FINAL BASIC ASSESSMENT REPORT

Basic Assessment for the proposed development of the up to 150 MW Padloper Solar PV Facility 5 (i.e., Padloper PV 5), the proposed development of 132 kV Electrical Grid Infrastructure between the proposed Padloper PV 4 and the proposed Padloper PV 5 (i.e., Padloper EGI 5), and their associated infrastructure, near Murraysburg in the Western Cape Province

PART A: MAIN REPORT

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November 2023

Prepared for:
African Clean Energy Developments (Pty) Ltd

AFRICAN CLEAN ENERGY DEVELOPMENTS

Prepared by:
Council for Scientific and Industrial Research (CSIR)

CSIR
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BASIC ASSESSMENT PROCESS

for the

Proposed development of the up to 150 MW Padloper Solar PV Facility 5 (i.e., Padloper PV 5), the proposed development of 132 kV Electrical Grid Infrastructure between the proposed Padloper PV 4 and the proposed Padloper PV 5 (i.e., Padloper EGI 5), and their associated infrastructure, near Murraysburg in the Western Cape Province

FINAL BASIC ASSESSMENT REPORT

November 2023

Prepared for:
African Clean Energy Developments (Pty) Ltd

Fernwood House, The Oval, 1 Oakdale Road
Newlands, Cape Town 7700

On behalf of:
Padloper PV (Pty) Ltd

Prepared by:

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Mapping:
Luanita Snyman-van der Walt (CSIR)

Formatting and Desktop Publishing:
Magdel van der Merwe (DTP Solutions)

Report details

Title:	Basic Assessment for the proposed development of the up to 150 MW Padloper Solar PV Facility 5 (i.e., Padloper PV 5), the proposed development of 132 kV Electrical Grid Infrastructure between the proposed Padloper PV 4 and the proposed Padloper PV 5 (i.e., Padloper EGI 5), and their associated infrastructure, near Murraysburg in the Western Cape Province: FINAL BASIC ASSESSMENT (BA) REPORT
Purpose of this report:	The purpose of this Final BA Report is to: • Present the details of and the need for the proposed project; • Describe the affected environment at a sufficient level of detail to facilitate informed decision-making; • Provide an overview of the BA Process being followed, including public consultation; • Assess the potential positive and negative impacts of the proposed project on the environment; • Provide recommendations to avoid or mitigate negative impacts and to enhance the positive benefits of the project; • Provide an Environmental Management Programme (EMPr) for the proposed project; and • Provide the Competent Authority with a reasoned opinion as to why this proposed project should be authorised. The Draft BA Report was made available to all Interested and Affected Parties (I&APs), Organs of State and stakeholders for a 30-day review period extending from 14 August 2023 to 13 September 2023. All comments submitted during the 30-day review have been incorporated and addressed, as applicable and where relevant, into the Final BA Report that has been submitted to DFFE for decision-making and recorded in a detailed Comments and Responses Report (Part C of this BA Report).
Prepared for:	African Clean Energy Developments (Pty) Ltd on behalf of Padloper PV (Pty) Ltd
Prepared by:	Council for Scientific and Industrial Research (CSIR): P. O. Box 320, Stellenbosch, 7599 Tel: +27 21 888 2400 Fax: +27 21 888 2693
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Mapping:	Luanita Snyman-van der Walt (CSIR)
Date:	November 2023
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KEY CHANGES MADE FROM THE DRAFT BA REPORT THAT WAS ISSUED FOR I&AP, STAKEHOLDER AND ORGAN OF STATE COMMENT FROM 14 AUGUST 2023 TO 13 SEPTEMBER 2023

Section of Report	Key Change
BA Report and Appendices	• The report date has been updated from "August 2023" to "November 2023".
Executive summary	• Project titles for projects 1-7 (i.e., Padloper PV 1-4 and Padloper PV and EGI 5-7) were updated to include the planned maximum generation capacity of each solar PV facility.
BA Report – Section A	• Project titles for projects 1-7 (i.e., Padloper PV 1-4 and Padloper PV and EGI 5-7) were updated to include the planned maximum generation capacity of each solar PV facility. • Section A.3 was updated to included additional detail and clarification on the location of the proposed Padloper EGI 5 in relation to the Eastern Strategic Transmission corridor. • Section A.6.1 was updated to include additional descriptions of the main activities to be undertaken during Construction Phase. • Section A.10.1.6 was updated to make reference to the revised National List of Ecosystems that are Threatened and in Need of Protection ("the Red List of Ecosystems") in Government Notice ("GN") No. 2747 of 18 November 2022, published under section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). • Section A.10.1.7 was updated to reference the Appendix in which proof of submission of the integrated HIA to the HWC is included. • The listed activities included in Table A.8 was revised to remove activities which are not applicable to the proposed development. • Table A.8 was updated with additional information regarding the applicability of listed activities included in the BA Report. An amended application form has been submitted to the DFFE.
BA Report – Section C	• Updated with additional information regarding the status and progress made on the BA Report, the submission of the Application for Environmental Authorisation to the DFFE, as well as DFFE's acknowledgment of receipt of the BA Report updated with details of the Public Participation Process undertaken thus far.
BA Report – Section D	• Table D.1 was updated to reflect the change in the EA status of one of the projects included in the Cumulative Assessment. • Table D.2 was updated with the reference numbers assigned by the National DFFE for the BA projects. • Section D.2.15 was updated with additional detail regarding the sensitivity mapping undertaken for the Visual Theme.
Comments and Responses Report	• The comments and/or issues raised by stakeholders and Interested and Affected Parties (I&APs) following the release of the Draft BA Report for the 30-day public comment period, extending from 14 August 2023 to 13 September 2023 (excluding public holidays), together with the responses from the BA project team were collated into a Comments and Responses Report that was compiled in line with guidance included in DFFE comments letter (DFFE Reference No: 14/12/16/3/3/1/2816), and which was submitted separately from the main Final BA Report. Copies of all comments received have been included in Appendix F.10 of this BA Report. The Final BA Report inclusive of all relevant and required appendices is currently being submitted to the DFFE for decision-making in line with Regulation 19(1)(a) of the 2014 NEMA EIA Regulations (as amended).
Appendix E	• Updated the database of I&APs, Stakeholders and Organs of State to reflect stages of consultation, commenting, as well as additions to the database. The approach followed for this I&AP database was guided by sections 3(3), 9, 12(1) and (2), 11 as well as 18 of the Protection of Personal Information Act, 2013 (Act No. 14 of 2013) (POPIA). Erring on the side of caution as recommended by the DFFE, the names and affiliations of non-

Section of Report	Key Change
	governmental I&APs are represented by an 'XXX" in the I&AP database that is being made available to the public.
Appendix F	• Updated with proof of placement of the newspaper advertisements for the release of the Draft BA Reports for comment (Appendix F.2). • Added copies and proof of submission of the Draft BA Reports and Application for EA to the DFFE and acknowledgement thereof (Appendix F.8). • Added the copies and proof of correspondence sent to stakeholders (including proof of submission of the integrated heritage impact assessment (HIA) to Heritage Western Cape (HWC) and local authorities for a 30-day consultation period) for the release of the Draft BA Report for comment (Appendix F.8) • Added copies of the correspondence received from stakeholders and proof thereof during the 30-day public comment period of the Draft BA Report (Appendix F.10)
Appendix H - J	• Updated the Environmental Management Programme (EMPr) for the powerline based on comments received from I&APs and Organs of State, following the 30-day public comment period on the Draft BA Report, with additional mitigation measures and management actions as recommended by these authorities and stakeholders.

Executive Summary

INTRODUCTION

African Clean Energy Developments (Pty) Ltd (hereinafter referred to as the "Project Developer") is proposing, on behalf of Padloper PV (Pty) Ltd (hereinafter referred to as "the Project Applicant"), the development of seven solar photovoltaic (PV) facilities with a capacity of between 100 and 250 MW each, seven associated 132 kV overhead power lines, and their associated infrastructure, approximately 18 km north-east of the town of Murraysburg in the Western Cape and Northern Cape Provinces (Figure A.1).

The proposed cluster of solar PV facilities, overhead power lines and their associated infrastructure are collectively referred to as the 'Padloper Solar and EGI Cluster'. The proposed cluster comprises of the following projects:

- PROJECT 1: Basic Assessment for the proposed development of the up to 250 MW Padloper Solar PV Facility 1 and associated infrastructure (i.e., Padloper PV 1), near Murraysburg in the Northern Cape Province
- PROJECT 2: Basic Assessment for the proposed development of the up to 150 MW Padloper Solar PV Facility 2 and associated infrastructure (i.e., Padloper PV 2), near Murraysburg in the Western Cape Province
- PROJECT 3: Basic Assessment for the proposed development of the up to 150 MW Padloper Solar PV Facility 3 and associated infrastructure (i.e., Padloper PV 3), near Murraysburg in the Western Cape Province
- PROJECT 4: Basic Assessment for the proposed development of the up to 150 MW Padloper Solar PV Facility 4 and associated infrastructure (i.e., Padloper PV 4), near Murraysburg in the Western Cape Province
- PROJECT 5: Basic Assessment for the proposed development of the up to 150 MW Padloper Solar PV Facility 5 (i.e., Padloper PV 5), the proposed development of 132 kV Electrical Grid Infrastructure between the proposed Padloper PV 4 and the proposed Padloper PV 5 (i.e., Padloper EGI 5), and their associated infrastructure, near Murraysburg in the Western Cape Province
- PROJECT 6: Basic Assessment for the proposed development of the up to 100 MW Padloper Solar PV Facility 6 (i.e., Padloper PV 6), the proposed development of 132 kV Electrical Grid Infrastructure between the proposed Padloper PV 4 and the proposed Padloper PV 6 (i.e., Padloper EGI 6), and their associated infrastructure, near Murraysburg in the Western Cape Province
- PROJECT 7: Basic Assessment for the proposed development of the up to 150 MW Padloper Solar PV Facility 7 (i.e., Padloper PV 7), the proposed development of 132 kV Electrical Grid Infrastructure between the proposed Padloper PV 4 and the proposed Padloper PV 7 (i.e., Padloper EGI 7), and their associated infrastructure, near Murraysburg in the Western Cape Province
- PROJECT 8: Basic Assessment for the proposed development of a 132 kV Overhead Power Line and associated Electrical Grid Infrastructure between the proposed Padloper PV 1 and the proposed authorised Ishwati Emoyeni Collector Substation (i.e., Padloper EGI 1), near Murraysburg in the Northern Cape and Western Cape Provinces

- PROJECT 9: Basic Assessment for the proposed development of a 132 kV Overhead Power Line and associated Electrical Grid Infrastructure between the proposed Padloper PV 2 and the proposed authorised Ishwati Emoyeni Collector Substation (i.e., Padloper EGI 2), near Murraysburg in the Western Cape Province

- PROJECT 10: Basic Assessment for the proposed development of a 132 kV Overhead Power Line and associated Electrical Grid Infrastructure between the proposed Padloper PV 2 and the proposed Padloper PV 3 (i.e., Padloper EGI 3), near Murraysburg in the Western Cape Province

- PROJECT 11: Basic Assessment for the proposed development of a 132 kV Overhead Power Line and associated Electrical Grid Infrastructure between the proposed Padloper PV 4 and the proposed authorised Ishwati Emoyeni Collector Substation (i.e., Padloper EGI 4), near Murraysburg in the Northern Cape and Western Cape Provinces.

Project 1 is located in the Ubuntu Local Municipality and Pixley Ka Seme District Municipality in the Northern Cape province, whilst Projects 2 7, 9, 10 will be located in the Beaufort West Local Municipality and the Central Karoo District Municipality in the Western Cape province. Projects 8 and 11 traverse both the specifically the Ubuntu Local Municipality and the Beaufort West Local Municipality in the Western Cape and Northern Cape Provinces.

The above 11 Basic Assessment (BA) Processes are being undertaken separately and have been split into two batches. Batch 1 comprises of Projects 5 – 7 whereas Batch 2 comprises of the BA Processes for Projects 1 - 4 and 8 – 11[1]. The BA Processes for the projects comprising Batch 1 and Batch 2 were initiated in August 2023 and September 2023, respectively. The Final BA Reports for the projects comprising Batch 1 are currently being submitted to the National DFFE for decision-making.

Note that the subject of this Final BA Report is the Project 5 (i.e., Padloper PV 5 and EGI 5 and their associated infrastructure). Separate Final BA Reports have been compiled for Project 6 and Project 7.

The proposed project is located entirely within the Renewable Energy Development Zone 11 (i.e., Beaufort West REDZ), one of the eleven REDZs formally gazetted in South Africa for the purpose of developing solar PV and wind energy generation facilities (Government Gazette 41445, Government Notice (GN) 114; 16 February 2018 and GN 144; 26 February 2021). Refer to Figure A.1 for the locality of the proposed projects in relation to the REDZs. In addition, the associated power line is partially located within the Eastern Strategic Transmission Corridor, one of the five EGI Power Corridors formally gazetted for implementation on 16 February 2018 in Government Gazette 41445, GN 113 and an additional two expanded corridors gazetted on 29 April 2021 in GN 383.

In line with the gazetted process for projects located within a REDZ, the proposed project is subject to a BA Process instead of a full Scoping and Environmental Impact Assessment (EIA) process and a reduced decision making period of 57 days, in terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the 2014 NEMA EIA Regulations (as amended) promulgated in Government Gazette 40772; in GN R326, R327, R325 and R324 on 7 April 2017. A BA Process in terms of Appendix 1 of the 2014 NEMA EIA Regulations (as amended) is therefore being undertaken for the proposed project. Note that the proposed EGI is being applied for as part of the Solar

[1] Approval to proceed with this phased release approach was granted during the pre-application meeting undertaken with the DFFE on 9 June 2023. Refer to Appendix G.3 of this BA Report for a copy of the approved minutes from the pre-application meeting.

PV development, and therefore the REDZs serve as the main focus for the application (not GN 113 and GN 383 for EGI development).

Section A.11 of this BA Report contains the detailed list of activities contained in R327, R325, and R324, as amended, which may be triggered by the various project components and thus form part of the BA Process.

An integrated PPP has been undertaken for the BA Processes (i.e., Padloper PV and EGI 5-7).

The Final BA Report was released to all Interested and Affected Parties (I&APs), Organs of State and stakeholders for a 30-day review period, extending from **14 August 2023 to 13 September 2023**, excluding public holidays. All comments submitted during the 30-day review period have been captured and addressed in the detailed Comments and Responses Report (CRR) (Part B of this BA Report). Refer to Appendix F.10 of this BA Report for copies of correspondence received from I&APs and Organs of State during the 30-day comment period.

PROJECT LOCATION

The locality of the proposed Padloper PV 5 project, including the associated infrastructure, is shown below in Figure A. The co-ordinates of the proposed project sites are detailed in Section A of this BA Report.

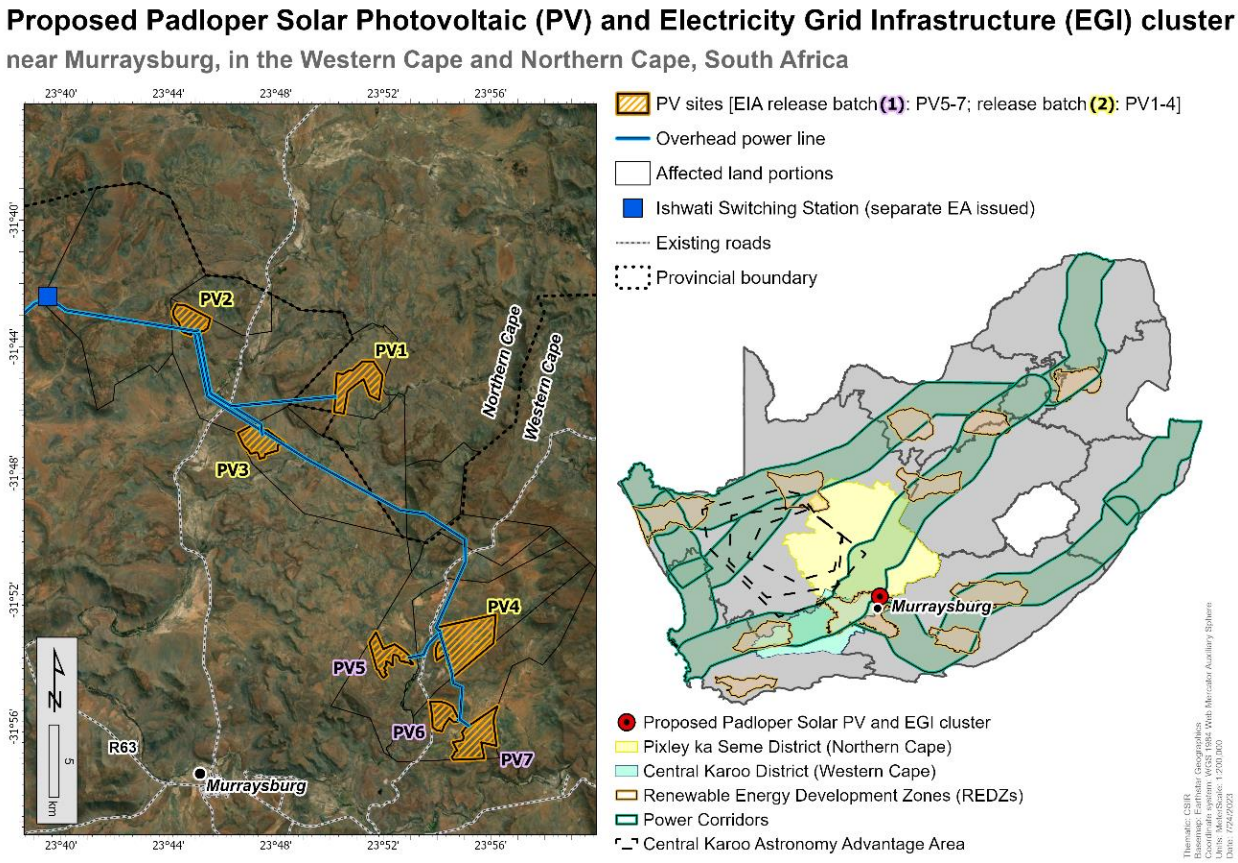

Figure A. Locality of the proposed Padloper Solar and EGI Cluster and the phased approach of the Basic Assessment Processes.

PROJECT BASIC ASSESSMENT TEAM

In accordance with Regulation 12 (1) of the 2014 NEMA EIA Regulations (as amended), the Project Developer has appointed the Council for Scientific and Industrial Research (CSIR) to undertake the required BA Processes in order to determine the biophysical, social and economic impacts associated with undertaking the proposed development. The project team, including the relevant specialists, is indicated in Table B below.

Table A. Project Team

Name	Organisation	Role/ Specialist Study
CSIR Project Team		
Paul Lochner (*Registered EAP (2019/745)*)	CSIR	EAP and Project Leader
Dhiveshni Moodley (*Cand.Sci.Nat*.)	CSIR	Project Manager
Helen Antonopoulos	CSIR	Project Officer
Luanita Snyman-van der Walt (*Pr.Sci.Nat.*)	CSIR	Project Mapping
Phindile Mthembu	CSIR	Project Officer
Specialists		
Johann Lanz	Private	Agricultural Compliance Statement
Kerry Schwartz	SLR Consulting	Visual Impact Assessment
Jayson Orton	ASHA Consulting	Heritage Impact Assessment (Archaeology, Cultural Landscape)
Elize Butler	Banzai Environmental	Palaeontology Impact Assessment
Brian Colloty	Enviro-Sci	Terrestrial Biodiversity, Terrestrial Plant Species, and Terrestrial Animal Species
Brian Colloty	Enviro-Sci	Aquatic Biodiversity and Species Impact Assessment
Anja Albertyn	Holland & Associates Environmental Consultants	Avifauna Impact Assessment
Hugo van Zyl and James Kinghorn	Independent Economic Researchers	Socio-Economic Impact Assessment (only undertaken for the PV component)
Debbie Mitchell	Ishecon	BESS Risk Assessment (only undertaken for the PV component)
Ntuthuko Hlanguza	SiVEST	Traffic Impact Assessment (only undertaken for the PV component)
Hardy Luttig, Dale Barrow and Shane Teek	GEOSS South Africa (Pty) Ltd	Geohydrology Assessment (only undertaken for the PV component)
Hardy Luttig and Shane Teek		Desktop Geotechnical Assessment (only undertaken for the PV component)
Lizande Kellerman, Dhiveshni Moodley, Helen Antonopoulos, Luanita Snyman-van der Walt and Minnelise Levendal (ex CSIR employee)	CSIR	Civil Aviation Site Sensitivity Verification
Lizande Kellerman, Dhiveshni Moodley, Helen Antonopoulos, Luanita Snyman-van der Walt and Minnelise Levendal (ex CSIR employee)	CSIR	Defence Site Sensitivity Verification

PROJECT DESCRIPTION

The proposed Padloper PV 5 will have a capacity of up to 150 MW. The associated infrastructure includes various structures, buildings and electrical grid infrastructure (EGI) such as, but not limited to, a 132 kV power line extending from the proposed Padloper PV 5 to the proposed Padloper PV 4, one on-site substation, and one Battery Energy Storage Systems (BESS). The proposed Solar PV facility will make use of PV solar technology to generate electricity from energy derived from the sun; and will connect to the national grid at the existing Gamma Main transmission Station (MTS) via the proposed Padloper PV 4 (that will be subject to a separate assessment process) and the authorised Ishwati Emoyeni Collector Substation. The locality of the proposed projects project is depicted in Figure A.2 below.

It is important to note at the outset that the exact specifications of the proposed project components will be determined during the detailed engineering phase (subsequent to the issuing of EAs, should such authorisations be granted for the proposed projects) but that the information provided below is seen as the worst-case scenario for the project. The information presented in Table C applies to the proposed project (i.e., Padloper PV 5, Padloper EGI 5 and their associated infrastructure).

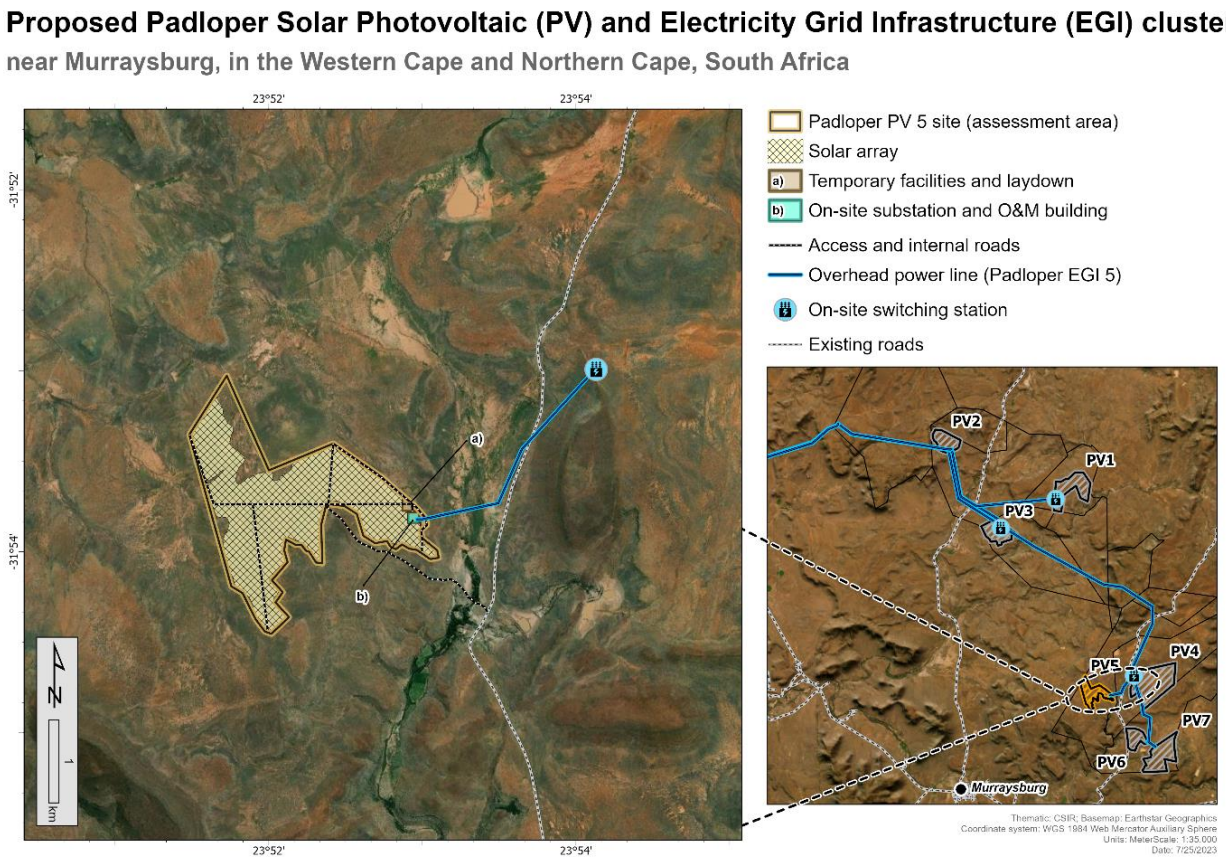

Figure B. Project Location and layout of the proposed Padloper PV 5 Project[2].

[2] Please note that the on-site switching station will be assessed separately as part of the BA Processes being undertaken for the proposed Padloper PV 4 Project.

Table B. Description of the Project Components

Infrastructure	Component	Dimensions / Specifications
Solar PV	Type of Technology	Solar Photovoltaic (PV) Technology
	Height of PV panels	Maximum of ± 4.5 m
	Capacity of the PV Facility	Up to 150 MW
	Area of PV Array (i.e., proposed area occupied by PV Modules)	202 hectares
	Total fenced area (i.e., the area that includes all associated infrastructure within the **fenced** off area of the PV facility)	243 hectares
	Technology mounting structure	The following technologies are being considered: • Single Axis Tracking structures (aligned north-south); • Dual Axis Tracking (aligned east-west and north-south); • Fixed Tilt Mounting Structure; • Mono-facial Solar Modules; or • Bifacial Solar Modules.
	inverter-transformer stations	3.5 MW inverters will be located across the proposed project. The exact number of inverters are still to be confirmed however all inverter-transformers will be within the PV array.
	Area occupied by inverter-transformer stations and height	Inverter-Transformer stations: 0.022 ha each The inverter stations will have a height of ± 3 m each (Excluding lightning rods. The lightning rods are expected to extend 10 m high. Each inverter station will have 1 – 2 lightning rods).
Overhead power line	Capacity	132 kV
	Foundation	The size of the footprint area will range from 0.6 m x 0.6 m to 1.5 m x 1.5 m. The minimum working area required around a structure position is 20 m x 20 m.
	Pylon	Steel monopole or lattice towers
	Tower type	Self-supporting and Angle Strain towers
	Height	17.4 m – 21 m
	Servitude length	Approximately 2.53 km
	Servitude width	The registered servitude will be up to 50 m wide. Note that the entire servitude will not be cleared of vegetation. Vegetation clearance within the servitude will be undertaken in compliance with relevant standards and specifications. A 400 m wide corridor (i.e., 200 m on either side of center line) was assessed by specialists, in order to identify sensitivities and features that need to be avoided.

Infrastructure	Component	Dimensions / Specifications
	Proximity to grid connection	This proposed 132 kV overhead power line will facilitate the connection of the proposed Padloper PV 5 to the existing Gamma MTS, via the proposed Padloper PV 4 and the authorised Ishwati Emoyeni Collector Substation.
Associated infrastructure		
Temporary Construction and Laydown area	Construction camp area (ha)	1 - 4 ha Note: These areas will be rehabilitated after construction and will not be retained for the operational phase.
Main access roads Please note: The existing road network will be and upgraded if needed.	Width of access roads (m)	5 m
	Length of access roads (km)	2.1 km The existing road network will be used as far as practically possible and upgraded as needed.
Internal access roads Please note: The existing road network will be used as far as practically possible and upgraded as needed.	Width of access roads (m)	5 m
	Length of access roads (km)	Up to 7 km of internal roads – in order for security patrols and to access all the equipment (module cleaning and equipment maintenance).
Upgrading of existing access road/s Please note: Where required for turning circle/bypass areas, however, access or internal roads may be up to 10 m to allow for larger component transport.	Yes / No	Yes. Existing roads will be used as far as practically achievable.
	Current width (m)	± 5 m
	Upgraded width (m)	± 8 m (6 m wide road surface with 1 m drain either side)
Internal transmission and/or distribution lines	All on-site medium voltage cabling (22 or 33 kV) will be buried to a maximum depth of 1.5 m.	
Site offices Including a warehouse/workshop and an operational and maintenance (O&M) control centre. The details provided in this section is for one site office.	Number of buildings	1
	Maximum height (m)	Up to 10 m
	Footprint (m²)	300 m²
Guard houses Note: There will be 2 guardhouses at the proposed project site. The details provided in this section is for one guard house.	Maximum height (m)	Up to 3 m
	Footprint (m²)	± 6 m x 6 m ± 36 m²

Infrastructure	Component	Dimensions / Specifications
Ablution facilities Note: There will be 2 ablution facilities proposed project site, included in site offices and guardhouse footprints. The details provided in this section is for one ablution facility.	Maximum height (m)	Up to 10 m
	Footprint (m²)	Staff lockers: ± 22 m x 11 m ± 242 m²
Battery energy storage system (BESS)	Battery technology type	Lithium-Ion, Sodium-Ion, Solid State and Redox Flow technology types are being considered
	Approx. footprint (ha)	± 5 ha
	Maximum height (m)	Up to 10 m
	Capacity	900 MWh
On-site substation	A 132 kV facility substation complex will be located within the site, will cover an area of approximately 2 ha and will have a height of up to 18 m.	
On site medium voltage cables or cable trays	Maximum depth (m)	Up to 1.5 m
	Capacity	22 or 33 kV
Water use requirements	Estimated quantity of water (litres) required for the construction phase	Up to 30 000 m^3 per annum
	Estimated quantity of water (litres) required for the operational phase	Up to 8 000 m^3 per annum
	Estimated quantity of water (litres) required for the decommissioning phase:	The exact amount of water required during this phase is unknown at this stage but expected to be similar to that of the construction phase.
Construction period		Up to 24 months

NEED FOR THE BA

As noted above, in terms of the 2014 NEMA EIA Regulations (as amended) published in GN R326, R327, R325 and R324, as well as GN 114 for procedures within a REDZs, a full BA Process is required for the proposed projects. The need for the BA is triggered by, amongst others, the inclusion of Activity 1 listed in GN R325 (Listing Notice 2):

- *"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs (a) within an urban area; or (b) on existing infrastructure".*

Section A of this Final BA Report contains the detailed list of activities contained in GN R327, R325 and R324 which are triggered by the various project components and thus form part of this BA Process.

The purpose of the BA is to identify, assess and report on any potential impacts the proposed project, if implemented, may have on the receiving environment. The BA therefore needs to show the Competent Authority, the DFFE; and the project proponent, Padloper PV (PTY) Ltd, what the consequences of their choices will be in terms of impacts on the biophysical and socio-economic

environment and how such impacts can be, as far as possible, enhanced or mitigated and managed as the case may be.

IMPACT ASSESSMENT

Full specialist studies are provided in Appendix D of this BA Report. Section B of this report provides a summary of the affected environment associated with these studies; and Section D provides a summary of the impact assessments conducted by the specialists.

A summary of the specialist studies is outlined below.

Agriculture

The Agriculture Compliance Statement was undertaken by Johann Lanz to inform the outcome of this BA from an agricultural and soils perspective. The complete Agriculture Compliance Statement is included in Appendix D. 1 of the BA report.

