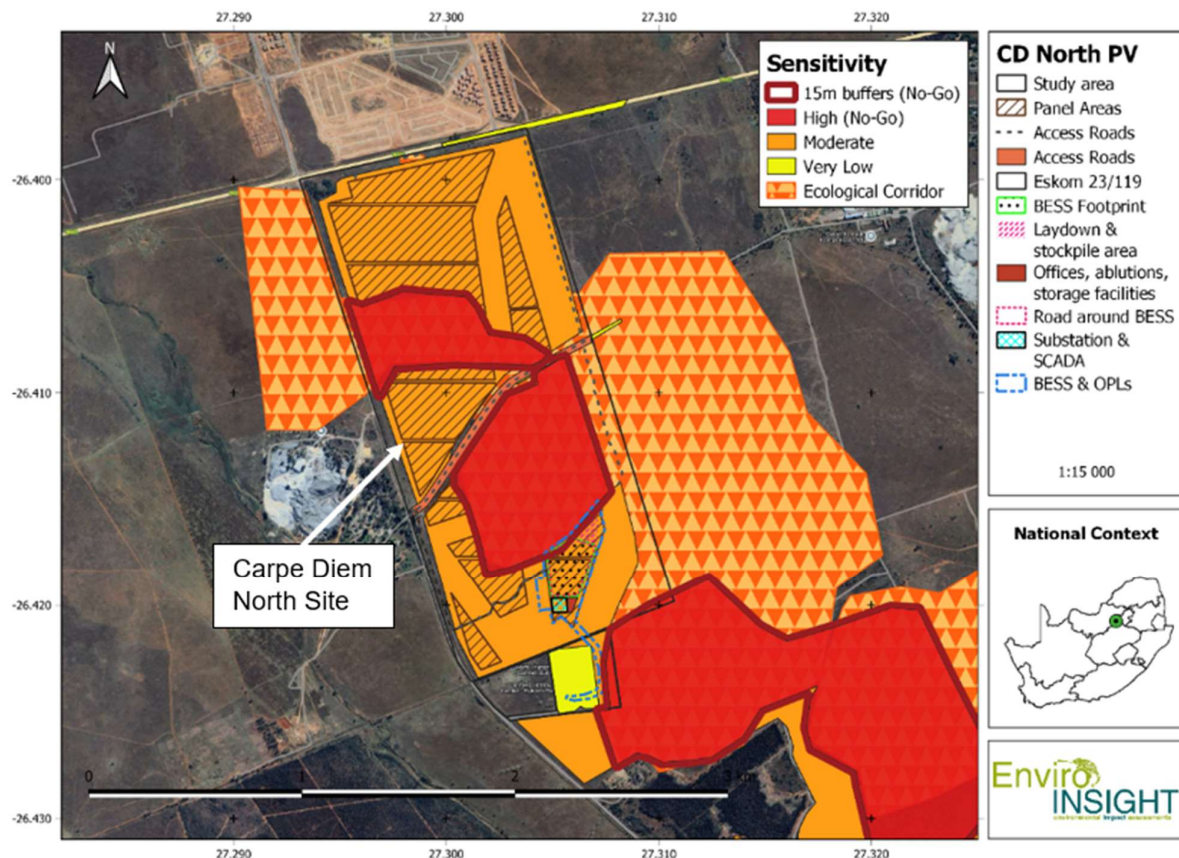


Figure 46: Terrestrial Biodiversity Sensitivity Map of the Carpe Diem North SPP.³⁴

6.2.11.1 Critical Biodiversity Areas

As stated in the Terrestrial Biodiversity Impact Assessment Report, “Critical biodiversity areas (CBA’s) are terrestrial and aquatic features in the landscape that are critical for retaining biodiversity and supporting

³⁴ Source: Figure 6-1 of the Terrestrial Biodiversity Impact Assessment Report (Enviro-Insight, June 2025) – refer to Appendix D3.1 of this FEIAR.

continued ecosystem functioning and services. The primary purpose of CBA's is to inform land use planning in order to promote sustainable development and protection of important natural habitat and landscapes".

In general, biodiversity priority areas are categorised and described as follows:

- Critical biodiversity areas (CBAs) - areas that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. If these areas are not maintained in a natural or near-natural state, then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses. In a CBA, the impact on biodiversity of a change in land use that results in a change from the desired ecological state is most significantly evidenced locally, at the point of impact, through the direct loss of a biodiversity feature such as loss of a population or habitat. All FEPA prioritised wetlands and rivers have minimum category of CBA 1, while all FEPA prioritised wetland clusters have minimum category of CBA 2.
- Ecological support areas (ESAs) - areas that are not essential to reach biodiversity representation targets or thresholds but which, nonetheless, play an important role in supporting the ecological functioning of CBAs and/or delivery ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree of restriction on land use and resource use in this specific ESA is most significant elsewhere in the landscape through the indirect loss of biodiversity due to a breakdown, interruption or loss of an ecological process pathway e.g., removing a corridor results in a population going extinct elsewhere, or a new plantation locally results in a reduction in stream flow at the exit to the catchment which affects downstream biodiversity.

Figure 47 below, indicates the proposed development site in relation to the 2024 Gauteng C-Plan v4.0 mapping of CBAs and ESAs. Indicated in the northern section of the study area is a CBA 2 (Important) and sections in the middle and southwards fall within an ESA. A CBA 2 is indicated based on Primary Grassland and potential orange list plant species. The ESA is mainly owing to Class 1 and 2 ridges, ecological corridors and secondary grassland. Several orange list plant species have been recorded, and some of the grassland patches are still natural and intact.

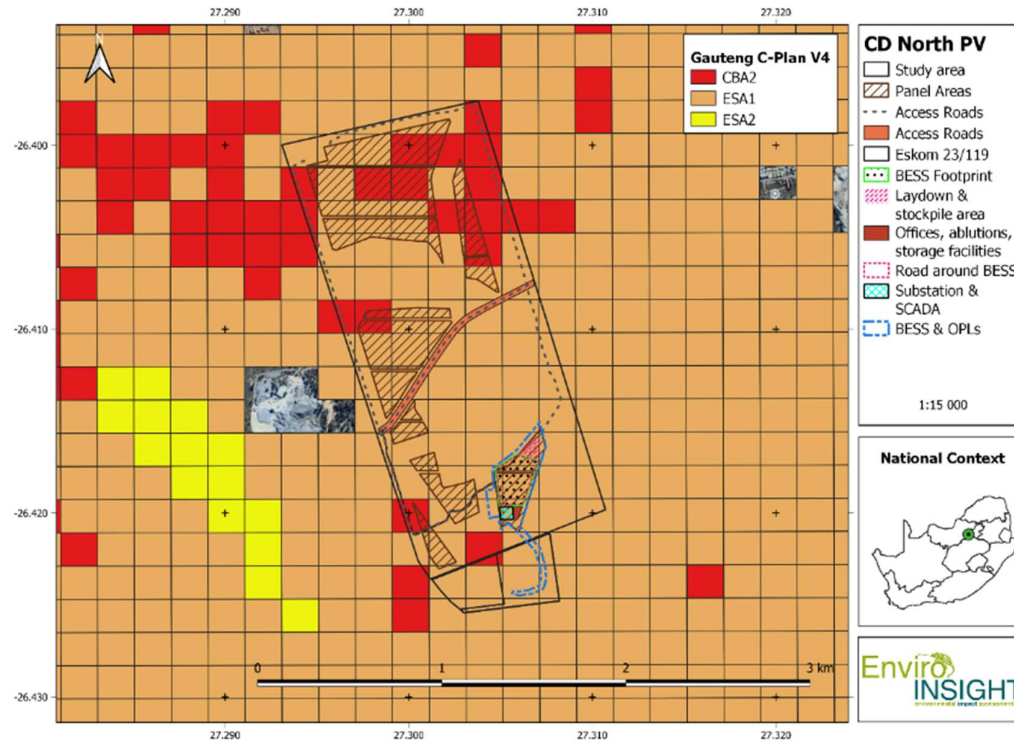


Figure 47: Location of the proposed SPP in relation to the GDARD C-Plan Map.³⁵ Note: for clarity, a white development site boundary line has been added to original map as provided by specialist.

Figure 48 below (as well as Appendix K4), overlays the proposed Carpe Diem North SPP site layout plan with the various environmental sensitivities which informed the site development plan. CBA and ESA delineations on the Gauteng C-Plan v4.0 which were verified on site by the Terrestrial Biodiversity Specialist (who included additional buffer zones) and visual buffer requirements, as well as Eskom HV OPL servitudes (indicated by the 'blank' or 'open' spaces on the site) have all been accounted for. Legislated high sensitivity areas (such as verified CBAS and ESAs with additional buffers) have all been avoided.

³⁵ Source: Figure 4-4 of the Terrestrial Biodiversity Impact Assessment Report (Enviro-Insight, June 2025) – refer to Appendix D3.1.

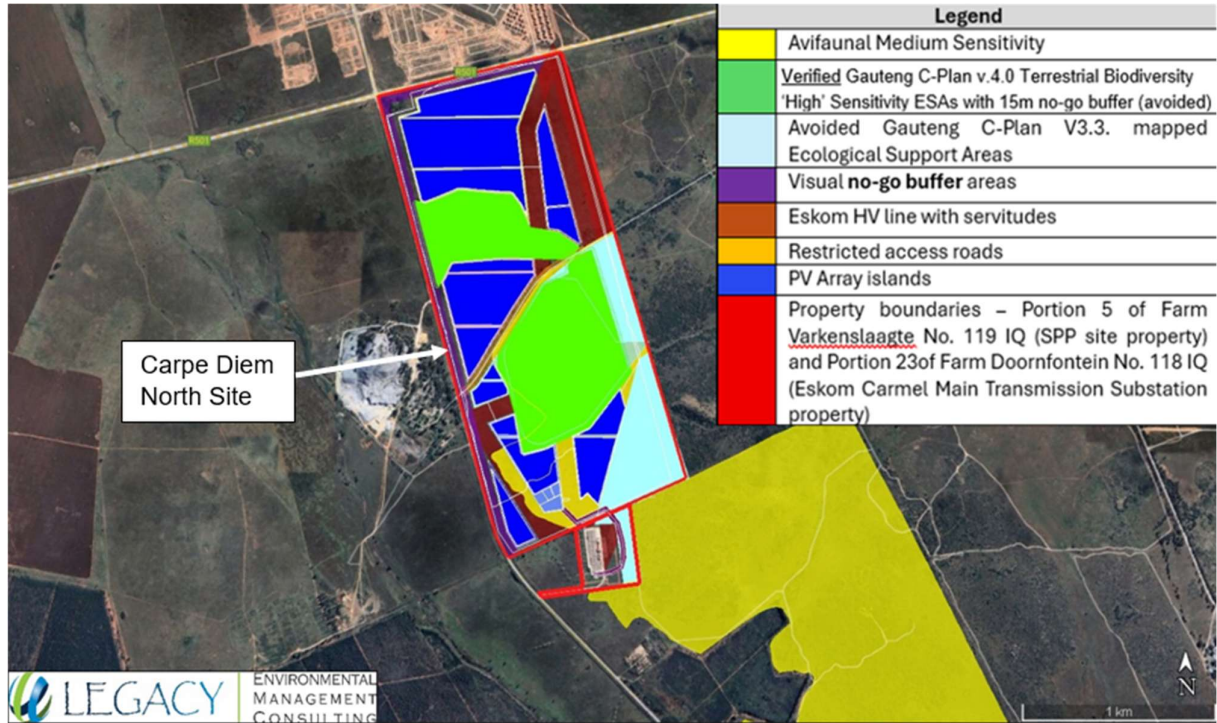


Figure 48: Carpe Diem North SPP proposed site layout map with biodiversity sensitivities³⁶, as well as other specialist sensitivities indicated for the site. Larger map with legible legend provided in Appendix K4.

6.2.12 Groundwater Potential

The Carpe Diem North site was also considered in terms of its potential for groundwater abstraction and use for the proposed development. From the Geohydrological Assessment conducted for the proposed Carpe Diem North SPP, the following main conclusions were drawn:

- The proposed Carpe Diem North SPP development site on Portion 5 of the Farm Varkenslaagte No. 119, is located within Quaternary Catchment C23E, with the DWS General Authorisation (GA) allocation regarding groundwater abstraction in the region demarcated as 0.00 m³/ha. This implies that no groundwater abstraction will be allowed under a GA and a groundwater use license will need to be obtained from the DWS if groundwater is to be abstracted from the site.
- During the hydrocensus, data such as borehole depth, water level (WL), total dissolved solids (TDS) and electrical conductivity (EC) was measured.
- The mean EC measured from these boreholes was 71.2 mS/m and values range between 36.1 to 116.0 mS/m which falls within the ideal to marginally classification range.
- The hydrocensus took into account existing registered boreholes as per the NGA, WARMS and any registered boreholes, or boreholes with the potential to be registered, on neighbouring farms.
- According to the Geohydrological Specialist Report, due to the anomalously deep regional water table, there were very few accessible boreholes which could be measured. Nonetheless, two potentially viable groundwater sources were identified viz. borehole HBh_04 and HBh_05.

³⁶ Mapped biodiversity sensitivities from shapefiles provided by Terrestrial Biodiversity Specialist (Enviro-Insight, June 2025) – refer to **Appendix D3.1** of this FEIAR.

- Existing third party borehole HBh_04 constitutes a historic mineshaft currently being dewatered by the Covalent Water Company (a company that supplies several water users in the area, including local farmers) and HBh_05, a farmer owned borehole which has yet to be correctly yield tested.
- Samples collected from HBh_05 and from a water outflow of HbH_04 on a neighbouring property, were submitted to a SANAS accredited laboratory for analyses. Groundwater from HBh_05 and HbH_04 are of good quality for irrigation and potable use. The hardness of Total Dissolved solids (TDS) concentration of HBh_05 were elevated to Class II (Marginal water quality which is conditionally acceptable although negative effects may occur) and Class I (Good water quality, suitable for use with rare instances of negative effects), respectively, implying that groundwater from HBh_05 should be treated before human consumption (according to the DWAF, now DWS, 1998 domestic water standard).
- Although the drilling of new boreholes is a potential option, **the deep (120 m to 150 m deep) water levels in the region, represent a significant capital expenditure to establish a viable borehole.**
- The Geohydrological Specialist confirmed that the hydrological depression cone induced by dewatering activities (primarily by mines in the area) would result in resting groundwater levels of depth of greater than 100 m **and recommended a borehole drill depth of 150 m to 200 m.** Should sufficient water be intersected before then, the drilling should continue for an additional 10 m.
- Any new borehole will need to be yield tested according to the SANS 10299_4-2003, to determine the safe yield of the borehole.
- A WULAA will then need to be undertaken for the new borehole before groundwater may be lawfully abstracted from it. In addition, any new borehole will require input from a Geotechnical Specialist to determine the potential for sinkhole formation due to water abstraction.
- The study site has been classified as overlying a high yielding aquifer with a groundwater vulnerability classification of 'High' (based on regional data and not accounting for the attenuation effect of the overlying thick quarternary sediments or the artificially lowered table).
- Figure 49 below, maps the registered NGA and WARMS boreholes as well as registered and non-registered boreholes not on any database. The maps also depict the location of current sinkholes on and near the proposed development site.
- According to the Geohydrological Report, although regional aquifer quality is currently considered marginal, unplanned or environmentally unsuitable mine closures could drastically decrease water quality to dangerous levels.
- **Based on the above assessment, the Applicant has decided not to pursue the drilling of a borehole on the proposed development site but to rather source water from a registered third party supplier.**
- The WULAA process, which was undertaken with the DWS has, therefore, indicated that abstraction of groundwater from Portion 5 of the Farm Varkenslaagte No. 119 IQ will not occur. The DWS has issued a GA for the proposed development water use authorisation as per Appendix K5.

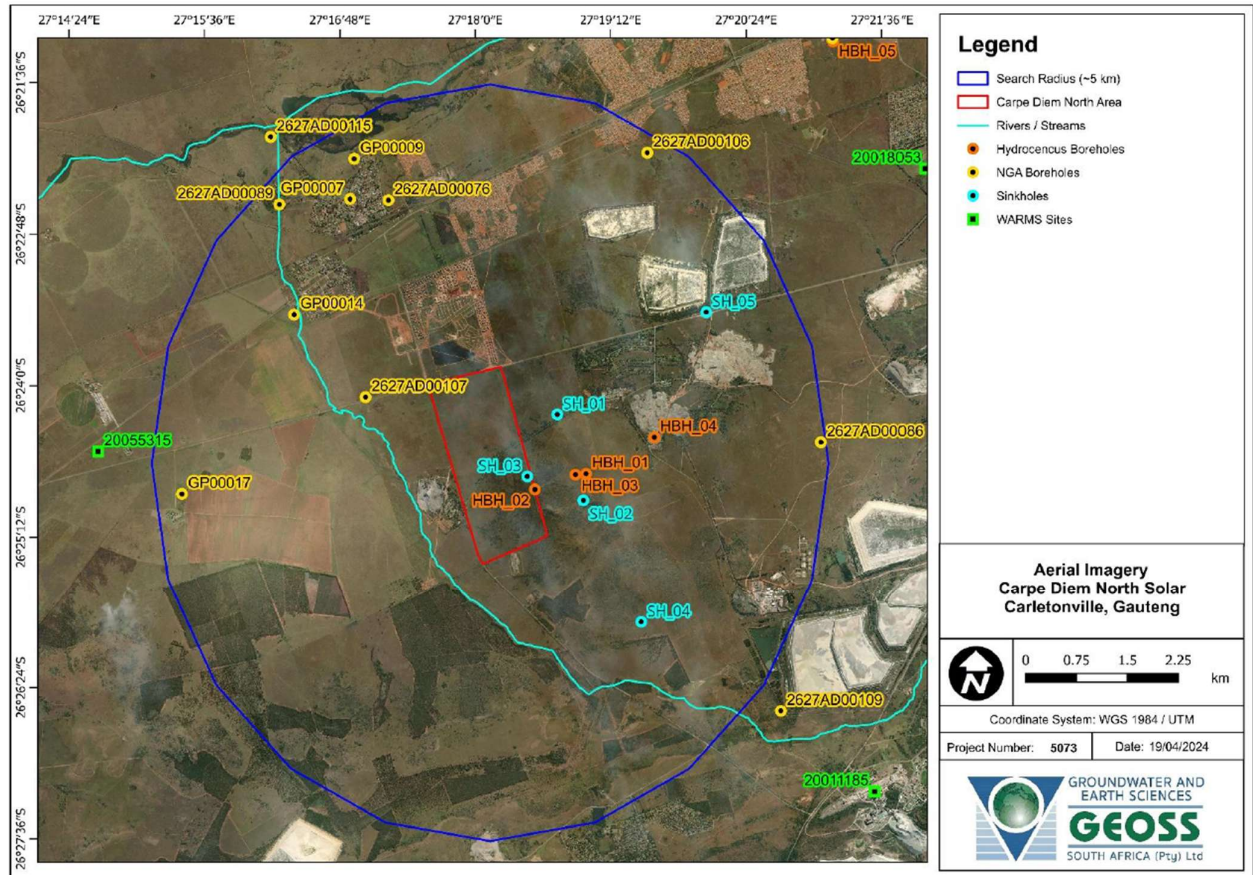


Figure 49: Aerial Photograph of proposed SPP site boundary (indicated in red) with relative locations of NGA, WARMS and hydrocensus boreholes, as well as current sinkhole locations.