Two main potential negative agricultural impacts have been identified. These impacts are described below:

- **Occupation of land** - Agricultural land directly occupied by the development infrastructure will become restricted for agricultural use, with consequent potential loss of agricultural productivity for the duration of the project lifetime. However, the Agriculture and Soils Study notes that the production potential of that land is limited to only being suitable as low carrying capacity grazing land. The loss of such land, of which there is no scarcity in the country, represents a minimal loss of agricultural production potential in terms of national food security and for the affected farm.
- **Soil erosion and degradation** – Erosion can occur as a result of the alteration of the land surface run-off characteristics, predominantly through the establishment of hard surface areas including roads. Loss of topsoil can result from poor topsoil management during construction related excavations. Soil erosion and loss of topsoil are completely preventable. The stormwater management that will be an inherent part of the engineering on site and standard, best-practice erosion control and topsoil management measures recommended and included in the EMPr, are likely to be effective in preventing soil erosion and loss of topsoil.

In quantifying the cumulative impact, the area of land taken out of agricultural use as a result of all the projects considered in the cumulative impact assessment (total generation capacity of 2789 MW) will amount to a total of approximately 4687 hectares. This is calculated using the industry standards of 2.5 and 0.3 hectares per megawatt for solar and wind energy generation respectively, as per the Department of Environmental Affairs (DEA) Phase 1 Wind and Solar Strategic Environmental Assessment (SEA) (2015). As a proportion of the total area within a 30 km radius (approximately 282,700 ha), this amounts to only 1.66% of the surface area. This is within an acceptable limit in terms of loss of low potential agricultural land which is only suitable for grazing, and of which there is no scarcity in the country.
The conclusion of this assessment is that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. The proposed development is therefore acceptable.

Therefore, from an agricultural impact point of view, it is recommended that the proposed development be approved.

Visual Impact Assessment

The Visual Impact Assessment (refer to Appendix D.2) were undertaken by Kerry Schwartz to inform the outcome of this BA from a visual perspective.

A broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a moderate visual sensitivity. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs. No formal protected areas and relatively few sensitive or potentially sensitive receptor locations were identified in the study area, thus confirming the moderate level of visual sensitivity.

The assessment identified nine potentially sensitive visual receptor locations within the combined study area. Only one of the identified receptor locations is expected to experience high levels of visual impact as a result of the proposed development. This receptor location is however inside the assessment area for the Padloper Solar Facilities 6 and 7 and a landowner of one of the farm portions involved in the Padloper PV and EGI Cluster.

Although the R63 receptor road traverses the study area, the PV arrays and powerlines are some considerable distance from the road and not visible from much of the road.

It was therefore concluded that the potential visual impacts associated with the proposed project is negative and of moderate significance. Given the low level of human habitation and the relatively low number of sensitive and potentially sensitive receptor locations however, the project is deemed acceptable from a visual perspective and the EA should be granted.

Considering all factors, it is recommended that the development of the facility as proposed be supported, subject to the implementation of the recommended mitigation measures. Anticipated visual impacts on sensitive visual receptors (if and where present) in close proximity to the proposed infrastructure are not considered to be fatal flaws.

Heritage Impact Assessment (Archaeology and Cultural Landscape)

The Heritage Impact Assessment was undertaken by Jayson Orton to inform the outcome of this BA from an archaeology and cultural heritage and landscape perspective. An integrated Heritage Impact Assessment containing Archaeology, Cultural Landscape and Palaeontology has been undertaken for the project in line with the requirements of HWC. However, for ease of reference, this section only deals with the Archaeology and Cultural Landscape. The complete Heritage Impact Assessment is included in Appendix D.3 of this BA Report.

The solar facility layout was revised to avoid the single significant archaeological site at waypoint 184 and impacts to this site are not expected. A house lies adjacent to the eastern part of the proposed facility access road. The current farm track lies 19 m from the corner of this house and its reuse should not result in any impacts to the structure. It should, nonetheless, be demarcated as a No-Go area.

Reuse of the road through the buffer is thus acceptable. One archaeological site occurs 80 m from the north-eastern end of the powerline route and is not expected to be impacted.

The assessment concluded that given the generally low sensitivity of the various study areas - the lack of impacts to heritage resources, the heritage specialist is of the opinion that the proposed Padloper PV 5 along with its respective EGI (and associated infrastructure) may be authorised in full but subject to recommendations which should be included as conditions of authorisation and contained in the EMPr (Refer to Section E of this BA Report.

Palaeontology Impact Assessment

The Palaeontology Impact Assessment was undertaken by Elize Butler to inform the outcome of this BA from a palaeontological perspective. As noted above, an integrated Heritage Impact Assessment containing Archaeology, Cultural Landscape and Palaeontology has been undertaken for the project in line with the requirements of HWC. However, for ease of reference, this section only deals with the Palaeontology. The complete Heritage Impact Assessment is included in Appendix D.3 of this BA Report.

Based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the overall development footprint (PV facility and overhead power line 400 m corridor) is rare. A medium Palaeontological Significance has been allocated for the construction phase of the PV development pre-mitigation and a low significance post mitigation.

It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. 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. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.

However, the study also notes that the proposed project is mostly underlain by the Balfour Formation (Adelaide Subgroup, Beaufort Group, Karoo Supergroup) with a small portion underlain by Jurassic Dolerite. It is further explained that the Balfour Formation (Adelaide Subgroup, Beaufort Group, Karoo Supergroup) has a Very High Palaeontological Sensitivity. Therefore, the Environmental Control Office/designated responsible person for this project, must constantly monitor Balfour Formation area during surface clearance and construction. If Palaeontological Heritage is uncovered during surface clearing and excavations, the Chance find Protocol attached should be implemented immediately.

The impact on the palaeontological heritage would be low pre-mitigation and very low post-mitigation (removal of fossils if they are found in the footprint), so as far as the palaeontology is concerned, the project should be authorised for proposed projects.

Terrestrial Biodiversity and Species Impact Assessment

The Terrestrial Biodiversity and Species Assessment (refer to Appendix D.4) was undertaken by Brian Colloty to inform the outcome of this BA from a terrestrial biodiversity and species perspective.

The nature of the project is such that it carries a low to moderate intensity impact on terrestrial resources, with highest number of impacts being associated creation of PV panel areas, roads, installation of cables and other infrastructures across the site. The project areas are however small, allowing for retention of much of the natural area so the ecosystems should remain largely unaffected.

This is largely based on the assumption that all Very High sensitivity habitats can be avoided, through the use of the existing tracks and roads shown in this assessment.

In conclusion, most of the anticipated impacts will include disturbance during the construction phase, while changes to form and function of the site will be limited in the operational phase, and it is anticipated that all these would be Very Low post mitigation.

Based on the findings of this study, the specialist finds no reason to withhold an authorisation of any of the proposed activities, assuming that the key recommended mitigations measures are implemented.

Aquatic Biodiversity and Species Impact Assessment

The Aquatic Biodiversity Assessment was undertaken by Brian Colloty to inform the outcome of this BA from an aquatic biodiversity perspective. The complete Aquatic Biodiversity and Species Assessment is included in Appendix D.5 of this BA Report.

The outcomes of the risk assessment indicate minor impacts from the proposed activities. A variety of aquatic features, mostly ephemeral in nature were identified within the study areas and, where required, the layout has taken some cognisance of these features by selecting areas that have already been impacted. On these grounds the current overall impact on the aquatic environment is Very Low (with mitigation).

Based on the findings of this study, the specialist finds no reason to withhold an authorisation of any of the proposed activities, assuming that the key recommended mitigations measures are implemented.

Avifauna Assessment

The Avifauna Impact Assessment was undertaken by Anja Albertyn to inform the outcome of this BA from an avifaunal perspective. The complete Avifauna Impact Assessment is included in Appendix D.6 of this BA Report.

The Site Ecological Importance rating of medium indicates that the PV site is potentially suitable for development if minimisation and restoration mitigation are implemented. Impacts of medium negative impact significance are acceptable, if followed by restoration activities (SANBI 2022).

The proposed PV development site avoids all areas identified as of high sensitivity during pre-application monitoring and is considered the preferred alternative site from an avifaunal perspective. The access road follows an existing farm road over its entire length and is also considered the best alternative location from an avifaunal perspective.

The impact assessment has identified potential impacts to avian species, most of which can be mitigated to a very low or low negative level. No residual impacts of high significance were identified for the proposed development.

Due to the footprint of the proposed PV development, a loss of approximately 205 ha of potential species of conservation concern (SCC) habitat is however unavoidable, and even with mitigation this impact is expected to be of medium negative significance for the SCCs that occur here (confirmed or high probability of occurrence). These are Blue Crane, Karoo Korhaan, Ludwig's Bustard, Lanner Falcon, Martial Eagle, and Verreaux's Eagle. However, due to these species having much surrounding

equivalent habitat available, this loss of habitat is not deemed to have unacceptably high impacts on these species if the recommended mitigation measures are implemented.

The impact assessment for the proposed power line has identified potential impacts to avian species, most of which can be mitigated to a very low or low negative level. No residual impacts of high significance were identified for the proposed development. The main negative impact of the proposed development is collisions with the EGI, which is difficult to mitigate for Ludwig's Bustard. Therefore, the impact significance rating with mitigation remains of moderate negative significance. The combined Site Ecological Importance rating of medium indicates that with minimisation and restoration mitigation, development activities with medium impact are acceptable if followed by appropriate restoration activities. The specialist assessment therefore concluded that the proposed power line development can be mitigated to an acceptable level of impact.

Based on the above results of the assessment, the proposed development is deemed acceptable from an avifaunal perspective, if all of the above mitigation measures are included for implementation in the EMPr.

Socio-Economic Assessment

The Socio-Economic Assessment (refer to Appendix D.7) was undertaken by Hugo van Zyl and James Kinghorn to inform the outcome of this BA from a socio-economic perspective.

The assessment found that the project is not free of commercial risk, nor would it be realistic to expect this. However, the balance between financial benefits and costs are likely to be positive for the applicant and landowner partners, barring unforeseen risks. In term of wider positive impacts, the project would be largely supportive of local and regional socio-economic development and energy supply planning imperatives including the diversification of the economy and energy sources.

Negative impacts would primarily arise at a local scale. It is anticipated that, with mitigation, the risks posed to the community by the influx of people, including job seekers, would be manageable and of a low significance with mitigation. Tourism facilities and attractions in the areas surrounding the project site are relatively limited and sparsely distributed. The tourism context combined with likely visual and associated heritage impacts in a landscape with scenic qualities should limit tourism impacts to a low significance during both construction and operations with mitigation. Impacts on surrounding landowners and communities, including to their sense of place, are expected to be low negative with mitigation during construction and operations.

In conclusion the assessment noted that it is considered most likely that the combined positive impacts of the project would exceed its negative impacts resulting in an overall net benefit with mitigation. The project is therefore all deemed acceptable in terms of socio-economic impacts and should be allowed to proceed.

Geohydrology Assessment

The Geohydrology Assessment (refer to Appendix D.9) was undertaken by Hardy Luttig and Shane Teek to inform the outcome of this BA from a geohydrological perspective.

The study notes that it is anticipated that the underlying aquifers will be able to deliver the requisite cumulative demands during the construction (22100 000 m^3/a) and operational (5745 000 m^3/a) phases, for each of the proposed developments comprising the Padloper PV and EGI Cluster, i.e., Padloper PV

1-7. The impact of the proposed Padloper Solar PV Facility Facilities 5 is anticipated to be low in terms of groundwater quality and groundwater availability.

Further, the cumulative water demands of the proposed Padloper Solar PV Development are anticipated to be low in terms of groundwater availability and quality. However, the needs of the neighbouring developments and farm owners/ landowners will also need to be established to ensure sustainable groundwater abstraction.

Instatement of an appropriate groundwater monitoring plan is paramount to ensure sustainable and responsible management of the groundwater reserves in the region. Therefore, a quarterly groundwater monitoring programme should be instated to ensure that no groundwater contamination takes place during the construction or decommissioning phases of this development. Further, monitoring would serve to ensure that the water use is lawful and confirm that impacts of abstraction on the regional aquifer(s) is negligible.

Therefore, it is supported that the project can progress as is, as long as the recommended mitigation measures are implemented.

Desktop Geotechnical Assessment

The Geotechnical Assessment (refer to Appendix D.10) was undertaken by Hardy Luttig and Shane Teek to inform the outcome of this BA from a geotechnical perspective.

The potential impact of the proposed development during the construction, operational and decommissioning phases of the projects is expected to be very low (post-mitigation) and is anticipated to have little effect on the site from a geotechnical point of view. Increased soil erosion may transpire as an impact of development, this may persist for the life of the project. However, the impact of this is expected to be very low and is anticipated to have little effect on the site from a geotechnical point of view. The study notes that variable soil and rock conditions will exist across the site. It is anticipated that conventional foundations can be employed for all structures. Karoo mudrock and sandstone should be avoided when selecting aggregates for concrete mixes.

Owing to the variable geologic and soil conditions across the proposed development area, the subgrade conditions will vary across the site. Therefore, it is recommended that an aggregate for wearing courses be investigated. The excavatability of the stratum on site are anticipated to variable, based on material composition and texture, the degree of weathering, and the nature of discontinuities within the rock and/or soil mass. However, the seismicity in the region is considered low.

The assessment concluded that the primary concern of this development is alteration of the stability of the soil across the site. Changes in the soil conditions across the site are anticipated mainly to arise as a consequence of increased/concentrated runoff, yielding increased erosion.

However, the area planned for the development of the solar facility is generally of low relief and the topography is gently undulous, therefore, no major cut slopes and/or rock face stabilisations are anticipated for this development.

Traffic Impact Statement

The Traffic Impact Assessment (TIA) (refer to Appendix D.13) was undertaken by Ntuthuko Hlanguza to inform the outcome of this BA from a traffic perspective.

The TIA found that the highest traffic impact of the proposed development would occur during the construction phases, which are temporary in nature and whose impacts can be effectively mitigated. The existing site accesses were found to be sufficient for the proposed facility but may require some upgrades. No fatal flaws were identified in the proposed project in respect of transportation and traffic aspects. No environmentally sensitive areas are required and therefore no areas are to be avoided from a transportation perspective.

With reference to this report, associated assessment and the findings made within, the specialist notes that the proposed project has a nominal impact on the existing traffic network.

The proposed project is therefore deemed acceptable from a transport perspective, provided the recommendations and mitigation measures in this report are implemented, and hence the Environmental Authorisation (EA) should be granted for the BA application.

Impacts relating to BESS

The proposed solar PV facility will have a Battery Energy Storage System (BESS) of up to 900 MWh located adjacent the on-site substation. A high-level Safety Health and Environmental Risk Assessment (SHE RA) for the proposed development of BESS was undertake by Deborah Mitchell and is included in Appendix D.8 of the BA Report.

Solid state Lithium-ion Redox flow (typically vanadium) BESS technologies are being considered and were assessed. The specific technology will only be determined following Engineering, Procurement and Construction (EPC) procurement.

Several specific recommendations were stated for the assessed BESS technologies (refer to the full SHE RA included in Appendix D. 8).

The assessment noted that at a large facility, without installation of the state-of-the art battery technology that includes protective features, there can be significant risks to employees and first responders. The latest battery designs include many preventative and mitigative measures to reduce these risks to tolerable levels. State-of-the-art technology should be used, i.e., not old technology, such as liquid phase lithium-ion batteries, that may have been prone to fire and explosion risks. The design should be subject to a full Hazard and Operability Study (HAZOP) prior to commencement of procurement. A HAZOP is a detailed technical systematic study that looks at the intricacies of the design, the control system, the emergency system etc. and how these may fail under abnormal operating conditions. Additional safeguards may be suggested by the team doing the study.

Overall, the SHE RA found that with suitable preventative and mitigative measures in place, none of the identified potential risks are excessively high, i.e., from a Safety, Health and Environment (SHE) perspective no fatal flaws were found with either type of technology (solid state - lithium-ion or redox flow - vanadium) for the BESS installations at the proposed solar PV facility.

Civil Aviation

The proposed project study area was determined and verified to be of low sensitivity (as it relates to civil aviation). This was determined through a site visit and based on existing databases, and confirms the sensitivity allocated on the Screening Tool. Based on the above, in terms of GN R320, no further requirements are applicable i.e., a Compliance Statement is not required.

Defence

The proposed project study area was determined and verified to be of low sensitivity (as it relates to defence installations). This was determined through a site visit and based on existing databases, and confirms the sensitivity allocated on the Screening Tool. Based on the above, in terms of GN R320, no further requirements are applicable i.e. a Compliance Statement is not required.

EAP'S RECOMMENDATION

None of the negative impacts identified within this BA that, in the opinion of the EAPs who have conducted this BA Process, should be considered "fatal flaws" from an environmental perspective, and thereby necessitate substantial re-design or termination of the project. This echoes the findings of the specialists as summarised above.

Section 24 of the Constitutional Act states that "everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that prevents pollution and ecological degradation; promotes conservation; and secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development." Based on this imperative, this BA was undertaken to ensure that these principles are met through the inclusion of appropriate management and mitigation measures, and monitoring requirements. These measures will be undertaken to promote conservation by avoiding the sensitive environmental features present on site and through appropriate monitoring and management plans (refer to the Environmental Management Programmes (EMPrs) included in Appendix H - J of this BA Report).

It is understood that the information contained in this BA Report and appendices is sufficient to make a decision in respect of the activity applied for.

Summary of Key Impact Assessment Findings

Based on the findings of the specialist studies, the proposed project is considered to have an overall moderate to very low negative environmental impact and an overall moderate positive socio-economic impact in all phases (construction, operation, and decommissioning, with there being a potential high positive impact during the operational phase (with the implementation of respective mitigation and enhancement measures).

Tables D below provide a summary of the impact assessment for each phase of the proposed projects **post mitigation for direct impacts**. Table F provides the same information for the **cumulative impacts**.

As indicated in Table D, the majority of the **direct negative impacts** were rated with a **low to very low post mitigation impact significance** for the **construction phase**, with only the Avifauna impacts being rated as **moderate to very low**. In terms of the operational and decommissioning phases, the majority of the **direct negative impacts** were rated with a **low to very low post mitigation impact significance**, with only the Avifauna and Visual impacts being rated as **moderate to very low**. In terms of **positive impacts**, the Socio-Economic impacts are rated as **moderate significance** for the construction, and decommissioning phase and **moderate to high** for the operational phase.

Based on Table E, the majority of the **cumulative negative impacts** were rated **very low to low post mitigation impact significance with moderate impact significance** being recorded for the Visual and Avifauna themes. As mentioned above, the impact significance recorded in Table E is applicable to the entire project (i.e., Padloper PV 5, Padloper EGI 5 and their associated infrastructure). In terms of **positive impacts**, the Socio-Economic impacts are rated as **moderate to high significance** to for the construction, and decommissioning phase and **high to very high** for the operational phase.

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Table C. Overall Impact Significance with the Implementation of Mitigation Measures for Direct Negative and Positive Impacts

Specialist Assessment		Construction Phase		Operational Phase		Decommissioning Phase	
DIRECT NEGATIVE IMPACTS							
Visual	PV	**Low**		**Moderate**		**Low**	
	EGI	**Low**		**Low**		**Moderate**	
Heritage (Archaeology and Cultural Landscape)	PV	**Low**		**Low**		**Low**	
	EGI	**Low**		**Low**		**Low**	
Palaeontology		**Low**		**Insignificant and/or not identified and/or not applicable**		**Insignificant and/or not identified and/or not applicable**	
Terrestrial Biodiversity and Species		**Very Low**		**Very Low**		**Very Low**	
Aquatic Biodiversity and Species		**Very Low**		**Very Low**		**Very Low**	
Avifauna	PV	**Very Low**	**Moderate**	**Low**	**Very Low**	**Low**	**Moderate**
	EGI	**Low**	**Very Low**	**Moderate**	**Very Low**	**Low**	**Very Low**
Socio-Economic		**Low**		**Low**		**Low**	
Geotechnical		**Very Low**		**Very Low**		**Very Low**	
Traffic		**Low**		**Low**		**Low**	
DIRECT POSITIVE IMPACTS							
Socio-Economic		**Moderate**		**Moderate**	**High**	**Moderate**	

Table D. Overall Impact Significance with the Implementation of Mitigation Measures for Cumulative Negative and Positive Impacts

Specialist Assessment	Construction Phase	Operational Phase	Decommissioning Phase
CUMULATIVE NEGATIVE IMPACTS			
Visual	**Moderate**	**Moderate**	**Low**
Heritage (Archaeology and Cultural Landscape)	**Very Low**	**Very Low**	**Very Low**
Palaeontology	**Low**	**Insignificant and/or not identified and/or not applicable**	**Insignificant and/or not identified and/or not applicable**
Terrestrial Biodiversity and Species	**Very Low**	**Very Low**	**Very Low**
Aquatic Biodiversity and Species	**Very Low**	**Very Low**	**Very Low**
Avifauna	**Moderate**	**Moderate**	**Moderate**
Socio-Economic	**Moderate**	**Moderate**	**Moderate**
Geotechnical	**Low**	**Low**	**Low**
Traffic	**Low**	**Low**	**Low**
CUMULATIVE POSITIVE IMPACTS			
Socio-Economic	**High**	**Moderate** / **Very High**	**High**

Note that all the specialists have recommended that the proposed project receives EA on condition that the recommended mitigation measures are implemented. Also, note that all conclusions and recommendations made in the respective Specialist Impact Assessment Reports have been incorporated into the project specific EMPr for adherence.

Cumulative Environmental Impact Statement

The cumulative impacts have been assessed by all the specialists on the project team. The cumulative assessment included approved renewable energy projects within a 30 km radius of the project sites, as well as existing and planned transmission lines, and also the additional proposed projects comprising the Padloper Solar and EGI Cluster. No cumulative impacts have been identified that were considered to be fatal flaws. The specialists recommended that the projects receive EA in terms of the EIA Regulations promulgated under the NEMA, including consideration of cumulative impacts. It is also important to note that the proposed project is located within Beaufort West REDZ (REDZ 11), which supports the development of large-scale wind and solar energy developments. The proposed project is therefore in line with the national planning vision for wind and solar development in South Africa.

All of the specialists have recommended that the proposed projects receive EAs if the recommended mitigation measures are implemented.

Overall Environmental Impact Statement

Taking into consideration the findings of the BA Process, as well as the fact that the proposed **Padloper PV 5 project (i.e., Padloper PV 5, Padloper EGI 5 and their associated infrastructure)** will be located within Beaufort West REDZ (REDZ 11), it is the opinion of the EAP, that the project benefits outweigh the costs and that the projects will make a positive contribution to sustainable infrastructure development in the nearby towns (i.e., Murraysburg and Graaf-Reinet) and surrounding regions, as well as making a positive contribution to energy generation for South Africa. Provided that the specified mitigation measures are applied effectively, it is recommended that the proposed projects receive EAs in terms of the EIA Regulations promulgated under the NEMA.

Summary of where requirements of Appendix 1 of the 2014 NEMA EIA Regulations (as amended, GN R326) are provided in this BA Report

Appendix 1	YES / NO	SECTION IN BA REPORT
Objective of the basic assessment process 2) The objective of the basic assessment process is to, through a consultative process- a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context; b) identify the alternatives considered, including the activity, location, and technology alternatives; c) describe the need and desirability of the proposed alternatives; d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine- (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and (ii) 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; and e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to- (i) identify and motivate a preferred site, activity and technology alternative; (ii) identify suitable measures to avoid, manage or mitigate identified impacts; and (iii) identify residual risks that need to be managed and monitored.	**Yes**	**Section A of the report includes the Introduction, legislative review, alternatives assessment and needs and desirability** **Section D includes a summary of the specialist studies and associated impact assessments undertaken**
Scope of assessment and content of basic assessment reports 3) (1) A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include: (a) details of: (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	**Yes**	**Section A.2**
(b) the location of the activity, including: (i) the 21-digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	**Yes**	**Section A.4**
(c) a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or, if it is- (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	**Yes**	**Section A.3 and Section A.4**
(d) a description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for; and a description of the activities to be undertaken including associated structures and infrastructure;	**Yes**	**Section A.5 and Section A.11**

Appendix 1	**YES / NO**	**SECTION IN BA REPORT**
(e) a description of the policy and legislative context within which the development is proposed including- (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	**Yes**	**Section A.10**
f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	**Yes**	**Section A.14**
(g) a motivation for the preferred site, activity and technology alternative;	**Yes**	**Section A.13**
(h) A full description of the process followed to reach the proposed preferred alternative within the site, including - (i) details of all the alternatives considered;	**Yes**	**Section A.13**
(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	**Yes**	**Section C**
(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	**Yes**	**Section C**
(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	**Yes**	**Section A.13 and Section B**
(v) the impacts and risks identified for each alternative, 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;	**Yes**	**Section A.13 and Section D.1**
(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	**Yes**	
(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	**Yes**	
(viii) the possible mitigation measures that could be applied and level of residual risk;	**Yes**	
(ix) the outcome of the site selection matrix;	**Yes**	
(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	**Yes**	
(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity.	**Yes**	**Section A.13**
(i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including- (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	**Yes**	**Section A.13**
(j) an assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts;	**Yes**	**Section D and Appendix C**

Appendix 1	**YES / NO**	**SECTION IN BA REPORT**
(ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;		
(k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	**Yes**	**Section D and Section E**
(l) an environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	**Yes**	**Section E**
(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr;	**Yes**	**Section D and E**
(n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	**Yes**	**Section E**
(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	**Yes**	**Please refer to each specialist study included in Appendix D**
(p) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	**Yes**	**Section E**
(q) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	**X**	**Not Applicable.**
(r) an undertaking under oath or affirmation by the EAP in relation to - (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and l&APs; (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 and affected parties; and	**Yes**	**Appendix B**
(s) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	**X**	**N/A**
(t) any specific information that may be required by the competent authority; and	**Yes**	**Comments raised during the 30-day review of the BID and the Draft BA Report have been addressed at relevant points throughout the Final BA Report.**
(u) any other matters required in terms of section 24(4)(a) and (b) of the Act.	**X**	**N/A**

Appendix 1	**YES / NO**	**SECTION IN BA REPORT**
2) Where a government notice *gazetted* by the Minister provides for the basic assessment process to be followed, the requirements as indicated in such a notice will apply.	**Yes**	**Refer to Section A.10 for a breakdown of the relevant gazettes that are applicable.**

SECTION A: INTRODUCTION, PROJECT DESCRIPTION; ALTERNATIVES; LEGISLATION; SCREENING TOOL

A.1 Introduction

African Clean Energy Developments (Pty) Ltd (hereinafter referred to as the "Project Developer") is proposing, on behalf of Padloper PV (Pty) Ltd (hereinafter referred to as "the Project Applicant"), the development of seven solar photovoltaic (PV) facilities with a capacity of between 100 and 250 MW each, seven associated 132 kV overhead power lines, and their associated infrastructure, approximately 18 km north-east of the town of Murraysburg in the Western Cape and Northern Cape Provinces (Figure A.1).

The proposed cluster of solar PV facilities, overhead power lines and their associated infrastructure are collectively referred to as the 'Padloper Solar and EGI Cluster'. The proposed cluster comprises of the following projects:

- PROJECT 1: Basic Assessment for the proposed development of the up to 250 MW Padloper Solar PV Facility 1 and associated infrastructure (i.e., Padloper PV 1), near Murraysburg in the Northern Cape Province
- PROJECT 2: Basic Assessment for the proposed development of the up to 150 MW Padloper Solar PV Facility 2 and associated infrastructure (i.e., Padloper PV 2), near Murraysburg in the Western Cape Province
- PROJECT 3: Basic Assessment for the proposed development of the up to 150 MW Padloper Solar PV Facility 3 and associated infrastructure (i.e., Padloper PV 3), near Murraysburg in the Western Cape Province
- PROJECT 4: Basic Assessment for the proposed development of the up to 150 MW Padloper Solar PV Facility 4 and associated infrastructure (i.e., Padloper PV 4), near Murraysburg in the Western Cape Province
- PROJECT 5: Basic Assessment for the proposed development of the up to 150 MW Padloper Solar PV Facility 5 (i.e., Padloper PV 5), the proposed development of 132 kV Electrical Grid Infrastructure between the proposed Padloper PV 4 and the proposed Padloper PV 5 (i.e., Padloper EGI 5), and their associated infrastructure, near Murraysburg in the Western Cape Province
- PROJECT 6: Basic Assessment for the proposed development of the up to 100 MW Padloper Solar PV Facility 6 (i.e., Padloper PV 6), the proposed development of 132 kV Electrical Grid Infrastructure between the proposed Padloper PV 4 and the proposed Padloper PV 6 (i.e., Padloper EGI 6), and their associated infrastructure, near Murraysburg in the Western Cape Province
- PROJECT 7: Basic Assessment for the proposed development of the up to 150 MW Padloper Solar PV Facility 7 (i.e., Padloper PV 7), the proposed development of 132 kV Electrical Grid Infrastructure between the proposed Padloper PV 4 and the proposed Padloper PV 7 (i.e., Padloper EGI 7), and their associated infrastructure, near Murraysburg in the Western Cape Province
- PROJECT 8: Basic Assessment for the proposed development of a 132 kV Overhead Power Line and associated Electrical Grid Infrastructure between the proposed Padloper PV 1 and the proposed

authorised Ishwati Emoyeni Collector Substation (i.e., Padloper EGI 1), near Murraysburg in the Northern Cape and Western Cape Provinces

- PROJECT 9: Basic Assessment for the proposed development of a 132 kV Overhead Power Line and associated Electrical Grid Infrastructure between the proposed Padloper PV 2 and the proposed authorised Ishwati Emoyeni Collector Substation (i.e., Padloper EGI 2), near Murraysburg in the Western Cape Province

- PROJECT 10: Basic Assessment for the proposed development of a 132 kV Overhead Power Line and associated Electrical Grid Infrastructure between the proposed Padloper PV 2 and the proposed Padloper PV 3 (i.e., Padloper EGI 3), near Murraysburg in the Western Cape Province

- PROJECT 11: Basic Assessment for the proposed development of a 132 kV Overhead Power Line and associated Electrical Grid Infrastructure between the proposed Padloper PV 4 and the proposed authorised Ishwati Emoyeni Collector Substation (i.e., Padloper EGI 4), near Murraysburg in the Northern Cape and Western Cape Provinces.

Project 1 will be located in the Ubuntu Local Municipality and Pixley Ka Seme District Municipality in the Northern Cape province, whilst Projects 2 - 7, 9, 10 will be located in the Beaufort West Local Municipality and the Central Karoo District Municipality in the Western Cape province. Projects 8 and 11 traverse both the Ubuntu Local Municipality and the Beaufort West Local Municipality in the Western Cape and Northern Cape Provinces.

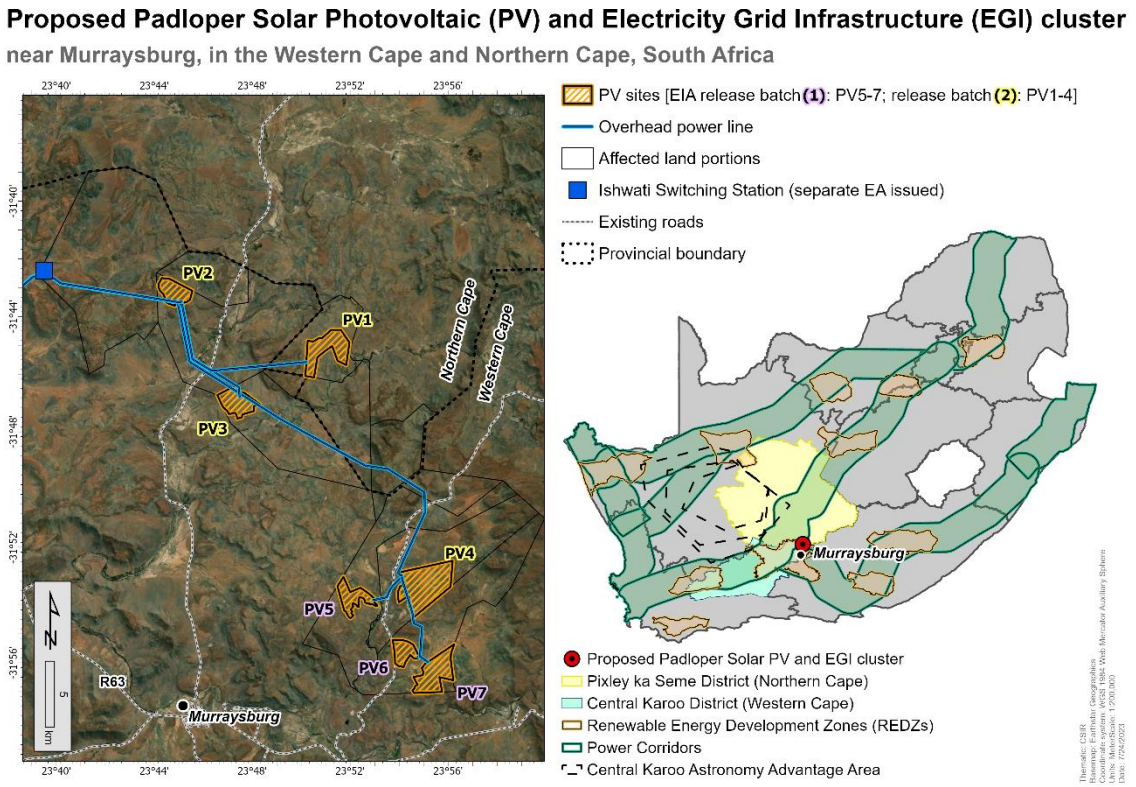


Figure A.1. Locality of the proposed Padloper Solar and EGI Cluster and the phased approach of the Basic Assessment Processes.

The above 11 Basic Assessment (BA) Processes are being undertaken separately and have been split into two batches. Batch 1 comprises of Projects 5 – 7 whereas Batch 2 comprises of the

BA Processes for Projects 1 - 4 and 8 – 11[3]. The BA Processes for the projects comprising Batch 1 and Batch 2 were initiated in August 2023 and September 2023, respectively. The Final BA Reports for the projects comprising Batch 1 are currently being submitted to the National DFFE for decision making.

Note that the subject of this Final BA Report is the Project 5 (i.e., Padloper PV 5 and EGI 5 and their associated infrastructure). Separate Final BA Reports have been compiled for Project 6 and Project 7.

The proposed Padloper PV 5 will have a capacity of up to 150 MW. The associated infrastructure includes various structures, buildings and electrical grid infrastructure (EGI) such as, but not limited to, a 132 kV power line extending from the proposed Padloper PV 5 to the proposed Padloper PV 4, one on-site substation, and one Battery Energy Storage Systems (BESS). The proposed Solar PV facility will make use of PV solar technology to generate electricity from energy derived from the sun; and will connect to the national grid at the existing Gamma Main transmission Station (MTS) via the proposed Padloper PV 4 (that will be subject to a separate assessment process) and the authorised Ishwati Emoyeni Collector Substation. The locality of the proposed projects project is depicted in Figure A.2 below.

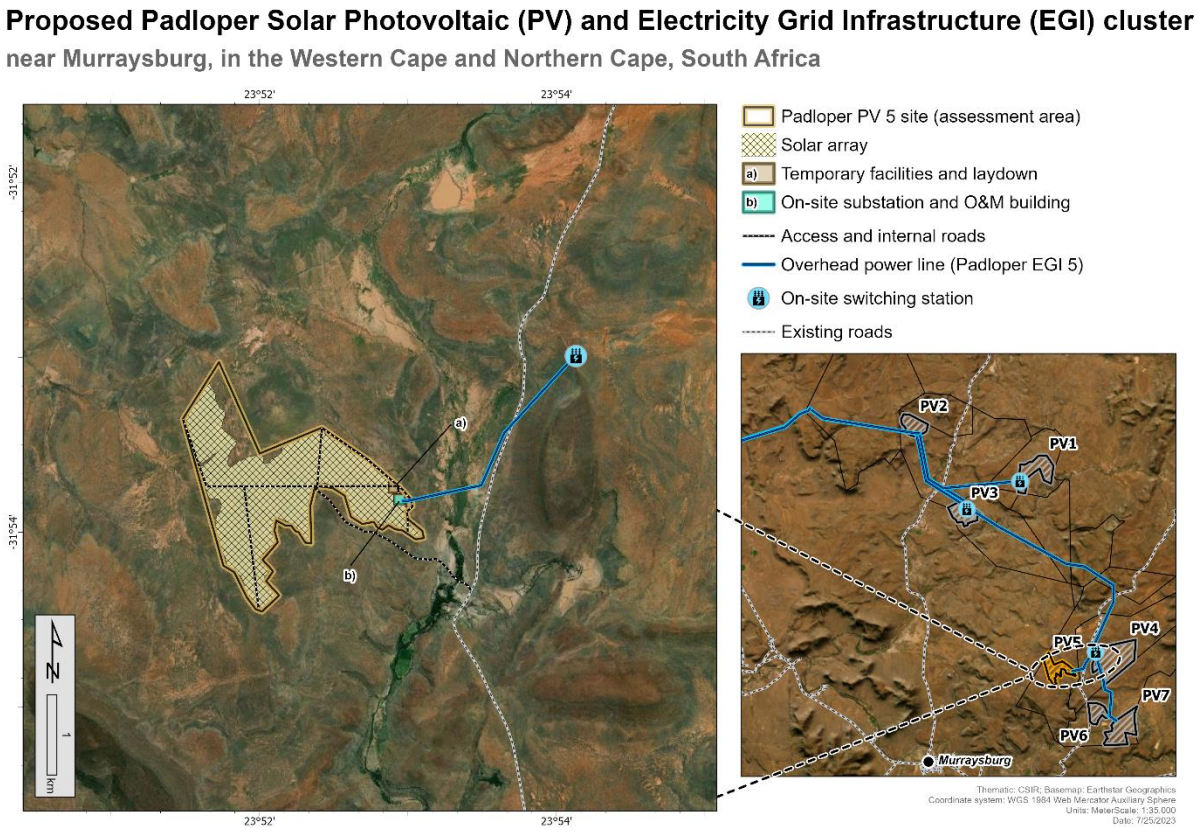


Figure A.2. Project Location and layout of the proposed Padloper PV 5 Project[4].

[3] Approval to proceed with this phased release approach was granted during the pre-application meeting undertaken with the DFFE on 9 June 2023. Refer to Appendix G.3 of this BA Report for a copy of the approved minutes from the pre-application meeting.

[4] Please note that the on-site switching station will be assessed separately as part of the BA Processes being undertaken for the proposed Padloper PV 4 Project.

The proposed Padloper PV 5 project site covers approximately 202 ha and will be developed on the following farm properties with associated Surveyor-General (SG) codes as shown in Table A.1 below.

Table A.1. List of Affected Farm Properties for the proposed Padloper PV 5 Project

Affected Farm Portion	SG Code	Padloper PV 5	Padloper EGI 5
Portion 3 of Farm Driefontein No. 26	C05200000000002600003	✓	✓
Portion 2 of Farm Driefontein No. 26	C05200000000002600002		✓

The proposed project is located entirely within the Renewable Energy Development Zone 11 (i.e., Beaufort West REDZ), one of the eleven REDZs formally gazetted in South Africa for the purpose of developing solar PV and wind energy generation facilities (Government Gazette 41445, Government Notice (GN) 114; 16 February 2018 and GN 144; 26 February 2021). Refer to Figure A.1 for the locality of the proposed projects in relation to the REDZs. In addition, the associated power line is partially located within the Eastern Strategic Transmission Corridor, one of the five EGI Power Corridors formally gazetted for implementation on 16 February 2018 in Government Gazette 41445, GN 113 and an additional two expanded corridors gazetted on 29 April 2021 in GN 383.

In line with the gazetted process for projects located within a REDZ, the proposed project is subject to a BA Process instead of a full Scoping and Environmental Impact Assessment (EIA) process and a reduced decision making period of 57 days, in terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the 2014 NEMA EIA Regulations (as amended) promulgated in Government Gazette 40772; in GN R326, R327, R325 and R324 on 7 April 2017. A BA Process in terms of Appendix 1 of the 2014 NEMA EIA Regulations (as amended) is therefore being undertaken for the proposed project. Note that the proposed EGI is being applied for as part of the Solar PV development, and therefore the REDZs serve as the main focus for the application (not GN 113 and GN 383 for EGI development).

Section A.11 of this BA Report contains the detailed list of activities contained in R327, R325, and R324, as amended, which may be triggered by the various project components and thus form part of the BA Process.

The Draft BA Report was released to all I&APs, Organs of State and stakeholders for a 30-day review period, extending from 14 August 2023 to 13 September 2023. All comments received during the 30-day review period have been incorporated and addressed, as applicable and where relevant, into the detailed Comments and Responses Report (CRR) and appended to this Final BA Report.

A.2 Project Team

In accordance with Regulation 12 (1) of the 2014 NEMA EIA Regulations (as amended), the Project Developer has appointed the CSIR to undertake the separate BA Processes to determine the biophysical, social and economic impacts associated with undertaking the proposed development. The Competent Authority for the proposed projects is the National Department of Forestry, Fisheries, and the Environment (DFFE).

The BA Process is being led by the Environmental Assessment Practitioner (EAP) and Project Leader, Paul Lochner. Paul Lochner has more than 27 years of experience in Environmental Assessment and management studies, primarily in the leadership and integration functions. This includes Strategic Environmental Assessments (SEAs), EIAs and Environmental Management Plans (EMPs). Paul has extensive experience in conducting Environmental Assessment and management processes across South Africa and internationally. Paul is a Registered EAP (2019/745) with the Environmental Assessment Practitioners Association of South Africa (EAPASA). He has been Project Leader on numerous renewable energy, ports and oil and gas related environmental studies and assessments. He has also authored several Guidelines, such as the Guideline for EMPs published in 2005 by the Western Cape government and was lead author on the introductory "Overview of IEM" document for the DEAT IEM Series. He was also Project Leader for the Wind and Solar REDZs SEAs Phases 1 and 2, within which the proposed projects will take place.

Dhiveshni Moodley, serves as the Project Manager, in the Environmental Management Services (EMS) group of the CSIR. Dhiveshni holds a BSc, BSc Honours (cum laude) and MSc (cum laude) degrees in Environmental Science from the University of KwaZulu-Natal. She has four year's work and research experience in flood risk, hydropedological- and wetland functional assessment specialist studies, as well as conducting BAs and Scoping/EIAs in the renewable energy sector. Her key interest lies in using Geographic Information System (GIS) analyses to aid the formation of accurate, feasible solutions to complex environmental challenges. Dhiveshni is registered as a Candidate Natural Scientist with the SACNASP (1472997/19).

Helen Antonopoulos and Phindile Mthembu are the Project Officers for the BA Process and are Environmental Consultants in training in the EMS group of the CSIR.

Various specialists and additional members from the CSIR have contributed to the Padloper BA Processes. The team which is involved in this BA Process is listed in Table A.2 below.

Table A.2. Details of the BA Team

Name	Organisation	Role/ Specialist Study
CSIR Project Team		
Paul Lochner (*Registered EAP (2019/745)*)	CSIR	EAP and Project Leader
Dhiveshni Moodley (*Cand.Sci.Nat.*)	CSIR	Project Manager
Helen Antonopoulos	CSIR	Project Officer
Luanita Snyman-van der Walt (*Pr.Sci.Nat.*)	CSIR	Project Mapping
Phindile Mthembu	CSIR	Project Officer
Specialists		
Johann Lanz	Private	Agricultural Compliance Statement
Kerry Schwartz	SLR Consulting	Visual Impact Assessment
Jayson Orton	ASHA Consulting	Heritage Impact Assessment (Archaeology, Cultural Landscape)
Elize Butler	Banzai Environmental	Palaeontology Impact Assessment
Brian Colloty	Enviro-Sci	Terrestrial Biodiversity, Terrestrial Plant Species, and Terrestrial Animal Species
Brian Colloty	Enviro-Sci	Aquatic Biodiversity and Species Impact Assessment

Name	Organisation	Role/ Specialist Study
Anja Albertyn	Holland & Associates Environmental Consultants	Avifauna Impact Assessment
Hugo van Zyl and James Kinghorn	Independent Economic Researchers	Socio-Economic Impact Assessment (only undertaken for the PV component)
Debbie Mitchell	Ishecon	BESS Risk Assessment (only undertaken for the PV component)
Ntuthuko Hlanguza	SiVEST	Traffic Impact Assessment (only undertaken for the PV component)
Hardy Luttig, Dale Barrow and Shane Teek	GEOSS South Africa (Pty) Ltd	Geohydrology Assessment (only undertaken for the PV component)
Hardy Luttig and Shane Teek		Desktop Geotechnical Assessment (only undertaken for the PV component)
Lizande Kellerman, Dhiveshni Moodley, Helen Antonopoulos, Luanita Snyman-van der Walt and Minnelise Levendal (ex CSIR employee)	CSIR	Civil Aviation Site Sensitivity Verification
Lizande Kellerman, Dhiveshni Moodley, Helen Antonopoulos, Luanita Snyman-van der Walt and Minnelise Levendal (ex CSIR employee)	CSIR	Defence Site Sensitivity Verification

A.3 Project Overview in Terms of Energy Planning

As noted above, the proposed projects fall within the REDZ 11 (i.e., Beaufort West REDZ) which was promulgated in GN 114 in February 2018. The REDZs represent areas where wind and solar PV development is being incentivised from resource, socio-economic and environmental perspectives. To date, the DFFE has gazetted 11 REDZs as well as procedures for submitting environmental impact assessment applications and reduced environmental authorisation timeframes within these REDZs, which have reduced the review timeframes by half and significantly simplified the authorisation process. The REDZs were identified in two phases, with the first 8 being identified through a Strategic Environmental Assessment (SEA) process which concluded in March 2015 and gazetted in February 2018 and the 3 additional REDZs concluded in March 2019 and gazetted in February 2021. A BA Process is undertaken instead of a full Scoping and EIA Process and is subjected to a reduced decision-making timeframe.

In addition, five EGI Power Corridors were gazetted for implementation on 16 February 2018 in Government Gazette 41445, GN 113 and an additional two expanded corridors were gazetted 29 April 2021. The Gazette documented notice, given by the Minister of Environmental Affairs, of alternative procedures to be followed when applying for EA for large scale electricity transmission and distribution development activities, identified in terms of section 24(2)(a) of the NEMA in the identified Strategic Transmission Corridors (i.e., areas declared as geographical areas of strategic importance). Developers proposing to submit applications for EA for large scale electricity transmission infrastructure within any of the five gazetted Strategic Transmission Corridors, that trigger Listed Activity 9 of Listing Notice 2 of the 2014 NEMA EIA Regulations (as amended), or any other listed and specified activities that are necessary for the realisation of such infrastructure and facilities, would need to follow a BA Process, as opposed to a full Scoping and EIA Process. The proposed PV facility also falls entirely within the Eastern EGI Corridor whereas the proposed power line is located partially within the Eastern EGI Corridor (approximately 0.9 km of the approximately 2.53 km proposed power line is located within the Eastern EGI corridor). The fact that the proposed project falls within the Eastern EGI Corridor is important as it indicates that the proposed project aligns with the strategic objectives of the country in terms of infrastructure placement.

Refer to Figure A.1 above which shows the location of the proposed projects in relation to the REDZ 11 and Eastern EGI Corridor.

A.4 Project Co-ordinates

The proposed Padloper PV 5 and the associated power line (Padloper EGI 5) will take place on the farm portions indicated in Table A.3.

Table A.3. Affected farm portion details

Affected Farm Portion	SG Code	Padloper PV 5	Padloper EGI 5
Portion 3 of Farm Driefontein No. 26	C05200000000002600003	✓	✓
Portion 2 of Farm Driefontein No. 26	C05200000000002600002		✓

The co-ordinates of the boundary points of the project PV site and the power line bend points are detailed in Table A.4. The start, middle and end points of the internal access road and the midpoints for the proposed on-site substation are detailed in Table A.5 and Table A.6 respectively:

Table A.4. Co-ordinate points along the boundary of PV facility and the associated power line route

Project Site	Point	Coordinate Points (Degrees, Minutes, Seconds)	
		Longitude (x)	Latitude (y)
Padloper PV 5 – Project Site Area	1	23° 51' 45.39679560" E	31° 54' 11.48356440" S
	2	23° 51' 28.97683200" E	31° 53' 21.15858480" S
	3	23° 51' 43.60957560" E	31° 53' 01.67355600" S
	4	23° 52' 00.07953240" E	31° 53' 33.00144720" S
	5	23° 52' 25.18254840" E	31° 53' 24.15258240" S
	6	23° 53' 01.34537280" E	31° 53' 48.91686360" S
	7	23° 53' 06.41574240" E	31° 54' 01.98358200" S
	8	23° 52' 36.95439000" E	31° 53' 54.71018880" S
	9	23° 52' 34.41030240" E	31° 53' 47.47879680" S
	10	23° 52' 22.53345960" E	31° 53' 44.12304960" S
	11	23° 52' 20.96527080" E	31° 54' 03.81667320" S
	12	23° 52' 06.73712040" E	31° 53' 55.95132840" S
	13	23° 52' 07.36542480" E	31° 54' 03.45422160" S
	14	23° 52' 05.49865200" E	31° 54' 13.39413120" S
	15	23° 52' 07.90813200" E	31° 54' 21.63902760" S
	16	23° 52' 01.04744280" E	31° 54' 27.21211560" S
Padloper EGI 5 – Bend points	1- start	23° 52' 57.87255720" E	31° 53' 49.25643360" S
	2	23° 53' 00.00575520" E	31° 53' 49.23956400" S

	3	23° 53' 29.66907480" E	31° 53' 43.92044880" S
	4	23° 53' 38.88826800" E	31° 53' 25.97373240" S
	5	23° 54' 04.70302200" E	31° 53' 02.10587640" S
	6 - end	23° 54' 07.43867640" E	31° 53' 01.29922440" S

Table A.5. Coordinates of the start, middle and end points of the proposed internal access roads associated with the proposed PV project

Internal Access Roads	Point	Coordinate Points (Degrees, Minutes, Seconds)	
		Longitude (x)	Latitude (y)
Padloper PV 5	Start ('a' in Figure A.3)	23° 53' 25.62190080" E	31° 54' 20.09675520" S
	Middle ('b' in Figure A.3)	23° 52' 54.14820240" E	31° 54' 03.78094680" S
	End ('c' in Figure A.3)	23° 52' 23.66026680" E	31° 53' 44.21706360" S

Table A.6. Co-ordinate Points of centroids of the onsite substation complex

Infrastructure	Point	Coordinate Points (Degrees, Minutes, Seconds)	
		Longitude (x)	Latitude (y)
On site substation complex	Centroid	23° 52' 56.550" E	31° 53' 48.677" S

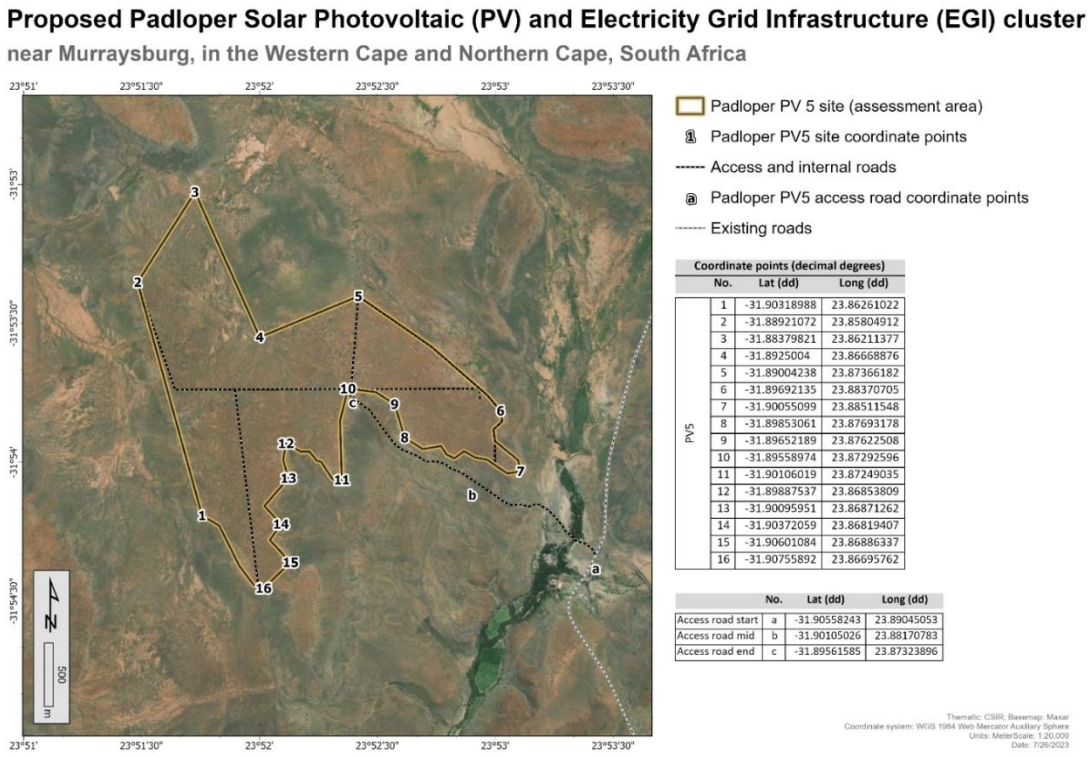


Figure A.3. Map showing the coordinates of vertices of the proposed Padloper PV 5 site

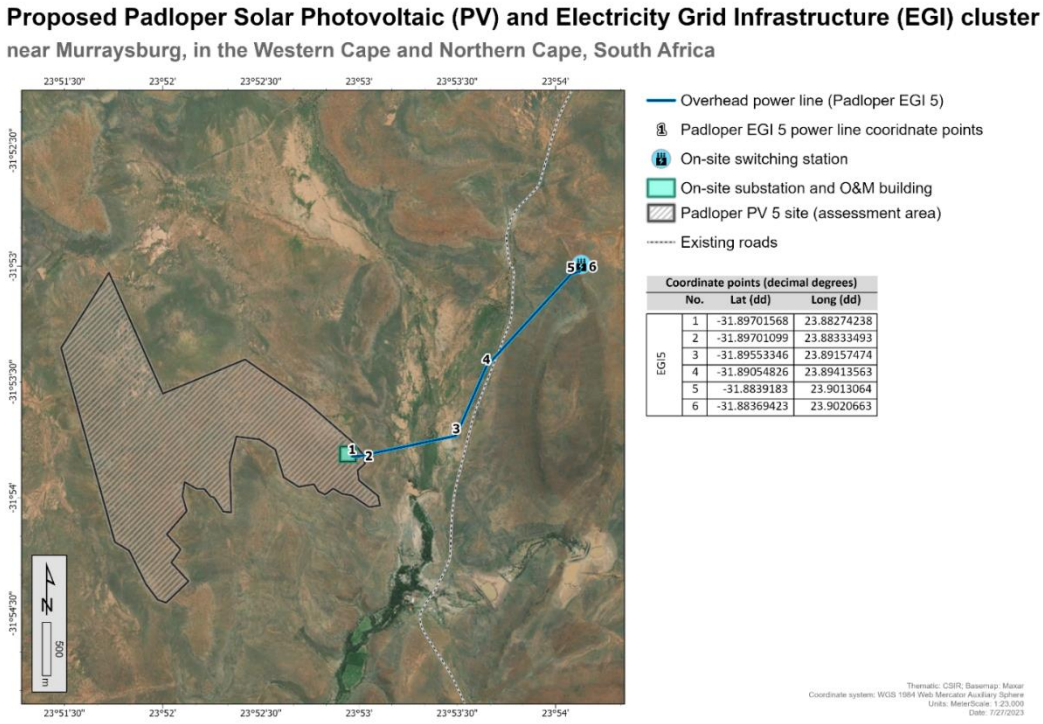


Figure A.4. Map showing the coordinate points of the proposed Padloper EGI 5 routing

A.5 Project Description

As noted in Section A.1 of this BA Report, the Project Developer is proposing the development of seven solar PV facilities (i.e., Padloper PV 1-7) and seven associated 132 kV overhead power lines (i.e., Padloper EGI 1-7), on behalf of the Project Applicant. The proposed powerlines (i.e., Padloper EGI 1-7) will support the connection of the proposed Padloper PV 1-7 to the existing Gamma MTS, via the proposed authorised Ishwati Emoyeni Collector Substation (DFFE Ref: 12/12/20/2351).

Three separate BA Reports were compiled for the proposed Padloper PV and EGI 5-7[5]. Note that this BA Report specifically addresses the proposed Padloper PV 5, the associated 132 kV overhead power line that is referred to as Padloper EGI 5 and their associated infrastructure (Figure A.2 above). A description of the key components of the proposed project is described below in Table A.7.

The proposed Padloper PV 5 will be developed with a possible maximum installed capacity of 150 MW. The proposed project is expected to have a permanent development footprint of up to approximately 202 ha and a temporary development footprint of approximately 3 ha. A summary of the key infrastructure components of the proposed Padloper PV 5 project (including the associated overhead power line (i.e., EGI 5) is provided in Table A.7 below.

The technical information on these components is also discussed within this sub-section. It is however important to note at the outset that the exact specifications of the proposed project components will be determined during the detailed engineering phase (subsequent to the issuing of EAs, should such authorisations be granted for the proposed projects) but that the information provided below is seen as the worst-case scenario for the project.

Table A.7. Description of the Project Components for the proposed Padloper PV 5 project

Infrastructure	Component	Dimensions / Specifications
Solar PV	Type of Technology	Solar Photovoltaic (PV) Technology
	Height of PV panels	Maximum of ± 4.5 m
	Capacity of the PV Facility	Up to 150 MW
	Area of PV Array (i.e., proposed area occupied by PV Modules)	202 hectares
	Total fenced area (i.e., the area that includes all associated infrastructure within the **fenced** off area of the PV facility)	Approximately 243 hectares
	Technology mounting structure	The following technologies are being considered: • Single Axis Tracking structures (aligned north-south); • Dual Axis Tracking (aligned east-west and north-south); • Fixed Tilt Mounting Structure; • Mono-facial Solar Modules; or • Bifacial Solar Modules.
	Inverter-transformer stations	3.5 MW inverters will be located across the proposed project. The exact number of

[5] It is important to note that the above 11 Basic Assessment (BA) Processes are being undertaken separately, however the projects have been split into two batches. Batch 1 comprises of Projects 5 – 7. The BA Processes for the projects comprising Batch 1 are being undertaken concurrently. Batch 2 comprises of the BA Processes for Projects 1 - 4 and 8 – 11, these processes will be undertaken separately. Approval to proceed with this phased release approach was granted during the pre-application meeting undertaken with the DFFE on 9 June 2023. Refer to Appendix G.3 of this BA Report for a copy of the approved minutes from the pre-application meeting.

Infrastructure	Component	Dimensions / Specifications
		inverters are still to be confirmed however all inverter-transformers will be within the PV array.
	Area occupied by inverter-transformer stations and height	Inverter-Transformer stations: 0.022 ha each The inverter stations will have a height of ± 3 m each (Excluding lightning rods. The lightning rods are expected to extend 10 m high. Each inverter station will have 1 – 2 lightning rods).
Overhead power line	Capacity	132 kV
	Foundation	The size of the footprint area will range from 0.6 m x 0.6 m to 1.5 m x 1.5 m. The minimum working area required around a structure position is 20 m x 20 m.
	Pylon	Steel monopole or lattice towers
	Tower type	Self-supporting and Angle Strain towers
	Height	17.4 m – 21 m
	Servitude length	Approximately 2.53 km
	Servitude width	The registered servitude will be up to 50 m wide. Note that the entire servitude will not be cleared of vegetation. Vegetation clearance within the servitude will be undertaken in compliance with relevant standards and specifications. A 400 m wide corridor (i.e., 200 m on either side of center line) was assessed by specialists, in order to identify sensitivities and features that need to be avoided.
	Proximity to grid connection	This proposed 132 kV overhead power line will facilitate the connection of the proposed Padloper PV 5 to the existing Gamma MTS, via the proposed Padloper PV 4 and the authorised Ishwati Emoyeni Collector Substation.
Associated infrastructure		
Temporary Construction and Laydown area	Construction camp area (ha)	1 - 4 ha Note: These areas will be rehabilitated after construction and will not be retained for the operational phase.
Main access roads Please note: The existing road network will be used as far as practically possible and upgraded as needed.	Width of access roads (m)	5 m
	Length of access roads (km)	2.1 km The existing road network will be used as far as practically possible and upgraded as needed.

Infrastructure	Component	Dimensions / Specifications
Internal access roads Please note: The existing road network will be used as far as practically possible and upgraded as needed.	Width of access roads (m)	5 m
	Length of access roads (km)	Up to 7 km of internal roads – in order for security patrols and to access all the equipment (module cleaning and equipment maintenance).
Upgrading of existing access road/s Please note: Where required for turning circle/bypass areas, however, access or internal roads may be up to 10 m to allow for larger component transport.	Yes / No	Yes. Existing roads will be used as far as practically achievable.
	Current width (m)	± 5 m
	Upgraded width (m)	± 8 m (6 m wide road surface with 1 m drain either side)
Internal transmission and/or distribution lines	All on-site medium voltage cabling (22 or 33 kV) will be buried to a maximum depth of 1.5 m.	
Site offices Including a warehouse/workshop and an operational and maintenance (O&M) control centre. The details provided in this section is for one site office.	Number of buildings	1
	Maximum height (m)	Up to 10 m
	Footprint (m²)	300 m²
Guard houses Note: There will be 2 guardhouses at the proposed project site. The details provided in this section is for one guard house.	Maximum height (m)	Up to 3 m
	Footprint (m²)	± 6 m x 6 m ± 36 m²
Ablution facilities Note: There will be 2 ablution facilities proposed project site, included in site offices and guardhouse footprints. The details provided in this section is for one ablution facility.	Maximum height (m)	Up to 10 m
	Footprint (m²)	Staff lockers: ± 22 m x 11 m ± 242 m²
Battery energy storage system (BESS)	Battery technology type	Lithium-Ion, Sodium-Ion, Solid State and Redox Flow technology types are being considered
	Approx. footprint (ha)	± 5 ha
	Maximum height (m)	Up to 10 m
	Capacity	900 MWh
On-site substation	A 132 kV facility substation complex will be located within the site, will cover an area of approximately 2 ha and will have a height of up to 18 m.	
	Maximum depth (m)	Up to 1.5 m

Infrastructure	Component	Dimensions / Specifications
On site medium voltage cables or cable trays	Capacity	22 or 33 kV
Water use requirements	Estimated quantity of water (litres) required for the construction phase	Up to 30 000 m^3 per annum
	Estimated quantity of water (litres) required for the operational phase	Up to 8 000 m^3 per annum
	Estimated quantity of water (litres) required for the decommissioning phase:	The exact amount of water required during this phase is unknown at this stage but expected to be similar to that of the construction phase.
Construction period		Up to 24 months

A description of the key components of the proposed projects are described below.

A.5.1 Solar Facility

As noted above, the maximum footprint of the solar PV facility is estimated to be approximately 202 ha. This will include the development of the solar field, BESS buildings and associated infrastructure, as detailed above. The exact number of solar panels arrays, confirmation of the foundation type and detailed design will follow as the development progresses.