6.2.13 Conclusion

The development of a renewable energy facility on the property known as Portion 5 of the Farm Varkenslaagte No. 119 IQ, near Carletonville is regarded as the Best Practicable Environmental Option (BPEO) based on the site selection process described above and the biophysical information gathered. Given the apparent suitability of the site for solar energy development, the Applicant does not intend to investigate any additional locations, as sufficient alternatives have already been considered (refer to Section 6.3 below).

6.3 Site/ Location Alternatives

Site/ Location alternatives refer to alternative properties or alternative sites on the same property.

Legacy EMC undertook a site investigation on 27 and 28 October 2022, and again on 09 and 10 April 2024, along with specialist consultants' respective site investigations. These investigations aimed to determine the site conditions and identify the opportunities and constraints of the area for the development of a SPP in the Carletonville area. Subsequently, a scoping-level assessment was performed by the specialist team to evaluate the suitability of the application area for the proposed solar plant.

Based on the site's sensitivities identified during the opportunities and constraints mapping, as well as the scoping assessment results and negotiations with land owners, the preferred site/location alternative, Portion

5 of the Farm Varkenslaagte No. 119 IQ, is the closest and most suited option for the development of a SPP to the north of Eskom's Carmel MTS. The proximity of the proposed development impacts the length of the grid connection power lines and shorted lines generally have less environmental sensitivities associated with them and less power losses due to conductor (line) resistance.

The EAP is further of the opinion that **Section 4.2** and **Section 6.2** provide adequate proof of the investigation of location alternatives and a sufficient motivation for not considering further location alternatives, apart from the Preferred Location Alternative and the No-Go Alternative.

On-site layout alternatives:

The preferred and only alternative for the on-site substation is towards the south-western section of the proposed development property, this is due to the limited availability of developable land, once Eskom restricted servitudes and environmentally sensitive areas are taken into account.

This preferred on-site substation will be located alongside the permanent laydown area, operations and maintenance buildings, and the SPP BESS area. The location of the on-site substation is the preferred alternative since it provides the shortest distance for a LiLo connection to the existing Eskom 132 kV HV OPL which runs to the immediate east of the proposed on-site substation location. This provides the most efficient grid connection alternative as explained in Section 6.3 above.

The grid connection corridor and the switching station portion of the on-site SPP substation which are part of the Carpe Diem North SPP's footprint, have been fully assessed during the EIA process for the intended EA application. Note: once construction is complete, the switching station portion and grid connection infrastructure will be handed over to Eskom.

6.4 Technology Alternatives

Technology alternatives are different means to achieve the same goal by using a different method or process (e.g., energy could be generated using wind, solar, nuclear or coal). The Site Selection process, above, however, provides a motivation for why solar is the preferred method. Technology alternatives could also mean considering different types of PV technology.

It is still the opinion of the project team that the impacts associated with SPP projects are far preferable (from an environmental impact perspective) to extractive and/ or non-renewable alternatives or even Wind Energy Facilities (WEF).

There are a multitude of different PV technologies available today. The best solutions, according to research conducted by Element Consulting Engineers, are currently either thin film (amorphous silicon or cadmium telluride) or multi-crystalline cells, depending on the space and irradiance conditions, with the electricity yield being the deciding factor.

Factors that influence performance are temperature and diffuse light. Multi-crystalline cells work best in low temperatures with clear skies. Thin film technologies perform better in areas with a warmer climate than multi-crystalline cells and perform well in diffused light.

In the quest to assess technology alternatives for the proposed Carpe Diem North SPP, three different types of solar panel technology types were assessed and three different types of axis tracking solutions were assessed.

6.4.1 Solar Panel Technology Alternatives

Solar Panel Technology Alternative 1: *Involves the use of thin-film technology for constructing the project's solar panels.*

Thin-film technology offers a sleek all-black appearance, often considered the most aesthetically pleasing type of solar panel. However, thin-film solar panels have significantly lower efficiency ratings compared to crystalline solar technology, typically ranging from 10% to 13% efficiency in commercial applications. As a result, more space is required to achieve the same power output as crystalline solar panels.

Thin film panels also contain cadmium, a known carcinogen that can harm people. Recycling and disposing of toxic cadmium at the end of the solar panel lifecycle can also present issues. Although emissions and toxic substances are emitted during the manufacturing process of solar panels, the emissions for the life cycle of the thin film solar panels are low.

It is important to note that thin film technology is progressing to become more cost-effective than crystalline silicon panels as the technology advances to reduce manufacturing costs and address environmental concerns.

Solar Panel Technology Alternative 2: *Concerns the use of multi-crystalline (also referred to as 'poly-crystalline') technology for the construction of the project solar panels.*

Multi-crystalline solar panels have an efficiency range from 15% to 17%. Since poly-crystalline cells contain multiple silicon cells, the electrons cannot easily move around between the cells – hence, decreasing the efficiency of the panel and the power output in comparison with monocrystalline solar panels - although this gap is increasingly reduced as the technology grows to increase the multi-crystalline technology's performance.

Multi-crystalline solar panels have a more affordable, less complicated and wasteful production process compared with mono-crystalline technology.

Solar Panel Technology Alternative 3: *Concerns the use of mono-crystalline technology for the construction of the project solar panels.*

Mono-crystalline solar panels have the highest efficiency rating of 17 % to 22 % since electrons can easily flow throughout the cell. These solar panels also typically have the highest power capacity ratings.

Although mono-crystalline solar panels are highly efficient, they are higher priced than the other types of solar panels. The difference between mono-crystalline and poly-crystalline solar panels is the cooling process, which causes multiple crystals to form on multi-crystalline solar panels as opposed to one on mono-crystalline solar panels. Unfortunately, monocrystalline solar panels are formed through an energy-intensive production process, which generates a lot of waste.

In summary, crystalline technology poses several crucial advantages over thin film technology – they are more durable and lasting, have a greater efficiency rating and are more cost-effective since they require a lower production process to complete.

6.4.2 Axis Tracking Technologies:

A solar tracker is a device that follows the sun as it moves across the sky and when coupled with solar panels, more energy from the sun can be harnessed through this tracking. Solar trackers can be either single-axis or

double-axis (otherwise referred to as 'dual-axis') solar trackers. The solar panels for the proposed Carpe Diem North SPP will involve north-facing solar arrays which may be with either a fixed angle of tilt, or with a single axis or dual axis tracking system.

The following structure orientation and tracking alternatives are under investigation regarding which would be the most suitable for implementation on the site:

Axis Tracking Technology Alternative 1:

Single-axis tracking: These solar panels will 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.

Axis Tracking Technology Alternative 2:

Double-axis tracking: These solar panels will be mounted in a north-south orientation to capture the most sunlight as the solar tracker tracks the sun's movement from east to west, but also as it moves from north to south.

PV installations can operate for many years with little maintenance or intervention. Therefore, after the initial capital outlay required for building the solar power plant, financial investment thereafter is limited. Operating costs are also extremely low compared to other existing power technologies.

Other technology suppliers may become available during the Scoping and EIA process, which may allow for more efficient/ effective electricity generation. The technology supplier ultimately chosen by the Applicant will depend, inter alia, on the cost and efficiency of the products.

6.4.3 BESS Technologies:

The two technology types under consideration are 'Solid State Batteries' and 'Fluid or Flow Batteries':

Solid-state batteries are self-contained and utilise either solid-state, liquid or gel electrolytes. The batteries typically consist of a graphite anode, a metal-oxide cathode, and an electrolyte gel package make use of either liquid, gel or solid-state electrolytes. The electrolyte in a solid-state battery can vary in chemical composition. A few common electrolytes that solid state battery could utilise are Nickel Cadmium (NiCad), Lead Acid (Pb), Lithium-Ion (Li-ion) or Sodium Sulphur (NaS). Coolants and refrigerants such as tetrafluoroethane and ethylene glycol, are stored within sealed thermal management systems within the batteries.

Battery cells are assembled into modules which are then installed into standard racks. These racks are placed in a container similar to a shipping container, except that the container has been specifically designed to house the battery racks and are electrically connected to form an integrated battery system.

Fluid/ Redox flow batteries utilise an electrochemical cell where chemical energy is provided by a fluid-type electrolyte which is pumped between storage tanks. The process results in the conversion of electrical energy to chemical energy or *vice versa*, when reversed. The flow battery storage tanks are placed in specially designed containers similar to shipping containers which have specific compartments to house the electrolyte fluid. It is common for flow battery tanks to first be installed on site and then filled with the electrolyte fluid, to prevent accidental spillage of chemicals. In some instances, fluid-type batteries require a periodic 'top-up' of the electrolyte which, in turn, requires the on-site bulk storage of the hazardous chemical.

The Proponent has not yet determined which battery cell technology will be utilised in the proposed on-site SPP BESS facility since this will form part of the detailed design stage which may be subject to Eskom's direction. Nonetheless, the Applicant has indicated a preferred BESS technology as indicated below:

BESS Technology Alternative 1 (Preferred Alternative):

For the Carpe Diem North SPP on-site BESS, utilisation of solid-state batteries is proposed as the preferred technology alternative (Alternative 1) for the development since this offers higher energy density and safety (particularly during transportation to site/construction and on-going operation and maintenance), with a longevity of 10 to 20 years.

BESS Technology Alternative 2:

Utilisation of flow batteries forms the second proposed technology alternative (Alternative 2) for the on-site BESS. Although flow batteries promise good scalability and a potential lifespan of more than 20 years, the safety risk is greater and developable land constraints presented by the proposed site renders this alternative less ideal.

6.5 Layout Alternatives

JUWI Renewable Energies (Pty) Ltd has determined that installing solar panels on the site is the most viable option, making it the Preferred Alternative. The site's wind conditions are unfavourable for a wind energy facility, and current and proposed future Eskom HV infrastructure further renders the site unsuitable for the development of wind energy turbines as a feasible large scale renewable energy source.

The various sensitivities and technical constraints presented by the proposed development site/study area resulted in three potential layout alternatives for the SPP which, together with the no-go alternative, being considered within this application. These layout alternatives are summarised below but have also been discussed and depicted in detail in Section 4.2 above:

- Alternative 1 (**most preferred alternative**) - SPP development on Portion 5 of the Farm Varkenslaagte No. 119 IQ using all developable land on the property, with a less than 100 m long **LiLo** OPL connection to the existing Eskom 132 kV OPL (refer to Figure 2 and Appendix K1).
- Alternative 2 (next preferred alternative) - SPP using all developable land on the property with a less than 150 m **UPL** connecting to the northern section of Carmel MTS on Portion 23 of the Farm Doornfontein No. 118 IQ, where the UPL becomes an OPL. The UPL will be developed using trenchless excavation i.e., pipe-jacking (refer to Figure 3 and Appendix K1).
- Alternative 3 - (least preferred alternative) - SPP array with a longer grid connection (less than 900 m) comprising an initial underground section (approximately 520 m) which partially follows Alternative 2's UPL route before continuing to run underground along and within the southern boundary of Portion 5 of the Farm Varkenslaagte No. 119 IQ, and surfacing as an OPL (approximately 360 m) skirting around the eastern boundary of the Carmel MTS boundary on Portion 23 of the Farm Doornfontein No. 118 IQ, and connecting to the southern section of the MTS. The UPL becomes an OPL **only after** it has crossed under the existing Eskom HV OPLs which enter Carmel MTS property from the North-east (refer to Figure 4 and Appendix K1).
- **No-go Alternative:** The development does not take place and the *status quo* is maintained.

Bar the 'No-go Alternative', the above order of Alternative preference is based on securing the most optimal grid connection.

6.6 No-Go Alternative

The “no-go” option or alternative will also be assessed as part of the EIA process. This option forms the baseline against which all other alternatives will be measured, and will, during the impact assessment phase, be assessed at the same level of detail as the other feasible and reasonable alternatives.

The “no-go” option entails not implementing the proposed activities on the application site, and involves utilising the site in terms of its current existing land use rights, which include all the duty of care and other legal responsibilities that apply to the owner of the property. The site is currently zoned “Agriculture Zone I”, and can therefore be utilised for any agricultural activities that comply with this zone. All the applicable permits must, however, be in place for the current agricultural activities to be an existing right.

7 PUBLIC PARTICIPATION PROCESS

7.1 Introduction

As per the principles enshrined in the Constitution including the NEMA, public participation is a right and is understood to be a series of inclusive and culturally appropriate interactions aimed at providing stakeholders with opportunities to express their views so that these can be considered and incorporated into the decision-making process. Effective public participation requires the prior disclosure of relevant and adequate project information to enable stakeholders to understand the risks, impacts, and opportunities of the proposed development.

This PPP will be undertaken in accordance with the principles of integrated environmental management as highlighted in the NEMA (Chapter 1), including Chapter 6 of the 2014 NEMA EIA Regulations (GN R982, as amended), Regulations 39 to 44.

The objectives of the PPP can be summarised as follows:

- Identify relevant individuals of the general public, communities, civic organisations and state departments or agencies who may be interested in or affected by the proposed development;
- Clearly outline the scope of the proposed development, including the scale and nature of the existing and proposed activities;
- Identify shortcomings and gaps in existing information;
- Identify viable project alternatives that will assist the relevant authorities in making an informed decision;
- Identify key concerns raised that should be addressed in the subsequent specialist studies;
- Highlight the potential for environmental and socio-economic impacts, whether positive or negative; and
- Inform stakeholders of the proposed solutions or mitigation measures which will be implemented to mitigate the potential impacts identified.

7.2 The Rights, Roles and Responsibilities of the I&AP

7.2.1 Rights of the I&AP

Registered Interested and Affected Parties (I&APs) have the right to bring to the attention of the EAP and Competent Authority any issues that they believe may be of significance to the consideration of the application. The rights of registered I&AP are qualified by certain obligations, namely:

- I&APs must ensure that their comments are submitted within the stipulated timeframes that have been approved by the DFFE, or within any extension of the timeframe agreed by the Applicant, EAP or Competent Authorities. Such extensions must be communicated to potential stakeholders during the course of the application process;
- Serve a copy of the comments submitted directly to the EAP, Applicant or the Competent Authorities, and
- Disclose to the EAP any direct business, financial, personal or other interest that they might have in the granting or rejection of this application.

7.2.2 Role of the I&AP

The role of the I&AP in the PPP usually includes one or more of the following:

- Assisting in the identification and prioritisation of issues that need to be investigated during the process;
- Proposing potential project alternatives to be investigated and possible mitigation measures in a means of preventing, minimising and managing negative impacts and enhancing proposed projected benefits;
- Assisting in or commenting on the development of mutually acceptable criteria to be used during the evaluation of project alternatives;
- Highlighting information in terms of the needs, values and expectations of the public in relation to the proposed development;
- Contributing local and traditional knowledge; and
- Validating that the issues raised during the PPP have been considered.

7.2.3 Responsibility of the I&AP

The responsibility of the I&AP in order to participate effectively during the process, are as follows:

- Register as an I&AP and become involved in the process as early as possible;
- Recommend potentially other I&APs who should be consulted;
- Contribute towards the design of the public participation process (including timeframes) to ensure that it is acceptable to all stakeholders;
- Follow the process once it has been accepted;
- Read the documents and supporting information provided and actively seek to understand the issues involved;
- Provide timeous responses to correspondence;
- Be courteous and respectful towards the EAP, project team and other stakeholders;
- Refrain from making subjective, unfounded or ill-informed statements; and

- Recognise that the process is confined to issues that are directly relevant to the proposed development.

7.3 Approach to Public Participation

The approach Legacy EMC has adopted in terms of the PPP is based on the following principles:

- Undertake meaningful and timely participation with I&APs;
- Focus on significant issues during the Process;
- Undertake due consideration of all alternatives tabled;
- Take accountability for the information provided and circulated;
- Encourage co-regulation, shared responsibility and a sense of ownership over the proposed project lifecycle;
- Apply “due process” particularly with regard to the PPP as provided for in the 2017 NEMA EIA Regulations; and
- Consider the needs, interests and values of all I&APs.

7.4 Proposed Public Participation Methodology

Legacy EMC proposed the following activities be undertaken as part of the Application and Scoping Phase and subsequent EIA PPP:

- Identify and registration of all I&APs;
- Notify the relevant Competent and Commenting Authorities about the proposed development;
- Notify all I&APs about the proposed project and circulation of the Scoping Report;
- Compilation of the C&RRt;
- Submit Scoping Report to Competent Authority for comment and decision/appeal;
- Circulation of the DEIAR for I&AP review and comment;
- Compilation of C&RR;
- Submit Final EIAR to Competent Authority for decision; and
- I&AP notification of the Competent Authority’s final decision on the Final EIAR and appeals procedure to be followed.

The activities undertaken thus far to ascertain public opinion regarding the proposed project are summarised in Table 32.

Table 32: Summary of activities undertaken and proposed during the PPP

Activity	Date
Media notice advertising the intended commencement of the PPP and the availability of the DSR	14 November – 13 December 2024
Extension to Comment Period	To 24 January 2025
Circulation of the DSR to public for a minimum of 30 days	14 November 2024 – 24 January 2025

Activity	Date
Submission of Application Form and DSR to DFFE for a minimum of 30 days	05 December 2024 – 27 January 2025
Submission of the FSR to DFFE	06 February 2025
Acceptance of the FSR and Plan of Study by DFFE	18 March 2025
Circulation of the DEIAR for a minimum of 30 day review and comment period	05 May – 06 June 2025
Submission of the FEIAR to DFFE	29 June 2025
Receipt of DFFE EA decision	16 October 2025
EA decision Appeal Process	16 October 2025 – 05 November 2025

7.4.1 Identification of Potential Interested and Affected Parties

The NEMA, as amended, provides the following definition for an “interested and affected party” (I&AP):

“Interested and affected party, for the purposes of Chapter 5 and in relation to the assessment of the environmental impact of a listed activity or related activity, means an interested and affected party contemplated in section 24(4)(a)(v), and which includes-

- (a) *any person, group of persons or organisation interested in or affected by such operation or activity; and*
- (b) *any organ of state that may have jurisdiction over any aspect of the operation or activity”.*

An initial list of potential I&APs was pro-actively identified for this project and was expanded upon during the DSR PPP. Based on these preceding PPPs and comments received in the acceptance letter from the DFFE, the following I&APs were identified for the purposes of comment on the DEIAR:

- The Property Owner(s) and Neighbouring Property Owner(s);
- Relevant Organs of State (including the municipal ward councillor); and
- Key non-governmental and community-based organisations (including the ratepayers association).

Refer to Appendix C1 for a copy of the I&AP list. The I&AP list was updated as the EIA Phase proceeded.

7.4.1.1 Relevant Organs of State

The following organs of state were notified of the availability of the DEIAR and requested to provide comments:

- Department of Forestry Fisheries and the Environment (Competent Authority, the DFFE);
- Department of Mineral Resources and Energy (DMRE);
- Department of Water and Sanitation (DWS);
- Gauteng Department of Agriculture and Rural Development (GDARD)
- National Energy Regulator of South Africa (NERSA);
- South African National Road Agency Limited (SANRAL);
- Department of Roads and Transport;

- South African Weather Service (SWAS);
- Eskom;
- West Rand District Municipality;
- Merafong City Local Municipality;
- South African Heritage Resources Agency (SAHRA); and
- Civil Aviation Authority (CAA).

7.4.1.2 Key Non-Governmental and Community Based Organisations

The following NGOs/ CBOs were notified of the availability of the DEIAR and were requested to provide comments:

- Endangered Wildlife Trust (EWT);
- SANParks; and
- BirdLife South Africa.

7.4.2 Project Announcement and Scoping Phase

This FEIAR endeavours to comply with all the requirements of Appendix 3 of the 2014 EIA Regulations and is being made publicly available for a 30-day comment period.

I&APs on the Stakeholder Database (Appendix C1) were notified of the availability of the DSR in writing via the circulation of a Background Information Document (BID) by email, normal mail and letter drop. Refer to Appendix C4 for Proof of I&AP Notification.

The DSR was made available on the Legacy EMC website (www.legacyemc.co.za) and in hard copy at the Carletonville Public Library (Beryl Street, Carletonville, 2499).

Where required, copies of the DSR were provided to the relevant organs of state for commenting purposes.

The requisite notice board and newspaper advertisement were placed, as per the requirements of Regulation 41 of the EIA Regulations, 2014 (as amended). An advertisement was published in the *Lowvelder newspaper*. Two site notice boards were erected along a publicly accessible boundary fence in the vicinity of the application site. Refer to Appendix C.

Written comments from I&APs on the DSR and/or BID were submitted to Legacy EMC by **Friday, 24 January 2024**.

All comments from the Scoping Phase were collated into a C&RR, which was submitted to DFFE along with the FSR.

7.4.2.1 Final Scoping Phase

The FSR, including a Plan of Study for EIA, which reflected the incorporation of the comments received on the DSR, was submitted to DFFE within 44 days of receipt of the application form.

The DFFE considered the FSR and accepted the report and advised the applicant to proceed with the tasks as per the Plan of Study for EIA.

Registered I&APs were notified of the submission of the FSR to DFFE and a copy was made available on Legacy EMC's website for information purposes (not for commenting purposes).

Once the FSR was accepted, the EIA Phase commenced and a DEIAR was compiled for the second PPP.

7.4.2.2 EIA Phase

DEIAR:-

The DEIAR was circulated to all registered I&APs for a minimum 30-day period for public scrutiny. I&APs are informed of project developments and have the opportunity to review and comment on the DEIAR. The PPP provides the Applicant with an opportunity to maintain open communication with regulating authorities, as well as the Competent Authority. The DEIAR submitted to the Competent Authority included an updated C&RR which captured input from the FSR acceptance and comment letter received from the DFFE.

The PPP conducted during the EIA Phase is a continuation of the overall project information dissemination and enables I&Ps to keep informed of project developments and to maintain communication with relevant authorities.

The DEIAR and the appended draft EMPs, which comply with the requirements of Appendix 3 and Appendix 4 to the 2014 EIA Regulations, respectively, were made available for a 30-day comment period as above. Copies of the DEIAR and the draft EMPs, together with all associated Appendices to the DEIAR, were provided to the relevant organs of state for commenting purposes. Registered I&APs were notified in writing of the availability of the DEIAR and draft EMPs for comment.

The EAP has maintained a register of all persons who submit written comments, attend meetings with the EAP or applicant, or who have requested their names to be placed on the register. The register also contains details of all organs of state who have jurisdiction in respect of the activity to which the project relates.

Final EIA Report (FEIAR)

This FEIAR and appended documents, which include Standard and Generic EMPs (as per Appendices I1 to I3), reflects the incorporation of comments received on the DEIAR (including appendices).

This FEIAR is submitted to the DFFE within 106 days of the acceptance of the FSR. *All comments received to date on the projects would have to be recorded in a Comments and Response Report and appended to the FEIAR before submission to the DFFE.*

Note: Registered I&APs would then be notified of the submission of the FEIAR to the DFFE and a copy of the FEIAR would be made available on Legacy EMC's website for information purposes (not for commenting purposes).

7.4.3 Review and Decision Period

Within 107 days of acknowledgement of receipt of the FEIAR, the DFFE will either:

- Grant environmental authorisation; or
- Refuse EA.

All registered I&APs will be notified of DFFE's final decision, including the reasons for the decision.

7.4.4 Opportunity for Appeal

All registered I&APs will be notified of DFFE's decision within 14 days of the decision being issued. Anyone wishing to appeal the decision will have to follow the process as stipulated in the National Appeal Regulations (2015), as amended.

Registered I&APs will also be informed of the provisions pertaining to the submission of appeals as per the EIA Regulations. I&APs will be provided with access to the EA decision, as well as the reasons for the decision.³⁷

The Competent Authority's Appeals Directorate will determine if a lodged appeal is warranted due to any factors related to the EIA process or the circumstance of the decision.

7.5 Opportunities to Participate

I&APs had the following opportunities to participate in the NEMA EIA process:

- The DSR and associated documents were made available for a minimum 30-day comment period from 14 November 2024 to 24 January 2025 (Actual and potential I&APs were notified of the availability of the report).
- Once the FSR was accepted by the DFFE, the DEIAR and EMPs were submitted to the DFFE and were made available for a minimum 30-day comment period (registered I&APs will be notified of the availability of the report).
- Upon receipt of the DFFE's decision to either grant or refuse EA, all registered I&APs will be informed of the decision within 14 days of receipt thereof, as well as of their rights and procedure in terms of the relevant appeal process.

7.5.1 Methods for Submitting Comments

I&APs were invited to submit their comments, queries or concerns regarding the proposed development, in writing in any of the following ways:

- Via email to: info@legacyemc.co.za / kim@legacyemc.co.za / tayla@legacyemc.co.za
- Via fax to 021 205 1966
- Via post to PO Box 12410, Die Boord, Stellenbosch, 7613

The following information should be included on all written submissions:

- DFFE Reference Number and/or Project Name
- The I&AP's name and contact details
- An indication of any direct business, financial, personal or other interest which they may have in the application.

I&APs were encouraged to contact Ms Kim Pontac / Ms Tayla Hobson telephonically on 021 887 4000 should they have any queries relating to or require any assistance with respect to the submission of comments.

³⁷ A copy of the EA will be uploaded to the Legacy EMC website.

7.6 Key Issues and Concerns

No issues and/or concerns of significance have been raised during the EIA process to date.

All formal comments received during the Scoping Phase and the EIA Phase comment periods have been, or will be incorporated into a Comments and Responses Report (refer to Appendix C5), along with copies of all comments received.

7.7 Conclusion

The PPP during the EIA Phase shall be conducted intensively to ensure that all issues and impacts of this proposed development are identified and addressed.

All comments raised by I&APs on the DEIAR were addressed during the remainder of the EIA Phase and incorporated into the FEIAR.

8 NEED AND DESIRABILITY

The following sections provide a brief overview of the need for renewable energy in South Africa, as well as a description and motivation for the need and desirability of the proposed project, as is required in terms of the NEMA EIA Regulations of 2014 (as amended) and the DEA's (now DFFE) Guideline on Need and Desirability (March 2017).

8.1 DEA's (now DFFE's) Guideline on Need and Desirability

The concept of "need and desirability" relates to, amongst others, the *nature, scale and location* of development being proposed, as well as the wise use of land. While essentially the concept of "need and desirability" can be examined in terms of the general meaning of its two components in which need primarily refers to time and desirability to place (i.e., is this the right time and is it the right place for locating the type of land-use/ activity being proposed?), "need and desirability" are interrelated and the two components collectively can be considered in an integrated and holistic manner.

To appropriately interpret the EIA Regulations' requirement to consider "need and desirability", it is necessary to turn to the principles contained in NEMA, which serve as a guide for the interpretation, administration and implementation of NEMA and the EIA Regulations. With regards to the issue of "need", it is important to note that this "need" is not the same as the "general purpose and requirements" of the activity. While the "general purpose and requirements" of the activity might to some extent relate to the specific requirements, intentions and reasons that the Applicant has for proposing the specific activity, the "need" relates to the interests and needs of the broader public. In this regard, the NEMA principles specifically inter alia require that environmental management must:

- *"place people and their needs at the forefront of its concern and equitably serve their interests";*
- *"be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option";*
- *pursue environmental justice "so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person";*
- *ensure that decisions take "into account the interests, needs and values of all interested and affected parties"; and*
- *ensure that the environment is "held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage".*

The consideration of "need and desirability" in EIA decision-making therefore requires the consideration of the strategic context of the development proposal along with the broader societal needs and the public interest. The government decision-makers, together with the EAPs and planners, are therefore accountable to the public and must serve their social, economic and ecological needs equitably. Ultimately, development must not exceed ecological limits to secure ecological integrity, while the proposed actions of individuals must be measured against the short-term and long-term public interest to promote justifiable social and economic development³⁸ i.e., ensuring the simultaneous achievement of the triple bottom line. Considering the merits of a specific application in terms of the need and desirability considerations, it must be decided, which alternatives

³⁸ Section 24 of the Constitution call for the securing of "ecological sustainable development and use of natural resources" and the promotion of "justifiable economic and social development".

represent the “best practicable environmental option”. In terms of the definition in NEMA and the purpose of the EIA Regulations, the BPEO is the option that provides the most benefit and causes the least damage to the environment as a whole, at a cost acceptable to society, in the long-term as well as in the short-term.

The questions to be engaged with when considering need and desirability, as per the DEA’s 2017 Guideline on Need and Desirability are tabulated below.

Table 33: Need and desirability questions and answers

Questions		Answers
Securing ecological sustainable development and use of natural resources		
1.	How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?	The SPP development has deliberately avoided areas of verified high environmental sensitivity as far as possible and integrated all recommended buffers proposed by various specialists, which includes avifauna and terrestrial resources, as well as visual aspects. Sections of the Grassland and Bushveld habitats are indicated as ‘High’ sensitivity and a 15 m buffer has been included to protect it from the development. The site selection process excluded pristine areas which typically fell with designated CBA or ESAs, and favoured zones disturbed by farming or other activities. In addition, the various mitigation measures recommended by specialists have been considered in the site selection process. Considering the above, the proposed development is not expected to significantly disturb ecosystems or cause loss of biodiversity, with implementation of the mitigation measures outlined in the EMPs (as per Appendices I1 to I3). The SPP’s location on primarily previously disturbed land is expected to maintain the area’s integrity, alongside the benefits of renewable energy. Additionally, the government, as a signatory to the Kyoto Protocol, is committed to establishing a national renewable energy framework for reducing greenhouse gas emissions and ensuring energy security. The Merafong City Local Municipality Integrated Development Plan (IDP) and Spatial Development Framework (SDF) are discussed in the report.
1.1	How were the following ecological integrity considerations taken into account: Threatened Ecosystems; Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure; Critical Biodiversity Areas (“CBAs”) and Ecological Support Areas (“ESAs”); Conservation Targets; Ecological drivers of the ecosystem; Environmental Management Framework; Spatial Development Framework; and Global and	In addition to the above, the ecological integrity of the site was taken into consideration in Section 5 of the report.

Questions	Answers
	international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).
1.2 How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Sections 5 and 6 describe how the environmental constraints of the site informed the application area, which is concentrated on areas that have been transformed by agriculture and areas that avoid biodiversity sensitivities. No notable disruption of flora and vegetation or natural process disruption is anticipated to occur as a result of the SPP and the implementation of its respective buffer and no-go areas. Measures to avoid or minimise impacts are included in the EMPs (as per Appendices I1 to I3).
1.3 How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	It is not envisaged that the proposed development will pollute or degrade the biophysical environment, due to the nature of the proposed development and receiving environment. Localised degradation is expected during the construction phase when vegetation will be cleared for roads and associated infrastructure; however, this can be mitigated by undertaking search and rescue and removing the bare minimum vegetation. The extent of any other environmental degradation has been assessed during the impact assessment phase.
1.4 What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	During the construction phase, waste typically produced includes packaging materials, including cardboard, plastic, and wood used for transporting and safeguarding solar panels. Throughout the operational lifespan and end-of-life, the waste generated may entail various forms of waste, including manufacturing waste (scrap silicon, glass, metal), installation waste (packaging materials), end-of-life waste (panels, inverters), maintenance and replacement waste, accidental damage waste, and obsolete technology waste. However, the proposed measures to address waste generation include implementing precise ordering to avoid excess inventory, conducting on-site sorting for recycling, maximizing material reuse opportunities, and employing safe disposal methods for unavoidable waste. These measures are integrated into the EMPs (as per Appendices I1 to I3).
1.5 How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Despite an intensive walkthrough of the footprint area for the proposed project by the heritage specialists, no evidence for any archaeological or heritage sites could be identified within the environs of the study area. As a result, it was confirmed in the Heritage Impact Assessment (Appendix D6) that no impact is expected from the proposed development on heritage. With no impact expected on heritage, no disturbance or enhancement of the nation's cultural heritage is therefore anticipated and no mitigation measures were deemed necessary.

Questions	Answers
	The existing visual condition of the landscape that may be affected by the proposed Carpe Diem SPP and associated infrastructure has been described. The study area's scenic quality has been rated low to moderate to high within the context of the sub-region. Sensitive viewing areas have been identified and mapped, indicating potential sensitivity to the Project, mainly for new residential areas (not yet occupied) to the immediate north of the SPP and for users of the Johannesburg Skydiving Club. Impacts on views are the highest when viewers are sensitive to change in the landscape, and the view is focused on and dominated by the change. The Project's visual impact will cause changes in the landscape that are noticeable to people viewing the landscape from the public road immediately west of the residential areas mentioned above. Mitigation measures explored for the visual impacts of the project relate to planning and site development, earthworks and vegetation and good housekeeping – these have been included in the Impact Assessment tables included in Appendix F and the standard EMPr (as per Appendix I3).
1.6 How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	This development will assist with minimising the use of non-renewable energy resources such as coal and oil, and will not exploit non-renewable natural resources (e.g., vegetation) to the extent that off-setting is required. Non-renewable resources will be used during the construction of the PV Plant (e.g. sand for concrete), but such raw materials will be sourced from licensed facilities. Heritage resources are regarded as non-renewable resources. Despite an intensive walkthrough of the footprint area for the proposed project by the heritage specialists, no evidence of any archaeological or heritage sites was identified within the environs of the study area.
1.7 How will this development use and/or impact on renewable resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts? (1) Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth, or does it reduce resource dependency (i.e. dematerialised growth)? (2) Does the proposed use of	Solar radiation is a source of energy which is non-polluting and renewable. The use of solar radiation on the site does not preclude other activities (e.g., grazing with small stock or harvesting of natural resources) on the development site. By using a renewable resource to generate electricity, it in turn reduces the need to generate electricity using non-renewable resources (such as coal or nuclear). The development of a SPP to exploit solar radiation to generate electricity may however have impacts on the ecosystem in which it is located. To avoid or minimise the impacts on the environment (i.e., with respect to the potential impacts on e.g., botany, fauna, and traffic), specialist assessments have been undertaken to assess these potential impacts and recommend mitigation measures to avoid or minimise the impacts of the activity. The EMPrs for the project (as per Appendices I1 to I3)

Questions	Answers
natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources?) (3) Do the proposed location, type and scale of development promote a reduced dependency on resources?	will include measures that should be taken to protect and limit the use of resources, such as water, and measures to protect the natural resources of the area (e.g. soil and water resources). Section 9 of this FEIAR provides a summary of potential impact identified to date as well as proposed mitigation measures.
1.8 How were risk-averse and cautious approach applied in terms of ecological impacts? What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)? What is the level of risk associated with the limits of current knowledge? Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development.	The precautionary approach was applied during this Scoping & EIA process. Gaps in knowledge, assumptions and uncertainties are outlined in Section 9 of this report as well as within the respective specialist reports. When considering impacts, the EAP and specialists must take into account the limits of current knowledge about the consequences of decisions and actions.
1.9 How will the ecological impacts, resulting from this development, impact on people's environmental right in terms of the following: (1) Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts? (2) Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	Section 9 of this FEIAR provides a summary of potential impacts identified to date as well as proposed mitigation measures. An assessment of the various environmental impacts has been undertaken. Mitigation measures have also been proposed. The SPP is located on privately owned land, therefore no loss of access to resources or loss of amenities is anticipated. The SPP is expected to have an indirect positive impact on air quality as an alternative to energy generation which avoids gaseous (such as greenhouse gas) and particulate emissions from coal-fired power stations.
1.10 Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	In terms of livelihoods, the development site was specifically selected to avoid High agricultural sensitivity areas. In addition, the agricultural specialist has determined that the proposed development presents a valuable opportunity to integrate renewable energy with agricultural production in a manner that benefits agriculture while minimising the loss of potential cropland and future agricultural production potential.
1.11 Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	The proposed SPP is situated within an area dominated by anthropogenic activities including mining, industrial structures and residential development. The landscape is thus highly modified and fragmented, with only patches of remaining natural grassland. Habitats recorded within the proposed development footprint include grassland, rocky grassland and disturbed grassland. Small watercourses are located on the footprint boundaries. The grassland displays variable signs of disturbance but in most areas natural, intact grassland still remains. The site selection process was guided by the opportunities and constraints assessment undertaken for