- **PV Modules**

The smallest unit of a PV installation is a cell. A number of cells form a module, and several modules cumulatively form the arrays (Figure A.5). An example of a solar PV facility is provided in Figure A.6.

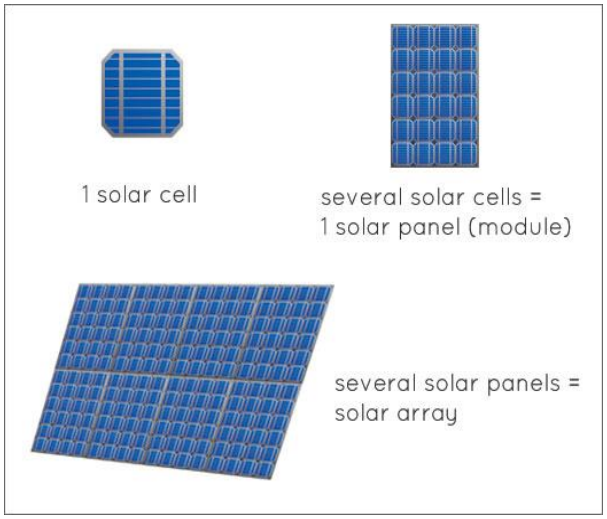


Figure A.5. Components of the Proposed PV Installation

Modules are arranged into strings that form the solar field and are installed on racks which are made of aluminium or galvanised steel. Foundations will likely be drilled and concreted into the ground. The entire structure is not expected to exceed 4.5 m in height (measured from the ground level), which is considered the worst-case. This system may be fixed, or may track the movement of the sun, either by adopting Fixed Axis Tracking (aligned east-west), Single Axis Tracking (aligned north-south), Dual Axis Tracking (aligned east-west and north-south), Fixed Tilt Mounting Structures or Bifacial Solar Modules

as explained above. Bifacial panels can be up to 20 - 40 % more effective since it also utilises solar radiation reflected from the surfaces onto the rear side of the panels. The tracker design will be confirmed during the detailed engineering phase.

Figure A.6. Example of PV Technology (DFFE, 2019)

A.5.2 Electrical components and connection to the grid

A.5.2.1 Electrical Grid Infrastructure

The proposed project includes the development of a 132 kV overhead power line which extends from the proposed Padloper PV 5 to the proposed Padloper PV 4 (i.e., EGI 5).

The overhead power line will extend approximately 17.4 - 21 m high and have a servitude length of approximately 2.53 km.

In order to identify sensitivities and environmental features that need to be avoided, the specialists have assessed an approximately 400 m wide corridor (200 m on either side of the overhead power line route) of the proposed 132 kV power line from the Padloper PV 5 on-site substation to the Padloper PV 4 on site switching station. However, the registered servitude will only be up to 50 m wide. Note that the entire servitude will not be cleared of vegetation. Vegetation clearance within the servitude will be undertaken in compliance with relevant standards and specifications.

The overhead line will consist of self-supporting and angle strain towers with steel monopole or lattice pylons. The span length is estimated to range between 200, 250 or 375 m.

A.5.2.2 On-site substation complex

The proposed project will include an on-site substation complex incorporating the facility substation, switchyard, collector infrastructure, a BESS and associated Operational and Maintenance (O&M) buildings. The substation complex will have a maximum development footprint of up to 2 ha to facilitate the connection between the solar facility and the national electricity grid network. The height of the substation hub will generally not exceed 18 m. It is likely to also include lightning masts up to 10 m in height.

The construction of the on-site substation complex would require the following activities:

- A survey of the study areas on which the proposed on-site substations will be constructed;
- Site clearing and levelling;
- Construction of access roads to the proposed substation sites (where required);
- Construction of substation terraces and foundations;
- Assembly and installation of equipment (including transformers);
- Connection of conductors to equipment;
- Testing of equipment; and
- Rehabilitation of any disturbed areas and protection of erosion sensitive areas.

A.5.2.3 Battery Energy Storage System (BESS)

BESS offer a wide range of advantages to South Africa including electricity supply reliability and quality improvement. The main purpose of the BESS is to mitigate intermittency of wind- and solar PV -energy generation by storing and dispatching of electricity when needed i.e., to contribute to the grid 24 hours/day, during peak demand at night or during power outages. In essence, BESS technology allows renewable energy to enter the completely independent power generation market.

The proposed project will also include one electrochemical BESS. The BESS will have a maximum height of 10 m (as recommended) and comprise an area of up to 5 ha that is likely to be included within the perimeter of the on-site substation complex (see Section A.5.2.2 above).

Considering the nature of the project, the Project Applicant would like to assess all available BESS technologies that could be implemented. The electrochemical BESS technologies for the proposed project that have been assessed include:

- Lithium-Ion Solid-State Containerised Batteries

Lithium-ion solid-state containerised batteries are sealed systems i.e., pre-assembled off site and then delivered to site for placement. This BESS system consists of multiple battery cells that are assembled together to form modules. A module may consist of several cells working in conjunction. Each cell contains a positive electrode, a negative electrode, and an electrolyte. The negative electrode for a lithium-ion cell is typically carbon. The positive electrode can be lithium iron phosphate or a lithium metal oxide. The electrolyte is usually a lithium salt dissolved in an organic solvent.

- Redox Flow Batteries (RFB): Vanadium-Vanadium Redox Flow Battery (VRFB), Zinc-iron Flow Battery (Zn-Fe), Zinc-Bromine Flow Battery (Zn-Br)

Flow batteries generally comprise of three major components: a cell stack, auxiliary parts, and electrolyte storage. The active chemical species in a flow battery are stored mostly externally in above-ground storage tanks. The energy is stored in two chemical components, which are dissolved in a liquid to form electrolytes during operation. The energy density of a RFB is thus dependent on the size of the storage tanks (Parsons, 2017). There are two types of RFB's i.e., a 'true' RFB and a hybrid RFB. In a 'true' RFB the electro-active materials used to store energy remain dissolved in solution. Therefore, the energy is determined by the volumes of electrolyte available. Examples of a 'true' RFB is the VRFB and iron-chromium systems. Hybrid RFBs deposit at least one chemical species as a solid during the charge cycle, therefore preventing the complete separation of power and energy characteristics (Parsons, 2017). Examples of a hybrid RFB is the Zn-Br RFB and the Zn-Fe RFB. Examples of electrolytes for

RFBs include Hydrochloric Acid and Sulphuric Acid, which are considered as dangerous goods in terms of the 2014 NEMA EIA Regulations (as amended), noting that the related activities are only triggered during the maintenance thereof when electrolyte is replaced (which typically occurs very infrequently).

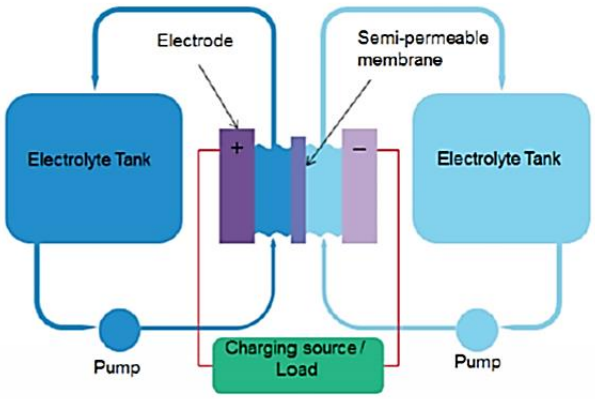


Figure A.7: Schematic diagram of a typical Redox Flow Battery (Source: Parsons, 2017)

The specific technology or mix of technologies chosen will only be determined following Engineering, Procurement and Construction (EPC) procurement. It is likely that new technologies will emerge in the time period it takes to complete the detailed design phase. Many factors will be taken into account including: environmental impact, availability, safety, performance and local content, when the technology choices are made.

The BESS will likely be pre-assembled and delivered to site for placement as per specifications of the supplier. It is proposed that the BESS would be housed in containers, with an associated operational, safety and control infrastructure. The BESS will be a sealed unit and will remain sealed during operations. The BESS's will be located adjacent to the on-site substations.

The supplier of the BESS will be confirmed during the detailed design; however the associated impacts and management measures have been captured in Section E of this BA Report.

A high-level Safety, Health and Environmental Risk Assessment for the development of BESS at the proposed project site is included in Appendix D. 8 of this BA Report. The potential risks associated with the battery energy storage system technologies being considered for this project as well as the associated mitigation measures have been included in the Environmental Management Programme (EMPr) (i.e., Appendix H of this BA Report).

A.5.3 Site Access and transportation of project components

A.5.3.1 Ports of entry

Various renewable energy components and equipment are available within South Africa, particularly at the country's major economic centres of Johannesburg, Durban, Gqeberha and Cape Town. However, due to the scale, logistics and technological requirements of industrial renewable energy developments, it is common to import many renewable energy components.

The recommended port of entry is the Port of Ngqura in the Nelson Mandela Bay Metropolis, 345 km south-east of the proposed facilities. The Port of Ngqura is one of only two ports in South Africa that

are not encompassed by a city (the other being the Port of Saldanha), making initial mobility more efficient. Alternative ports of entry are the Port of Cape Town (± 622 km south-west of the proposed facility) and the Port of Saldanha (± 678 km west of the proposed facility).

In respect of air travel, the closest international airports to the proposed facilities are in Gqeberha (± 355 km), Bloemfontein (± 475 km) and Cape Town (± 622 km).

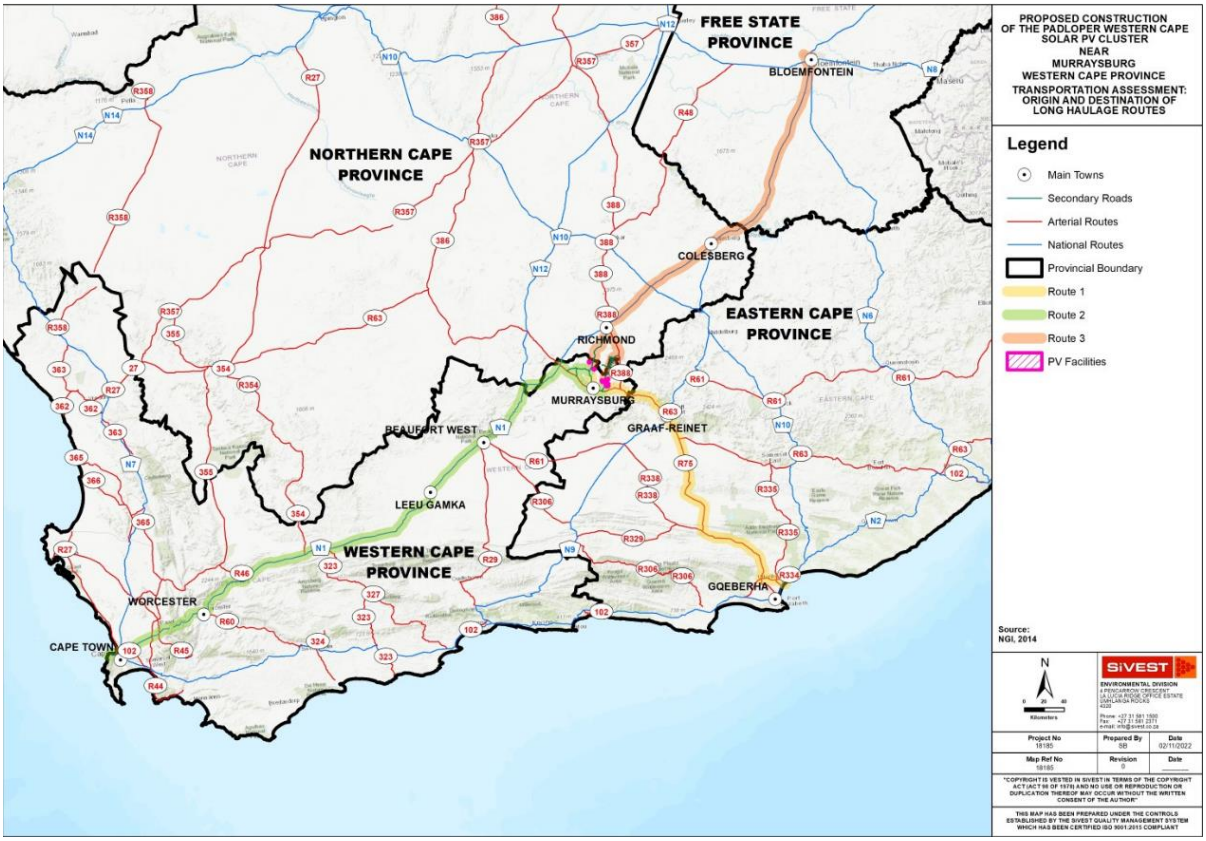
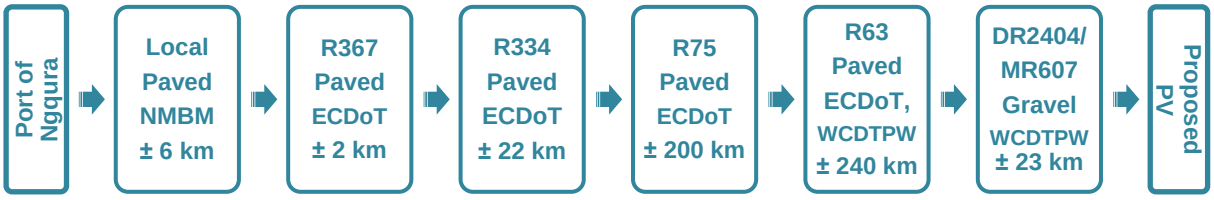


Figure A.8. Routes for the transportation of project components from the potential Ports of entry to the proposed Padloper PV 5 project site (Source: SiVEST (Pty) Ltd, 2023).

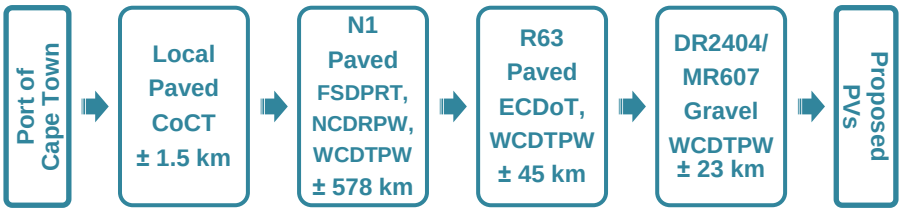
Route 1: Port of Nggura to the proposed project site (Preferred)



This route consists of regularly maintained national and provincial asphalt roads that are in good condition and are approximately 9 m wide. Resurfacing and widening are currently being undertaken by SANRAL within the first 85 km of the route, with approximately four stop-and-go control points. The route features one notable mountain pass, namely Van Ryneveld's Pass on the R63 approximately 270 km into the journey. The pass is 2.1 km long and has an altitude variance of 40 m. Despite some twisty

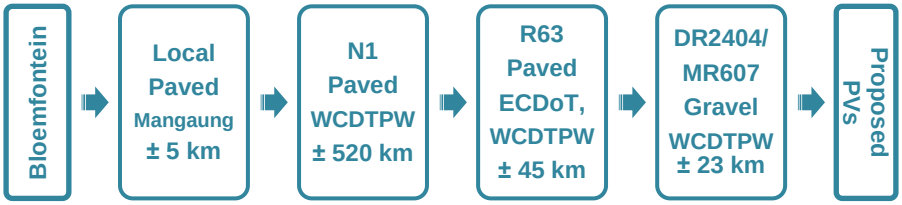
sections along the pass, the route is considered suitable for the transportation of the anticipated abnormal loads.

Route 2: Cape Town to the proposed project site



This route includes the N1, which is the country's longest national road traversing diagonally across South Africa between Cape Town in the southwest corner of the country and Beitbridge in the north-east. The route is well maintained and in good condition and is suitable for the anticipated abnormal loads.

Route 3: Bloemfontein to the proposed project site



This route follows the N1 for all but 50 km of the distance. The route is well maintained and in good condition and is suitable for the anticipated abnormal loads.

A.5.3.2 Internal service roads

Internal roads will also be constructed within the footprint of the PV Facilities. The internal roads are expected to be composed of gravel and extend approximately 5 m wide. The total internal road length is estimated at approximately 7 km but may vary slightly, depending on the final design.

A.5.3.3 External Site Access roads

The Traffic Impact Statement (Appendix D.13 of the BA Report) states that the existing road network surrounding the proposed development is well established and provides an acceptable degree of mobility and access but require minor upgrades to achieve the required functionality. The mobility roads join the major centres and towns with each other, while access roads provide access roads from smaller nodes and individual properties than mobility roads.

The proposed facilities can be accessed using public roads R63 and DR2404. All intersections in this road network are non-signalised (Figure A.9 below).

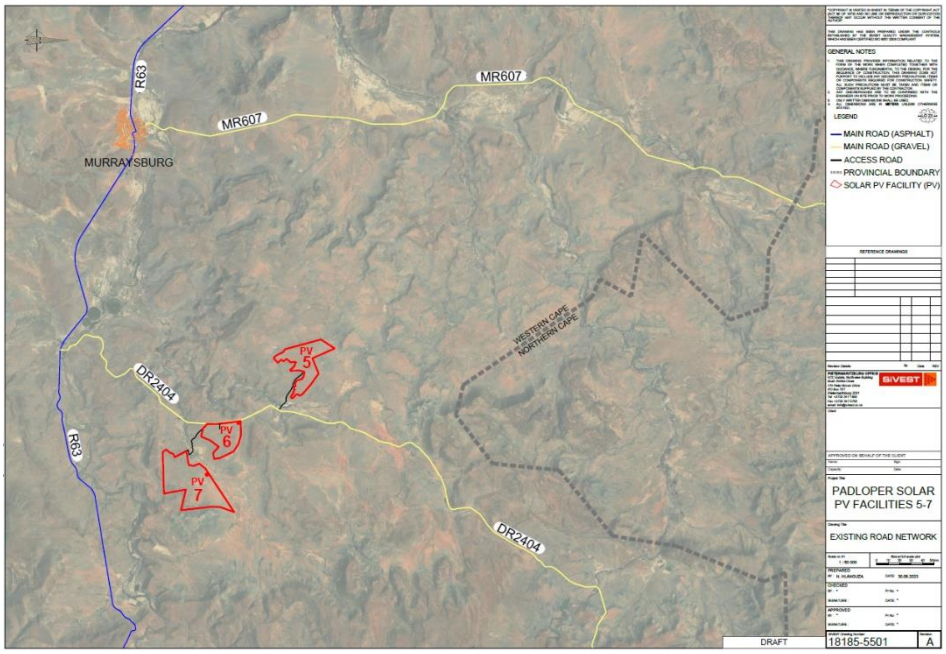


Figure A.9. Main roads and proposed access points to the proposed Padloper PV 5-7 (Source: SiVEST (Pty) Ltd, 2023)

Road R63 is an asphalt trunk road spanning three provinces (Eastern Cape, Western Cape and Northern Cape) which is maintained by SANRAL. It carries the RCAM classification R2 and is lightly trafficked in the vicinity of the proposed Padloper PV Facilities. The road is in good condition and is suitable for the requirements of the proposed development. Road R63 provides access to DR2404.

Road DR2404 is a gravel divisional road within the Western Cape with an RCAM classification of R4. The road begins at its intersection with the R63 approximately 10 km east of Murraysburg. The intersection has sight distances of approximately 320 m and 1 800 m, which are sufficient for the developments' anticipated construction traffic. DR2404 is approximately 6 m wide for most of the assessed length, with a few sections that are approximately 4 m wide and may require widening. Moderate corrugation and oversized aggregate were observed on some sections of the road surface. Construction traffic is advised to travel at a slow speed on DR2404 due to the 6 m width, in order to allow timely sighting and safe passing of opposing traffic. It is also recommended that the road be bladed before construction to smoothen out the corrugations and rocky surface. This will assist with safer transportation of PV panels and construction material, as well as reduce road degradation. Road DR2404 provides access to the proposed development.

Exact specifications of the widening and upgrading of the unnamed farm gravel road will be confirmed during the detailed design phase. The widening and upgrading also depends on the expected vehicular volumes and type of vehicles that would use the road. This will determine the specific road geometry regarding width, road foundational structure (layer thicknesses), etc. Typically for PV projects, the roads classified to accommodate larger vehicular traffic and loads would be upgraded or upsized as follows:

- Wider gravel wearing coarse road widths (ranging up to 5 m) and a thicker dimension (up to 200 mm thick);
- Dependent on the in-situ soil properties, the edge constrains on either side of the gravel wearing coarse might be required in the form of either kerbing or a compacted shoulder to protect the road surface;

- The lower road foundational layers would follow the widened wearing coarse dimensions;
- Additional foundational layers would usually be required in the form and thickness of 150 mm selected quality subgrade materials that would have to attain specific engineering qualities; and
- There might also be specific surface water infrastructure required to manage surface water runoff in the form of side channelling, conduits crossing the road structure or additional earthwork shaping.

Such upgrading and widening has been accommodated for in the relevant listed activities applicable to the proposed project. Refer to Section A.11 of this BA Report.

A.5.4 Associated Infrastructure

A.5.4.1 Operations and Maintenance (O&M) Area

The onsite O&M area is required to support the functioning of the proposed project and provide services to personnel who will be responsible for the construction as well as operation and routine maintenance of the facility during its lifespan. The proposed O&M area will be fenced with access control and will be located within the proposed development footprint of the on-site substation hub and will typically comprise of the following:

- O&M building (including a control centre, site offices, warehouses, workshop, visitors centre, etc);
- Worker amenities (e.g., canteen, ablution facilities, changing room, etc.);
- Storage structures for equipment, materials, fuel, oil, machinery etc. (e.g., containers, skips etc.);
- Security office and boom gate;
- Parking area;
- A concrete batching plant of up to 0.25 ha (approx. 50 m x 50 m);
- Water storage (likely in 10 000 L above ground conventional (plastic) storage tanks); and
- Central waste collection and storage area.

It is anticipated that the O&M building complex, which will form part of the development footprint earmarked for the construction of the substation hub. The maximum height of onsite buildings and other related infrastructure is not likely to exceed 10 m.

A.5.4.2 Construction Compound and Laydown areas

During the construction phase, the proposed development will require the establishment of a construction compound and laydown area with a total approximate temporary footprint of up to 3 ha. It is anticipated that this area will be fenced with access control.

A.5.4.3 Converters/Inverters, Low Voltage Cables, and Medium Voltage Cables

As mentioned above, the solar arrays are typically connected to each other in strings, which are in turn connected to converters/inverters that convert Direct Current (DC) to Alternating Current (AC). Each converter/inverter station is expected have a height of approximately 3 m (apart from lightning conductors) and have a footprint of 0.022 ha.

The strings will be connected to the converter/inverter stations by medium voltage underground (internal) DC cables (to a maximum depth of 1.5 m) or cable trays. Power from the converter/inverter

stations will be collected in medium voltage transformers through underground (internal) AC cables, cable trays or AC cables which will be below ground.

The inverter stations will in turn be connected to the proposed on-site substations, via medium voltage (33 kV) internal underground cables. It is more likely that the 22/33 kV internal cables will be underground to a maximum depth of 1.5 m.

The 22/33 kV cables or power lines will feed into the on-site substations where the voltage will be increased to transmit the power via the 132 kV overhead power line into the proposed authorised Ishwati Emoyeni Collector Substation via the proposed Padloper PV 4 switching station.

A.5.4.4 Stormwater Channels and Water Pipelines

The following design principles are proposed to manage storm water overland flow and mitigate erosion:

- The area where the solar panels will be installed will not be cleared. The vegetation will only be trimmed and the panels will be installed on steel supporting structures above the height of the vegetation;
- The internal roads are proposed to be constructed level with the natural ground level to prevent the channelization of the surface water. This will also prevent concentrated surface runoff erosion;
- For the scattered small ridges that have localized steeper gradients it is proposed that localized storm water cut-off channels be implemented above the areas only when evidence of erosion is observed at the natural state (prior to construction); and
- At loading areas and building structures, allowance will be made to minimize any erosion that might occur. This can be achieved by placing vegetated grass blocks on the verges of these hardened areas to limit flow velocity and to assist with the recharge of the water table.

Therefore, the existing rainfall and storm water runoff characteristics will not be changed with the construction should the proposed design principles be implemented. The solar panels will not replace the vegetated area and thus storm water runoff is not increased due to the proposed PV development.

Details of storm water management are to be confirmed once the Engineering, Procurement and Construction (EPC) contractor has been selected and the design is finalised. It is proposed that a detailed storm water management plan be developed during the detailed design phase. Recommendations for the management of storm water are discussed in Section D of this BA Report and Appendices H - J.

A.5.4.5 Panel Maintenance and Cleaning Area

During the O&M phase, the accumulation of dust on solar panels generally negatively influences the productivity of solar facilities. As such the panels require regular cleaning. It is proposed that panel cleaning will take place quarterly; however, this may be revised should the site conditions warrant more frequent cleaning. A dedicated panel maintenance and cleaning area will be required on site during the O&M phase.

A.6 Overview of the Project Development Cycle

The following section is applicable to the Padloper PV 5 project (i.e., proposed development of the PV facility, the associated EGI and the associated infrastructure). The project can be divided into the following three main phases:

- Construction Phase;
- Operational Phase; and
- Decommissioning Phase.

Each activity undertaken as part of the above phases may have environmental impacts and, where applicable, has therefore been assessed by the specialist studies (summarised in Section B and full studies included Appendix D of this BA Report).

A.6.1 Construction Phase

The construction phase will take place subsequent to the issuing of EAs from the DFFE and a successful bid in terms of the REIPPPP (i.e., the issuing of a Power Purchase Agreement (PPA) from the Department of Mineral Resources and Energy (DMRE)). The construction phase for the proposed project is expected to extend up to 24 months.

The main activities that will form part of the construction phase are:

- Removal of vegetation for the proposed infrastructure, where necessary, within the approved development footprint to facilitate the construction and/or establishment of infrastructure. Note that vegetation is planned to be trimmed within the PV array area (and not removed completely);
- Excavations for infrastructure and associated infrastructure;
- Establishment of a laydown area for materials and equipment;
- Establishment of parking areas, offices, workshop, waste area, hazardous materials store, access roads etc.;
- Erection of a perimeter security fence;
- Stockpiling of topsoil and cleared vegetation, where necessary (except for the PV array);
- Creation of employment opportunities;
- Transportation of material and equipment to site, and personnel to and from site;
- Construction of the solar field and additional infrastructure; and
- Rehabilitation of areas disturbed by construction activities and landscaping.

A.6.2 Operational Phase

The following activities will occur during the operational phase of the PV project:

- The generation of electricity from the proposed solar facility;
- Storage of energy generated by the proposed solar facility in electrochemical batteries; and
- Maintenance of the solar field and associated infrastructure.

During the life span of the proposed project (approximately 20 years), on-going maintenance will be required on a scheduled basis. In general, maintenance on the structures will involve visual inspection, and only equipment that fails will be replaced in manner similar that of construction activities. The EMPrs (Appendices H – J of this BA Report) includes the requirement for method statements to be compiled

prior to the operational phase to describe the manner in which maintenance will be undertaken for the structures and infrastructure impacting on watercourses.

A.6.3 Decommissioning Phase

At the end of the operational phase, the solar facility may be decommissioned, or may be repowered i.e., redesigned and refitted so as to operate for a longer period. The main aim of decommissioning is to return the land to its original, pre-construction condition. Should the unlikely need for decommissioning arise i.e., if the facility becomes outdated or the land needs to be used for other purposes, the decommissioning procedures will be undertaken in line with the approved EMPr and the site will be rehabilitated and returned to its pre-construction state insofar as possible.

Various components of the proposed project, which are to be decommissioned will be reused, recycled, or disposed of in accordance with the relevant regulatory requirements. The decommissioning phase of the project is also expected to create temporary skilled and unskilled employment opportunities.

A.7 Socio-Economic

A.7.1 Employment during Construction

During the construction phase, both skilled and unskilled temporary employment opportunities will be created. It is difficult to specify the actual number of employment opportunities that will be created at this stage; however, employment opportunities range between 350 - 429. The skills breakdown of employment opportunities is estimated as 340 - 410 low-skilled, 6 - 12 medium skilled and 4 - 7 high skilled personnel. It should be noted that the employment opportunities provided in this report are estimates and is dependent on the final engineering design and the REIPPPP Request for Proposal provisions at that point in time or another suitable tender process.

A.7.2 Employment during Operations

With regards to direct employment during the operation phase, it is anticipated that between 67–94 opportunities by the proposed project. The proposed development will create in the region of 67 - 94 full time employment opportunities during the 20-to-25-year operational phase. The skills breakdown of employment opportunities is estimated as 62 - 85 low-skilled, 2 - 4 medium skilled and 3 - 5 high skilled personnel. These unskilled jobs will be linked to services such as panel cleaning, maintenance and security.

A.7.3 Socio-Economic Investment and Development

The Applicant will ultimately own the project, if successful, and will compile an Economic Development Plan which will be compliant with REIPPPP requirements or another suitable tender process and will inter alia set out to achieve the following:

- Create a local community trust or similar (as required by REIPPPP) which has an equity share in the project life to benefit historically disadvantaged communities;
- Initiate a skills development and training strategy to facilitate future employment from the local community;
- Give preference to local suppliers for the construction of the facility; and
- Support local community upliftment projects and entrepreneurship through socio-economic and enterprise development initiatives.

A.8 Traffic Generation

As noted above, in terms of traffic generation, a Traffic Impact Statement, as technical input for this BA, has been commissioned and included in Appendix D.13 of this BA Report.

The types of materials and equipment that will need to be transported to site during the construction phase include the following:

- Building materials will be transported by single-unit trucks within the road freight limitations of South Africa.
- Transformers and switch gears will be transported with the following abnormal load dimensions; width: 4.5 m, length: 27 m and height: 4.5 m on double axle trucks within the road freight limitations of South Africa.
- Workers from the surrounding area will be transported by taxi/bus/shuttle or private car.
- Transformers will be transported by abnormal load trucks with the following dimensions: width: 13 m, length: 4.0 m and height: 4.5 m for which a permit will need to be applied for in terms of Section 81 of the National Road Traffic Act and authorisation needs to be obtained from the relevant road authorities to modify the road reserve to accommodate turning movements at intersections.

The construction phase of the proposed project is expected to generate 96 daily trips, 44 of which are peak hour trips; the operational phase is expected to generate 22 daily trips, 20 of which are peak hour trips; and the decommissioning phase is expected to generate 86 daily trips, 44 of which are peak hour trips.

No additional traffic is expected for the EGI component as construction will occur at the same time as the PV facility.

Refer to the Traffic Impact Statement included Appendix D.13 of this BA Report for a complete description of the assumptions used in the trip calculations noted above. It is important to note that the Traffic Impact Statement has assumed the worst-case construction period of 24 months. The section below provides a description of the water usage requirements.

A.9 Service Provision: Water Usage, Sewage, Solid Waste and Electricity Requirements

A.9.1 Water Usage

During the construction phase, up to 30 000 m^3 of water will be required per annum. Water will be required for human consumption and construction activities. This is also classified as potable water and should be of a reputable source and conform to SANS quality standards. The decommissioning phase is also expected to result in the same water usage requirements.

During the operational phase, it is estimated that the panel washing process, and human consumption as well as other operational phase activities will require up to 8 000 m^3 litres of water per year. The water for panel washing does not need to meet the same quality standards as that required for potable water, however the water should be tested to ensure that it does not negatively impact on the mechanical equipment. Potable water is not available from an existing municipal infrastructure system and therefore needs to be sourced and imported and safely stored on site. The low operational annual

figure is based on recovery of 50% or more of the panel washing water. The developer recognises the need for water saving measures and recycling of panel washing water is planned. This method uses a mobile filtration de-ioniser, particulate filter and no soaps.