Questions	Answers
	the originally proposed development area. Near-pristine areas were excluded from the original application area and the PV Plant has been well-positioned on areas already predominantly disturbed by previous farming activities, agricultural grazing and disturbed grassland habitats, outside of recommended buffer areas. Due to the transformed nature of the project footprint, and taking into account the inherent benefits associated with renewable energy, the development is not expected to compromise the ecological integrity of objectives/targets for the area.
1.12 Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the “best practicable environmental option” in terms of ecological considerations?	Section 6 of the FEIAR discusses alternatives and summarizes the factors considered during the site selection phase. Although the property is zoned for agriculture, the project footprint is not extensively used for intensive agricultural purposes. An assessment by the agricultural specialist determined the low agricultural potential of the site, suggesting that landowners would have pursued more intensive agricultural activities if the potential were higher. Given these findings, the development of a renewable energy facility on this site appears to be a suitable option based on the site selection process and gathered biophysical information.
1.13 Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	Please refer to Section 9 of the FEIAR and the corresponding specialist reports in Appendix D for a comprehensive overview of the identified cumulative impacts. According to the DFFE Screening Tool Report, there are a total of six other renewable energy projects either in process or approved within a 30 km radius of the site. It is crucial to consider the results of the cumulative impact analysis in conjunction with the impacts of the proposed development. The ongoing developments in the region raise concerns about potential significant cumulative impacts, particularly regarding avifaunal impacts such as collision risk, habitat loss and fragmentation, and the loss of suitable habitat for threatened species.
Promoting justifiable economic and social development	
2.1 What is the socio-economic context of the area, based on, amongst other considerations, the following considerations: (1) The IDP; (2) Spatial priorities and desired spatial patterns; (3) Spatial characteristics; and (4) Municipal Economic Development Strategy?	The socio-economic context of the area is summarised in Section 3 of this report. More detail in this regard is provided in the Socio-Economic Report (Appendix D7), which considers the compatibility of the proposed project with spatial planning. The IDP, SDF and EMF are discussed in Section 3 of this report.
2.2 Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area? Will the development complement the local socio-	The Socio-Economic Assessment (Appendix D7) considers the socio-economic context and impacts of the development. This is also summarised in Section 3 and Section 5 of this FEIAR. During the construction phase, the following impacts are, amongst others, anticipated:

Questions	Answers
	economic initiatives (such as local economic development (LED) initiatives), or skills development programs? the influx of job seekers, increase in local crime levels, contribution towards skills development, local business opportunities, economic income generation and new employment opportunities. During the operational phase, the following impacts are, amongst others, anticipated: visual impact, security and crime risk, tourism and educational opportunities, loss of agricultural land, impact on surrounding land values, new employment opportunities and revenue to the local municipality. These potential impacts are further described in Section 9 of the Scoping Report and the Socio-Economic Assessment (Appendix D7).
2.3 How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	The proposed development is not intended to address a wide variety of societal needs, but rather address the need to establish an SPP within the area. However, it is anticipated that the Carpe Diem North SPP and its supply of renewable energy to the national grid, potential job creation and local economic development would provide a positive socio-economic contribution in terms of societal needs for the surrounding communities.
2.4 Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impacts be socially and economically sustainable in the short- and long-term?	The proposed development is expected to create temporary employment opportunities during the construction phase as well as permanent employment opportunities during the operational phase. During the operational phase, electricity will be produced from renewable resources which is more sustainable than other energy alternatives, such as nuclear or coal. In the long term, the reduction in greenhouse gasses will contribute to the mitigation of climate change and the minimisation of environmental pollution associated with alternatives.
2.5 In terms of location, describe how the placement of the proposed development will: (1) result in the creation of residential and employment opportunities in close proximity to or integrated with each other; (2) reduce the need for transport of people and goods; (3) result in access to public transport or enable non-motorised and pedestrian transport; (4) compliment other uses in the area; (5) be in line with the planning for the area; (6) for urban related development, make use of underutilised land available with the urban edge; (7) optimise the use of existing resources and infrastructure; (8) opportunity costs in terms of bulk infrastructure expansions in non-priority areas; (9) discourage "urban sprawl" and contribute to compaction/densification; (10) contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs; (11) encourage environmentally sustainable land development practices and processes; (12) take into	The proposed SPP will provide employment opportunities for members of the local community and will also provide direct economic benefits to the local community as outlined in Section 1.6 of the DSR. The proposed SPP will not preclude the use of the property for agricultural purposes in the future and is also not regarded as being incompatible with the conservation objectives for the area. The PV Plant will make use of underutilised land, which is not currently being fully exploited for agricultural purposes (due to the low agricultural potential of the soils). Location factors favour this site for solar energy development due to the proximity of the site to the existing Eskom HV overhead power lines and Eskom Carmel MTS. The site is also easily accessed via national road infrastructure and the proximity of the site to the town of Carletonville would mean that locally employed staff would not have to travel far to work. Impacts on the sense of place and heritage of the area have been considered in this FEIAR.

Questions	Answers
	account special locational factors that might favour the specific location; (13) the investment in the settlement or area in question will generate the highest socio-economic returns; (14) impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area; and (15) in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?
2.6 How were a risk-averse and cautious approach applied in terms of socio-economic impacts? (1) What are the limits of current knowledge? (2) What is the level of risk associated with the limits of current knowledge? (3) Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	The Limitations and Assumptions can be found in the Socio-Economic Assessment report, Appendix D7, Section 1.3.2.
2.7 How will the socio-economic impacts, resulting from this development, impacts on people's environmental right in terms of the following: (1) Negative impacts: e.g. health (e.g. HIC-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts? (2) Positive impacts: What measures were taken to enhance positive impacts?	The Socio-Economic Assessment (Appendix D7) considers the negative and positive socio-economic impacts during the construction and operational phases, as well as measures to mitigate or enhance such impacts. This is also summarised in Section 9 of this FEIAR. Apart from localised dust and noise impacts during the construction stage of the SPP, the potential influx of job seekers and the potential for increased crime are potential negative socio-economic impacts expected from the proposed development during the construction phase. The potential impacts on people's health and well-being during the operational phase, in terms of aspects such as visual character and sense of place, have also been considered in the socio-economic report. Job creation, education and training opportunities, the provision of renewable energy, increase in economic development are positive impacts expected from the operational phase of the proposed development.
2.8 Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts?	In terms of livelihoods, the development site has been partially previously used for agricultural purposes, including rain-fed crop production and grazing. The agricultural potential for crop production is low, which would explain why many areas on the development site lie fallow. The operation of the SPP on the development site will not preclude agricultural activities (i.e. small stock grazing) from taking place.
2.9 What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	All the findings mentioned above were carefully considered during the development phase of this project, with the primary aim being to avoid, minimise, and address impacts on biodiversity. This involved identifying

Questions	Answers
	the most effective environmental options to prevent biodiversity loss and ecosystem disturbance, following the mitigation hierarchy and land use guidelines.
2.10 What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons? Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	It is not anticipated that adverse environmental impacts will be distributed in such a manner as to unfairly discriminate against any person. The local community will benefit from the proposed development, as described in Section 1.6 above. Section 6 of this FEIAR provides a summary of the factors that were considered during the preparation of the site layout. Based on input from the public and organs of state, it is possible that further revisions to the site layout may need to be considered to ensure that the best practical environmental option (BPEO) is selected.
2.11 What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	Benefits that will accrue to local communities because of the project are summarised in Section 1.6 above. The Applicant will institute measures, as outlined in the EMPs (as per Appendices I1 to I3), to ensure that a fair procurement strategy is maintained.
2.12 What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	The Socio-Economic Assessment (Appendix D7) has considered the impact on human health and well-being due to materials used in the manufacture of PV cells. This is also summarised in Section 9 of this FEIAR. The Applicant is also to ensure, inter alia, that the working conditions throughout the project life-cycle adhere to the minimum requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), as amended (OHSA).
2.13 What measures were taken to: (1) ensure the participation of all interested and affected parties; (2) provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation; (3) ensure participation by vulnerable and disadvantaged persons; (4) promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means; (5) ensure openness and transparency, and access to information in terms of the process; (6) ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge; and (7) ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were promoted.	The public participation process is outlined in Section 7 of this report and includes the process to be followed to ensure as many I&APs are reached and allowed to comment. All comments received have been considered and responded as captured in the Comments and Response Report (refer to Appendix C5) and will continue to be made available during subsequent I&AP commenting rounds.

Questions	Answers
2.14 Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	The economic benefits of increased employment opportunities and the associated social benefits of embarking on the project are limited given the nature and scope of the proposed Carpe Diem North SPP. However, the significant advantage of unlocking benefits for local communities and businesses outweighs the social costs emanating from the proposed SPP.
2.15 What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or dangers of associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	The EMPs (as per Appendices I1 to I3) will make provision for “Toolbox Talks”, which should be held with all workers on site. The dangers associated with the job as well as their right to refuse work that is harmful to human health, or the environment should be communicated to workers at this time. The applicant is also to ensure, inter alia, that the working conditions on site adhere to the minimum requirements of the OHSA.
2.16 Describe how the development will impact on job creation in terms of, amongst other aspects: (1) the number of temporary versus permanent jobs that will be created; (2) whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area); (3) the distance from where the labourers will have to travel; (4) the location of job opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits; and (5) the opportunity costs in terms of job creation.	The Socio-Economic Assessment (Appendix D7) considers the impact on new employment opportunities during the construction and operational phases. This is also summarised in Section 9 of this FEIAR. The exact number of jobs to be created during the construction and operational phases of the proposed development is unknown at this stage. However, it is anticipated that a maximum of 40 staff members will be employed at the facility. The construction related jobs will involve skilled, semi-skilled and low-skilled persons to be afforded to the surrounding communities where possible. The specific nature of the operational phase jobs to be created requires mostly highly skilled and skilled persons which would account for approximately 75% of the direct employment need at this stage of the project life-cycle.
2.17 What measures were taken to ensure: (1) that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and (2) that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	Section 3 of this FEIAR summarises the legal and policy context applicable to the proposed SPP. A list of the organs of state that have been notified and provided with an opportunity to comment is provided in Section 7.4.1.1 of this report. The EAP is not aware of any current conflicts of interest between organs of state that are required to be resolved.
2.18 What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?	Several specialist studies were commissioned to inform the initial site layout of the SPP on the development property. Factors such as the agricultural potential, vegetation condition, presence/ absence of surface water resources and avifaunal impacts were used to inform the preferred site layout, and realistic mitigation measures are proposed to reduce or enhance impacts. As such the “measures” that will be taken include the consideration of various specialist inputs to ensure that the BPEO is assessed and submitted to the DFFE for approval.

Questions	Answers
2.19 Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	The mitigation measures proposed must be realistic and implementable for the outcome of the impact assessment to be reliable. In the event that the lifespan of the SPP cannot be extended, then the PV Plant will be decommissioned. Decommissioning will include removing all electrical infrastructure, removing of all components and breaking up the foundations on ground level, re-contouring the surface, and re-vegetation of the foundations and hardstand areas. As such it is anticipated that a negligible management burden will remain after the operational phase of the SPP.
2.20 What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	Section 28 of NEMA (<i>Duty of Care</i>) holds every person who causes, has caused or may cause significant pollution and degradation of the environment accountable. As such, the mechanisms provided for in the NEMA could be used by any person or the responsible authority(ies) to hold those responsible for pollution and degradation of the environment accountable. The necessary rehabilitation measures have been incorporated into the EMPs (as per Appendices I1 to I3), which under NEMA's Duty of Care principle holds the Applicant responsible for the costs of remedying environmental degradation (e.g., erosion of topsoil or pollution of groundwater) that may occur during the construction phase. These costs may be placed onto contractors/sub-contractors by the Applicant.
2.21 Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	Section 6 of this FEIAR provides a summary of the factors that were taken into account during the preparation of the site layouts. The Socio-Economic considerations, which include such aspects as: sense of place, impact on human health and well-being, impact on existing farming operations and impact on local tourism, are described in the Socio-Economic Assessment (Appendix D7) as well as in Section 9 of this FEIAR, which provides a summary of the potential impacts associated with the development and operation of the proposed SPP.
2.22 Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	The positive and negative cumulative socio-economic impacts are described in the Socio-Economic Assessment (Appendix D7) as well as in Section 9 of this FEIAR, which provides a summary of the potential impacts associated with the development and operation of the proposed SPP. Negative: The potential negative visual impact and demand for resources will be compounded with additional new developments in the immediate location. Similarly, the potential influx of jobseekers and increased local crime will be compounded if other new

Questions	Answers
	developments in the area are taken forward and come to fruition. Positive: The benefits of several new developments will also be compounded, especially with regard to new employment and business development opportunities. The contribution toward economic income could provide a catalyst for further economic development, whilst reliable electricity could attract large industries to the area.

8.2 The Need for Renewable Energy in South Africa

In addition to the then DEA's (now DFFE's) guideline for Need and Desirability, it is worthwhile to include a short introduction on the role and value of renewable energy in South Africa, as extracted from the Socio-Economic Assessment Report.

8.2.1 Project Need & Desirability

Growing concerns such as climate change and the ongoing exploitation of non-renewable resources have prompted increased international pressure on countries to increase their share of renewable energy generation. Over the last few years, South Africa has been adversely impacted by interruptions in the supply of electricity. The creation of a 'decentralized' power generation facility will secure a supplementary energy source for the area, especially during the winter season when power consumption is higher. The proposed Carpe Diem North SPP is therefore considered to be of national importance in anticipation of its contribution to electricity supply and reduced reliance on fossil energy, whilst also enabling the country to meet international environmental and sustainability commitments.

In 2010, the Department of Energy, the Treasury and the Development Bank of Southern Africa collaborated to set up the Independent Power Producer (IPP) office and designed the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP). The REIPPPP is bringing renewable energy to the National grid faster and cheaper than new-build coal plants, with construction times for projects averaging less than two years. At the heart of the programme was the provision that Eskom enter Power Purchase Agreements (PPAs) with IPPs, ensuring that investors could forecast accurately their profits and bankability. The REIPPPP is a tender process consisting of "rounds" where the lowest tariff and most competitive Economic Development score is awarded a 20-year PPA with Eskom as the off-taker.

8.2.2 Compatibility with spatial planning from an economic perspective

The individual benefits of a project exaggerate its true benefits if the project reduces benefits elsewhere in the area. Economic desirability is, therefore, essential to determine whether the proposed project complements economic planning as reflected in spatial development planning. It is not sufficient that the project results in some positive spin-offs, if it is not compatible with planning guidance, designed to maximize the overall economic potential of an area.

SDFs and Structure Plans are central to economic development planning and are prepared to guide overall development in a direction that local and provincial authorities see as desirable. Notwithstanding, the basic purpose of an SDF is to outline the spatial implications of IDPs.

To provide some context for the establishment of renewable energy facilities, national energy legislation and policy, Provincial strategy, actions and planning documents related to renewable energy, District and Local documents that relate to IDP, SDF and Local Economic Development (LED) frameworks and strategies are considered as a premise for further assessment. In addition, other planning and development guidelines and policies are considered where appropriate.

Energy policy and supply is also a matter of socio-energy system design and the IPPPP therefore should also contribute to the broader national development objectives of job creation, social upliftment and the broadening of economic ownership (Independent Power Producer Office, 2020a).

8.2.3 Conclusions on Project Need

A key factor in the feasibility assessment of an SPP is the tariff that NERSA is prepared to pay for the electricity generated by the operator of the SPP.

The large capital outlay for the PV panels and the direct and indirect infrastructure can only be justified by the tariff obtained for the electricity and consequently the minimum required return for the investors in the project. An agreement is concluded with the landowner to lease a portion of the farm for a period that equates to the economic life of the SPP.

The NDP 2030 sets out six interlinked priorities that include enabling faster economic growth, higher investment and greater labour absorption. The proposed Carpe Diem North SPP development subscribes to the NDP principles by offering renewable resources in an area that requires development to assist employment creation.

The proposed site falls just outside the Klerksdorp Renewable Energy Development Zone (REDZ) 10, as identified by the DFFE for solar energy generation (Refer to Figure 50 below).

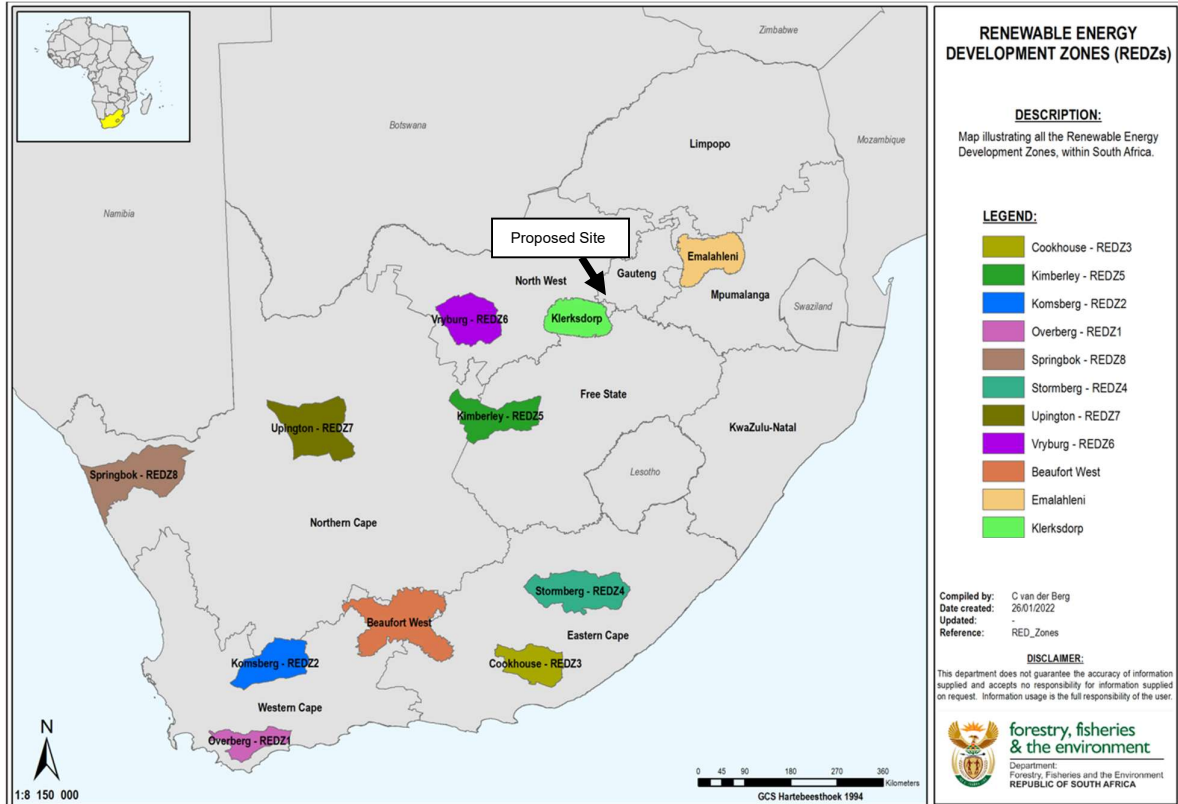


Figure 50: Location of the Carpe Diem North SPP just outside the Klerksdorp REDZ 10.

The Province's economic prospects lie in the diversification of its economy, which includes moving towards alternative energy sources to provide its energy requirements and reduce the environmental impact of coal-dependent electricity.

The proposed Carpe Diem North SPP represents a private investment in renewable energy and is thus particularly aligned with the provincial SDF strategy to diversify its energy generation and adapt to global climate change.

It is clear from both National, Provincial and Municipal legislation, policies, strategies and action programmes, that targets have been set to achieve a greater energy output from renewable energy sources.

There is growing pressure on the stable and reliable provision of electricity generation throughout the country, and Eskom's inability to guarantee constant supply requires investment in alternative and renewable energy sources.

9 ENVIRONMENTAL EVALUATION AND ANTICIPATED IMPACTS

9.1 Introduction

The methods of evaluating the baseline environment and identifying the potential environmental impact issues of the proposed development, and alternative development options, included the following:

- Site visits by the EAP, developer and specialist consultants to undertake the environmental evaluation of the site and assess the likelihood of impacts occurring;
- Review of existing environmental information, including topographic and/or orthophoto maps and/or aerial photographs, and how the proposed development associates with such features;
- Research from secondary sources of information and the various planning reports for the local and district municipalities, and how the proposed development aligns itself with such information and forward planning;
- Meetings with the developer, engineers and other specialists appointed (soil scientist, engineers, botanist, archaeology and heritage specialist etc.), to discuss the potential impacts that may occur;
- Consultation with authorities and I&APs throughout the previous and current public participation process to obtain their input on issues of concern, and potential impacts related to the proposed development; and
- Consideration of the findings of the specialist studies that have been conducted and which aided in the identification of the environmental opportunities and constraints of the site, and informed the preferred location and layout presented in this report.

9.2 Impact Rating Methodology

The assessment of the potential environmental and social impacts was based on Legacy EMC team's professional judgement, field observations and desk-top analysis. The significance of potential impacts that may result from the proposed remediation was determined in order to assist decision-makers, specifically the DFFE and to some extent also the applicant.

The standard Legacy EMC method of impact/risk rating has been adopted in order to enable the author of the EIR to determine the overall impact of the proposed activities by collating the information at hand into a uniform rating matrix.

The following methodology has been applied to the prediction and assessment of impacts. Potential impacts have been rated in terms of the direct, indirect and cumulative nature of the impact:

- **Direct** impacts – are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable;
- **Indirect** impacts – of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place as a result of the activity;
- **Cumulative** impacts – are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future

activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

The significance of each potential impact, with and without the implementation of the proposed mitigation measures, has been assessed based on the following variables (evaluation components):

- Spatial extent – The size of the area that will be affected by the impact;
- Intensity – The anticipated severity of the impact;
- Duration – The timeframe during which the impact will be experienced;
- Probability – The probability of the impact occurring;
- Reversibility – The “reversibility” of the environmental impacts of the proposed development after project cessation or decommissioning;
- Irreplaceability – The “irreplaceability” of natural characteristics in the area that may be impacted upon by the proposed development.

Using the criteria above, the impacts will further be assessed with the use of quantifiable values as described below:

Table 34: Evaluation of criteria, by means of quantitative ratings and descriptions

Criteria	Description	Quantitative Rating
Duration	Temporary (less than a year)	1
	Short term (1 to 6 years)	2
	Medium term (6 to 15 years)	3
	Long term (the impact will cease after the operational life of the activity)	4
	Permanent (mitigation will not occur in such a way or in such a time span than the impact can be considered transient)	5
Spatial extent	Site specific	1
	Local (less than 2 km from the site);	2
	Regional (within 30 km of the site)	3
	National (beyond Provincial boundaries and within National boundaries)	4
	International / Transboundary (Beyond National boundaries)	5
Intensity Applicable to Negative Impacts (at indicated spatial extent)	None (Biophysical and/or social functions and/or processes will remain unaltered)	0
	Very Low (Biophysical and/or social functions and/or processes might be negligibly altered)	2
	Low (Biophysical and/or social functions and/or processes might be slightly altered)	4
	Medium (Biophysical and/or social functions and/or processes might be notably altered)	6
	High (Biophysical and/or social functions and/or processes might be considerably altered)	8

Criteria	Description	Quantitative Rating
Intensity Applicable to Positive Impacts (at indicated spatial extent)	Very High (Biophysical and/or social functions and/or processes might be severely altered)	10
	None (Biophysical and/or social functions and/or processes will remain unaltered)	0
	Very Low (Biophysical and/or social functions and/or processes might be negligibly enhanced)	2
	Low (Biophysical and/or social functions and/or processes might be slightly enhanced)	4
	Medium (Biophysical and/or social functions and/or processes might be notably enhanced)	6
	High (Biophysical and/or social functions and/or processes might be considerably enhanced)	8
	Very High (Biophysical and/or social functions and/or processes might be substantially enhanced)	10
Probability	Improbable (5% to no chance of occurring)	1
	Probable (5% - 25% chance of occurring)	2
	Medium Probability (25% - 75% chance of occurring)	3
	Highly probable (75% - 95% chance of occurring)	4
	Definite (greater than 95% chance of occurring)	5
Reversibility	No impact	0
	Impact will be reversible	1
	High potential that impact might be reversed	2
	Moderate potential that impact might be reversed	3
	Low potential that impact might be reversed	4
	Impact cannot be reversed	5
Irreplaceability	None	0
	Very low potential for loss of irreplaceable resources	1
	Low potential for loss of irreplaceable resources	2
	Moderate potential for loss of irreplaceable resources	3
	High potential for loss of irreplaceable resources.	4
CUMULATIVE impact	Definite loss of irreplaceable resources	5
	High: The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern.	
	Medium: The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socioeconomic resources of local, regional or national concern.	
	Low: The activity is localised and might have a negligible cumulative impact.	
	None: No cumulative impact on the environment.	

Once the evaluation components have been ranked for each impact, the significance of the potential impact is assessed (or calculated) using the following formula:

SP (significance points) = (intensity + duration + spatial extent + irreplaceable + reversibility) x probability.

The maximum value is 150 SP (significance points). The unmitigated and mitigated scenarios for each environmental impact should be rated as per the table below (Table 35).

Table 35: Definition of significance ratings (positive and negative)

Significance Points	Environmental Significance	Description
125 – 150	Very high (VH)	An impact of high or very high significance could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.
100 – 124	High (H)	Cumulative Impacts: The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern.
75 – 99	Moderate-high (MH)	If left unmanaged, an impact of moderate-high significance could influence a decision about whether or not to proceed with the proposed project. Mitigation options should be re-evaluated.
40 – 74	Moderate (M)	If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with the proposed project. Cumulative Impacts: The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern.
<40	Low (L)	An impact of low significance is likely to contribute to positive decisions about whether or not to proceed with the proposed project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation. Cumulative Impacts: The activity is localised and might have a negligible cumulative impact.
+	Positive impact (+)	A positive impact is likely to result in a positive consequence/effect and is likely to contribute to positive decisions about whether or not to proceed with the proposed project.

9.3 Summary of Potential Environmental and Social Impacts Identified

Whilst the potential environmental, social and cultural impacts (and issues), including cumulative impacts where applicable, should be considered and/or assessed during the environmental impact assessment phase, they are being identified and considered during the scoping process by means of:

- The experience of the EAP;
- Inputs made by the specialist consultants; and
- Inputs made by I&APs during the Scoping and EIA Process.

The FEIAR includes the **impacts and risks which have informed the identification of each alternative**, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which they can be reversed, may cause irreplaceable loss of resource and can be avoided, managed or mitigated.

Although, there are three potential Power line routes to facilitate grid connection, there is only one site development plan layout. The EAP has not deemed it necessary to consider any other alternatives apart from the preferred and no-go options.

The following sections provide a **summary** of the main potential impacts (and issues) and provide an assessment of these impacts. The reader is referred to the **complete** specialist reports attached as Appendix D to this FEIAR, which elaborates on the summary of potential impacts presented below. The Impact Assessment Tables are attached as Appendix F.

9.3.1 Agricultural

The STR determined a 'High Sensitivity' for the Agriculture Theme. However, after SSV the Agricultural Specialist disputed the 'High Sensitivity' rating and verified that the site is, in fact a 'Medium Sensitivity'.

An Agricultural Compliance Statement was therefore provided for the project. Furthermore, the Specialist report (attached as Appendix D1 of the DEIAR and FEIAR) states that the STR "rating of the agricultural sensitivity of the assessment area is mostly medium but it includes some areas of high sensitivity. This assessment disputes the classified land capability, based on the assessment of the cropping potential of the site in this report. It verifies the land capability as a maximum of 7 (unsuitable for cropping). This assessment therefore disputes the high sensitivity rating by the screening tool and verifies the entire assessment area as being of medium agricultural sensitivity.

The cropping potential of the site is limited predominantly by the shallow soils. The site is not suitable for rain-fed crop production. The limited agricultural potential of the site limits its agricultural use to grazing only".

9.3.2 Aquatic Ecosystem Impacts

Desktop resources indicated no aquatic features within the Carpe Diem North SPP site on Portion 5 of Farm Varkenslaagte No. 119 which was confirmed by the Aquatic Biodiversity Specialist's field assessments, documented in the April 2024 Aquatic Biodiversity Impact Assessment Report attached as Appendix D2.

These field assessments were undertaken by Delta Ecology in October 2022 and February 2023, and assessed the aquatic impacts which the proposed Carpe Diem North SPP and associated infrastructure could have on environment.

Portion 5 of Farm Varkenslaagte No. 119 slopes from approximately 1598 m.a.s.l in the south-east corner to 1527 m.a.s.l in the north-west portion with an average gradient of 3-12% across the majority of the site.

9.3.3 Avifaunal Impacts

Two Avifaunal site impacts assessments were undertaken by Enviro-Insight, in July 2023 and again in April 2024. These were to assess the avifaunal impacts of the proposed Carpe Diem North SPP and grid connection.

The effects of a solar farm on birds are highly variable and depend on a wide range of factors including the design and specification of the development, the topography of the surrounding land, the habitats affected, and the density/ diversity of birds present.

The PA is located in a region dominated by some natural but mostly disturbed grasslands and stands of alien invasive trees. The density and diversity of Priority Species was low and most of these species were common and widespread and largely synanthropic (water and natural grassland associates excluded) and the density and diversity of SCC was very low.

The proposed PV project is situated within an area dominated by anthropogenic activities including mining, industrial structures and residential development. The landscape is thus highly modified and fragmented, with only patches of remaining natural grassland. Habitats recorded within the proposed development footprint include grassland, rocky grassland and disturbed grassland. The study area is located in the Carletonville Dolomite Grassland and a small section towards the southwest of the Gauteng Shale Mountain Bushveld. Neither is considered threatened.

Typical potential impacts include (but are not necessarily limited to):

- **Habitat loss** (including foraging and breeding) and fragmentation due to displacement (avoidance of disturbance). Habitat loss has the tendency to not only destroy existing habitat but also displace bird species from large areas of natural habitat. This specifically has a greater impact on bird species restricted to a specific habitat and its requirements.
- **Collision and electrocution with power transmission lines and panel infrastructure.** In some cases, collision can be associated with combustion (streamers) from polarised light pollution and waterbird species mistaking large PV panel areas as wetlands or other waterbodies, a case known as the “lake effect” (as per Jenkins et al. 2017). The mitigation of these impacts is addressed in this report with operational phase monitoring designed incorporated into the EMPs (refer to Appendix I).
- **Disturbance due to noise, such as machinery movements and maintenance operations** during the construction and operational phase of the proposed PV solar farm.
- **The attraction of some novel bird species due to the development of a solar farm** with associated infrastructure, such as perches, nest and shade opportunities.
- **Cleaning substances:** Chemicals being used to keep the PV panels clean from dust (suppressants), etc.

New mitigation measures range from simple (e.g., buffering of habitats) to complex (retrofitting of panels to avoid Lake Effect Impacts). However, by far, the best mitigation option remains the first step of the mitigation hierarchy which is “avoidance”. Consequently, all attempts must be made to avoid potential impacts arising from the proposed development through the application of necessary buffers for sensitive areas, where placement of panel infrastructure may not occur. Additional remaining impacts must be minimised through the application of known and previously tested mitigation measures.

9.3.4 Impacts on Terrestrial Biodiversity

A Terrestrial Biodiversity Impact Assessment (**Appendix D3.1**) was conducted by Enviro-Insight CC, in July 2023 and updated in May 2024 and again in April 2025, for the proposed SPP Facility on Portion 27 of Farm Doornfontein No. 118 IQ.

Although the DFFE STR anticipated the presence of three sensitive plant species, all categorised as medium sensitivity, in the study area, none of these species were observed during the site survey. Nevertheless, the existence of suitable habitat indicates that several faunal species have the potential to inhabit the area.

The following existing impacts were observed during the surveys:

- Alien invasive plants;
- Powerlines;
- Infrastructure (roads and houses); and
- Fencing.

A sensitivity map was created for the study area, designating high-sensitivity areas as no-go zones. The rocky Grassland and Watercourse are indicated as having 'High' terrestrial biodiversity sensitivity and a 15 m buffer has been included to protect these highly sensitive areas from development.

The site is considered to have moderate to high sensitivity. However, it is feasible to place solar infrastructure within agricultural grazing and transformed grassland habitats. Please note that subsequently, most high-sensitivity areas have been excluded from the development footprint.

The following Terrestrial Biodiversity impacts were identified for the various phases of the project -

Construction Phase:

i. Loss of habitat and sensitive features.

- Loss of habitat for the OPL will be limited and will mainly be impacted on by the pylons and 5 m service road below the OPL.
- It is estimated that approximately 2 ha will be cleared for the OPL service road. This will result in loss of vegetation and will increase edge effects. The functionality of these vegetation patches will be reduced but is not considered a significant impact as the extent is small.
- Where underground power lines will be utilised to connect PV islands, this installation will clear topsoil and vegetation. Appropriate rehabilitation is required post-construction.

ii. Loss of protected species.

- No plant SCC are expected or were recorded during the survey.
- Several provincially protected species occur on site, which must either be relocated prior to construction or alternative measures made (depending on comments received from the provincial authority). A permit application is required from the provincial department where the proposed development will impact these species for the placement of the OPL.

iii. Introduction and spread of alien invasive species.

- Alien and invasive species are more likely to be established in disturbed areas due to construction activities.
- Currently, alien invasive species are dominant close to existing infrastructure such as roads, under existing powerlines and homesteads.
- Vehicles can also transport seeds from other areas and introduce new species previously unknown to the area.
- Ground disturbance due to the digging of trenches for the placement of underground power lines has the potential for alien species to germinate as conditions become favourable.

iv. Increased erosion and soil compaction including dust levels.

- Erosion is likely to occur where vegetation has been cleared.

- Heavy machinery and vehicles operated during the construction phase will lead to soil compaction. Plants cannot readily establish in compacted soil, since the soil is too hard for root penetration.
- Water infiltration is less in compacted areas and the runoff is higher, which could lead to increased erosion.
- It is expected that internal routes will cross the Watercourse habitat. This may result in damage to the habitat, including changes in flow patterns, functionality and erosion.
- Erosion increases the sediment load in the watercourses, resulting in increased sedimentation downstream of the disturbance. Sedimentation may cause a blockage and alter the characteristics of the watercourse.

v. Littering and General Pollution

- The site camp and construction activities are potential sources of pollution, including hydrocarbons, construction material, domestic waste and sewage.
- Pollution may inhibit plant growth.
- It can cause soil and water pollution if not managed appropriately.
- Pollution will be localised to the site, but several pollutants may spread due to water runoff.

Operational Phase:

iv. Increase in alien invasive species

- After construction, alien invasive species could be established in optimal conditions.
- If not managed, these species can spread and reduce plant species diversity and could alter species composition.

v. Loss of species composition and diversity

- Numerous trees and shrubs will be removed, where only the herbaceous and grass layers remain to some extent.

vi. Littering and General Pollution

- The most likely types of pollutants are hydrocarbons spilt when refuelling vehicles, leakages from poorly maintained vehicles, spillage from maintaining machinery on site and littering at the site office or security gate.

Decommissioning Phase

i. Alien invasive species management

- During this phase, machinery can disturb the soil which can create optimal conditions for seeds to sprout.
- Vehicles can also transport seeds from other areas and introduce new species previously unknown to the area.

ii. Loss of habitat

- Some vegetation may be destroyed during decommissioning, which may result in loss of species composition and diversity. Decommissioned areas must be rehabilitated to restore the habitats.

9.3.4.1 Cumulative Terrestrial Biodiversity Impacts

Cumulative impacts including other approved EGI projects within a 30 km radius are considered. There are several approved renewable energy projects in the area, and due to the Carmel Eskom substation, the grid connection density for transmission and distribution in this area could become exceptionally high. However, with appropriate management plans the vegetation cover and structure underneath these facilities can be well managed to ensure the persistence and protection of the natural vegetation.

i. Habitat Loss and Fragmentation

- The vegetation types are not threatened but are located on a Class 2 ridge. This linear development will be located in close proximity to an existing Eskom substation where the grid infrastructure is already abundant.
- The extent of the substation footprints and the pylon footings will impact the vegetation.
- Grassland and Bushveld habitats still remain important ecological features in terms of ecosystem functioning, climate refugia, landscape corridors and harbouring endemic species.

The loss of vegetation and fragmentation of natural habitats which is virtually unavoidable with any type of development, has a negative impact on the regional ecosystem as it disrupts the natural flow of ecosystem services and affects all fauna and flora that are dependent on those habitats. The impact of clearing the vegetation was rated by the terrestrial biodiversity specialist to be 'Moderate' Negative. Limited meaningful mitigation measures are possible, and rehabilitation post-construction and post-operational are required.

9.3.5 Faunal Impacts

No faunal impacts are identified for the proposed development. The terrestrial biodiversity specialist found that *Clonia uvarovi* and *Lepidochrysops procera* are unlikely to be affected by the proposed OPL grid connection, especially in context with the prevailing current impacts on the site. The Spotted-neck Otter (*Hydrictris maculicollis*; IUCN Vulnerable) is not considered (under 'the precautionary principle') to occur within the study area owing to a lack of suitable habitat.