Water required for the construction, operational and decommissioning phases will preferably be sourced from a borehole drilled on site, which will be subject to complete geohydrological testing and the necessary water use authorisation obtained (as applicable). The location of existing boreholes on the farm portions which are affected by the proposed Padloper PV and EGI Cluster (i.e., Padloper PV 1-7) and surrounding areas are indicated in the Geohydrology Assessment (Appendix D. 9 of the BA Report).

The Geohydrology Assessment notes that anecdotal evidence suggests that many identified boreholes deliver limited supply, in addition some of the boreholes on this property may require upgrading and/or deepening to deliver the requisite volumes required by the proposed solar facility. The assessment recommends that the legal status of groundwater use at each property should be confirmed as this will inform the need for future water use authorisations. If groundwater is available and suitable, water pipelines may need to be constructed in order to transfer groundwater from the existing boreholes to the PV facility. The assessment further confirms that should ground water, if used, should be monitored (i.e., abstraction volumes, quality and water levels) and that this should ideally be implemented one year prior to the start of construction if the project timeframes permit.

As a second option, water will be sourced from the Beaufort West Local Municipality. The project Applicant will consult with the Local Municipality and specific arrangements for water to either be trucked in, or otherwise made available for collection at their Water Treatment Plant via a metered standpipe. These arrangements will be agreed on in a Service Level Agreement (SLA).

Should the sources discussed above not be viable, the Project Applicant will investigate into a third-party water supplier which may include a nearby mine or other private services.

Storage tanks will also be allowed for at the onsite substation control room, as well as the O&M Building but this is localised small tanks for household use.

A.9.2 Sewage or Liquid Effluent

The proposed projects will require sewage services during the construction, operational and decommissioning phase. Low volumes of sewage or liquid effluent are estimated. More specifically, it is estimated that approximately 55 m^3 per month will be generated during the construction phase. During the operational phase, it is estimated that 3 m^3 per month will be generated.

Liquid effluent will be limited to the ablution facilities during the construction and operational phases. Portable sanitation facilities (i.e., chemical toilets) will be used during the construction phase, which will be regularly serviced and emptied by a suitable (private) contractor on a regular basis. Permanent ablution facilities may be installed during the operational phase. The effluent will be stored on site in watertight concrete structures (conservancy tanks) and thereafter transported to and disposed of at the Local Municipal sewerage treatment works.

A.9.3 Solid Waste Generation

The quantity of waste generated will depend on the construction phase, which is estimated to up to 24 months. However, it is estimated that approximately 12 m^3 of waste will be generated every month during the construction phase. During the construction phase, the following waste materials are expected:

- Packaging material, such as the cardboard, plastic and wooden packaging and off-cuts;
- Hazardous waste from empty tins, oils, soil containing oil and diesel (in the event of spills), and chemicals;
- Building rubble, discarded bricks, wood and concrete;
- Domestic waste generated by personnel; and
- Vegetation waste generated from the clearing of vegetation.

Solid waste will be managed via the EMPr during the construction and operational phases (Appendices H - J of the BA Report), which incorporates waste management principles. During the construction phase, general solid waste will be collected and temporarily stockpiled in skips in a designated area on site and thereafter removed, emptied into trucks, and disposed at a registered waste disposal facility on a monthly basis by an approved waste disposal Contractor (i.e., a suitable Contractor) or the municipality. In addition, a skip will be placed on site and any damaged or broken PV panels (i.e., those not returned to the supplier) will be stored in this skip. A specialist waste management company will be commissioned to manage and dispose of this waste.

Any hazardous waste (such as contaminated soil as a result of spillages) will be temporarily stockpiled (for less than 90 days) in a designated area on site (i.e., placed in leak-proof storage skips), and thereafter removed off site by a suitable service provider for safe disposal at a registered hazardous waste disposal facility.

Waste disposal slips and waybills will be obtained for the collection and disposal of the general and hazardous waste. These disposal slips (i.e., safe disposal certificates) will be kept on file for auditing purposes as proof of disposal. The waste disposal facility selected will be suitable and able to receive the specified waste stream (i.e., hazardous waste will only be disposed of at a registered/licenced waste disposal facility). The details of the disposal facility will be finalised during the contracting process, prior to the commencement of construction. Where possible, recycling and re-use of material will be encouraged. Waste management is further discussed in the EMPr (Appendices H - J of this BA Report).

During the operational phase after construction, the facility will produce minor amounts of general waste (as a result of the offices). It is estimated that approximately 2.5 m^3 of waste will be generated every month during the operational phase. Waste management is discussed in the EMPr (Appendices H – J of this BA Report).

A.9.4 Electricity Requirements

In terms of electricity supply for the construction and operational phases, the developer will make use municipal and Eskom services and generators on site during construction.

A.10 Applicable Legislation

The scope and content of this BA Report has been informed by the legislation, guidelines and information series documents listed below. It is important to note that the specialist studies included in Appendix D of this BA Report also include a description of the relevant applicable legislation.

A.10.1 National Legislation

A.10.1.1 The Constitution of the Republic of South Africa (Act 108 of 1996)

The Constitution, which is the supreme law of the Republic of South Africa, provides the legal framework for legislation regulating environmental management in general, against the backdrop of the fundamental human rights. Section 24 of the Constitution states that:

- "Everyone has the right:
  - to an environment that is not harmful to their health or well-being; and
  - to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that –
    - prevent pollution and ecological degradation;
    - promote conservation; and
    - secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

Section 24 of the Bill of Rights therefore guarantees the people of South Africa the right to an environment that is not detrimental to human health or well-being, and specifically imposes a duty on the State to promulgate legislation and take other steps that ensure that the right is upheld and that, among other things, ecological degradation and pollution are prevented.

In support of the above rights, the environmental management objectives of the proposed project are to protect ecologically sensitive areas and support sustainable development and the use of natural resources, whilst promoting justifiable socio-economic development in the towns nearest to the project site.

A.10.1.2 NEMA and EIA Regulations published on 8 December 2014 (as amended on 7 April 2017 and 11 June 2021; GN R327, GN R326, GN R325 and GN R324)

Chapter 1, Section 2 of the NEMA sets out a number of principles to give guidance to developers, private landowners, members of the public and authorities. The proclamation of the NEMA gives expression to an overarching environmental law. Various mechanisms, such as cooperative environmental governance, compliance and non-compliance, enforcement, and regulating government and business impacts on the environment, underpin NEMA. NEMA, as the primary environmental legislation, is complemented by a number of sectoral laws governing marine living resources, mining, forestry, biodiversity, protected areas, pollution, air quality, waste and integrated coastal management. Principle number 3 determines that a development must be socially, environmentally and economically sustainable. Principle Number 4(a) states that all relevant factors must be considered, inter alia i) that the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied; ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied; vi) that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised; and viii) that negative impacts on

the environment and on peoples' environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.

GN R327 contains the relevant listed activities that are triggered, thus requiring a BA. Please refer to Section A.11 of this BA Report for the complete list of listed activities.

A.10.1.3 Government Notice (GN) R960 (published 5 July 2019)

GN R960 was published on 5 July 2019 and came into effect for compulsory use of the National Web Based Environmental Screening Tool of 4 October 2019. The notice outlines the requirement to submit a report generated by the National Web Based Environmental Screening Tool, in terms of Section 24(5)(h) of the NEMA and Regulation 16(1)(b)(v) of the 2014 NEMA EIA Regulations (as amended) when submitting an Application for EA in terms of Regulations 19 and 21 of the 2014 NEMA EIA Regulations (as amended). As such, the Application for EA for the proposed project has been run through the National Web Based Environmental Screening Tool, and the associated report generated and attached to the amended Application for EA, which has been submitted to the DFFE with the Final BA Report). The Screening Tool report is also included in Appendix K of this BA Report.

A.10.1.4 Government Notice (GN) R320 (20 March 2020)

GN R320 prescribes the general requirements for undertaking site sensitivity verification and protocols for the assessment and minimum report content requirements for identified environmental impacts for environmental themes in terms of sections 24(5)(a) and (h) and 44 of NEMA, when applying for EA.

The Specialist Assessments undertaken as part of this BA Process comply with GN R320, where applicable, including Agriculture, Aquatic Biodiversity and Terrestrial Biodiversity. The remaining specialist assessments comply with Appendix 6 of the 2014 NEMA EIA Regulations (as amended), and where relevant, Part A of GN R320 which contains site sensitivity verification requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed. The site sensitivity verifications required for Defence, as well as the Civil Aviation also comply with GN R320. The protocols were enforced within 50 days of publication of the notice i.e., on 9 May 2020.

A.10.1.5 Government Notice (GN) R1150 (30 October 2020)

GN R1150 prescribes procedures and protocols in respect of specific environmental themes for the assessment of, as well as the minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the NEMA, when applying for EA. GN R1150 includes a protocol for the specialist assessment and minimum report content requirements for environmental impacts on a) Terrestrial Animal Species and b) Terrestrial Plant Species. The requirements of these protocols apply from the date of publication (i.e., from 30 October 2020), except where the Project Applicant provides proof to the Competent Authority that the specialist assessment affected by these protocols had been commissioned prior to the date of publication of these protocols in the Government Gazette, in which case Appendix 6 of the 2014 NEMA EIA Regulations (as amended) will apply to such applications. The Terrestrial Biodiversity Specialist Assessment undertaken as part of this BA Process was commissioned in May 2022. Therefore, the Terrestrial Impact Assessment (included in Appendix D.4) was undertaken in adherence to the protocol.

GN R3717 was promulgated on 28 July 2023 which amends the terrestrial plant and animal species protocol that was published in GN R1150 in October 2020. The amendment entails the removal of the term "terrestrial" from the protocol to ensure that it applies to all plant and animal species, including freshwater species. However, the Aquatic Biodiversity specialist was appointed in 2022, prior to the

promulgation of the amendment in GN R3717. Therefore, the amendment is not applicable to the proposed project. The Aquatic Biodiversity specialist assessment has been undertaken in compliance with GN R320.

A.10.1.6 National Environmental Management: Biodiversity Act (Act 10 of 2004)

The National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA) 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 use of indigenous biological resources in a sustainable manner, amongst other provisions". The Act states that the state is the custodian of South Africa's biological diversity and is committed to respect, protect, promote and fulfil the constitutional rights of its citizens.

Chapter 1 sets out the objectives of the Act, and they are aligned with the objectives of the Convention on Biological Diversity, which are the conservation of biodiversity, the sustainable use of its components, and the fair and equitable sharing of the benefits of the use of genetic resources. The Act also gives effect to CITES, the Ramsar Convention, and the Bonn Convention on Migratory Species of Wild Animals. The State is endowed with the trusteeship of biodiversity and has the responsibility to manage, conserve and sustain the biodiversity of South Africa.

This Act therefore serves to control the disturbance and land utilisation within certain habitats, as well as the planting and control of certain exotic species. Effective disturbance and removal of threatened or protected species encountered on or around the sites, will require specific permission from the applicable authorities.

Furthermore, NEMBA states that the loss of biodiversity through habitat loss, degradation or fragmentation must be avoided, minimised or remedied. The loss of biodiversity includes inter alia the loss of endangered, threatened or protected plant and animal species.

Chapter 5 of NEMBA (Sections 73 to 75) regulates activities involving invasive species, and lists duty of care as follows:

the landowner/land user must take steps to control and eradicate the invasive species and prevent their spread, which includes targeting offspring, propagating material and regrowth, in order to prevent the production of offspring, formation of seed, regeneration or re-establishment;

- take all required steps to prevent or minimise harm to biodiversity; and
- ensure that actions taken to control/eradicate invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment.

The revised National List of Ecosystems that are Threatened and in Need of Protection ("the Red List of Ecosystems") in Government Notice ("GN") No. 2747 of 18 November 2022, published under section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), which lists all 456 terrestrial ecosystem types, 120 of which are categorised as threatened. Should a project fall within a vegetation type or ecosystem that is listed as being threatened or protected, actions in terms of NEMBA are triggered. Based on the preliminary sensitivity screening, site sensitivity verifications and detailed impact assessment that was undertaken for the proposed development site, none of the listed threatened ecosystems was found to occur within the proposed power line corridor. In addition, no terrestrial animal and plant species of conservation concern (SCC) were identified within the proposed development site (refer to Section D of this BA Report for a summary of the Terrestrial Biodiversity and Species Impact Assessment findings).

A.10.1.7 The National Heritage Resources Act (Act 25 of 1999)

The National Heritage Resources Act (Act 25 of 1999) (NHRA) introduces an integrated and interactive system for the management of national heritage, archaeological and palaeontological resources (which include landscapes and natural features of cultural significance).

Parts of sections 35(4), 36(3) (a) and 38(1) of the NHRA apply to the proposed project:

Archaeology, palaeontology and meteorites

Section 35 (4) – No person may, without a permit issued by the responsible heritage resources authority:

- destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
- destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;
- bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

Burial grounds and graves

Section 36 (3) (a) No person may, without a permit issued by South African Heritage Resources Agency (SAHRA) or a provincial heritage resources authority:

- destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
- destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

Heritage resources management

38 (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorized as:

a) the construction of a road, wall, power line, 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 the site –
    (i) exceeding 5 000 m^2 in extent, or
    (ii) involving three or more 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 resources authority;
d) the re-zoning of a site exceeding 10 000 m^2 in extent; or
e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

While landscapes with cultural significance do not have a dedicated Section in the NHRA, they are protected under the definition of the National Estate (Section 3). Section 3(2)(c) and (d) list "historical settlements and townscapes" and "landscapes and natural features of cultural significance" as part of the National Estate. Furthermore, Section 3(3) describes the reasons a place or object may have cultural heritage value. Section 38 (2a) of the NHRA states that if there is reason to believe that heritage resources will be affected then an impact assessment report must be submitted.

The Heritage Western Cape (HWC) is required to provide comment on the proposed project. In line with HWC requirements, a Notification of Intent to Develop (NID) was submitted to the HWC for the proposed project on 14 December 2022 by Dr. Jayson Orton of ASHA Consulting (Pty) Ltd. (see Appendix F.5). HWC responded on 21 February 2023 confirming that the NID application was discussed by Heritage Officers Meeting held on 20 February 2023. The proposed Padloper PV Projects 2-7 were all discussed this meeting and assigned the Case Number of HWC22121416CM0209. The response from HWC on the combined NID has determined the requirements for the assessment phase from a heritage perspective (see Appendix F.6).

As per the requirements of the HWC, an integrated Heritage Impact Assessment (HIA) including archaeology, cultural landscape and palaeontology was undertaken, and an integrated HIA report compiled. The integrated HIA was submitted to HWC and released to registered conservation bodies and the relevant local municipalities for a 30-day consultation period in line with the requirements of the HWC (see Appendix F.7). These relevant specialist assessments are also included in Appendix D.3 of this BA Report which were released to I&APs for a 30-day public comment period extending from 14 August 2023 to 13 September 2023 (excluding public holidays).

The integrated HIA was also submitted to the HWC for consideration and comment on 26 October 2023. Refer to Appendix F.9 of this Final BA Report for proof of submission of the HIA to HWC for comment, as well as their acknowledgement of receipt. The final comments from HWC will be forwarded to the DFFE once received.

The proposed project may require a permit in terms of the NHRA prior to any fossils or artefacts being removed by professional palaeontologists and archaeologists. If archaeological mitigation is needed, then the appointed archaeologist will need to submit a Work Plan to the HWC to conduct the work. This must be carried out well in advance of construction to ensure that there is enough time for HWC to approve the mitigation work before construction commences.

Should professional palaeontological mitigation be necessary during the construction phase, the palaeontologist concerned will need to apply for a Fossil Collection Permit from HWC. Palaeontological collection should comply with international best practice. All fossil material collected must be deposited, together with key collection data, in an approved depository (museum / university). Palaeontological mitigation work including the ensuing Fossil Collection reports should comply with the minimum standards specified by Heritage Western Cape (2016) and SAHRA (2013).

A.10.1.8 National Forests Act (Act 84 of 1998)

The National Forests Act (Act 84 of 1998) (NFA) allows for the protection of certain tree species of conservation concern. The Minister has the power to declare a particular tree to be a protected tree. According to Section 12 (1) d (read with Sections (5) 1 and 62 (2) (c)) of the NFA, a licence is required to remove, cut, disturb, damage or destroy any of the listed protected trees. The most recent list of protected tree species was published in 2019. The Department of Agriculture, Land Reform and Rural Development (DALRRD) is authorised to issue licences for any removal, cutting, disturbance, damage

to or destruction of any protected trees. Therefore, the removal of any protected tree species listed within the NFA will require a tree removal permit, which can be obtained from the DALRRD.

A.10.1.9 Conservation of Agricultural Resources Act (Act 43 of 1983)

The objectives of the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) are to provide for the conservation of the natural agricultural resources of South Africa by the:

- maintenance of the production potential of land;
- combating and prevention of erosion and weakening or destruction of the water sources; and
- protection of the vegetation and the combating of weeds and invader plants.

The CARA states that no land user shall utilise the vegetation of wetlands (a watercourse or pans) in a manner that will cause its deterioration or damage. This includes cultivation, overgrazing, diverting water run-off and other developments that damage the water resource. The CARA includes regulations on alien invasive plants. According to the amended regulations (GN R280 of March 2001), declared weeds and invader plants are divided into three categories:

- Category 1 may not be grown and must be eradicated and controlled,
- Category 2 may only be grown in an area demarcated for commercial cultivation purposes and for which a permit has been issued, and must be controlled, and
- Category 3 plants may no longer be planted and existing plants may remain as long as their spread is prevented, except within the flood line of watercourses and wetlands. It is the legal duty of the land user or landowner to control invasive alien plants occurring on the land under their control.

Should alien plant species occur within the development footprint, it will be managed in line with the Environmental Management Programme (EMPr) (included as Appendix G of this BA Report). Rehabilitation after disturbance to agricultural land is also managed by CARA. The DALRRD reviews and approves applications in terms of these Acts according to their Guidelines for the evaluation and review of applications pertaining to renewable energy on agricultural land, dated September 2011.

A.10.1.10 National Water Act (Act 36 of 1998)

One of the important objectives of the National Water Act (Act 36 of 1998) (NWA) is to ensure the protection of the aquatic ecosystems of South Africa's water resources. Section 21 of this Act identifies certain land uses, infrastructural developments, water supply/demand and waste disposal as 'water uses' that require authorisation (licensing) by the Department of Water and Sanitation (DWS). Chapter 4 (Part 1) of the NWA sets out general principles for the regulation of water use. Water use is defined broadly in the NWA, and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering the bed, banks, course or characteristics of a watercourse, removing water found underground for certain purposes, and recreation. In general, a water use must be licensed unless it is listed in Schedule I, is an existing lawful use, is permissible under a general authorisation, or if a responsible authority waives the need for a licence. The Minister may limit the amount of water which a responsible authority may allocate. In making regulations the Minister may differentiate between different water resources, classes of water resources and geographical areas.

All water users who are using water for agriculture: aquaculture, agriculture: irrigation, agriculture: watering livestock, industrial, mining, power generation, recreation, urban and water supply service must register their water use. This covers the use of surface- and groundwater.

Section 21 of the NWA lists the following water uses that need to be licensed:

a) taking water from a water resource;
b) storing water;
c) impeding or diverting the flow of water in a watercourse;
d) engaging in a stream flow reduction activity contemplated in section 36;
e) engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);
f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
g) disposing of waste in a manner which may detrimentally impact on a water resource;
h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
i) altering the bed, banks, course or characteristics of a watercourse;
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; and
k) using water for recreational purposes.

Any activities that take place within a watercourse, or within 100 m of the edge of a watercourse, or within 500 m of a delineated wetland boundary, will require a water use authorisation in terms of Section 21 (c) and Section 21 (i) of the NWA.

The risk assessment that was undertaken as part of the Aquatic Biodiversity Specialist Assessment determined that the proposed power line poses a low risk of impacting aquatic habitat, water flow and water quality within the servitude corridor. The water use activities associated with the proposed project could potentially be authorised through the general authorisations for Section 21(c) and (i) water uses. Also, a water use authorisation in terms of Section 21(a) might be required for the proposed groundwater abstraction from boreholes for construction purposes, which would however be highly unlikely to impact on any surface water ecosystem in the area.

A.10.1.11 Water Services Act (Act 108 of 1997)

Water will be required during the construction, operational and decommissioning phases of the proposed projects, for consumption purposes, earthworks and grassing etc. Water will also be required for panel cleaning during the operational phase. Water will either be sourced from the local municipality. Compliance with this act will be undertaken during the relevant phase of the project, in consultation with the local and district municipalities, if relevant (i.e., if water is sourced from the local municipality).

A.10.1.12 Hazardous Substances Act (Act 15 of 1973)

During the construction phase of the proposed project, fuel, oils and relevant chemicals would be utilised to power and/or operate vehicles, generators and construction equipment. In addition, potential spills of hazardous materials could occur during the construction and operational phases. Such management actions are recommended in the EMPr, which has been included as Appendices H - L to this BA Report.

A.10.1.13 Subdivision of Agricultural Land Act (Act 70 of 1970)

The Subdivision of Agricultural Land Act (Act 70 of 1970) (SALA) requires that any long-term lease associated with the renewable energy facility be approved by the DALRRD. The SALA consent is separate from the Application for EA and needs to be applied for and obtained separately. An application for the change of land use (re-zoning) for the development on agricultural land will be lodged by the Project Applicant for approval in terms of the SALA, as required.

A.10.1.14 National Environmental Management: Waste Act (Act 59 of 2008) (NEMWA)

General and hazardous waste will be generated during the construction, operational and decommissioning phases, which will require proper management. Such management actions are recommended in the EMPr, which has been included as Appendix G to this BA Report.

A.10.1.15 National Environmental Management: Air Quality Act (Act 39 of 2004)

The proposed vegetation clearance and stockpiling activities, including earthworks and the use of construction machinery and vehicle traffic, may result in the unsettling of, and temporary exposure to, dust. Appropriate dust control methods will need to be applied. Such management actions are recommended in the EMPr, which has been included as Appendix G to this BA Report.

A.10.1.16 Development Facilitation Act (Act 67 of 1995)

The Development Facilitation Act (Act 67 of 1995) (DFA) sets out a number of key planning principles which have a bearing on assessing proposed developments in light of the national planning requirements. The planning principles most applicable to the study area include:

- Promoting the integration of the social, economic, institutional and physical aspects of land development;
- Promoting integrated land development in rural and urban areas in support of each other;
- Promoting the availability of residential and employment opportunities in close proximity to or integrated with each other;
- Optimising the use of existing resources including such resources relating to agriculture, land, minerals, bulk infrastructure, roads, transportation and social facilities;
- Contributing to the correction of the historically distorted spatial patterns of settlement in the Republic and to the optimum use of existing infrastructure in excess of current needs;
- Promoting the establishment of viable communities; and
- Promoting sustained protection of the environment.

A.10.2 Provincial Legislation

A.10.2.1 Western Cape Nature and Environmental Conservation Ordinance (Act 19 of 1974) and the Western Cape Nature Conservation Laws Amendment Act (Act 3 of 2000)

This Act should be given consideration following issuing of EA, should such EA be granted, with particular respect to its Chapters IV (The protection of wild animals other than fish) and Chapter VI (The protection of flora). The requirement for permits when removing and relocating specific flora that may be encountered or alternatively addressing fauna that may be encountered around the sites would require due consideration.

The Western Cape Nature Conservation Laws Amendment Act (2000) provides for the amendment of various laws on nature conservation in order to transfer the administration of the provisions of those

laws to the Western Cape Nature Conservation Board, which includes various regulations pertaining to wild plants and animals including avifauna.

A.10.2.2 Draft Western Cape Biodiversity Bill (7 May 2019)

The purpose of the Draft Western Cape Biodiversity Bill, 2019 is to provide for the framework and institutions for nature conservation and the protection, management and sustainable use of biodiversity and ecosystems in the Province; and for matters incidental thereto. This law has not been promulgated however some aspects of its Chapter 7 (Protection of Ecosystems, Ecological Infrastructure and Species), in particular, may apply to the affected sites, once promulgated.

A.10.2.3 Western Cape Land Use Planning Act (Act 3 of 2014)

The purpose of the Western Cape Land Use Planning Act (Act 3 of 2014) is to consolidate legislation in the Province pertaining to provincial planning, regional planning and development, urban and rural development, regulation, support and monitoring of municipal planning and regulation of public places and municipal roads arising from subdivisions; to make provision for provincial spatial development frameworks; to provide for minimum standards for, and the efficient coordination of, spatial development frameworks; to provide for minimum norms and standards for effective municipal development management; to regulate provincial development management; to regulate the effect of land development on agriculture; to provide for land use planning principles; to repeal certain old-order laws; and to provide for matters incidental thereto. Several aspects of this Act may apply to the affected sites, in particular the regulation of the effect of land development on agriculture.

A.10.3 Local Planning Legislation

A.10.3.1 Environmental Management Framework

Research indicates that there is no Environmental Management Framework (EMF) for the Central Karoo District Municipality. The Screening Tool also notes that no intersections with EMF areas have been found.

A.10.3.2 Beaufort West Local Municipality Integrated Development Plan (Beaufort West Local Municipality 2017-2022)

The **vision** of the Beaufort West Local Municipality Integrated Development Plan (BWLM IDP) 2017-2022 is to be the *economic gateway in the Central Karoo, where people are developed and live in harmony together.*
Further unpacking of the vision indicates the provision of directives regarding the growth of the economy and ensuring financial sustainability among other areas in which development is required.

The five priority areas of the IDP are:

1. Service to the people – seeking to improve and maintain basic service delivery through infrastructure development;
2. Sustainable economic growth by leveraging competitive advantages of the region (The IDP identifies low economic growth as one of the main reasons for the lack of new labour entrants into the economy);
3. A well-run administration that is efficient, effective and has the right skills mix;
4. Ensure financial sustainability; and
5. Be a transparent organisation.

A.10.4 International Finance Corporation Performance Standards

In order to promote responsible environmental stewardship and socially responsible development, the proposed power line project will as far as practicable incorporate the environmental and social policies of the International Finance Corporation (IFC). These policies provide a frame of reference for lending institutions to review environmental and social risks of projects, particularly those undertaken in developing countries.

Through the Equator Principles, the IFC's standards are now recognised as international best practice in project finance. The IFC screening process categorises projects into A, B or C in order to indicate relative degrees of environmental and social risk. The categories are:

- Category A - Projects expected to have significant adverse social and/or environmental impacts that are diverse, irreversible, or unprecedented;
- Category B - Projects expected to have limited adverse social and/or environmental impacts that can be readily addressed through mitigation measures; and
- Category C - Projects expected to have minimal or no adverse impacts, including certain financial intermediary projects.

Accordingly, projects such as this proposed power line are categorised as Category B projects. The EIA Process for Category B projects examines the project's potential negative and positive environmental impacts. As required for Category B projects, a BA Process is being undertaken for the proposed solar facility project.

A.11 Listed Activities Associated with the Proposed Project

Section 24(1) of the NEMA states: "*In order to give effect to the general objectives of integrated environmental management laid down in this Chapter, the potential impact on the environment of listed activities must be considered, investigated, assessed and reported to the competent authority charged by this Act with granting the relevant environmental authorization*".

The reference to "listed activities" in Section 24 of the NEMA relates to the regulations promulgated in GN R982, R983, R984 and R985 in Government Gazette (GG) 38282, dated 4 December 2014, which came into effect on 8 December 2014. These were amended in GN R326, R327, R325 and R324, dated 7 April 2017. GN R326 contains the regulations for the Environmental Assessment Process. The relevant GN published in terms of the NEMA collectively comprise the NEMA EIA Regulations listed activities that require either a BA (i.e., GN R327 and GN R324), or Scoping and EIA (i.e. GN R325) to be conducted. As noted previously, due to the project being proposed in a REDZ, the proposed project requires a BA Process.

The 2014 NEMA EIA Regulations (as amended) were further amended as follows:

- GG 41766, GN 706 on 13 July 2018;
- GG 43358, GN 599 on 29 May 2020;
- GG 44701, GN 517 on 11 June 2021; and
- GG 45999, GN 1816 on 3 March 2022.

Based on the transitional arrangements, these amendments (where they have been commenced with) apply to the proposed project as the original Application for EA was not submitted before the above

amendments took effect (where relevant). The relevant amendments have been taken into consideration in this BA Process.

Table A.8 below provides a list of the applicable listed activities associated for the proposed project in terms of Listing Notice 1 (GN R 327), Listing Notice 2 (GN R325) and Listing Notice 3 (GN R324) in terms of the 2014 NEMA EIA Regulations (as amended). The amended Application for EA for this BA Process is being submitted to the DFFE together with the Final BA Report, which makes reference to all relevant listed activities forming part of the proposed project.