9.3.6 Geohydrological Impacts

A Desktop Geohydrological Impact Assessment was undertaken by GEOSS, in July 2023 and a site assessment was conducted in March 2024 with the report being issued in May 2024 (as per Appendix D10).

The list of potential Geohydrological impacts for the construction and operational phases of the proposed Carpe Diem North SPP includes:

- **Potential impact on groundwater quality due to accidental oil spillage/fuel leakage;**
- **Potential impact on groundwater quality due to leakages from BESS; and**
- **Potential impact on groundwater quality due to leakages from cleaning of solar panels.**

The amount and use of water during the decommissioning phase of the solar PV facility, at this stage, is uncertain. Decommissioning will likely require the usage of heavy machinery and other equipment; therefore, precaution should be taken for spilling of hydrocarbons and contamination related to the operation of this equipment. It is recommended that monitoring of groundwater quality be implemented during this phase. The monitoring interval would depend on the work to be undertaken and the stipulated time frame in which the work would have to take place.

The cumulative impacts of the Carpe Diem North SPP, with respect to groundwater quality, are believed to be minimal by the geohydrological specialists. Considering that the sites will be exposed to contamination sources during the construction and decommissioning phases mainly, which is expected to be short periods of time in comparison to the operation phase of the solar facility. The total water usage is also relatively low and will also be at a minimum during the longer operation phase. Thus, the cumulative impacts are considered minimal.

It would be prudent to consider the implementation of a quarterly monitoring programme of the production boreholes, ideally initiated at least one year prior to the commencement of construction if the project timeframes permit. This would serve to confirm the baseline water levels throughout one wet and dry season cycle, as well as confirm the baseline water quality. Monitoring would also ensure that the extracted volumes comply with relevant authorised abstraction volumes. Temporal water level, water quality and abstraction data should be collected. This data should be reviewed and interpreted on at least a quarterly basis. The geohydrological assessment (and similar assessments in the area) would need to be reviewed if and when final water requirements for the area become available, e.g. if additional water is required for additional/new developments in the region, or if water requirements for any of the facilities change.

When considering the potential impacts of the development on the groundwater resources of the area as well as the availability of potential groundwater resources the following recommendations/mitigation measures have been proposed for the Carpe Diem North SPP by GEOSS:

- The groundwater supply can be sourced from either existing boreholes on neighbouring properties, newly developed boreholes, or a combination of these options.
- The legal status of groundwater use at each property should be confirmed. This will inform the need for future water use authorisations. All water uses as defined in the NWA (1998) need to be considered.
- Making use of any groundwater resources in the area will require a Water Use License Application to the Department of Water and Sanitation under Section 39 of the National Water Act, 1998 (Act No. 36 of 1998).
- Every effort should be made to visit all boreholes and undertake yield and quality tests at boreholes that could be considered for future supply (based on their relative proximity). The information obtained from the National Groundwater Archive (NGA) database would be a useful starting point in determining which of the boreholes should be tested for their yields.
- Groundwater exploration via geological and geophysical methods is recommended for the proposed solar facility, should existing boreholes not be sufficient to meet the demand. Groundwater exploration aims to understand the geological environment, which can increase the chance of borehole success, and provide more realistic yields and depths of a borehole to be drilled, which could be expected.
- All boreholes planned for use will require scientific yield and quality testing and analysis.
- Monitoring of groundwater (abstraction volumes, quality and water levels) will be required, this should ideally be implemented one year prior to the start of construction if the project timeframes permit.
- All mitigation measures related to groundwater contamination from BESS leakages, accidental oil and fuel spillages, and cleaning agents proposed in this report need to be adhered to.

9.3.7 Heritage Issues/ Impacts

No evidence was found on site by the heritage specialists of any archaeological or heritage sites within the environs of the study area. Consequently, the Heritage Impact Assessment (**Appendix D6**) confirmed that no impact is expected from the proposed development on heritage. With no impact expected on heritage, no further mitigation is required.

If heritage resources are discovered during site clearance, construction activities that may impact the find must stop, and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures. Furthermore, no preferences on heritage grounds were given for any particular layout among the various site options under consideration. It was concluded by the respective specialist that the overall impact of the proposed development on heritage resources will be 'Low'. Provided that the general recommendations and mitigation measures outlined in the Heritage Impact Assessment are implemented, the impact would be acceptably 'Low' or could be totally mitigated to the degree that the project could be approved from a heritage perspective.

9.3.8 Visual Issues/ Impacts

The Visual Impact Assessment (**Appendix D5**) site visit was undertaken by Graham Young Landscape Architect, on 27 October 2022 and 15 March 2023.

The impact on the visual environment during the construction phase is assessed to have a low intensity over a localized area and would occur over the short-term (less than five years). The significance of the unmitigated impact would be localized but extend beyond the site boundary (to at least 3,0km in some areas) and is predicted to be 'Moderate'. The implementation of mitigation measures would not significantly reduce the anticipated impact, which would remain 'Moderate'.

The impact on the visual environment during the operational phase is assessed to have a moderate intensity and would occur over the long-term (anticipated to be thirty years). The unmitigated impact would be localized but extend beyond the site boundary (to at least 3,0km) and is assessed to be 'Moderate'. The significance of a moderate impact is that it should have an influence on the decision and the impact will not be avoided unless it is mitigated. With effective mitigation the impact could reduce to 'Low'.

At decommissioning the impact is expected to have a low intensity over a localized area and would occur over the short-term (less than five years). The significance of the unmitigated impact would be localized but extend beyond the site boundary (to at least 3,0km in some areas) and is predicted to be 'Low'. The implementation of mitigation measures would not significantly reduce the anticipated impact during this phase and would remain 'Low'.

The degree of Confidence of the significance assessment is moderate as the results of the I&AP process were not known at the time of drafting the report. It is assumed that sensitivity to the Project is moderate. After decommissioning, the site will be rehabilitated back to its original topography and vegetative cover.

Impact of Glint and Glare

The South African Civil Aviation Authority (SACAA) obstacle notice 3/20201 Additional Requirements for Solar Project Applications states that a Glint and Glare Assessment would not be required if the solar PV facility is not within a 3km radius of the aerodrome (Part 139.01.30 (3)). Therefore, a full Glint and Glare Assessment is not required.

Cumulative Effect

The intervisibility and the Project along with the other solar PV projects proposed in the sub-region, would over time, result in the nature and character of the study being impacted in a manner beyond the anticipated moderate negative impact of the proposed Project alone. The significance of the cumulative impact of these projects during their operational phases is assessed to be a moderate intensity and over the long-term with an unmitigated sub-regional impact extending beyond the sites, which is assessed to be 'Moderate'.

Effects of Night Lighting

I&APs consistently raise the impact of night lighting, specifically when they can be seen from tourist or residential sites and when the effect would continue for the Project's life. The negative effect of night lighting caused by the SPP would be seen against a night sky already impacted by lights from surrounding residential and mining areas. Security lighting could, however, potentially, be detrimental to people living immediately north and east of the site as well as users of the aerodrome. Management measures should be implemented to limit the spillage of light beyond the SPP's site boundaries.

The following generic mitigation measures are suggested for the Project. The following general actions are recommended:

1. Planning and site development

- With the preparation of the land within the full extent of the servitude onto which activities will take place, the minimum amount of existing vegetation and topsoil should be removed.
- Specifications with regards to the placement of construction camps (if required), as well as a site plan of the construction camp, indicating waste areas, storage areas and placement of ablution facilities, should be included in the EMP. These areas should either be screened or positioned in areas where they would be less visible from the public road north of the Project site.
- Construction activities should be limited to between 08:00 and 17:00 or in conjunction with the ECO.
- Adopt responsible construction practices that strictly contain the construction/establishment activities to demarcated areas.
- Building or waste material discarded should be undertaken at an authorised location, which should not be within any sensitive areas.

2. Earthworks and vegetation

- Earthworks should be executed so that only the footprint and a small 'construction buffer zone' around the proposed activities are exposed. In all other areas, the naturally occurring vegetation should be retained, especially along the periphery of the site(s).
- Disturbed soil must be exposed for the minimum time possible once cleared of vegetation to avoid prolonged exposure to wind and water erosion and to minimise dust generation.

3. Good Housekeeping

- "Housekeeping" procedures should be developed for the Project to ensure that the project site and lands adjacent to it are kept clean of debris, garbage, graffiti, fugitive trash, or waste generated on-site; procedures should extend to control of "track out" of dirt on vehicles leaving the active construction site and controlling sediment in stormwater runoff.
- During construction, temporary fences surrounding the material storage yards and laydown areas should be covered with 'shack' cloth (khaki coloured) or shade cloth.
- Operating facilities should be actively maintained during operation.

9.3.9 Traffic Issues/ Impacts

The Traffic Impact Assessment (**Appendix D8**) was undertaken by Koleko Solutions, in July 2023.

Based on the findings of this study, the following conclusions were made:

- The proposed plant has a GLA of 6,247,400 m².
- The access road into the Carpe Diem PV facility is via the D92-1020.
- Based on the information provided by the client, during operation, there is an expected 3 vehicles per hour IN and OUT of the facility. During construction, there is an expected 10 vehicles per hour IN and OUT of the facility of which 5 are trucks.
- Traffic counts were conducted at three intersections adjacent to the development.
- All the intersections operated under capacity and with an acceptable level of service (LOS A) for the existing and future scenarios.
- No road upgrades were found to be required to accommodate the traffic generated from the development both during the construction and operational phases.
- This parking generation rate was used to calculate the expected parking requirements at the proposed development, based on the GLA of each site.
- It is recommended that at least 10 parking bays be provided on-site.

The cumulative impact of traffic generated by the proposed project is projected to be low since the activity is localized, and any cumulative effect will mostly be negligible.

From a traffic engineering perspective, the proposed development is expected to have a minimal traffic impact on the current surrounding road network. Hence it is recommended that the development be approved from a traffic engineering perspective.

9.3.10 Socio-Economic Issues/ Impacts

The Draft Socio-Economic Baseline Report (**Appendix D7**) was undertaken by Multi-Purpose Business Solutions, in August 2023.

1. Carpe Diem Solar PV Plant:

Various qualitative and quantitative impacts of a socio-economic nature are attributed to a development project; these impacts can be divided between those applicable to the construction or post - construction (operational) phases. Construction for the proposed Carpe Diem North SPP is expected to be approximately 2 years.

Potential positive socio - economic impacts: -

- Local communities will benefit from the provision of renewable energy;
- Create local employment opportunities for people with different types and levels of skills during construction and operations;
- The local and provincial economies will benefit from the procurement of goods and services and the spending of wages and salaries during construction and operations; and

- The development will create opportunities for small businesses in the goods and services sectors during construction and operations.

Potential negative socio - economic impacts during construction: -

- The movement of large construction vehicles will affect traffic flows and residents along the access routes.
- Construction activities create dust and noise at the development site that would affect nearby receptors.
- An influx of job seekers could lead to competition with local residents for employment opportunities.
- The presence of construction activities may contribute to an increase in local crime.

Potential negative socio - economic impacts during operations: -

- The proposed development may impact the sense of place for passing tourists and surrounding land users.
- Passing aeroplanes and people that may be affected by glare and glint from the PV panels.
- The development could negatively impact surrounding landowners in terms of the perceived value of surrounding properties if they affect income production or the sense of place.
- Target for on-site criminal activities, in particular from syndicates in search of high-value components.

2. Overhead Powerline:

Various potential qualitative and quantitative impacts are associated with the construction and operational phases of an OPL. Construction for the proposed Carpe Diem LiLo OPL is expected to be less than 2 months.

Potential negative socio - economic impacts associated with the proposed Carpe Diem LiLo OPL are provisionally identified as follows: -

- Nuisance factors, such as dust and noise (construction);
- Increase in local crime (construction);
- Loss of agricultural land (operations); and
- Health risks of electromagnetic field.

Potential positive socio - economic impacts include the following: -

- Minimal environmental degradation due to short length of LiLo OPL connection on-site;
- Provision of electricity - related infrastructure;
- Creating new employment opportunities (construction); and
- Local economic income (construction).

The cumulative impacts refer to any other additional development(s) as well as existing activities within the immediate area that could compound any positive or negative impacts associated with the proposed development. For the Carpe Diem North SPP, this particularly relates to other renewable energy projects within 30 km of the proposed development sites.

9.3.11 Cumulative Impacts

As discussed in detail under the various Specialist Assessments above, the cumulative impacts of the proposed Carpe Diem North SPP refer to any other additional development/s in the region, as well as existing activities within the immediate area that could compound any positive or negative impacts associated with the proposed development.

For the Carpe Diem North SPP, this particularly relates to other renewable energy projects within 30 km of the proposed development sites. There are currently no Concentrated Solar Power facilities within 30 km of the proposed development site. However, due to the siting of Eskom's Carmel MTS, there are several Solar Photovoltaic facilities either undergoing application, or currently authorised, within the 30 km radius surrounding the proposed development site and, consequently, Carmel MTS, as indicated in Figure 51 below.

Despite the number of Solar PV facilities within a 30 km of the proposed Carpe Diem North SPP development, Specialist assessments and ratings of the respective cumulative impacts support the cumulative impact environmental statement that the proposed development may proceed subject to Specialist and Authorities recommendations and conditions.

Table 36: Proximity of Cumulative Impact Solar PV Projects to Proposed Carpe Diem North SPP

No.	Project Name	DFFE Reference No.	Capacity	Proximity
1	Carpe Diem South SPP	14/12/16/3/3/2/2681	150 MW	Neighbouring site
2	Carmel Solar 1 Photovoltaic Solar Energy Facility (SEF)	14/12/16/3/3/2/2310	240 MW	Neighbouring site*
3	Carmel Solar 2 PV SEF	14/12/16/3/3/2/2311	240 MW	Neighbouring site*
4	Varkenslaagte Solar PV SEF	14/12/16/3/3/2/2312	240 MW	Neighbouring site*
5	Carmel Solar 3 PV SEF	14/12/16/3/3/2/2313	240 MW	Neighbouring site*
6	Varkenslaagte Solar PV SEF	14/12/16/3/3/2/2312	240 MW	Neighbouring site*
7	Turffontein Solar 1 PV SEF	14/12/16/3/3/2/2314	240 MW	< 4 km
8	Carletonville SPP	14/12/16/3/3/2/2575	300 MW	< 5 km
9	Mopane Solar PV 2	14/12/16/3/3/2/2293	130 MW	< 6 km
10	Mopane Solar PV 3	14/12/16/3/3/2/2294	130 MW	< 6 km
11	Rooidraai Solar PV SEF	14/12/16/3/3/2/2344	150 MW	~10 km
12	Seelo Alpha Solar PV & BESS Project	14/12/16/3/3/2/2343	240 MW	< 10 km
13	Seelo Beta Solar PV & BESS Project	14/12/16/3/3/2/2342	240 MW	< 10 km
14	Seelo Charlie Solar PV & BESS Project	14/12/16/3/3/2/2341	149 MW	< 10 km
15	Rooidraai Solar PV SEF	14/12/16/3/3/2/2344	150 MW	~10 km
16	Mopane Solar PV 4	14/12/16/3/3/2/2295	120 MW	< 11 km
17	Phadima Solar PV Facility	14/12/16/3/3/2/2375	240 MW	~14 km
18	Angus Solar Power Plant	14/12/16/3/3/2/2351	250 MW	< 19 km*
19	Bonsmara Solar Power Plant	14/12/16/3/3/2/2352	250 MW	< 22 km*

No.	Project Name	DFFE Reference No.	Capacity	Proximity
20	Tuli Solar Power Plant	14/12/16/3/3/2/2353	250 MW	< 22 km*
21	Simbra Solar Power Plant	14/12/16/3/3/2/2354	250 MW	< 22 km*
22	Sibanye PV	14/12/16/3/3/2/919	200 MW	~27 km

* **Note:** Some developments are an incremental combination of farms which lie adjacent to each other with each combination registered as a separate application.

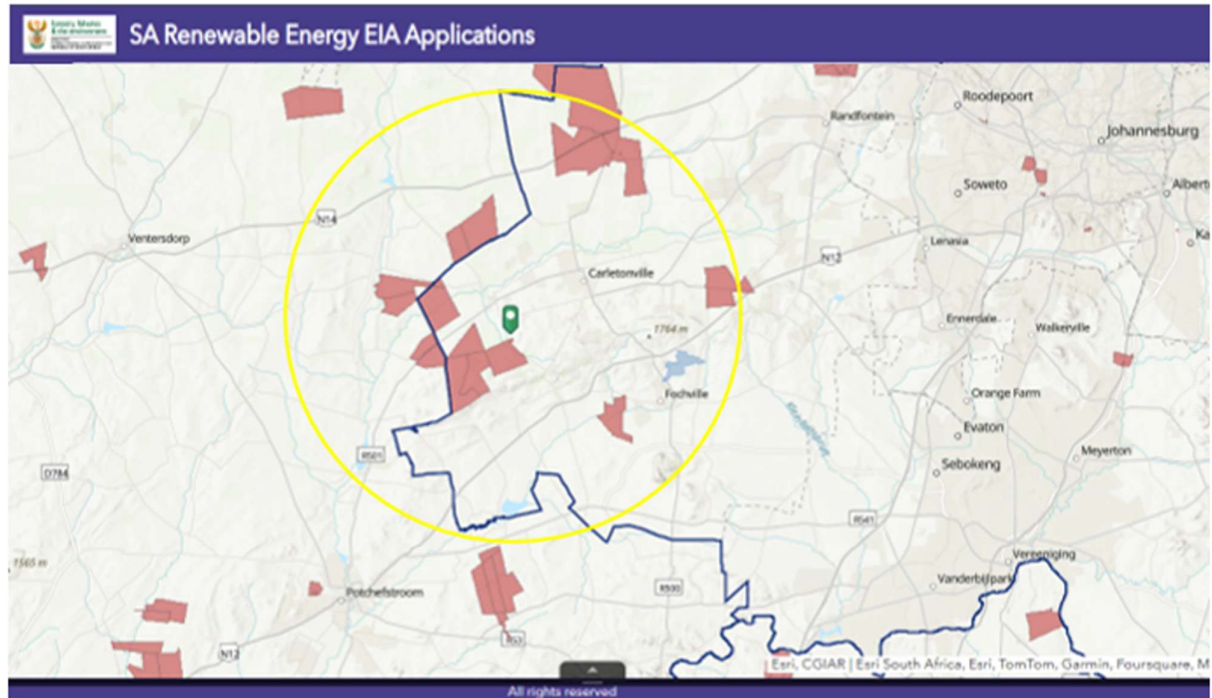


Figure 51: Cumulative map³⁹ of other solar PV applications (indicated in red) surrounding proposed Carpe Diem North SPP development site (centre of proposed development site indicated with green marker). Approximate 30 km radius from centre of proposed development site indicated with yellow circle.

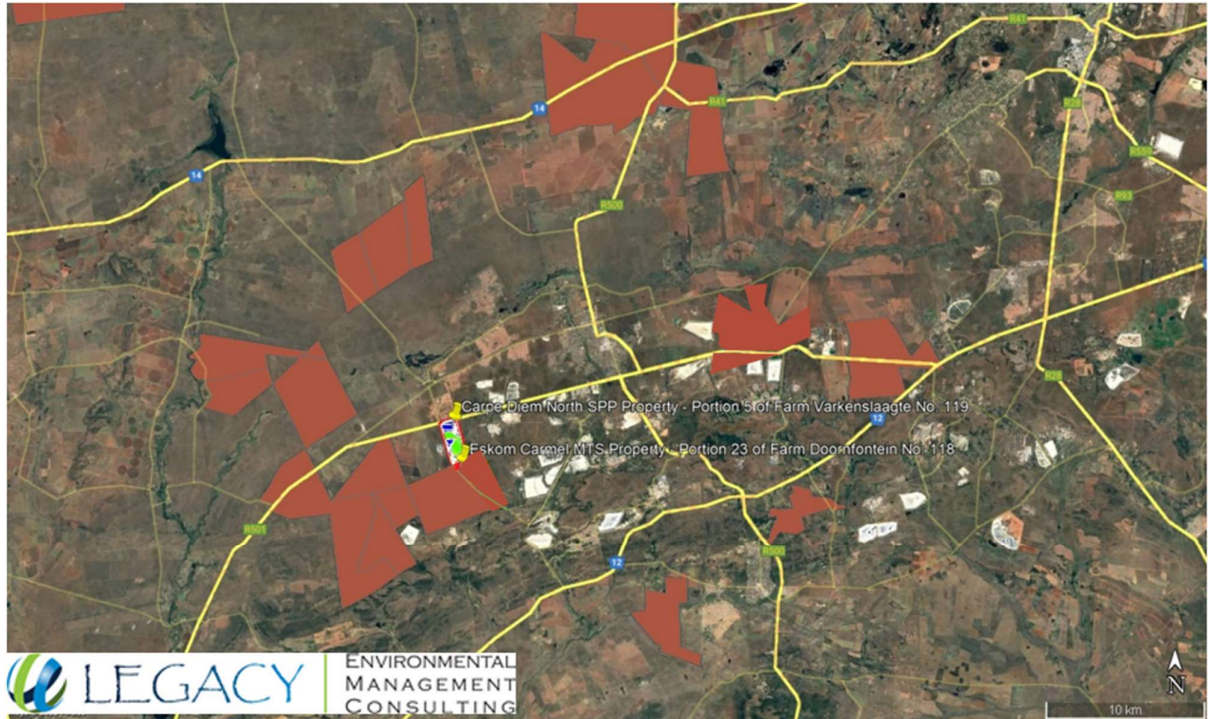


Figure 52: Cumulative Map of other solar PV applications (indicated by the maroon polygons) within 30 km of the proposed Carpe Diem North SPP development site, which is overlain with environmental sensitivities.

Carpe Diem North SPP environmental sensitivities are displayed as per **Figure 48** above and **Appendix K4** of this FEIAR.

9.3.12 Impacts Associated with the No-Go Alternative

The option to not proceed with the development will result in many of the identified impacts not occurring. As such, potential negative impacts such as visual intrusion or terrestrial biodiversity losses, will not be realised and therefore do not need to be mitigated. Similarly, however, positive impacts related to economic income and employment opportunities, as well as contribution towards meeting the Country's climate change commitments will not be realised.

In some instances, however, the option of not proceeding with the development may result in impacts, predominantly related to the continuation of the status quo (or 'business as usual').

In terms of biophysical impacts associated with the no-go alternative, the following are relevant:

Impact on vegetation: Tilling for crop production and grazing of the fallow lands and natural pastures will likely continue under the no-go scenario, as well as the proliferation of alien plant species and the continuation of littering activities on site, therefore preventing the natural succession of fallow lands back to indigenous vegetation in areas where this takes place.

In terms of socio-economic impacts associated with the no-go, the following are relevant:

- **Socio-Economic:** In the absence of the SPP, the envisaged impact (e.g. crime) or opportunity (e.g. job creation) related thereto will not be realised.

- **Traffic:** Without the proposed SPP, the potential traffic impact will not be realised. The current demand on the existing road network in the site vicinity is low and the road network and intersections operate at acceptable levels of services. All the intersections and roadways will continue to operate at acceptable levels of service in the future during the worst peak hours of the year without the proposed development.
- **Noise and Dust:** Without the proposed SPP, the potential impact of noise and dust during the construction phase will not be realised, although ongoing farm activities could create dust and noise independently of the proposed development.
- **Contribution to renewable energy:** Without the proposed PV Plant, the potential contribution towards renewable energy - and perhaps cheaper electricity for local industries - will not be realised.

In terms of heritage impacts associated with the no-go, the following are relevant:

- The no-go alternative in heritage terms is self-evident, i.e. there would be no potential impacts on heritage resources.

Section 38(3)(d) of the NHRA requires that an evaluation of impacts on heritage resources also be made relative to the sustainable socio-economic benefits to be derived from that development. In terms of the subject proposals, there is no question that the installation will have substantial socio-economic benefits for the local community, at a time when both nuclear energy and coal-generated energy are becoming increasingly controversial for cost and environmental reasons. Of all sources of energy generation currently implemented in the country, coal is undoubtedly the least sustainable with proven environmental problems, while nuclear energy is becoming increasingly uncompetitive as the cost of energy storage for clean systems involving wind and photovoltaic generation rapidly decreases. The PV Installation has an operating life span of 20 - 25 years and in the event of not proving viable or problematic for other reasons, could be fully removed at the end of that period.

In terms of agricultural impacts associated with the no-go, the following are relevant:

- Farming activities could be established on-site in future with limited capacity, as has been the case historically.
- The opportunity to generate capital i.e., the yearly remuneration for the farmer(s) for leasing a portion of his land for the proposed SPP, for future farming developments will not be realised.

9.3.13 Impacts that may result from the Decommissioning and Closure Phase

The impacts that may result from the decommissioning phase are summarised, where relevant.

In the case of an SPP, the decommissioning phase involves the disassembly and/or replacement of the existing PV panels with modern technology, which usually happens 20 to 30 years after the initial commissioning. The decommissioning phase could therefore create additional construction - related employment opportunities as opposed to the typical job loss associated with decommissioning.

If the PV panels are disassembled and the site is not further utilised for solar energy production, the land needs to be rehabilitated to its former state. The environmental rehabilitation of disturbed areas is the responsibility of the developers, who should make provision for this in their long-term budget.

Solar and wind energy technology is essentially reversible and decommissioning a renewable energy facility is straightforward and simple compared to the problems associated with decommissioning a nuclear power station or a coal or gas-fired plant (<http://www.bwea.com/ref/faq.html#decomissioning>). The concrete bases

could be removed or covered with peat, stone or other indigenous material and the site returned as close as practicably possible to its original state. The way that a local authority wishes to have a renewable energy facility decommissioned should be covered by clauses in its planning permission. These clauses typically require all visible traces of the renewable energy facility to be removed.

The Decommissioning Phase of the PV plant will only occur if the need for a PV plant at this particular site has become obsolete and if new technology cannot be employed to prolong the operational phase of the PV plant. The development will aim to maximise the civil and electrical investments made. In the case of decommissioning, mitigation measures have been included in the EMPr for the removal of all PV plant infrastructure and the safe disposal of any material or potentially hazardous material from the SPP footprint.

The Decommissioning Phase has been considered and assessed by the specialists (where relevant) albeit the Applicant does not intend to decommission the development in the foreseeable future. In the unlikely event that decommissioning does take place, it should undergo the necessary assessment as per the legal requirements at the time of decommissioning. It is, however, envisaged that upgrades and refurbishment of the PV Plant may take place in the long-term future.

Direct impacts would include the creation of new jobs for workers during decommissioning activities and the associated income and taxes paid. Indirect impacts would occur from new economic development and would include things such as new jobs at businesses that support the decommissioning workforce or that provide project materials, and associated income and taxes.

9.4 Description and Assessment of the Significance of Impacts prior to and after mitigation

Summary tables of the assessment of potential environmental impacts that may arise during the construction and operation phases of the project are provided in the appended specialist studies (**Appendix D**) and impact assessment tables (**Appendix F**), where relevant.

9.5 Summary of Potential Environmental and Social Impacts

The final impact assessment for the construction, operation and decommissioning phases is summarised as follows:

Table 37: Summary of Potential Environmental and Social Impacts

CONSTRUCTION PHASE		
Criteria	Rating Before mitigation	Rating After mitigation
TERRESTRIAL BIODIVERSITY		
Habitat loss and fragmentation		
Status and Nature of the Impact	Negative; High (H)	Negative; Moderate (M)
Loss of SCC		
Status and Nature of the Impact	Negative; High (H)	Negative; Moderate (M)
Increased alien invasive species		
Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Moderate (M)

Increased erosion and soil compaction		
Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Moderate (M)
Littering and general pollution		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
CUMULATIVE IMPACTS		
Loss of vegetation during construction phase		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Moderate (M)
AVIFAUNAL IMPACTS		
Habitat Destruction		
Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Moderate (M)
Disturbance of bird roosts and breeding sites		
Status and Nature of the Impact	Negative; High (H)	Negative; Low (L)
Disturbance due to noise such as machinery movements and maintenance operations		
Status and Nature of the Impact	Negative; High (H)	Negative; Low (L)
CUMULATIVE IMPACTS		
Habitat Loss		
Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Moderate (M)
Collision mortality (vehicle)		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
Collision mortality (infrastructure)		
Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Moderate (M)
VISUAL IMPACTS		
Visual Impacts of the SPP		
Change to the landscape characteristics and key views caused by the physical presence of project activities during the construction phase.		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Moderate (M)
Visual Impacts of the OPL		
Change to the landscape characteristics and key views caused by the physical presence of project activities during the construction phase.		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)
HERITAGE IMPACTS		
Disturbance to unidentified heritage resources		

Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)
Palaeontological sensitivity impact		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Moderate (M)
SOCIO-ECONOMIC IMPACTS		
Economic benefit from local procurement – contribution towards local economic income and employment		
Status and Nature of the Impact	Positive; Moderate (M)	N/A
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Positive; Moderate-High (MH)	N/A
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
Nuisance Factors (Dust and Noise) affecting nearby receptors		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Moderate (M)
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
Influx of job seekers increasing employment competition		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Moderate (M)
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
Incoming construction workers can disrupt family structures and social networks in local communities		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Moderate (M)
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
Potential increase in local crime		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Moderate (M)

NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
TRAFFIC IMPACTS		
Increased traffic volume during construction		
Status and Nature of the Impact	Negative; Low (L)	Negligible
CUMULATIVE IMPACTS		
Status and Nature of the Impact	N/A	N/A
GEOHYDROLOGICAL IMPACT		
Potential impact on groundwater quality from accidental oil spills or fuel leakage		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
Impact on groundwater quality due to leakage from BESS		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Very Low (L)
CUMULATIVE IMPACT		
Status and Nature of the Impact	Negative; Low (L)	Negligible

OPERATIONAL PHASE		
Criteria	Rating Before mitigation	Rating After mitigation
AVIFAUNAL IMPACTS		
Disturbance due to noise such as machinery movements and maintenance operations		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)
Bird Mortalities		
Status and Nature of the Impact	Negative; High (H)	Negative; Moderate (M)
Loss of Bird Foraging Habitat		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)
Disruption of bird migratory pathways		
Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Moderate (M)
Attraction of some novel bird species		
Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Moderate (M)
Chemical Pollution Spills		
Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Low (L)

CUMULATIVE AVIFAUNAL IMPACTS		
Criteria	Rating Before mitigation	Rating After mitigation
Habitat Loss		
Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Moderate (M)
Increased Collision Mortality (Vehicles)		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
Increased Collision Mortality (Infrastructure)		
Status and Nature of the Impact	Negative; Moderate-High (MH)	Negative; Moderate (M)

TERRESTRIAL BIODIVERSITY		
Terrestrial Biodiversity Impacts		
Loss of species composition and diversity		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Moderate (M)
Increased alien and invasive species		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
Littering and general pollution		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)

GEOHYDROLOGICAL IMPACTS		
Potential impact on groundwater quality due to leakages from BESS.		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Very Low (VL)
Potential impact on groundwater quality due to leakages from cleaning of solar panels.		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)

POTENTIAL POSITIVE SOCIO-ECONOMIC IMPACTS:		
Provision of renewable electricity		
Status and Nature of the Impact	Positive; Moderate (M)	N/A
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Positive; High (H)	N/A
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
Contribution towards employment		
Status and Nature of the Impact	Positive; Low (L)	N/A

CUMULATIVE IMPACTS		
Status and Nature of the Impact	Positive; Moderate (M)	N/A
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
Contribution towards local economic income		
Status and Nature of the Impact	Positive; Moderate (M)	N/A
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Positive; Moderate-High (MH)	N/A
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
POTENTIAL NEGATIVE SOCIO-ECONOMIC IMPACTS		
Sense of Place		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Negative; Moderate-High (HM)	Negative; Moderate (M)
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
Local Crime		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Very Low (L)
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
Surrounding property values		
Status and Nature of the Impact	Negative; Moderate (M)	Positive; Low (L)
CUMULATIVE IMPACTS		
Status and Nature of the Impact	Negative; Moderate (M)	Positive; Low (L)
NO-GO ALTERNATIVE		
Status and Nature of the Impact	N/A	N/A
VISUAL IMPACTS		
Visual Impacts of the SPP		
Change to the landscape characteristics and key views caused by the physical presence of project activities during the operational phase.		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)

CUMULATIVE IMPACTS		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Moderate (M)
Visual Impacts of the OPL Alternatives		
Change to the landscape characteristics and key views caused by the physical presence of project activities during the operational phase.		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)

TRAFFIC IMPACTS		
Increased traffic volume during operation		
Status and Nature of the Impact	Negative; Low (L)	N/A

DECOMMISSIONING PHASE		
Criteria	Rating Before mitigation	Rating After mitigation

TERRESTRIAL BIODIVERSITY IMPACTS		
Loss of habitat		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)
Increased alien invasive species		
Status and Nature of the Impact	Negative; Moderate (M)	Negative; Low (L)

VISUAL IMPACTS		
Visual Impacts of the SPP		
Change to the landscape characteristics and key views caused by the physical presence of Project activities		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)
Visual Impacts of the OPL Alternatives		
Change to the landscape characteristics and key views caused by the physical presence of Project activities		
Status and Nature of the Impact	Negative; Low (L)	Negative; Low (L)

9.6 Gaps in knowledge, underlying assumptions and uncertainties

9.6.1 Gaps in knowledge

The experience and competency of the EAP, the public participation process currently being undertaken, and the detailed specialist studies should ensure that there are very few, to no gaps, in knowledge regarding the completion of this FEIAR. However, the following known gaps in knowledge currently exist:

- New information may come to light during the Scoping and EIA Process. Such information will be considered by the EAP and assimilated into the development proposal (as and if required).
- Any inaccuracies in the sources of information used could limit this report. However, the EIA process is in the Scoping Phase which means that should there be any additional gaps in knowledge due to insufficient information, an opportunity exists during the EIA process for the improvement of information, should this be necessary.

9.6.2 Underlying assumptions

The following assumptions and limitations apply to this report:

- Where data supplied by Applicant/ proponent or other specialist consultants, has been used, it has been assumed that the information is correct, unless otherwise stated. No responsibility is accepted by Legacy EMC for incomplete or inaccurate data supplied by external parties;
- It is Legacy EMC's professional opinion that the adopted predictive methods are sufficient and adequate for rating the significance of the impacts during the Impact Assessment;
- Legacy EMC's assessment of the significance of impacts of the proposed project on the receiving environment has assumed that the activities will be confined to the area as described in Section 1 and Section 4. If there are any substantial changes to the description of the proposed activity, impacts may need to be reassessed;
- Where detailed information is not available, the precautionary principle, i.e. a conservative approach that overstates negative impacts and understates benefits, has been adopted;
- It is assumed that the PPP undertaken during this process has identified all relevant concerns of stakeholders;
- Limitations and uncertainties within the various techniques adopted by the specialists are referred to in each specialist study, where relevant;
- The proponent will in good faith implement the agreed mitigation measures identified in this report. In this regard, it is assumed that the proponent will commit sufficient resources and employ suitably qualified personnel; and
- Notwithstanding the above, Legacy EMC is confident that these assumptions and limitations do not compromise the overall findings of this report.

The preliminary assessment of impacts is based on input from the specialist reports as well as the experience of the EAP with the previous Scoping and EIA Process and other similar projects. Mitigation measures have been proposed all of which have been included in the EMPs made available for comment during the EIA Phase. Such mitigation is considered to be reasonable and must be implemented in order for the outcome of the assessment to be accurate. The Applicant has confirmed that they have the necessary resources and expertise to undertake the recommended mitigation measures.

9.6.3 Uncertainties

The information provided in this FEIAR is based on specialist reports, site assessment (September/October 2022, January and September 2023 and April 2024) and desktop investigations (December 2022, and updated in 2023 and again in 2024/2025). Where relevant, comments from I&APs have been incorporated into this FEIAR.

10 ENVIRONMENTAL IMPACT STATEMENT

10.1 Environmental Impact Statement

In accordance with the EIA Regulations of 2014, as amended, the environmental impact statement must contain the following.

- Summary of the key findings of the environmental impact assessment;
- A map at an appropriate scale that 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 (Refer to the Preferred Layout Plan attached as Figure 2) and
- A summary of the positive and negative impacts of the proposed development.