Table A.8. Listed Activities in GN R327, GN R325, and GN R324 that will be potentially triggered by the proposed project

Activity No(s)	Listed Activity(ies) as set out in Listing Notice 1 of the EIA Regulations, 2014 as amended	Description of project activity that triggers listed activity
Activity 11(i)	The development of facilities or infrastructure for the transmission and distribution of electricity - (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts or more; excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is — (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	The proposed project will entail the construction of an associated 132 kV overhead power line connecting the proposed solar facility to the switching station located on the proposed Padloper PV 4 site. An on-site substation complex will be constructed at the solar facility. The transformation capacity is estimated at 200 - 250 MVA, and generally stepping up from 22 kV or 33 kV to 132 kV for injection into the Eskom grid. The overhead power line and on-site substation complex constitute facilities for the distribution and transmission of electricity. The proposed project will take place outside of an urban area. This activity would therefore be triggered.
Activity 12 (ii) [(a) and (c)]	The development of: (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- a) within a watercourse; b) in front of a development setback; or c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	The proposed solar PV facility will have an estimated footprint of over 200 ha (excluding access roads). The proposed project will also entail the construction of various infrastructure and structures (such as the solar field, BESS, laydown area, internal roads, and ancillary infrastructure such as O&M building / centre, site office, workshop, staff lockers, bathrooms/ ablutions, warehouse, guard house, etc.). These developments will constitute infrastructure with a physical footprint of more than 100 m². The Aquatic Biodiversity Assessment (Appendix D.5 of this BA Report) notes that no wetlands were found within the study area, only riverine features such as alluvial

	excluding- (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	floodplains and riparian zones. The study area is traversed by a minor watercourse and a core function aquatic habitat (i.e., alluvial watercourses with riparian vegetation) is present. As such, development could occur within 32 m of a watercourse, thereby triggering this activity. The proposed PV project will be constructed on farm portions outside of urban areas, approximately 18 km from Murraysburg, in the Western Cape Province, thereby triggering this activity.
Activity 19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving- a) will occur behind a development setback; b) is for maintenance purposes undertaken in accordance with a maintenance management plan; c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or	The proposed project may entail the excavation, removal and moving of more than 10 m^3 of soil, sand, pebbles or rock from nearby watercourses onsite. The proposed project may also entail the infilling of more than 10 m^3 of material into the nearby watercourses, thereby triggering this activity. The Aquatic Biodiversity Assessment (Appendix D.5 of this BA Report) notes that no wetlands were found within the study area, only riverine features such as alluvial floodplains and riparian zones. The study area is traversed by a minor watercourse and a core function aquatic habitat (i.e., alluvial watercourses with riparian vegetation) is present. As such, development could occur within 32 of a watercourse, thereby triggering this activity. Specifically, the associated infrastructure traversing watercourses (such as access roads) will result in the accumulated infilling

	e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.	or depositing of more than 10 m^3 of material into watercourse and wide flood plains. This activity would therefore be triggered.
Activity 24 (ii)	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; but excluding a road– a) which is identified and included in activity 27 in Listing Notice 2 of 2014; or b) where the entire road falls within an urban area; or which is 1 km or shorter.	Existing roads will be used as far as practically achievable. However, the access and internal road network will need to be developed and upgraded (using all technically feasible existing farm roads where possible) to ensure that the delivery of project infrastructure components and associated infrastructure is possible and that maintenance teams are able to access the entire solar field throughout the lifespan of the project. It is proposed that the road network will be approximately 8 m wide (6 m wide road surface with 1 m drain either side) and will be longer than 1 km. Where required for turning circle/bypass areas, however, access or internal roads may be up to 10 m to allow for larger component transport. This activity is therefore applicable to the various main access roads to the site and the roads between project components. This activity would therefore be triggered.
Activity 28 (ii)	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes, or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	The proposed solar facility will be developed outside of an urban area. It will be constructed on various affected farm portions near Murraysburg in the Western Province. The land earmarked for the development of the proposed facility is currently used for agricultural purposes. The proposed solar PV facility, which is considered a commercial/industrial development, will have a footprint in excess of 1 ha (minimum footprint of about 202 ha). This activity would therefore be triggered.
Activity 48 (i) (a) and (c)	The expansion of (i) infrastructure or structures where the physical footprint is expanded by 100 square metre or more, where such expansion occurs (a) within a	The proposed project will require the upgrading of existing roads within the project area, as well as watercourse crossing upgrades, where such upgrades may take

	watercourse and (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.	place within watercourses and within 32 m from the edge of these watercourses. The total footprint of the upgrades and expansion of infrastructure to would be in excess of 100 m^2 within a watercourse, or within 32 m of a watercourse. This will be confirmed and verified during detailed specialist assessments. The Aquatic and Species Assessment (Appendix D.5 of this BA Report) notes that no wetlands were found within the study area, only riverine features such as alluvial floodplains and riparian. The study further notes that the study area is traversed by a minor watercourse and a core function aquatic habitat (i.e., alluvial watercourses with riparian vegetation) is present within the study area. As such, development could occur within 32 metres of a watercourse and this activity would be triggered.
Activity 56 (ii)	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre- (i) where the existing reserve is wider than 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas.	The Transportation Study (Appendix D.13) notes that the existing road network surrounding the proposed development is well established and provides an acceptable degree of mobility and access. The study further notes that the proposed facilities can be accessed using public roads R63 and DR2404 (existing roads will be used as far as practically achievable) some of which will require an upgrade to accommodate the proposed adjusted land use. Where required, existing gravel roads will be upgraded, and may be widened by more than 6 m and/or lengthened by more than 1 km. This activity would therefore be triggered.
Activity No(s):	**Listed Activity(ies) as described in Listing Notice 2 of the EIA Regulations of 2014, as amended**	**Description of project activity that triggers listed activity**
Activity 1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs	The proposed project is a solar PV facility (i.e., facility for the generation of electricity from a renewable resource) with a maximum installed capacity of up to 150 MW. The proposed PV project will be constructed on farm portions, approximately 18 km from the town of Murraysburg, within the Western Cape Province. Therefore, the proposed

	a) within an urban area; or b) on existing infrastructure.	project is situated outside of an urban area and this activity would be triggered. Note that GN 114 states that Applications for EA for large scale Wind and Solar PV energy facilities, when such facilities trigger Activity 1 of Listing Notice 2 of 2014 of the 2014 NEMA EIA Regulations (as amended) and any other listed and specified activities necessary for the realisation of such facilities, and where the entire proposed facility is to occur in such REDZs, must follow a BA Process, in order to obtain EA. As such, the proposed project will be subject to a BA process instead of a full Scoping and EIA process. This activity would therefore be triggered.
Activity 4	The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic meters.	The proposed project will include the installation of a BESS. The BESS will cover an area of approximately 5 ha at the proposed solar facility project site, have a maximum height of 10 m and have a storage capacity of approximately 900 MWh. As such, the BESS will constitute the storage and handling of approximately 30 000m^3 of electrolyte. Therefore, this activity could be triggered depending on the type of electrochemical batteries to be used.
Activity 15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for: (i) the undertaking of a linear activity; or (i) maintenance purposes undertaken in accordance with a maintenance management plan.	The proposed solar PV facility, which is considered as commercial/ industrial developments, will have an estimated footprint of approximately 200 ha (excluding access roads). The proposed project will also entail the construction of various infrastructure and structures. As a result, more than 20 ha of indigenous vegetation would be removed for the construction of the proposed project. Note that GN 114 states that Applications for EA for large scale Wind and Solar PV energy facilities, when such facilities trigger Activity 1 of Listing Notice 2 of 2014 of the 2014 NEMA EIA Regulations (as amended) and any other listed and specified activities necessary for the realisation of such facilities, and where the entire proposed facility is to occur in such REDZs, must follow a BA Process, in order to obtain EA. This activity would therefore be triggered.

Activity No(s):	Listed Activity(ies) as described in Listing Notice 3 of the EIA Regulations of 2014, as amended	Description of project activity that triggers listed activity
Activity 4 (i)(ii)(aa)	The development of a road wider than 4 metres with a reserve less than 13,5 metres. i. Western Cape ii. Areas outside urban areas; (aa) Areas containing indigenous vegetation	Internal roads will be constructed at the proposed solar facility. The internal roads are estimated to have a width of approximately 8 m (6 m with a 1 m drain on either side). Where required for turning circle/bypass areas, however, access or internal roads may be up to 10 m to allow for larger component transport. The proposed solar facilities will take place outside of an urban area in the Western Cape on sites that contain indigenous vegetation. This activity would therefore be triggered.
Activity 12 (i)(ii)	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. i. Western Cape ii. Within critical biodiversity areas identified in bioregional plans	The proposed solar PV facility will have an estimated footprint of approximately 200 ha (excluding access roads). The proposed project will also entail the construction of various infrastructure and structures. As a result, more than 300 m² of indigenous vegetation would be removed for the construction of the proposed project and associated infrastructure, thereby triggering this activity. The proposed project will take place outside of an urban area in the Western Cape, on sites that contains a small area of critical biodiversity areas. The Terrestrial Biodiversity Specialist Report (Appendix D.4) indicates that the study area contains small portions of CBA Type 1 in terms of the 2017 Western Cape Biodiversity Spatial Plan. This activity would therefore be triggered.
Activity 14 (ii)(a)(c)(i)(i)(ff)	The development of – (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs – (a) within a watercourse; (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; i. Western Cape	The proposed solar PV facility will have an estimated footprint of approximately 202 ha (excluding access roads). The proposed project will also entail the construction of various infrastructure and structures. This will constitute infrastructure with a physical footprint of more than 10 m², and some may occur within small drainage features and 32 m of the watercourses, as noted by the Aquatic Biodiversity and Species Assessment (Appendix D. 5 of this BA Report). The proposed project will take place outside of an urban area in the Western Cape, on

	i. Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	sites that contains a small area of critical biodiversity areas. The Terrestrial Biodiversity Specialist Report (Appendix D.4) indicates that the study area contains small portions of CBA Type 1 in terms of the 2017 Western Cape Biodiversity Spatial Plan. This activity would therefore be triggered.
Activity 18 (i)(ii)(aa)	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. i. Western Cape ii. All areas outside urban areas: (aa) Areas containing indigenous vegetation;	The study further notes that the proposed facilities can be accessed using public roads R63 and DR2404 (existing roads will be used as far as practically achievable) some of which will require an upgrade to accommodate the proposed adjusted land use. Existing access roads to the proposed solar facilities will be used as far as practically achievable and will be upgraded where needed. The current width of the existing access roads is approximately 5 m, and the upgraded width is proposed to be approximately 8 m. Therefore, the existing roads may be widened by more than 4 m and/or lengthened by more than 1 km. The proposed PV project will be constructed on several farm portions, approximately 18 km north-east of Murraysburg within the Western Cape Province. Therefore, the proposed project is situated outside of an urban area. The proposed project will take place on sites that contains a small area of critical biodiversity areas. The Terrestrial Biodiversity BA Report Inputs (Appendix D.4) indicates that the study area contains small portions of CBA Type 1 in terms of the 2017 Western Cape Biodiversity Spatial Plan. This activity would therefore be triggered.

A.12 National Web-Based Environmental Screening Tool

As noted above, GN 960 (dated 5 July 2019) published a notice of the requirement to submit a report generated by the National Web Based Environmental Screening Tool, in terms of Section 24(5)(h) of the NEMA and Regulation 16(1)(b)(v) of the 2014 NEMA EIA Regulations (as amended), when submitting an Application for EA in terms of Regulations 19 and 21 of the 2014 NEMA EIA Regulations (as amended). GN 960 came into effect for compulsory use of the National Web Based Environmental Screening Tool (hereafter also referred to as the Screening Tool) from 4 October 2019. As such, the Application for EA for the proposed project has been run through the National Web Based

Environmental Screening Tool, and associated reports generated and attached to the combined Applications for EA.

- **Padloper PV 5**

Based on the selected classification, the National Web Based Environmental Screening Tool provides a list of specialist studies that should be undertaken as part of the BA Process, as well as identifies the sensitivities on site that need to be verified by either the EAP or the specialists, where relevant, as noted in the Assessment Protocols of 20 March 2020 (GN 320). The classification that applies to the proposed projects is **Utilities Infrastructure; Electricity; Generation; Renewable; Solar; and PV**.

The following list of Specialist Assessments have been identified by the National Web Based Environmental Screening Tool for inclusion in the BA Report (Table A.9). The National Web Based Environmental Screening Tool Report notes that it is the responsibility of the EAP to confirm this list and to motivate in the BA Report, the reason for not including any of the identified specialist studies.

Table A.9. List of Specialist Assessments identified by the Screening Tool for the Padloper PV 5 project

	Specialist Study Required by the Screening Tool	Assessment undertaken in BA	Type of Assessment undertaken in BA	Appendix of BA Report
1	Agriculture and Soils	Yes	Protocol GN 320: Compliance Statement	D.1
2	Landscape / Visual Impact Assessment	Yes	Appendix 6: Impact Assessment	D.2
3	Archaeological and Cultural Heritage Impact Assessment	Yes	Appendix 6: Impact Assessment	D.3
4	Desktop Paleontology Impact Assessment	Yes	Appendix 6: Impact Assessment	D.3
5	Terrestrial Biodiversity Impact Assessment	Yes	Protocol GN320: Impact Assessment. The Terrestrial Biodiversity Impact Assessment includes feedback on Terrestrial Plant and Animal Species. Protocol GN1150: The Animal and Plant Species Protocol	D.4
6	Plant Species Assessment			
7	Animal Species Assessment			
8	Aquatic Biodiversity Impact Assessment	Yes	Protocol GN320: Impact Assessment. The study undertaken as part of the BA is referred to as Aquatic Biodiversity and Species. Note: Aquatic Biodiversity Assessment was commissioned in July 2022, before the Species Protocol was amended in July 2023.	D.5
9	Civil Aviation Assessment	Yes	Protocol GN 320: Site Sensitivity Verification (No requirements for low sensitivity in terms of GN 320)	D.11
10	Defense Assessment	Yes	Protocol GN 320: Site Sensitivity Verification (No requirements for low sensitivity in terms of GN 320)	D.12
11	RFI Assessment	No	Motivation not to undertake a specialist assessment.	N/A
12	Geotechnical Assessment	Yes	Appendix 6: Desktop Assessment	D.10
13	Socio-Economic Assessment	Yes	Appendix 6: Impact Assessment	D.7

It must be noted that the Screening Tool did not identify the need for the following specialist assessments, however these studies have been commissioned as part of the BA Process to ensure that all potential impacts resulting from the proposed project are considered as best as possible and to ensure that suitable management actions are recommended:

- Avifauna Impact Assessment: The Specialist Assessment is included in Appendix D.6 of this BA Report. The Avifauna Impact Assessment has been undertaken in compliance with GN 1150 (Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species: Impact Assessment), as well as relevant guidelines.
- Traffic Impact Assessment: The Specialist Assessment is included in Appendix D.13 of this BA Report. The Traffic Impact Assessment has been undertaken in compliance with Appendix 6 of the 2014 NEMA EIA Regulations (as amended).
- BESS High Level Safety, Health and Environment Risk Assessment: The detailed study is included in Appendix D.8 of this BA Report. This is a technical report and does not need to fulfil the requirements of the 2014 NEMA EIA Regulations (as amended). It was undertaken to ensure that high level impacts associated with the BESS are addressed.
- Geohydrology Impact Assessment: The Specialist Assessment is included in Appendix D.9 of this BA Report. The Geohydrology Impact Assessment has been undertaken in compliance with Appendix 6 of the 2014 NEMA EIA Regulations (as amended). The Geohydrology Assessment was undertaken in order to consider and assess the impact of potentially using groundwater during the construction and operational phases.

- **Padloper EGI 5**

Based on the selected classification, the National Web Based Environmental Screening Tool provides a list of specialist studies that should be undertaken as part of the BA Process, as well as identifies the sensitivities on site that need to be verified by either the EAP or the specialists, where relevant, as noted in the Assessment Protocols of 20 March 2020 (GN 320). The classification that applies to the **proposed projects is Utilities Infrastructure; Electricity; Distribution and Transmission; Power Line.**

The following list of Specialist Assessments have been identified by the National Web Based Environmental Screening Tool for the EGI component (Table A.10). The National Web Based Environmental Screening Tool Report notes that it is the responsibility of the EAP to confirm this list and to motivate in the BA Report, the reason for not including any of the identified specialist studies.

Table A.10. List of Specialist Assessments identified by the Screening Tool for Padloper EGI 5

No.	Specialist Study Required by the Screening Tool	Assessment undertaken in BA	Type of Assessment undertaken in BA	Appendix of BA Report
1	Agricultural Impact Assessment	Yes	Protocol GN 320: Compliance Statement	D.1
2	Landscape / Visual Impact Assessment	Yes	Appendix 6: Impact Assessment	D.2
3	Archaeological and Cultural Heritage Impact Assessment	Yes	Appendix 6: Impact Assessment	D. 3
4	Palaeontology Impact Assessment	Yes	Appendix 6: Impact Assessment	D. 3
5	Terrestrial Biodiversity Impact Assessment	Yes	Protocol GN320: Impact Assessment. The Terrestrial Biodiversity Impact Assessment includes feedback on Terrestrial Plant and Animal Species.	D.4
6	Plant Species Assessment			
7	Animal Species Assessment			

No.	Specialist Study Required by the Screening Tool	Assessment undertaken in BA	Type of Assessment undertaken in BA	Appendix of BA Report
8	Aquatic Biodiversity Impact Assessment	Yes	Protocol GN320: Impact Assessment. The study undertaken as part of the BA is referred to as Aquatic Biodiversity and Species. Note: Aquatic Biodiversity Assessment was commissioned in July 2022, before the Species Protocol was amended in July 2023.	D.5
9	Avian Impact Assessment	Yes	Protocol GN320: Impact Assessment in accordance to the Animal Species protocol	D.6
10	Civil Aviation Assessment	Yes	Protocol GN 320: Site Sensitivity Verification (No requirements for low sensitivity in terms of GN 320)	D.11
11	RFI Assessment	No	Motivation not to undertake a specialist assessment.	N/A
12	Geotechnical Assessment	No not specifically for EGI (Refer to Section A.12.2 below)	Appendix 6: Desktop Assessment	D.10

A.12.1 Square Kilometer Array and Radio Frequency Interference

The Astronomy Geographic Advantage (AGA) Act (Act 21 of 2007) aims to provide for the preservation and protection of areas within the Republic that are uniquely suited for optical and radio astronomy; to provide for intergovernmental co-operation and public consultation on matters concerning nationally significant astronomy advantage areas; and to provide for matters connected therewith. The purpose of the AGA Act is to preserve the geographic advantage areas that attract investment in astronomy. The AGA Act also notes that declared astronomy advantage areas are to be protected and properly maintained in terms of Radio Frequency Interference (RFI). The AGA Act is administered by the Department of Higher Education, Science and Technology (previously the Department of Science and Technology).

According to the CSIR Wind and Solar Phase 2 SEA (DFFE, 2019: Part 3, Page 2), the majority of the mid-frequency dish array of the Square Kilometre Array (SKA) will be constructed in the core which is in located in the Northern Cape; with dish antennas being located in the spiral arms. The South African component of the SKA will consist of approximately 3 000 receptors comprising dish antennas, each with a diameter of 15 m, and radio receptors known as dense aperture-arrays. The outer stations in the spiral arms will extend beyond the borders of South Africa and at least 3 000 km from the core area. About 80% of the receptors, including a dense core and up to 5 spiral arms, will be located in the Karoo Central Astronomy Advantage Area (KCAAA) (DFFE, 2019: Part 3, Page 2).

The KCAAA, which is located between Brandvlei, Van Wyksvlei, Carnarvon and Williston in the Northern Cape Province, was officially declared in 2014 by the Minister of Science and Technology in terms of the AGA Act for the purposes of protection RFI and Electromagnetic Interference (EMI). The declaration of the KCAAA ensures the long-term viability of the area to be used for astronomical installations (DFFE, 2019: Part 3, Page 2).

PV installations are known to have unintentional radiated emissions from electrical and electronic equipment that have the potential to interfere with the SKA Radio Telescope project in the Northern

Cape. This can result in interference to celestial observations and/or data loss. Such interference is typically referred to as RFI (DFFE, 2019: Part 3, Page 2).

The location of the proposed projects does not pose an EMI or RFI risk to the SKA, as the proposed projects are located outside of the Northern Cape and outside of the KCAAA. Refer to Figure A.10 for the location of the proposed project in relation to the SKA and KCAAA. Furthermore, based on the findings of the Wind and Solar Phase 1 SEA (DEA, 2015), the proposed project sites fall within an area of low sensitivity in terms of SKA sensitivity for the development of solar PV energy. This also aligns with the findings of the Screening Tool (i.e., the proposed project sites fall within a low sensitivity in terms of the relative RFI theme sensitivity).

During the initial pre-application meeting undertaken on 30 August 2022, it was explained that it is not intended to commission a RFI study for the proposed project due to the location of the proposed projects being far away from the SKA and KCAAA; the findings of the Screening Tool and the findings of the Wind and Solar Phase 1 SEA (DEA, 2015). All correspondence relating to the pre-application meeting is addressed in Appendix G of this BA Report.

Furthermore, the South African Radio Astronomy Observatory (SARAO) is registered on the project I&AP database as a key stakeholder and was given the opportunity to comment on the Draft BA Report during the 30-day comment period. Proof of correspondence with SARAO is included in Appendix F.9 of this Final BA Report.

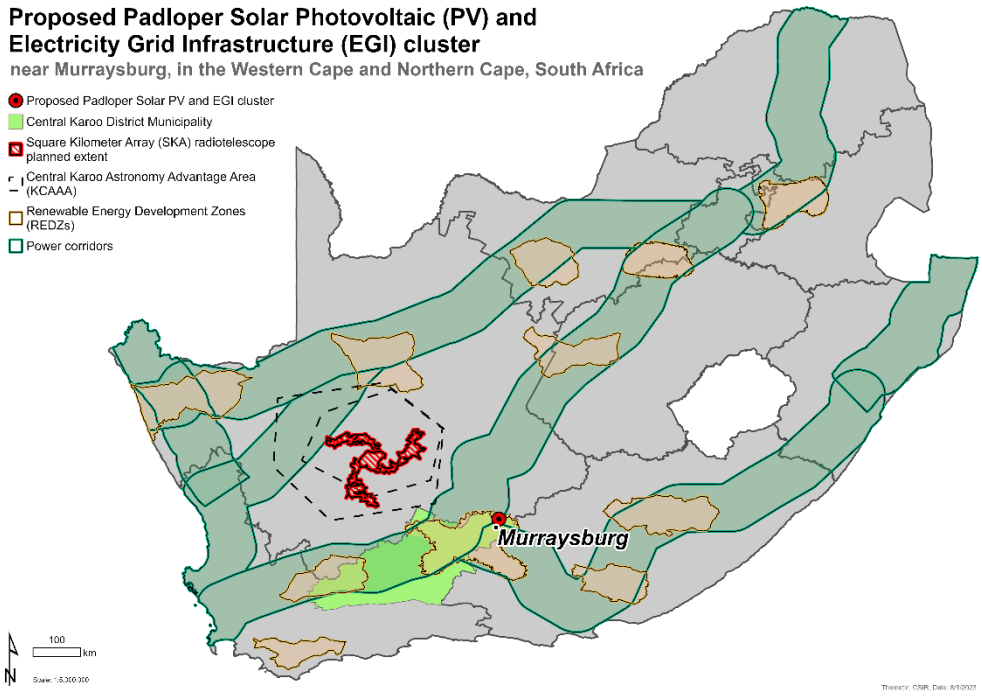


Figure A.10. Location of the proposed project in relation to the SKA and KCAAA

A.12.2 Geotechnical Assessment

A Desktop Geotechnical Assessment was undertaken for the solar PV and has not been undertaken for the EGI. An in-depth assessment will be undertaken during the detailed design phase, once preferred bidder status is obtained in terms of the REIPPPP or similar processes. Contractors and

suppliers will only be selected and appointed after preferred bidder status is obtained (should it be granted). In line with best practice, and to ensure that all aspects are covered in the assessment, suppliers of sub-structures, inverters and transformers and civil sub-contractors are required to provide input into the scope of work of the Geotechnical Assessment. Therefore, in depth Geotechnical Assessments can only be undertaken during detailed design, if preferred bidder status is obtained. The level of assessment currently undertaken as part of this BA Process for the PV project is considered more than adequate to highlight potential development constraints and identify potential impacts from a geotechnical perspective.

A.13 Description of Alternatives

This section discusses the alternatives that have been considered as part of the BA Process. Sections 24(4) (b) (i) and 24(4A) of the NEMA require an Environmental Assessment to include investigation and assessment of impacts associated with alternatives to the proposed project. In addition, Section 24O (1)(b)(iv) also requires that the Competent Authority, when considering an application for EA, takes into account "where appropriate, any feasible and reasonable alternatives to the activity which is the subject of the application and any feasible and reasonable modifications or changes to the activity that may minimise harm to the environment".

Therefore, the assessment of alternatives should, as a minimum, include the following:

- The consideration of the no-go alternative as a baseline scenario;
- A comparison of the reasonable and feasible alternatives; and
- Providing a methodology for the elimination of an alternative.

The 2014 NEMA EIA Regulations (as amended) defines alternatives, in relation to a proposed activity, as "different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:

- property on which or location where the activity is proposed to be undertaken;
- type of activity to be undertaken;
- design or layout of the activity;
- technology to be used in the activity;
- operational aspects of the activity; or
- and includes the option of not implementing the activity";

Regulation 2 (e) of Appendix 1 of the 2014 NEMA EIA Regulations (as amended) states that one of the objectives of the BA Process is to, through a consultative process, and through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to (i) identify and motivate a preferred site, activity and technology alternative; (ii) identify suitable measures to avoid, manage or mitigate identified impacts; and (iii) identify residual risks that need to be managed and monitored.

This Basic Assessment report has provided a full description of the process followed to reach the proposed preferred activity and technology alternative, site ad location of the development footprint within the site, including details of the alternatives considered and the outcome of the site selection matrix.

A.13.1 No-go Alternative

The no-go alternative assumes that the proposed projects will not go ahead i.e., it is the option of not constructing the proposed solar PV facilities and associated infrastructure. This alternative would result in no environmental impacts on the site or surrounding local area as a result of the proposed projects. It provides the baseline against which other alternatives are compared and is considered throughout the report.

The following implications will occur if the "no-go" alternative is implemented (i.e., the proposed project does not proceed):

- No benefits will be derived from the implementation of an additional land-use;
- No additional power will be generated or supplied through means of renewable energy resources by this project at this location;
- The "no go" alternative will not contribute to and assist the government in achieving its renewable energy target of 26 630 MW total installed capacity by 2030 (for Wind, Solar PV and Concentrated Solar Power);
- Electricity generation will remain constant (i.e., no renewable energy generation will occur on the site for the proposed project) and the local economy in terms of surrounding communities and towns within the local municipality will not be diversified;
- There will be lost opportunity for skills transfer and education/training of local communities;
- The positive socio-economic impacts likely to result from the project such as increased local spending and the creation of local employment opportunities will not be realised;
- There will be no opportunity for additional employment in an area, where job creation is identified as a key priority;
- The local economic benefits associated with the REIPPPP will not be realised, and socio-economic contribution payments into the local community trust will not be realised;
- The development of solar PV facilities instead of coal fired power stations can directly contribute to South Africa's response to climate mitigation; and
- Wind and solar energy are the cheapest source of electricity in South Africa. The development of the proposed Solar PV Facilities can contribute to the competitive nature of the REIPPPP to drive prices down even further to ensure that South Africans have access to affordable yet clean electricity.

Converse to the above, the following benefits could occur if the "no-go" alternative is implemented:

- Only the agricultural land use will remain;
- No vegetation or species of special concern (flora and fauna) will be removed or disturbed during the development of the proposed projects;
- No aquatic resources will be impacted upon during the construction and operation of the PV and EGI Facility;
- No destruction of habitat will occur;
- No change to the current landscape will occur;
- No avifaunal impacts will occur due to the establishment of the project;
- No additional traffic will be generated;
- There will be no changes to the sense of place; and
- No additional water use will be required.

Table A.11. Summary of the PV No-go Alternative from Specialist Assessments

Specialist Study	No-go Alternative Assessment
Agricultural Compliance Statement	The no-go alternative considers impacts that will occur to the agricultural environment in the absence of the proposed development. There are no agricultural impacts of the no-go alternative. Even though the impacted land has low agricultural production potential, and the impact of the development is low, its negative agricultural impact is more significant than that of the no-go alternative, and so from an agricultural impact perspective, the no-go alternative is the preferred alternative. However, the no-go alternative would prevent the proposed development from contributing economic benefits to the farm owner as well as contributing to the environmental, social and economic benefits associated with the development of renewable energy in South Africa.
Visual Impact Assessment	In the no-go alternative, there would be no PV facility and associated EGI and therefore no additional visual intrusion on the landscape and on surrounding farmsteads. At the same time no renewable energy would be produced at the site for export to the national grid.
Heritage Impact Assessment	Not constructing the facility will mean that the study area stays undeveloped and the status quo is retained. The impacts that occur will be as per the existing impacts described in the assessment (but with the added possibility that Wind Energy Facilities may be built in the area). Importantly, electricity generation would not take place which means that this benefit would be lost to society. This suggests that the No-Go option is less desirable in heritage terms.
Palaeontology	The no-go alternative (i.e., no solar PV facility and power line development) will probably have a neutral impact on palaeontological heritage
Terrestrial Biodiversity and Species Impact Assessment	Not developing this PV project and leaving it up to the landowners to make the decision to transform the land to agricultural land and/or grazing, which will not assist in protecting the sensitive features and ecosystems.
Aquatic Biodiversity and Species Impact Assessment	The site contains sensitive aquatic features. Not developing this PV project will not assist in protecting the sensitive features and ecosystems.
Avifauna Impact Assessment	The no-go option will result in no additional impacts on avifauna and will result in the ecological status quo being maintained, which will be to the advantage of the avifauna. No fatal flaws were discovered in the course of the investigations.

Specialist Study	No-go Alternative Assessment
Socio-Economic Impact Assessment	The no-go alternative is, by definition, the continuation of the status quo the impacts of which can best be described as neutral. In particular, it can be noted that the no-go alternative would result in: • Neutral impacts linked to project expenditure as this expenditure would not occur. • Neutral impacts linked to funding of socio-economic development as this funding would not occur. • Neutral social impacts associated primarily with the influx of people as there would be no influx. • Neutral impacts on surrounding landowners and communities as the risk factors associated with the project would be absent. • Neutral impacts on tourism as the risk factors associated with the project would be absent.
Geohydrology Assessment	In terms of the no-go alternative, the ground water facilities would remain as is.
Geotechnical Assessment	The status quo in terms of geology would remain the same.
Traffic Assessment	Should the project not go ahead, the traffic conditions in the area would remain as is.

As outlined in Section D of this report, the majority of the negative impacts identified as part of this assessment can be reduced to moderate or low significance with the implementation of mitigation measures. None of specialists found that the proposed projects should not go ahead i.e., no fatal flaws were identified. As noted above, the Socio-Economic Impact Assessment identified positive impacts from a social upliftment perspective. These include benefits to the local community via employment opportunities and the development of locally owned industries to support construction related activities.

Hence, while the “no-go” alternative will not result in any negative environmental impacts as a result of the proposed project; it will also not result in any positive community development or socio-economic benefits. It will not assist government in addressing climate change, reaching its set targets for renewable energy, nor will it assist in supplying the increasing electricity demand within the country. Hence the “no-go” alternative is not a preferred alternative, or a reasonable and feasible alternative considered in this BA Process. Hence, the “no-go” alternative is not currently the preferred alternative.

A.13.2 Land-use Alternatives

At present the proposed site is zoned for agricultural land-use. The land use on the site and immediate surrounds is mostly grazing but some crop production still occurs in the surrounding area. The land has a long-term grazing capacity of 20 – 22 hectares per large stock unit.

The cropping potential of the site is completely limited by the combination of climate (arid climate with low moisture availability) and soil constraints (limited soil depth) so that it is totally unsuitable for rain-fed crop production. Therefore, the site not considered particularly preservation worthy as agricultural

production land. The classified land capability of the site ranges from 4 (Low - Very Low) to 6 (Low – Moderate). The very low agricultural potential of the facility footprints and associated EGI corridors limits their viable agricultural use to low carrying capacity grazing only.

The loss of such land, of which there is no scarcity in the country, represents a minimal loss of agricultural production potential in terms of national food security and for the affected farm. Since no viable cropland is lost as a result of this development, its negative agricultural impact is therefore assessed as being of Low significance and acceptable.

Due to the low agricultural sensitivity of the site, and the effectively uniform agricultural conditions across the site, it is highly likely that there will be no material difference between the agricultural impact of any possible, alternative layouts on the site.

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

It is important to re-iterate that the economic benefits to the landowner associated with the proposed Solar PV Facility and EGI are likely to be more significant than that of the current farming activities on site. The proposed development offers a land use with much higher income generating capacity than any viable agricultural land use on the site. Based on the above, the agricultural land use is not a preferred alternative.

Refer to Sections B and D of this BA Report for a summary of the Agriculture Compliance Statement, as well as Appendix D.1 for the complete report.

A.13.3 Type of Activity - Renewable Energy Alternatives

Where the "activity" is the generation of electricity from a renewable energy source, possible alternatives that could be considered on the project site include renewable energy technologies such as Hydro Energy, Biomass, and Wind Energy. **However, based on the preliminary investigations undertaken by the Project Applicant, no other renewable energy technologies are deemed to be appropriate for the site**. The unsuitability of other renewable energy developments for the site, as well as the potential risks and impacts of each, are discussed below.

In terms of the alternatives considered for the EGI to be undertaken, this is entirely dependent on the activity associated with the proposed Solar PV Facility (where the activity associated with the PV Facility is generation of electricity). Essentially, the proposed Solar PV Facility govern the type of activity associated with the proposed EGI project. The activity to be undertaken is therefore the transmission of electricity that will be generated by the proposed Solar PV Facility. The only feasible method of transmitting the electricity that is generated by the proposed Solar PV Facilities to the existing Gamma MTS via proposed authorised Ishwati Emoyeni Collection Substation, via overhead power lines.

A.13.3.1 Hydro Energy

The proposed project site does not contain any large inland water bodies, which excludes the possibility of renewable energy from small- or large-scale hydro energy generation. In addition, the site location is

identified as 'Not suitable' in terms of hydropower suitability (Figure A.13). Therefore, the implementation of a Hydro Energy Facility at the proposed site is not considered to be a reasonable and feasible alternative to be assessed as part of this BA Process.

A.13.3.2 Biomass Energy

The proposed project sites do not contain any abundant or sustainable supply of biomass. In addition, the site is located in an area with less than 5 000 t/a in terms of annual forestry biomass (Figure A.13). Therefore, the implementation of a Biomass Energy Facility at the proposed site is not considered to be a reasonable and feasible alternative to be assessed as part of this BA Process.

A.13.3.3 2019 IRP, Wind and Solar SEA, Solar Energy and Wind Energy

The 2019 Integrated Resource Plan (IRP) was published in Government Gazette 42784, GN 1360 on 18 October 2019 for the period 2019 to 2030. As indicated in Figure A.11, coal makes up approximately 43 % of the total installed capacity indicated in the 2019 IRP, whereas Wind and Solar PV respectively make up 23 % and 10 %.

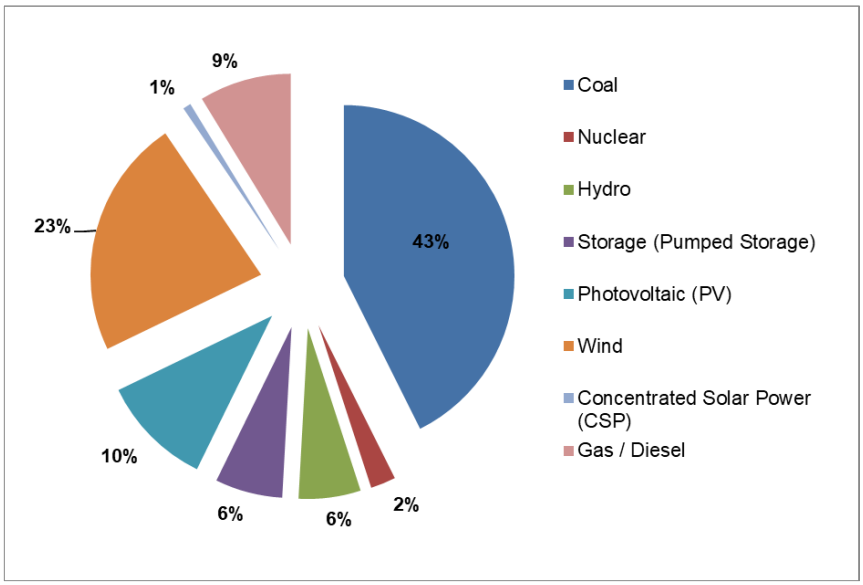


Figure A.11. 2019 IRP Total Installed Capacity (% of MW).

The 2019 IRP proposes to secure 26 630 MW of renewable energy capacity by 2030 (for Wind, Solar PV and Concentrated Solar Power). This amount excludes Hydropower and Pumped Storage. Of this total, 1474 MW of Solar PV, 1980 MW of Wind and 300 MW of Concentrated Solar Power is already installed capacity. In addition, of the 26 630 MW, approximately 814 MW of Solar PV, 1362 of Wind and 300 MW of Concentrated Solar Power is committed or already contracted capacity. Furthermore, 6 000 MW of Solar PV and 14 400 of Wind of this 26 630 MW is new additional capacity. This is indicated in Figure A.12.

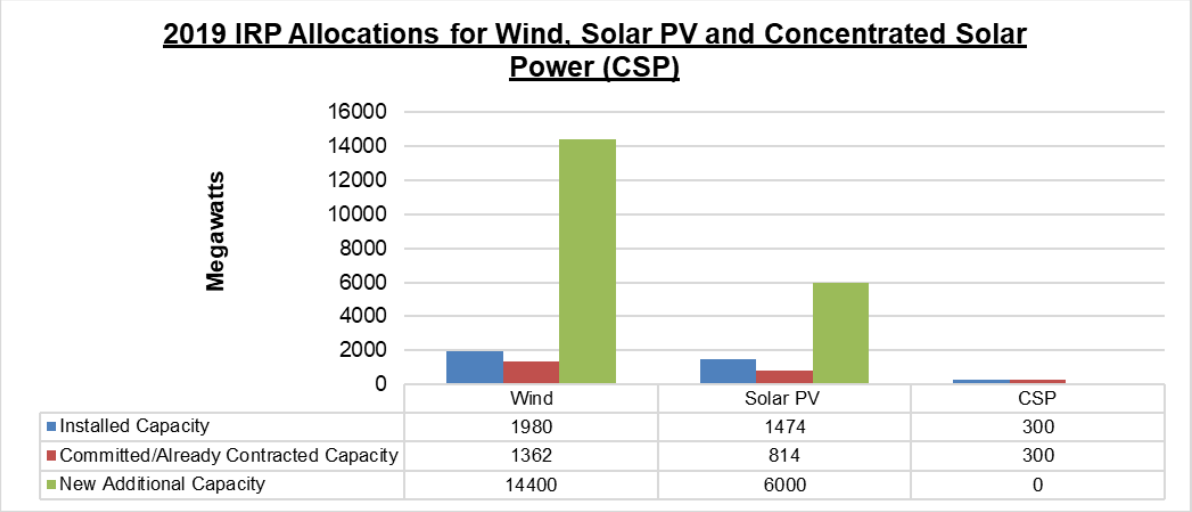


Figure A.12. 2019 IRP Allocations for Wind, Solar and Concentrated Solar Power in MW.

Linked to the 2010 IRP, the DMRE entered into a bidding process for the procurement of 3 725 MW of renewable energy from IPPs by 2016 and beyond. On 18 August 2015, an additional procurement target of 6 300 MW to be generated from renewable energy sources was added to the REIPPPP for the years 2021 - 2025, as published in Government Gazette 39111.

On 7 July 2020, in Government Gazette 43509 and GN 753, the Minister of Mineral Resources and Energy, in consultation with the National Energy Regulator of South Africa (NERSA), determined that new generation capacity needs to be procured to contribute towards energy security. Specifically, 2000 MW will be procured from a range of energy source technologies in accordance with the short-term risk mitigation capacity allocated for the years 2019 to 2022 (under "other" in the allocation table contained in 2019 IRP). In line with this, the Risk Mitigation IPP Procurement Programme (RMIPPPP) was designed and launched in August 2020 by the DMRE in order to fulfil the GN 753 Ministerial Determination.

In order to submit a bid in terms of the REIPPPP, the proponent is required to have obtained an EA in terms of the EIA Regulations as well as several additional authorisations or consents. Linked to this, the National Department of Environmental Affairs (DEA) in discussion with the Department of Energy (DoE) (now respectively operating as the DEFF and DMRE), was mandated by MinMec to commission a SEA to identify the areas in South Africa that are of strategic importance for Wind and Solar PV development. The Phase 1 Wind and Solar PV SEA[6] was completed in 2015 and was in support of the Strategic Infrastructure Plan (SIP) 8, which focuses on the promotion of green energy in South Africa. Phase 2 of the SEA was completed in 2019 and identified three additional REDZs. As noted above, the SEA aimed to identify strategic geographical areas best suited for the roll-out of large-scale wind and solar PV energy projects, referred to as REDZs. Through the identification of the REDZs, the key objective of the SEA was to enable strategic planning for the development of large scale wind and solar PV energy facilities in a manner that avoids or minimises significant negative impact on the environment while being commercially attractive and yielding the highest possible social and economic benefit to the country – for example through strategic investment to lower the cost and reduce timeframes of grid access. Following the completion of the SEA, the REDZs were gazetted in February 2018 in GN 114 and 2021 in GN 144 by the Minister of Environmental Affairs. The location of the proposed projects within a REDZ (specifically REDZ 11 (Beaufort West REDZ)) supports the development of a large-scale

[6] More information on the SEA can be accessed at https://redzs.csir.co.za

renewable energy project in the location (Refer to Figure A.3). The proposed projects are therefore in line with the national planning vision for wind and solar development in South Africa.

Based on the above, both wind or solar PV projects are supported within the REDZs. In order to ensure that a Wind Energy Facility is successful, a reliable wind resource is required. Wind resource is defined in terms of average wind speed and includes Weibull distribution (used to describe wind speed distributions); turbulence, wind direction, and pattern of wind direction (as depicted by a wind rose). These factors are all key considerations used in determining whether a site is suitable for the development of a Wind Energy Facility. A mean wind power density map has also been created (CSIR, 2018), which is not related to any specific turbine type and demonstrates the wind resource of the country. The mean wind power density map shows that the project area falls within an area that has lower wind power density in comparison to the rest of the country (Figure A.14). Overall, wind energy development can occur within this area but other localities in South Africa may be more favourable for wind energy development. Site specific requirements for wind energy facilities make it a less feasible alternative when compared to solar PV at this specific site. Therefore, the implementation of a Wind Energy Facility at the proposed site is not considered to be a reasonable and feasible alternative to be assessed as part of this BA Process.

In terms of the suitability of solar development at this location, the proposed project area has a high Global Horizontal Irradiation[7] (GHI), relevant to PV installations (Figure A.14). Therefore, this area is deemed as one of the most suitable for the construction and operation of solar energy facilities as opposed to other areas and provinces within South Africa. For example, coastal regions within the Eastern Cape and Western Cape mainly have a lower solar radiation (shown in the lighter orange shades in Figure A.13), which is not completely feasible for the proposed project.

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Therefore, the implementation of solar energy facility at the proposed project site is more favourable and feasible than wind energy development. In terms of project and location compatibility, the proposed solar energy facility is considered to be the most feasible renewable energy activity alternative.

[7] Global Horizontal Irradiance is the total amount of shortwave radiation received from above by a surface horizontal to the ground

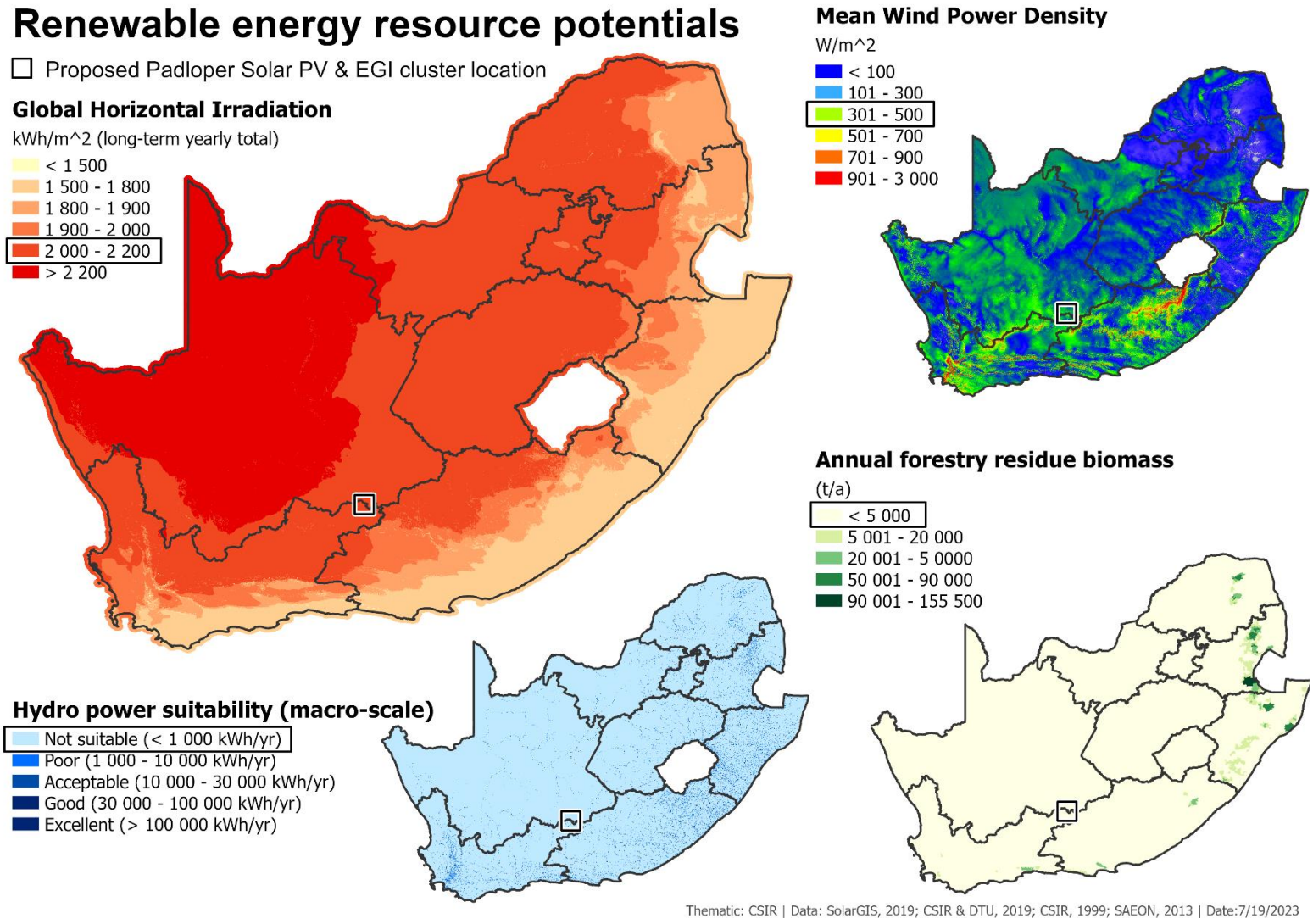

Figure A.13. Renewable Resource Availability in South Africa.

Since the alternative activities considered were deemed not to be reasonable and feasible for the area and the site, no other renewable energy technologies alternatives were further assessed in this BA process.

Table A.12. Summary of Evaluation of Potential Risks and Impacts for Renewable Energy Alternatives

Type of Renewable Energy Alternative	Are suitable resources available at the proposed project site?	Main Potential Impacts and Risks?	Is this the Preferred Alternative?
Biomass Energy	No – not suitable	• Significant Waste Generation • Air Emissions	No
Hydro Energy	No – not suitable	Not suitable	No
Wind Energy	Potentially with advanced turbines to harvest wind at low wind power density. Better areas in the country.	• Visual • Noise • Bird and bat collisions • Loss of agricultural land • Impacts on aquatic ad terrestrial biodiversity	No
Solar Energy	Yes	• Visual • Loss of agricultural land • Impacts on heritage resources • Impacts on aquatic ad terrestrial biodiversity	Yes

A.13.4 Technology Alternatives

A.13.4.1 Solar Panel Types

Only the PV solar panel type was considered in the BA. Due to the scarcity of water in the proposed project area and the large volume of water required for Concentrated Solar Power (CSP), this technology is not deemed feasible or sustainable and will not be considered in the BA. This is the main difference between PV and CSP technology that led to the selection of PV as the preferred solar panel technology. Furthermore, CSP technology requires a larger development footprint to obtain the same energy output as PV technology, and it requires active solar tracking to be effective. As described above, in terms of the 2019 IRP, 300 MW capacity is already installed for CSP; and an additional 300 MW has been allocated for 2019, whilst there is no new additional capacity allocated for this technology. Solar PV is allocated an additional new capacity of 6 000 MW in terms of the 2019 IRP. This means that the need and desirability of CSP is not as evident and justified compared to PV.

A.13.4.2 Mounting System

Solar panels can be mounted in various ways to ensure maximum exposure of the PV panels to sunlight. The main mounting systems that will be considered as part of the design are Single Axis Tracking structures (aligned north-south); Fixed Axis Tracking (aligned east-west); Dual Axis Tracking (aligned east-west and north-south); Fixed Tilt Mounting Structure or Bifacial Solar Modules.

A.13.4.3 BESS

The proposed solar facility will have Battery Energy Storage Systems (BESS) of up to 900 MWh located adjacent the onsite substation. Batteries that are being considered include, solid state Lithium-ion such as Lithium Iron Phosphate, Lithium Nickel Manganese Cobalt oxides or sodium-ion systems, and Redox flow (typically vanadium). The specific technology will only be determined following Engineering, Procurement and Construction (EPC) procurement.

- There are numerous different battery technologies, but using one consistent battery technology system for the BESS installations associated with all the PV developments in the complex would allow for ease of training, maintenance, emergency response and could significantly reduce risks.

- Where reasonably practicable, state-of-the-art battery technology should be used with all the necessary protective features e.g., draining of cells during shutdown and standby-mode, full BMS with deviation monitoring and trips, leak detection systems.

- **There are no fatal flaws associated with the proposed battery installation for either of the two technology types**.

- The overall design should be subject to a full Hazard and Operability (HAZOP) study prior to finalization of the design.

- For the VRFB systems there should be an environmentally friendly method of filling the systems with electrolyte upon startup and an end of life (and for possible periodic purging requirements) solution for the large quantities of hazardous electrolyte should be investigated, e.g., can it be returned to the supplier for re-conditioning.

- Prior to bringing any solid-state battery containers into the country, the contractor should ensure that:

    - An Emergency Response Plan is in place that would be applicable for the full route from the ship to the site. This plan would include details of the most appropriate emergency response to fires both while the units are in transit and once, they are installed and operating.

    - An End-of-Life plan is in place for the handling, repurposing or disposal of dysfunctional, severely damaged batteries, modules and containers.

- The site layout and spacing between lithium solid-state containers should be such that it mitigates the risk of a fire or explosion event spreading from one container to another.

- Under certain weather conditions, the noxious smoke from a fire in a lithium battery container could travel some distance from the unit. The smoke will most likely be acrid and could cause irritation, coughing, distress etc. Close to the source of the smoke, the concentration of toxic gases may be high enough to cause irreversible harmful effects. Location of the facilities needs to ensure a suitable separation distance from public facilities/residences etc. The current proposed BESS location is over 500 m from isolated farmhouses / other occupied facilities and 100 m from the R 63 is therefore suitable. The risks of significant impacts is very low.

- Where there is a choice of alternative locations for the BESS, those that are further from water courses would be preferred. VRFB hazards are mostly related to possible loss of containment of electrolyte and solid-state systems may experience fires that may result in loss of containment of liquids or the use of large amounts of fire water which could be contaminated. One would not want these run-offs to enter water courses directly. The buffer distance between water bodies and the facilities containing chemicals should be set in consultation with a water specialist and is therefore not specified in this SHE RA. It should be noted that the locations are well over 100 m from the closest water source and will likely be suitable.

- For molten metal batteries the most significant hazards are to persons working with the facilities, e.g., operation and maintenance personnel. Suitable procedures will need to be in place and PPE to be specified.

- Finally, it is suggested once the technology has been chosen and more details of the actual design are available, the necessary updated Risk Assessments should be in place.

Although no final choice is made, the worst-case scenario, as discussed in the BESS RA, has no fatal flaws to prevent development. New technology particularly Vanadium Redox Flow, alleviate many environmental and safety concerns.

The BESS complements solar generation. Its immediately dispatchable. The no-go alternative will result in reliance on other power sources at night. Some of them not immediately dispatchable and leading to low grid capacity and load shedding. The current reliance on dispatchable power from diesel generators is a very costly and environmentally hazardous power source."

There are no feasible technology alternatives for Powerlines.

A.13.5 Site Alternatives

The preferred site within the Western Cape was selected based on national level considerations (high solar radiation levels) and the fact that the proposed sites fall within the REDZ 11 (as discussed above). The grid connectivity possibilities were a motivating factor. The easing of MW size restrictions allows larger projects and so more farms were optioned to add to the project.

A detailed screening phase and iterative design approach was adopted, which integrated the screening and assessment of environmental impacts of the technical components of the project, early in the project lifecycle. As noted in Section A.1 above, the proposed project comprises of the cluster of 7 solar PV facilities and 7 associated powerlines. The proposed Padloper PV and EGI cluster initial comprised of 11 Solar PV facilities. Specialists were appointed to do an initial screening of the area that will influence the project layout. Here, specialist identified wetlands, heritage resources as areas to avoid.

Following the integration of the DFFE screening tool outcomes and specialist site sensitivity data possible sensitive areas were identified and avoided at this first delineation of the PV and power line study areas. This resulted in the overall cluster being reduced to 7 solar PV facilities and 7 associated power lines. The detailed sensitivity data was also applied to the delineate, at a fine scale, the developable area within the 7 solar PV facility sites and informed the routing of the corridor.

An initial area of approximately 243 ha was identified and screened for approximately 350 MW solar energy facility. The Project Applicant subsequently reduced the PV area project boundary to avoid the delineated "No-Go" areas and thus refined the project development footprint for further detailed

specialist assessment. The outcome of the site selection process was the identification of approximately 202 ha potentially developable area on which the project is proposed.

On a site specific (local) level, the sites on the proposed project were deemed suitable due to all the site selection factors (such as land availability, distance to the national grid, site accessibility, topography, current land use and landowner willingness) being favourable. The site selection criteria considered by the Applicant are discussed in detail below Table A.13.

Table A.13. Site selection factors and suitability of the site

FACTOR	SUITABILITY OF THE SITE
Land Availability	The proposed farm portions for the proposed PV facility is a suitable size for the proposed project. The land available to develop at the preferred site is approximately 243 ha. This total area was assessed by the specialists, however only an estimated 202 ha is needed for the proposed project footprints.
Irradiation Levels	2000 – 2200 kWh/m^2
Distance to and availability of the grid	The planned that the Padloper PV 5 will connect to the Padloper PV 4 (i.e., Padloper EGI 5), the power will then be evacuated to the Ishwati Emoyeni Collector Substation via the Padloper EGI 4. The proposed Padloper EGI 5 is located approximately 2.5 km from the proposed Padloper PV 4. The proposed Padloper PV 4 is located approximately 36 km east of the proposed authorised Iswhati Emoyeni Collector Substation.
Site Accessibility	The proposed site can be accessed via existing farm gravel roads which will be upgraded as part of the proposed project. In addition, the site is in close proximity to the national road R63 and provincial road DR2404. It can be accessed from likely points of supply through an existing road network comprising asphalt and gravel roads that are in good and suitable condition, including for the transportation of abnormal loads.
Topography	The broader area is largely characterised by a mix of flat to undulating and hilly terrain with distinctive koppies and hills in evidence while several pans dot the larger landscape. The terrain drops relatively steeply towards the valleys associated with the Snyderkraal and Buffels Rivers in the west and south respectively. Steep slopes also mark the divide between the central sector of the site and the higher lying, more mountainous areas that dominate the north- east. The elevation of the site ranges between about 1260 and 1445 metres above mean sea level (mamsl). Higher lying areas are characterised by intrusions and lower lying areas are characterised by drainage channels infilled with quaternary sediments, i.e. ephemeral river beds.
Current Land Use	Agriculture – low intensity grazing with evidence of degradation regarding: habitat to support biodiversity, pans, and presence of alien species. Heritage sites are not preserved.
Visual Impact	The sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. Several adjacent renewable energy facilities have been planned in the area (i.e., EA Approved). These project, in conjunction with the proposed Padloper PV and EGI Cluster will inevitably introduce an increasingly industrial character into a largely natural, pastoral landscape. However, the Visual specialist confirms that these cumulative impacts can be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments.
Landowner Willingness	The landowners have signed consent for the use of the land for the proposed project. This is considered an important aspect of the proposed project in terms of its viability (i.e., this will limit potential appeals during the decision-making process, as the landowners are willing and supportive of the proposed projects being undertaken on their farms).

Furthermore, the proposed Padloper PV 5 project forms part of a larger solar and EGI cluster that is being proposed, comprising the proposed development of 6 other solar PV facilities along with their associated power lines. The main determining points for the Project Applicant was to find suitable,

developable land in one contiguous block to (i) optimize design, (ii) minimize construction and operational costs, (iii) minimize sprawling development and limit the impact footprints (particularly on undeveloped areas), and (iv) to minimise the impacts to the receiving environment.

From an impact and risk assessment perspective, the implementation of proposed project will most likely result in fewer risks in comparison to its implementation at alternate sites (i.e., regions with similar irradiation levels), based on the following points:

- There is no guarantee that the current land use of alternative sites will be flexible in terms of development potential, for example the agricultural potential for alternative sites might be higher and of greater significance.
- There is no guarantee of the willingness of other landowners to allow the implementation of a solar facility on their land and if the landowners strongly object, then the project will not be feasible.
- There is no guarantee that other sites within the Western Cape will be located close to existing or proposed electrical infrastructure to enable connection to the national grid. The further away a project is from the grid, the higher the potential for significant environmental and economic impacts.

Given the site selection requirements associated with solar energy facilities and the suitability of the land on the project site and no initial fatal flaws being present, no other site alternatives were considered as part of the BA Process. The Padloper PV 5 project site is therefore deemed feasible and selected as the preferred site.

A.13.6 Development Footprint Location and Layout Alternatives

As an initial step, the Project Applicant consulted the National Web-Based Environmental Screening Tool to determine a baseline description of the prevalent environmental sensitivities within the proposed preferred project site. Subsequent consultation with the affected landowners was then also undertaken in order to identify possible areas within the proposed project site boundary that should be excluded from development. This then guided the selection of the best suitable developable footprint to be assessed by the specialists from an environmental sensitivities and practical/technical perspective. The study area that was subjected to specialist assessment covers approximately 243 ha.

Detailed specialist assessment of the study area during the BA through desktop-based analysis and fieldwork methodologies (where required) resulted in the verification of environmental sensitivities present on site. The proposed permanent development footprint is based on an indicative project layout of the proposed projects, which was assessed by the specialists during the BA to indicate potential sensitive areas that should preferably be avoided. Based on these findings from the specialist assessments, the preliminary layout was refined to avoid (where possible) the most sensitive features that were identified by the specialists within the original assessed study area. This revised project infrastructure layout was taken forward for further assessment by the specialist team. The specialists have, based on their impact assessment of the proposed development footprint of the refined their sensitivity mapping of the proposed project layout with recommendations regarding micro siting and selection of infrastructure location alternatives, as well as required mitigation measures and management actions. As noted above, an area of approximately 243 ha was assessed by the specialists in order to identify sensitive features, using desktop and field work methodologies (where required), which in turn led to the identification of the preferred site for the solar PV facility and EGI (202 ha of the assessed area of approximately 243 ha). The sites for PV facility and EGI were identified to avoid the sensitivities highlighted by the specialists.

In the selection process, some areas within the preferred project site were eliminated for the following reasons:

- Solar resources: To ensure that a project has a good chance of being constructed in the highly competitive REIPPPP space or similar tender processes, solar arrays must be placed in the areas with the highest solar resources.
- Buildable areas: Consideration of all preliminary technical and environmental parameters (prior to the BA Process) which demarcate where solar array placement is feasible and exclude those areas that are not. This is based on maximum allowable slopes, setbacks from farmsteads and 'No-Go' zones to avoid potential environmental sensitivities identified by specialists.
- Landowner input: The affected landowners were provided with the opportunity to state preference for certain areas of their properties to be excluded from the development. This meant that some areas of potential development would be excluded due to landowner preferences.

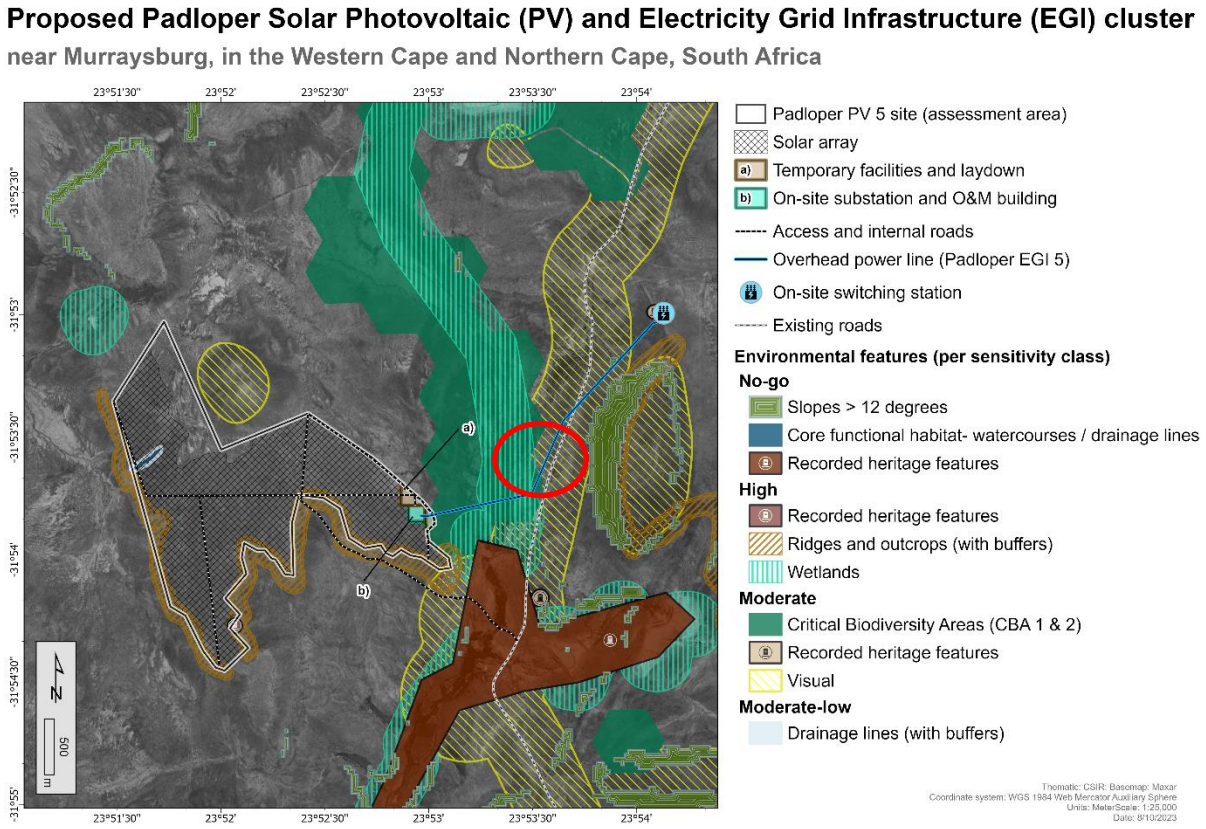

Figure A.14. Locality map showing the preferred solar PV layout and power line routing, in relation to the various sensitivities identified by specialists.

The above map shows the preferred project infrastructure placements in relation to all identified "no-go" areas for inter alia agriculture, avifauna, aquatic and terrestrial biodiversity, visual sensitive receptors, heritage features etc. within and around the project site that was assessed (Figure A.15). The BESS Risk Assessment advises the safe distances BESS should be from settlements, roads, heritage sites and watercourses/boreholes and these have been adhered to. These maps also confirm that the placement of key project infrastructure components is located well outside the identified and mapped "no-go" areas and the project site is therefore more than suited for the development of the proposed projects, given that all measures be taken to avoid, manage or mitigate potential impacts that may be imposed by the proposed development.

Based on the findings of the specialist studies, an environmental sensitivity map has been produced (as included in Section D of this report and Appendix C). This map shows the sensitivities on site (e.g., terrestrial ecology, watercourse features, and sensitive heritage features etc.) within the area identified and assessed. The sensitive environmental features found within the preferred sites, as described in the specialist studies (Appendix D) and discussed in Sections B and D of this BA Report, are able to be avoided by the location, layout and design of the proposed projects. The current layout is thus a culmination of extensive technical, economic and environmental planning.

Following the exclusion of the required areas, sufficient developable area is still available on site which does not compromise the current ecological integrity of the site or go against the requirements of the landowners.

A.13.7 Concluding Statement for Alternatives

The following alternatives were considered in the BA Phase:

- **No-go Alternative:**

The no-go alternative assumes that the proposed project will not go ahead i.e., it is the option of not constructing the Padloper PV 5 and its associated power line. This alternative would result in no environmental impacts (positive and negative) on the site or surrounding local area, as a result of the proposed facilities. The no-go alternative has been investigated in this BA. **The no-go is not preferred**.