10.1.1 Summary of the key findings of the EIA

The key findings of the EIA are:

- From the impact assessment undertaken, the overall impacts of the proposed Carpe Diem South SPP Development on the environment are predominantly anticipated to be of a 'High' (in some instances, 'Moderate High' and 'Very High' significance) to 'Moderate' negative significance before mitigation and 'Moderate' or 'Low' negative (apart from a 'Moderate-High' negative cumulative impact on Sense of Place) after mitigation measures have been implemented. In some instances, the proposed development will have 'Moderate-High' to 'Low' positive implications on the surrounding environment, especially on the socio-economic environment of the area.
- The proposed development is not incompatible with agriculture and the grazing of small stock can be allowed on the site during the operational phase.
- Since the proposed development will not occupy scarce, viable cropland, the land can potentially still be used for grazing and its negative impact may be offset by economic and other benefits to farming, the overall negative agricultural impact of the development (loss of future agricultural production potential) is assessed as being of 'Low' significance and is considered acceptable.
- The proposed PV project is situated within an area dominated by anthropogenic activities including mining, industrial structures and residential development to the north. The landscape is thus highly modified and fragmented, with only patches of remaining natural grassland and/or bushveld. The presence and abundance of alien invasive species although not as high as on some of the neighbouring properties e.g., to the south, is still high with several other anthropogenic impacts including roads, alien invasive species stands, agricultural land, and secondary grassland (previously ploughed).
- There are no aquatic features/watercourses located on the Carpe Diem North SPP site as indicated from desktop studies and confirmed through physical site visits to undertake aquatic sensitivity verification assessments.
- Due to the avoidance of 'Very High' and 'High' terrestrial biodiversity sensitivity rated areas, no intact examples of a protected or endangered vegetation type will be affected by the development and no rare or threatened species occur on the site. There will be complete clearance of the development footprint when the ground based solar PV panel support frame and infrastructure is initially developed/installed. Thereafter, any vegetation that grows beneath the PV array will be trimmed.
- Although the STR anticipated the presence of sensitive plant and animal species in the study area, none of these species were observed during the site survey. Nevertheless, the existence of suitable habitat indicates that several species have the potential to inhabit the area. In summary, by applying

- appropriate avoidance mitigation of the most sensitive habitats, no significant adverse impacts to animal SCC are expected from the proposed development.
- The terrestrial biodiversity specialist confirmed that the current layout is supported from a terrestrial biodiversity perspective and adheres to the relevant recommendations.
 - No biodiversity offsets relevant to the terrestrial biodiversity aspects are required for the current layout.
 - The avifaunal specialist found that the project area is situated within a region characterised by mostly disturbed grasslands and patches of alien invasive trees, with some remaining natural areas. The density and diversity of Priority Species were low, with most being common, widespread, and largely synanthropic (excluding water- and grassland-associated species), while SCC were present in very low numbers.
 - The avifaunal specialist confirmed that the current layout aligns with the proposed specialist's mitigations and recommendations and that no avifaunal offsets are recommended.
 - Overall, the avifaunal specialists concluded that the impacts associated with SEF projects are far preferable (from an environmental impact perspective) to extractive and/ or non-renewable alternatives or even Wind Energy Facilities (WEF).
 - From a geotechnical perspective, development of the Carpe Diem North SPP is permitted provided precautionary measures are implemented such as the "SANS 1936, Part 3 (2012): Design and construction of buildings, structures and infrastructure"; not allowing the ponding of water on the site and ensuring the Local Authority, Merafong City Municipality, has a Dolomite Risk Management System.
 - From a heritage perspective, despite an intensive walkthrough of the footprint area for the proposed project by the heritage specialists, no evidence for any archaeological or heritage sites could be identified within the environs of the study area. As a result, no objection to the proposed construction was given, under the condition that a walkdown of the final approved footprints be conducted before construction commences, and a 'chance fossil finds procedure be developed, should any heritage fossils or artifacts be discovered during ground clearance or excavation.
 - The palaeontological specialist concluded that the construction of the development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.
 - From a visual impact perspective, the study area's scenic quality has been rated 'Low' to 'High' within the context of the sub-region. Sensitive viewing areas have been identified and mapped, indicating potential sensitivity to the Project, mainly for new residential areas (not yet occupied) to the immediate north of the site and for users of the R501 and local connector road west of the site. Impacts on views are the highest when receptors are sensitive to change in the landscape and the view is focused on and dominated by the change.
 - The impact on the visual environment during construction is assessed as 'Low' intensity over a localised area. It would occur over the short term (less than five years). The impact on the visual environment during the operational phase is assessed to have a "Moderate" intensity and would occur over the long term (anticipated to be thirty years). The unmitigated impact would be localised but extend beyond the site boundary (to at least 3,0km) and is considered 'Moderate'. The significance of a moderate impact is that it could influence the decision, and the effect will not be avoided unless it is mitigated. With effective mitigation, the impact could be reduced to 'Low'. At decommissioning, the impact is expected to be low intensity over a localised area and occur over the short term (less than five years).
 - The degree of confidence in the significance assessment might change if the results of the I&AP process indicate very high sensitivity to the development. The assessment has assumed a moderate receptor sensitivity to the Project. After decommissioning, the site will be rehabilitated back to its original topography and vegetative cover.

- From a traffic engineering perspective, the proposed development on the site is expected to have a minimal/'Low' traffic impact on the current surrounding road network. Hence it is recommended that the development be approved from a traffic engineering perspective.
- From a socio-economic perspective, the provision of renewable energy, increased employment opportunities and associated social benefits of the project are limited given the nature and scope of the project. However, the significant benefit of creating a sustainable flow of energy and unlocking benefits for local communities and businesses outweighs the social costs emanating from the proposed development.

10.1.2 Summary of the positive and negative impacts of the proposed development

The key positive and negative issues and impacts associated with the proposed development are summarised as follows:

- Avifaunal impacts include negative effects such as habitat loss, disturbance to bird roosts and breeding sites, noise-related disruption, increased mortality from collisions with vehicles and infrastructure, loss of foraging areas, disruption of migratory routes, attraction of new bird species, and risks from chemical pollution and spills.
- Terrestrial biodiversity impacts include habitat fragmentation and loss, proliferation of alien invasive species, increased soil erosion and compaction, pollution and littering, vegetation loss during construction, and a decline in species diversity and composition.
- Geohydrological impacts involve potential groundwater contamination from oil or fuel spills, leaks from the BESS, or the use of cleaning agents on solar panels.
- Visual impacts stem from changes to the landscape and key views due to construction activities, excavation for underground cables, and the presence of tall infrastructure structures.
- Traffic impacts are expected to be minor, with only limited congestion during construction.
- Heritage impacts include possible disturbance to unidentified heritage resources and palaeontological concerns, which are deemed low with mitigation.
- Socio-economic impacts involve negative and positive impacts. Negative impacts may include changes to the sense of place, an influx of job seekers, increased crime risks, disruption to local communities, and a potential decrease in nearby property values. Positive socio-economic impacts include the generation of renewable energy, job creation, and contributions to the local economy.

10.1.3 Summary of cumulative impacts (positive and negative) of the proposed development

Cumulative impacts, for the environmental themes listed in the STR, have been included in various specialist reports. The specialist assessments together with the EAP's statements regarding cumulative impacts have been included below.

Agriculture:

The cumulative agricultural impact of the proposed Carpe Diem North SPP is considered low and acceptable. Renewable energy projects must be located near substations with available capacity, naturally limiting their spread and thereby protecting most of the country's agricultural land. The site in question is only suitable for grazing, which is not scarce nationally and thus represents a minimal loss in agricultural productivity.

Moreover, the proposed development remains within the land use limits set by the agricultural protocol, aligning with national goals to preserve high-potential farmland; soil degradation risks are minimal and manageable through mitigation as included in the Standard EMP (refer to Appendix I3); the project can enhance financial security for the farm and grazing can continue beneath the PV panels, particularly benefiting from the added security of the fenced facility. Consequently, since no viable cropland is affected and grazing can still occur, the agricultural impact is deemed minor and justified.

Aquatic Biodiversity:

Desktop resources indicate no aquatic features within Portion 5 of Farm Varkenslaagte No. 119 IQ. This was confirmed by the specialist's site assessments conducted on the 27th and 28th of October 2022.

It should be noted that the cumulative impact for the immediately adjacent proposed Carpe Diem South SPP (which has a pre-mitigation impact rating of 'Medium' to 'Medium-High') was 'Very Low', 'Low' and 'None' (pre-mitigation). These post-mitigation results for the Carpe Diem South SPP site, support the conclusion that the overall cumulative aquatic impact of the proposed Carpe Diem North SPP will remain unaffected by the proposed Carpe Diem South SPP.

Terrestrial Biodiversity inclusive of ecosystems, as well as Plant/Flora Species and Animal Species:

Approximately four solar PV developments are currently located within 30 km of the proposed Carpe Diem North SPP, with more renewable energy projects expected due to the site's proximity to the Carmel Substation. The Terrestrial Biodiversity Specialist identified vegetation loss during construction as the main cumulative impact. However, the overall cumulative impact on terrestrial biodiversity is considered 'Low'. This is because the development footprint deliberately avoids areas classified as having 'High' or 'Very High' sensitivity, and the remaining portions of the site are already highly degraded or transformed. The area also shows a high presence of alien invasive species and is impacted by roads, agriculture, and previously disturbed land.

Avifaunal:

The avifaunal specialist assessed that several existing renewable energy developments in the region have already contributed to negative impacts on local avifauna, to which the proposed Carpe Diem North SPP would add further pressure - particularly in relation to habitat loss, fragmentation, and collision risks - and must therefore be evaluated within a cumulative impact context.

According to the Avifaunal Impact Assessment (**Appendix D4**), the cumulative impact of habitat loss was rated as 'Moderate-High' before mitigation and reduced to 'Moderate' after mitigation. Collision mortality caused by vehicles was assessed as 'Moderate' pre-mitigation, decreasing to 'Low' post-mitigation. Collision mortality associated with infrastructure, such as PV panels and transmission lines, was rated as 'Very High' prior to mitigation and reduced to 'Moderate-High' once mitigation measures are implemented.

The preconstruction surveys and subsequent impact analysis emphasize the need to assess these impacts in combination with those from existing developments, as the cumulative effect on avifaunal communities—particularly for threatened species—could be significant without proper mitigation. The avifaunal specialist concluded that the impact assessment and monitoring programmes recommended for the proposed development, indicate that the impacts can be mitigated to acceptable levels and that the assessment must be considered in context within the greater EIA process, which factors in economic desirability amongst other positive impacts.

Visual:

The cumulative visual impact of the proposed Carpe Diem North SPP, when considered alongside other existing and proposed solar PV projects in the area, was assessed as having a 'Moderate' intensity over the long term, with an unmitigated impact extending beyond the immediate site, thus influencing the wider sub-regional landscape.

While the projects would not be visible within the same direct line of sight, the overall intervisibility across the sub-region would, over time, alter the nature and character of the landscape. This gradual transformation was assessed with a 'Moderate' cumulative visual impact, similar in scale to that of the proposed project on its own. Collectively, these developments are expected to shift the visual baseline and the sense of place within the sub-region, even though they may not be simultaneously visible from a single viewpoint.

Archaeological/Cultural Heritage:

The potential pre-construction impacts on tangible cultural heritage resources were initially rated as 'Medium' negative but are expected to be reduced to a 'Low' negative impact with the application of recommended buffer zones and management measures. In terms of cumulative impacts, the heritage specialist assessed the effect of the proposed Carpe Diem North SPP on unidentified heritage resources (i.e., possible heritage resource finds during the project life) to be 'Low' both before and after mitigation.

The heritage specialists concluded that, if the general recommendations and mitigation measures outlined in the report are followed, the overall heritage impact would be acceptably low or could be mitigated to a level that allows for project approval. As a condition for proceeding, the specialists recommended a final walkdown of the approved development footprint prior to the start of construction.

Paleontological:

The cumulative palaeontological impacts of the proposed Carpe Diem North SPP were assessed as 'Medium' before mitigation and reduced to 'Low' post-mitigation, falling within acceptable limits for the project. As the development footprint is not considered sensitive in terms of palaeontological resources, the project is not expected to cause significant harm to the area's fossil heritage. Consequently, the construction of the development was considered acceptable from the palaeontological specialist for its full extent, and no further palaeontological studies, ground-truthing, or specialist mitigation measures are required—unless new fossil discoveries are made during construction.

10.2 EAP's Professional Opinion and Recommended Conditions of Authorisation

The EAP undertaking the EIA is required to provide the following:

- 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;
- Any aspects that were conditional to the findings of the assessment either by the EAP or specialist, which are to be included as conditions of authorisation.

It is concluded that the environmental impacts associated with the proposed development (including possible cumulative impacts) will not result in unacceptable long-term environmental impacts, should the proposed mitigation and monitoring measures, as are discussed in this document and contained in the attached EMPs

(refer to Appendices I1 to I3), be implemented diligently. The Standard EMPr (as per Appendix I3) includes the EMPrs should be included as a condition of authorisation.

The social and economic benefits associated with the proposed Carpe Diem North SPP are expected to outweigh the costs (negative biophysical impacts) resulting from the proposed development.

It is therefore recommended that the proposed development should be authorised under the condition that the mitigation measures as described in the attached EMPrs (as per Appendices I1 to I3) are implemented diligently and that regular compliance inspections are undertaken to ensure compliance with the prescribed mitigation measures.

The Preferred Site Layout (Alternative 1) is recommended since it provides the most efficient grid connection alternative; however, both site layout alternatives are proposed for EA since the final connection point at or near the Carmel MTS will be determined following negotiations with Eskom.

An Environmental Control Officer must be appointed by the Applicant to compile environmental compliance checklists on at least a monthly basis, to ensure that the construction phase of the development is implemented according to the recommendations of the EMPrs (as per Appendices I1 to I3), and that the construction phase complies with the conditions of authorisation. The results of the ECO Checklists should be submitted to the competent authority.

An annual ECO site inspection must be undertaken for the lifetime of the SPP. The results of the ECO Checklists should be submitted to the competent authority.

In addition, the following should be included as conditions of authorisation:

- A Procurement Strategy (as recommended by the Socio-Economic Assessment);
- The required plans and strategies listed in Section 4.2.1 of the Standard EMPr (as per Appendix I3) must be prepared prior to commencement of construction.

10.3 Duration and Validity

The EA, if granted, should be valid for a period of ten (10) years.

If the EA is granted and stands after the regulated appeal period, construction must commence before the EA validity period lapses.

To prevent the triggering of the NEMA EIA Regulations Listing Notice 1, Activity 32³⁹, the proposed development of the Carpe Diem North SPP and Associated infrastructure should be concluded by mid-October 2035, unless an amendment application is submitted to the Competent Authority to extend the EA validity period.

10.4 Conclusion

The following general conclusions are made:

1. The preferred location and preferred layout are attached as **Appendix J1**, included in **Figure 2**, respectively, and described in Section 4 (Scope of the Proposed Activity) of this report. The other layout alternatives, though not preferred, differ only in the OPL corridor indicated for grid connection

³⁹ Listing Notice 1, Activity 32: "The continuation of any development where the environmental authorisation has lapsed and where the continuation of the development, after the date the environmental authorisation has lapsed will meet the threshold of any activity or activities listed in this Notice, Listing Notice 2 of 2014 or Listing Notice 3 of 2014".

and are acceptable from an impact perspective since Alternative 2 is a UPL to be installed through trenchless excavation and Alternative 3 is partly a UPL (to be installed through trenchless excavation) with the remaining OPL part of the grid connection lying in an already registered OPL corridor under the Norm⁴⁰ (Registration No.: BESS/2024/GP/3).

2. The EAP has, therefore, consolidated the development proposal information into this FEIAR, in accordance with the content requirements of Appendix 3 to the EIA Regulations of 2014, as amended. The relevant information from the specialist studies, prepared as part of the previous application, has been incorporated into this report, with updated information provided by the EAP where required (e.g. updated biodiversity mapping and latest policy documents).
3. In terms of section 24 of the 2014 EIA Regulations, the EAP is of the opinion that this FEIAR complies with the content requirements of Appendix 3 to the 2014 NEMA EIA Regulations and is not in conflict with a prohibition contained in legislation. The attached Standard EMPr (as per Appendix I3) complies with Appendix 4 of the EIA Regulations.
4. Several **potential environmental impacts** have been identified by the EAP and specialists as contained in this FEIAR. Where relevant, additional impacts identified by I&APs during the DEIAR public participation phase, were considered and assessed in the FEIAR as submitted to the DFFE for a decision.
5. Impact management actions have been proposed in the Standard EMPr (as per Appendix I3), which need to be implemented for the outcome of the preliminary assessment of potential impacts to be accurate.

Registered I&APs were notified of the availability of the DEIAR for a minimum 30-day comment period. All comments received from I&APs to date have been incorporated into the C&RR and, where necessary, incorporated into this FEIAR.

This FEIAR is submitted, together with the C&RR, to the DFFE for a decision on whether to issue EA, or not.

Registered I&APs will be notified of the submission of the FEIAR to the DFFE and a copy will be made available on our website for information purposes.

Any comments or queries may be directed to Ms Kim Pontac or Ms Tayla Hobson on 021 887 4000 or info@legacyemc.co.za / kim@legacyemc.co.za / tayla@legacyemc.co.za.

Please find the Appendices attached a separate files for download.

⁴⁰ The Battery Storage Exclusion Norm for the Exclusion of Identified Activities Associated with the Development and Expansion of Battery Storage Facilities from the Requirement to obtain an EA, as per Government Notice No. 4557, published in Gazette No. 50387, 27 March 2024

Appendix A CV of the EAP (Kim Pontac and Tayla Hobson)



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Appendix B *Photo Sheet*



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Appendix C *Public Participation*



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C1: List of Interested and Affected Parties



C2: Background Information Document



C3: Site Notices and Advertisement

C4: Proof of Notification of I&APs

C5: Comments and Response Report

C6: Comments Received

C7: Comments and Responses Table

Appendix D *Specialist Studies*



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D1.1: Agricultural Compliance Statement

D2.1: Aquatic Biodiversity Scoping Assessment for the SPP Development

D3.1: Terrestrial Biodiversity Assessment

D3.2: Animal Species Compliance Statement

D4.1: Avifaunal Impact Assessment for the SPP and OPL Development



D5: Visual Impact Assessment

D6: Heritage Impact Assessment

D7: Socio-Economic Assessment

D8: Traffic Impact Assessment

D9: Engineering Services Report including a Stormwater Management Plan

D10: Desktop Geohydrological Assessment

D11: Geotechnical Investigation

D12: Glint and Glare Assessment

Appendix E *DFFE Screening Tool Report (STR)*



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Appendix F *Impact Assessment Methodology & Tables*



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Appendix G *Site Sensitivity Verification Report (SSVR)*



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Appendix H *EAP and Specialist Declarations*



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Appendix I *Environmental Management Programmes (EMPrs)*



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I1.1: Generic EMPr for Overhead Powerline

I1.2: Generic EMP_r for On-site Substation

I1.3: Standard EMPr

Appendix J *Site Development Plans/Layouts*



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Appendix K *Other*



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K1: Site Layout Drawings and Co-ordinates



K2: SAHRA Final Decision



K3: Gazetted Bioregional Plan

K4: Site Layout Map with Sensitivities