- **Land Use Alternative:**

The site has low agricultural potential because of, predominantly, aridity constraints, but also due to soil constraints. Agricultural land use is limited to low density grazing. The economic benefits to the landowner associated with the proposed Solar PV Facility is likely to be more significant than that of the current farming activities on site. **Based on the above, the agricultural land use is not a preferred alternative.**

- **Type of Activity - Renewable Energy Alternatives:**

In terms of project and location compatibility, the proposed solar energy and BESS facilities and associated EGI are considered to be the most favourable and feasible renewable energy activity alternative (i.e., in comparison to Biomass, Hydro Energy and Wind Energy). **Solar energy is the preferred and only renewable energy technology alternative to be developed on site as a result of**:

- The proposed solar PV facility falls within the REDZ 11 (Beaufort West) and the EGI falls partially within the Eastern EGI Corridor. The proposed project is therefore in line with the criteria of the SEA and located in an area of strategic importance for solar energy development;
- Overall, wind energy development can occur within this area but other localities in South Africa may be more favourable for wind energy development. Site specific requirements for wind energy facilities make it a less feasible alternative when compared to solar PV at this specific site; and
- The site has very good solar resource availability (i.e., GHI).

- **Technology Alternatives:**

Only the PV solar panel type was considered in the BA, along with various mounting options that will be considered in the design. There are no technology alternatives for transmission lines.

- **Site Alternatives:**

Given the site selection requirements associated with solar PV facility and associated EGI and the suitability of the land available on the farm portions and no initial fatal flaws being present, **no other site alternatives were considered as part of the BA Process**.

- **Development Footprint Location and Layout Alternatives:**

An area of approximately 243 ha was assessed by the specialists. The specialists identified environmental sensitivities within this region, which led to the identification of the most suitable area for the solar PV facility and EGI. In addition, the specialist assessed the EGI corridor and specific routing. Based on the inputs from the specialists, the layout was devised to avoid environmentally sensitive areas (no-go areas), while still retaining technical and financial viability, as well as the requirements of landowners (as applicable). The current proposed layout is the preferred layout that was assessed by all the specialists on the project team (Appendix A of this BA Report).

Summary of Legislative Requirements for the Assessment of Alternatives

The 2014 NEMA EIA Regulations (as amended) (Appendix 3 of the GN R982) have certain requirements in terms of the selection of the **proposed preferred activity, site, and location of the development footprint within the site**. Table A.15 below indicates the requirements of the 2014 NEMA EIA Regulations (as amended) in terms of the process leading to the preferred activity, site, and development footprint location alternatives. Table A.15 also includes a response from the EAP showing how the requirements of the 2014 NEMA EIA Regulations (as amended) have been addressed in this report.

Table A.14. The Requirements for the consideration of Alternatives based on the 2014 NEMA EIA Regulations (as amended)

	Section of the EIA Regulations	Requirements for an EIA Report in terms of Appendix 3 of the 2014 NEMA EIA Regulations (GN R982)	Response from EAP
1.	Appendix 3 – (2)	The objective of the BA Process is to, through a consultative process:	Refer to responses below.
2.	Appendix 3 – (2) (c)	• identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment.	As noted in the preceding sections of this BA Report, the preferred site for the proposed project is approximately 202 ha in extent. The combined environmental sensitivity map is included as Figure A.15 and included in Appendix C as well as in Section E of this BA Report. The significant environmental features identified by the relevant specialists have been mapped and overlain with the project study area and layout. The buffers and exclusion areas that need to be applied to the sensitive areas (as identified in the specialist assessments) have also been mapped and overlain by the study area. The remaining areas outside of the sensitive areas and buffers are then regarded as

	Section of the EIA Regulations	Requirements for an EIA Report in terms of Appendix 3 of the 2014 NEMA EIA Regulations (GN R982)	Response from EAP
			the areas available for development (i.e., the development footprint). Therefore, a suitable project layout within the development footprint has been determined ensuring that the areas that have a high or very high environmental sensitivity will be avoided by the proposed siting of the proposed projects. A single suitable location for the proposed site has been identified based on the sensitivity mapping and the development footprint. As noted above, a worst-case scenario was adopted by the specialists in terms of the area of assessment. The specialist assessments included in Section E of this BA Report therefore include an impact assessment process (inclusive of cumulative impacts) and by default, a ranking process of the identified development footprint focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment.
3.	Appendix 3 – (2) (d)	• determine the nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and the degree to which these impacts (a) can be reversed; (b) may cause irreplaceable loss of resources, and (c) can be avoided, managed or mitigated.	The specialist assessments included in Section E of this BA Report include a description and assessment of the nature, significance, consequence, extent, duration, and probability of the identified impacts for the preferred alternatives. The specialist assessments also include the assessment of the reversibility and irreplaceability of the potential identified impacts, as well as the degree to which the identified impacts can be avoided, managed, or mitigated.
4.	Appendix 3 – (2) (e)	• identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment.	Refer to the development footprint and sensitivity mapping approach described in Point 2 above.
5.	Appendix 3 – (2) (f)	• identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity.	The specialist assessments included in Section E and Appendix C of this BA Report include a description, identification, and assessment of identified impacts that the proposed PV, BESS and EGI will impose on the preferred location of the proposed project.
6.	Appendix 3 – (2) (g)	• identify suitable measures to avoid, manage or mitigate identified impacts.	The specialist assessments included in Appendix D of this BA Report. Section D of this BA Report includes identification of suitable measures to avoid, manage, or mitigate identified impacts.
7.	Appendix 3 – (2) (h)	• identify residual risks that need to be managed and monitored.	The specialist assessments included in Appendix D of this BA Report. Section D of this BA Report includes identification of residual risks that need to be managed and monitored.
8.	Appendix 3 - (3)(h)	A full description of the process followed to reach the proposed development footprint within the approved site, including –	Refer to the development footprint and sensitivity mapping approach described in Point 2 above.

	Section of the EIA Regulations	Requirements for an EIA Report in terms of Appendix 3 of the 2014 NEMA EIA Regulations (GN R982)	Response from EAP
		• details of the development footprint alternatives considered; • (iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; • (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; • (ix) if no alternative development locations for the activity were investigated, the motivation for not considering such; and • (x) a concluding statement indicating the preferred alternative development location within the approved site.	
9.	Appendix 3 – (3) (l)	An environmental impact statement which contains (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	Refer to the development footprint and sensitivity mapping approach described in Point 2 above.
10.	Appendix 3 – (3) (n)	The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment.	Refer to the development footprint and sensitivity mapping approach described in Point 2 above

- **Summary Statement:**

Based on the above, the preferred activity is the development of renewable energy facilities on site using solar PV as the preferred technology. In terms of the preferred location of the site, the following farm portions are preferred:

Affected Farm Portion	SG Code	Padloper PV 5	Padloper EGI 5
Portion 3 of Farm Driefontein No. 26	C05200000000002600003	✓	✓
Portion 2 of Farm Driefontein No. 26	C05200000000002600002		✓

The location and layout of the activity have been informed by the outcomes of the specialist screening studies (undertake prior to the commencement of the BA Process) and detailed impact assessments and technical feasibility, as well as landowner requirements. The preferred layout is further discussed in Section D of this BA Report.

A.14 Need and Desirability

It is an important requirement in the BA Process to review the need and desirability of the proposed project. Guidelines on Need and Desirability were published in the Government Gazette of 20 October 2014. These guidelines list specific questions to determine need and desirability of proposed developments. This checklist is a useful tool in addressing specific questions relating to the need and desirability of a project and assists in explaining that need and desirability at the provincial and local context. Need and desirability answer the question of whether the activity is being proposed at the right time and in the right place. Table A.15 includes a list of questions based on the DFFE's Guideline to determine the need and desirability of the proposed project. It should be noted this table was informed by the outcomes of the BA Process.

The table below details includes a list of questions based on the DFFE's Guideline to determine the need and desirability of the proposed project.

Table A.15. The Guideline on the Need and Desirability's list of questions to determine the "Need and Desirability" of a proposed project.

NEED	
Question	**Response**
1. How will this development (and its separate elements/aspects) impact on the ecological integrity of the area)?	
1.1. How were the following ecological integrity considerations taken into account? 1.1.1. Threatened Ecosystems, 1.1.2. 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, 1.1.3. Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs"), 1.1.4. Conservation targets, 1.1.5. Ecological drivers of the ecosystem, 1.1.6. Environmental Management Framework, 1.1.7. Spatial Development Framework, and 1.1.8 Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).	The environmental sensitivities present on site and ecological integrity considerations were addressed within the Avifauna, Aquatic Biodiversity, and Terrestrial Biodiversity and Plant and Animal Species Impact Assessments (Appendix D.4, of the BA Report) and the Aquatic Biodiversity and Species Assessment (Appendix D.5 of the BA Report) undertaken as part of this BA Process. The Avifauna Assessment (Appendix D.6 of the BA Report) also addresses ecological integrity. The above specialist studies explain that the proposed PV study area and the associated EGI assessment corridor is located predominantly within the Eastern Upper Karoo (NKu 4) vegetation unit, associated with the mainstem systems of the Brak / Buffels rivers. This vegetation unit is that is considered as Least Concern from a conservation status and is characterised by low lying areas separated by a higher lying plateau and/ or inselbergs (koppies). The western portion of the proposed Padloper PV 5 area contains areas identified as ESA 1. The proposed EGI 5 assessment corridor contains areas identified as CBA 1. The proposed project area contains small portions of the respective footprints within a National Freshwater Ecosystem Priority Area (NEFPA) and is discussed in greater detail in the aquatic assessment, however any of the aquatic habitats associated with this NFEPA were delineated a finer scale so that the footprint could be excluded from any core or function aquatic zones. It is therefore the Aquatic and Terrestrial Ecological specialist's opinion that the proposed development is considered compatible with the aims and objectives of ESAs from an aquatic and terrestrial biodiversity point of view. Two principal factors are considered to be the master elements driving the localised ecology. These can be considered to be broadly meteorological factors, namely wind,

NEED	
Question	**Response**
	rainfall and temperature, while edaphics, particularly giving rise to lithic or sandy environments may be considered a geophysical driver. The specialists identified all ecological sensitive areas on site that would need to be avoided by the proposed development (e.g., pans, wetland environments), as well as how to suitably develop around and within these areas so that the ecological integrity of the areas is maintained (refer to Section D and Appendix D of this BA Report). The sensitivities identified by the various specialists have been taken into consideration and avoided where possible into order to identify the Buildable Areas / development footprint. The feature and sensitivity maps for the study area, and the combined layout and sensitivity maps are included in Section B and D of this BA Report, as in Appendix C. The Screening Tool also notes that no intersections with EMF areas have been found. These specialists concluded that the proposed project could proceed provided that the recommended mitigation measures and management actions provided are implemented. Therefore, the proposed development would not unacceptably compromise the ecological integrity of the context and associated conservation goals and would be developed in support of responding to climate change and the South African energy crisis through development of a renewable energy facility.
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?	The environmental sensitivities present on site and ecological integrity considerations were addressed within the Avifauna, Aquatic Biodiversity, and Terrestrial Biodiversity and Plant and Animal Species Impact Assessments (Appendix D.4, of the BA Report) and the Aquatic Biodiversity and Species Assessment (Appendix D.5 of the BA Report) undertaken as part of this BA Process. The Avifauna Assessment (Appendix D.6 of the BA Report) also addresses ecological integrity. The specialists identified all ecological sensitive areas on site that would need to be avoided by the proposed development (e.g., pan and wetland environments), as well as how to suitably

NEED	
Question	**Response**
	develop around these areas so that the ecological integrity of the areas is maintained (refer to Section D and Appendix D of this BA Report). The buffer areas recommended by the specialists were used to design the solar array area and the power line routing. The buffers have therefore been avoided in the layout of the proposed PV Facility and power line routing. A sensitivity map produced based on the input obtained from the various specialist studies is included in Section B and D of this Report, as well as in Appendix C. Measures to avoid, remedy, mitigate and manage impacts are included within the Terrestrial and Aquatic Biodiversity and Species Assessment, as well as the Environmental Management Programme (EMPr), included as Appendices H - J of this BA Report.
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?	This development has the potential to impact on the ecology of the area. The proposed development of the project is expected to result in an overall Very Low ecological impact when suitable mitigation measures are employed. Refer to the Terrestrial Biodiversity and Species Assessment (Appendix D.4 of the BA Report) and the Aquatic Biodiversity and Species Assessment (Appendix D.5 of the BA Report), as well as Section D of the BA Report. Measures to avoid, remedy, mitigate and manage impacts are included within the Terrestrial and Aquatic Biodiversity and Species Assessment, and the EMPr, included as Appendices H - J of this BA Report.
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?	The description of the potential waste generation is included in Section A of this BA Report (this Section). It is not anticipated that a significant amount of waste will be generated. Waste generation during the construction phase will include liquid effluent and solid waste, and other general and hazardous waste (e.g., contaminated material as a result of spills). Waste generation during the operational phase will be very limited. Measures to avoid, remedy, mitigate and manage impacts are included within the EMPr, included as Appendices H - J of this BA Report.

NEED	
Question	**Response**
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?	A Heritage Impact Assessment including a Cultural Landscape Assessment and Palaeontology Impact Assessment was undertaken as part of this project (included as Appendix D.3 of this BA Report). Potential impacts to heritage resources were identified as an impact during the construction and decommissioning phases. The overall findings of the Heritage Impact Assessment are that all significant sites have been avoided and no impacts are anticipated. The study further notes that impacts to the landscape are unavoidable but, in this case, are deemed within acceptable limits. From a palaeontology perspective, disturbance, damage or destruction of fossils within the development footprint due to excavations and surface clearance was identified as an impact, rated with an overall very low significance with the implementation of mitigation measures. In addition, the studied concluded that fossil heritage of scientific and conservational interest in the development footprint is rare. The applicable measures to avoid, remedy, mitigate and manage impacts are included in Section D and Appendix D (full specialist study) as well as in the EMPr. Measures to avoid, remedy, mitigate and manage impacts are included within the Heritage Impact Assessment and Palaeontology, and the EMPr, included as Appendices H - J of this BA Report.
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 the 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?	Water required for the construction, operational and decommissioning phases will preferably be sourced from a borehole drilled on site, which will be subject to complete geohydrological testing and the necessary water use authorisation obtained (as applicable). The location of existing boreholes on the farm portions which are affected by the proposed Padloper PV Cluster (i.e., Padloper PV 1-7) and surrounding areas are indicated in the Geohydrology Assessment (Appendix D. 9 of the BA Report). The Geohydrology Assessment notes that anecdotal evidence suggests that many identified boreholes deliver limited water supply, in addition some of the boreholes on this property may require upgrading and/or deepening to deliver the requisite volumes of water required by the proposed solar facility. The assessment recommends that the legal status of groundwater use at each property should be

NEED	
Question	**Response**
	confirmed as this This will inform the need for future water use authorisations. If groundwater is available and suitable, water pipelines may need to be constructed in order to transfer groundwater from the existing boreholes to the PV facility. The assessment further confirms that should ground water, if used, should be monitored (i.e., abstraction volumes, quality and water levels) and that this should ideally be implemented one year prior to the start of construction if the project timeframes permit. As a second option, water will be sourced from the Beaufort West Local Municipality. The Project Applicant will consult with the Local Municipality and specific arrangements for water to either be trucked in, or otherwise made available for collection at their Water Treatment Plant via a metered standpipe. These arrangements will be agreed on in a Service Level Agreement (SLA). Should the sources discussed above not be viable, the Project Applicant will investigate into a third-party water supplier which may include a nearby mine or other private services. The necessary approvals will be sought from the Department of Water and Sanitation (DWS) should groundwater be sourced from the existing boreholes for the proposed project. Management actions to ensure the responsible and equitable use of water during the construction, operation and decommissioning phases are provided in the EMPr (Appendices H - L of this BA Report).
1.7. How will this development use and/or impact on renewable natural 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?	The proposed project aims to harness solar energy for the generation of electricity. This proposed project is seen as a source of 'clean energy' and reduces the dependence on non-renewable energy sources, such as coal fired power plants. The proposed development is located in the Beaufort West REDZ. In addition, the proposed power line is located partially in the Eastern Strategic Transmission Corridor. The REDZs represent areas where wind and solar PV energy development is being incentivized from resource, socio-economic and environmental perspectives. For more information, refer to Section A.13 of this BA Report, which deals with Alternatives, and thus outlines the suitability of this activity.

NEED	
Question	**Response**
1.7.1. 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. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life) 1.7.2. Does the proposed use of 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 of the proposed development alternative?) 1.7.3. Do the proposed location, type and scale of development promote a reduced dependency on resources?	The environmental sensitivities present on site and ecological integrity considerations were addressed within the Avifauna, Aquatic Biodiversity, and Terrestrial Biodiversity and Plant and Animal Species Impact Assessments (Appendix D.4, of the BA Report) and the Aquatic Biodiversity and Species Assessment (Appendix D.5 of the BA Report) undertaken as part of this BA Process. The Avifauna Assessment (Appendix D.6 of the BA Report) also addresses ecological integrity.
1.8. How were a risk-averse and cautious approach applied in terms of ecological impacts?: 1.8.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)? 1.8.2. What is the level of risk associated with the limits of current knowledge? 1.8.3. 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 environmental sensitivities present on site and ecological integrity considerations were addressed within the Avifauna, Aquatic Biodiversity, and Terrestrial Biodiversity and Plant and Animal Species Impact Assessments (Appendix D.4, of the BA Report) and the Aquatic Biodiversity and Species Assessment (Appendix D.5 of the BA Report) undertaken as part of this BA Process. The Avifauna Assessment (Appendix D.6 of the BA Report) also addresses ecological integrity. The precautionary approach has been adopted for this assessment, i.e., assuming the worst-case scenario will occur and then identifying ways to mitigate or manage these impacts. For example, the cumulative impact assessment considered that all approved renewable energy projects within the 30 km radius would be constructed. However, it is unlikely that all will be constructed as most will be based on the outcomes of the bidding windows in terms of the REIPPPP. Therefore, this approach is considered to be precautionary in nature. Additionally, the location of the PV facility within the assessed area and the layout thereof was determined based on the specialist findings.

NEED	
Question	**Response**
	Refer to Appendix D of this BA Report for the complete specialist studies. These studies outline the assumptions and limitations that were applicable to the respective studies. The risk associated with the limits in knowledge is considered to be low.
1.9. How will the ecological impacts resulting from this development impact on people's environmental right in terms following: 1.9.1. 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? 1.9.2. Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	Refer to Section D and Appendix D of this BA Report which respectively include the findings of the specialist assessments, as well as the complete studies undertaken. The Socio-Economic Assessment (included in Appendix D.7 of this BA Report) notes that the proposed project is not free of commercial risk, nor would it be realistic to expect this. However, the balance between financial benefits and costs are likely to be positive for the applicant and landowner partners barring unforeseen risks. In terms of wider positive impacts, the project would be largely supportive of local and regional socio-economic development and energy supply planning imperatives including the diversification of the economy and energy sources. It is considered most likely that the combined positive impacts of each project (i.e., Padloper PV 5, 6 and 7) would exceed its negative impacts resulting in an overall net benefit with mitigation. Creation of employment and business opportunities, generate income for affected landowner/s, promotion of renewable energy projects, and the development and/or growth of locally owned industries were identified as some of the positive socio-economic impacts during the construction and operation phase of the proposed projects. With regards to the Visual Impact Assessment (Appendix D.2 of this BA Report), the visual impact significance associated with the proposed project are of low significance during both construction and decommissioning phases. During operation however, visual impacts from the proposed project would be of moderate significance with relatively few mitigation measures available to reduce the visual impact. This is as a result of the sparse human habitation and the predominance of natural vegetation that covers much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. As such, the SEF and EGI developments would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader study area.

NEED	
Question	**Response**
	A broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a moderate visual sensitivity. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs. No formal protected areas and relatively few sensitive or potentially sensitive receptor locations were identified in the study area, thus confirming the moderate level of visual sensitivity.
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.)?	This is considered and addressed as part of the Socio-Economic Assessment undertaken for this project (included in Appendix D.7 of this BA Report and summarised in Section D). The Socio-Economic Assessment (included in Appendix D.7 of this BA Report) notes that the proposed project is not free of commercial risk, nor would it be realistic to expect this. However, the balance between financial benefits and costs are likely to be positive for the applicant and landowner partners barring unforeseen risks. In terms of wider positive impacts, the project would be largely supportive of local and regional socio-economic development and energy supply planning imperatives including the diversification of the economy and energy sources. It is considered most likely that the combined positive impacts of each project (i.e., Padloper PV 5, 6 and 7) would exceed its negative impacts resulting in an overall net benefit with mitigation. Creation of employment and business opportunities, generate income for affected landowner/s, promotion of renewable energy projects, and the development and/or growth of locally owned industries were identified as some of the positive socio-economic impacts during the construction and operation phase of the proposed projects. The project was therefore deemed acceptable in terms of socio-economic impacts and should be allowed to proceed.
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 impacts on ecological integrity objectives of the area were considered as part of the Aquatic and Terrestrial Biodiversity and Species Impact Assessments undertaken for this project and have been included in Appendix D.4 and D.5 of this BA Report.

NEED	
Question	**Response**
	In addition, the vision of the Beaufort West Local Municipality Integrated Development Plan (BWLM IDP) 2017-2022 is to be the economic gateway in the Central Karoo, where people are developed and live in harmony together. Further unpacking of the vision indicates the provision of directives regarding the growth of the economy and ensuring financial sustainability among other areas in which development is required. The five priority areas of the BWLM IDP are: 1. Service to the people – seeking to improve and maintain basic service delivery through infrastructure development; 2. Sustainable economic growth by leveraging competitive advantages of the region (The IDP identifies low economic growth as one of the main reasons for the lack of new labour entrants into the economy); 3. A well-run administration that is efficient, effective and has the right skills mix; 4. Ensure financial sustainability; and 5. Be a transparent organisation. This project contributes towards four of the five priority areas. The inclusion of renewable energy not only plays to the natural strengths of the area (i.e., good solar irradiation levels), but also appears to be aimed at bringing parity between the existing employment sectors by providing much needed growth within the local construction and electricity employment sectors. The proposed activity therefore does not compromise any of the objectives set within IDP.
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?	Refer to Section A.13 of this BA Report, which deals with Alternatives. This section outlines the suitability of the proposed activity.
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?	Each specialist assessment has taken into consideration and has assessed the potential cumulative impacts of this proposed development. Please refer to Appendix

NEED	
Question	**Response**
	D and Section D of this BA Report where the potential cumulative impacts are discussed for this project. Overall, the majority of the cumulative negative impacts identified for the proposed project were rated with a moderate to low post mitigation impact significance for the construction phase, operational phase, and decommissioning phase.
2.1. What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?	
2.1.1. The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area	The vision of the Beaufort West Local Municipality Integrated Development Plan (BWLM IDP) 2017-2022 is to be the economic gateway in the Central Karoo, where people are developed and live in harmony together. Further unpacking of the vision indicates the provision of directives regarding the growth of the economy and ensuring financial sustainability among other areas in which development is required. The five priority areas of the BWLM IDP are: 1. Service to the people – seeking to improve and maintain basic service delivery through infrastructure development; 2. Sustainable economic growth by leveraging competitive advantages of the region (The IDP identifies low economic growth as one of the main reasons for the lack of new labour entrants into the economy); 3. A well-run administration that is efficient, effective and has the right skills mix; 4. Ensure financial sustainability; and 5. Be a transparent organisation. This project contributes towards four of the five priority areas. The inclusion of renewable energy not only plays to the natural strengths of the area (i.e., good solar irradiation levels), but also appears to be aimed at bringing parity between the existing employment sectors by providing much needed growth within the local construction and electricity employment sectors. The proposed activity therefore does not compromise any of the objectives set within IDP. The proposed

NEED	
Question	**Response**
	projects will also be supportive of the IDP's objective of creating more job opportunities. The proposed projects will create job opportunities and economic spin offs during the construction and operational phases (if EA is granted by the DFFE). Therefore, the proposed solar PV facilities would help to address the need for increased electricity supply (on a national level) while also providing advanced skills transfer and training to the local communities and creating contractual and permanent employment in the area. The proposed PV facility is also located in REDZ 11, and the proposed power line is located partially within the Eastern Strategic Transmission corridor which are geographical areas that has been identified on a strategic planning level to have reduced negative environmental impacts but high commercial attractiveness (due to its proximity to, inter alia, the national grid) and socio-economic benefit to the country. The development of solar energy is therefore important for South Africa to reduce its overall environmental footprint from power generation (including externality costs), and thereby to steer the country on a pathway towards sustainability. Therefore, the proposed project is in line with strategic plans and national policy.
2.1.2. Spatial priorities and desired spatial patterns (e.g. need for integration of segregated communities, need to upgrade informal settlements, need for densification, etc.)	This is not applicable, as the proposed project is located within a rural area and the site is zoned for agricultural use.
2.1.3. Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.)	As indicated above, the current land use on the proposed site is agriculture, low density livestock grazing. The impact of the proposed project on cultural or heritage areas (including archaeology and palaeontology) was assessed as part of the HIA in the BA Process. Please refer to Appendix D.3 Report of this BA Report for the full integrated HIA. It is not expected that this will significantly threaten the agricultural activities present on site. An Agricultural Compliance Statement (Appendix D.1 of this BA Report and summarised in Section D) was undertaken as part of this BA to reflect the impact of

NEED	
Question	**Response**
	the proposed project in terms of agriculture. The conclusion of the Agricultural Compliance Statements is that the proposed developments will not have an unacceptable negative impact on the agricultural production capability of the site. As noted, an EMPr was compiled for the proposed project to ensure that all potential negative impacts identified are suitably managed and mitigated, and potential positive impacts are enhanced. The EMPr has been included Appendices H - J of this BA Report. The impact on the sense of place is difficult to predict and would potentially be ambiguous. This is due to the subjective nature of perceptions regarding the relative attraction or disturbance of the project in a rural landscape. The visual impact and considerations have been further assessed as part of the Visual Impact Assessment and is included in Appendix D.2 of this BA Report. The Visual Impact Assessment (VIA) found the visual impact significance associated with the proposed project are of low significance during both construction and decommissioning phases. During operation however, visual impacts from the proposed project would be of moderate significance with relatively few mitigation measures available to reduce the visual impact. This is a s a result of the sparse human habitation and the predominance of natural vegetation that covers much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. As such, the SEF and EGI developments would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader study area. In addition, a broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a moderate visual sensitivity. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs.
2.1.4. Municipal Economic Development Strategy ("LED Strategy").	The Beaufort West Municipality Spatial Development Framework (SDF) was found to be most relevant with respect to spatial planning at the local level. It was completed in 2013 and builds on the 2011 Urban Restructuring Framework. The SDF

NEED	
Question	**Response**
	acknowledges the need for the development of renewable energy. However, similar to the provincial SDF, it also highlights the need to minimise impacts on biodiversity and tourism with the R63 identified as a secondary scenic route[8]. Even though the proposed solar facilities will not provide the municipality directly with electricity, the energy produced by the facility will feed into the national grid. The proposed project would also provide advanced skills transfer and training to the local communities and creating contractual and permanent employment in the area.
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? 2.2.1. Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	Refer to the Socio-Economic Assessment summarised in Section D and included in Appendix D.7 of this BA Report, for an outline of the socio-economic impacts that could occur due to the proposed development of the solar PV facility.
2.3. How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	
2.4. Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long term? Will the impact be socially and economically sustainable in the short- and long-term?	
2.5. In terms of location, describe how the placement of the proposed development will:	
2.5.1. result in the creation of residential and employment opportunities in close proximity to or integrated with each other,	Refer to the Socio-Economic Assessment summarised in Section D and included in Appendix D.7 of this BA Report, for an outline of the socio-economic impacts that could occur due to the proposed development of the solar PV facility. The Socio-Economic Assessment (included in Appendix D.7 of this BA Report) notes that the proposed project is not free of commercial risk, nor would it be realistic to expect this. However, the balance between financial benefits and costs are likely to be positive for the applicant and landowner partners barring unforeseen risks. In term of wider positive impacts, the project would be largely supportive of local and regional

[8] CNdV Africa. 2013. Beaufort West Municipality SDF. CNdV Africa, Cape Town

NEED	
Question	**Response**
	socio-economic development and energy supply planning imperatives including the diversification of the economy and energy sources. It is considered most likely that the combined positive impacts of each project (i.e., Padloper PV 5, 6 and 7) would exceed its negative impacts resulting in an overall net benefit with mitigation. Creation of employment and business opportunities, generate income for affected landowner/s, promotion of renewable energy projects, and the development and/or growth of locally owned industries were identified as some of the positive socio-economic impacts during the construction and operation phase of the proposed projects.
2.5.2. reduce the need for transport of people and goods,	Not applicable. This is a renewable energy project proposal.
2.5.3. result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),	Not applicable. This is a renewable energy project proposal.
2.5.4. compliment other uses in the area,	The area is a farming area. Low density, natural grazing is by far the predominant agricultural activity in the area. Should the proposed project proceed, approximately 202 ha of the land will be developed on, and it is not expected that this will significantly threaten the agricultural activities present on site. An Agricultural Compliance Statement (Appendix D.1 of this BA Report and summarised in Section D) was undertaken as part of this BA to reflect the impact of the proposed project in terms of agriculture. The conclusion of the Agricultural Compliance Statements is that the proposed developments will not have an unacceptable negative impact on the agricultural production capability of the site.
2.5.5. be in line with the planning for the area,	
2.5.6. for urban related development, make use of underutilised land available with the urban edge,	Not applicable. The proposed projects are located within a rural area and the site is zoned for agricultural use.
2.5.7. optimise the use of existing resources and infrastructure,	The proposed projects will connect to the proposed authorised Ishwati Emoyeni Collector Substation and will make use of existing access roads as far as possible. The gravel farm road leading to the solar PV facility will be used for access and will be upgraded as part of the proposed project.
2.5.8. opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),	These projects are a renewable energy project and not related to bulk infrastructure expansion.

NEED	
Question	**Response**
2.5.9. discourage "urban sprawl" and contribute to compaction/densification,	Refer to the Socio-Economic Assessment summarised in Section D and included in Appendix D.7 of this BA Report, for an outline of the socio-economic impacts that could occur due to the proposed development of the solar PV facility. One of the impacts identified is the disruption of local social structures as a result of the construction work force and in-migration of job seekers. Adequate management measures have been identified in this regard.
2.5.10. 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,	This is not applicable as the proposed projects are located within a rural area and the sites are zoned for agricultural use.
2.5.11. encourage environmentally sustainable land development practices and processes,	Based on the findings of this BA, the proposed projects would not have a significant ("high") negative impact on the receiving environment, with the implementation of suitable mitigation measures (Section D) and will therefore not go against sustainable land development practices and processes. In addition, the proposed projects will be designed according to relevant national specifications and standards which are regarded as best practice in the renewable energy sector. In addition, the proposed PV facility is also located in REDZ 11, and the proposed power line is located partially within the Eastern Strategic Transmission corridor and the development proposal will therefore be aligned with national planning priorities.
2.5.12. take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),	Refer to Section A.13 of this BA Report, which deals with Alternatives. This section outlines the suitability of the proposed activity, as well as the selection thereof.
2.5.13. the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),	The Socio-Economic Assessment (included in Appendix D.7 of this BA Report) notes that the proposed project is not free of commercial risk, nor would it be realistic to expect this. However, the balance between financial benefits and costs are likely to be positive for the applicant and landowner partners barring unforeseen risks. In term of wider positive impacts, the project would be largely supportive of local and regional socio-economic development and energy supply planning imperatives including the diversification of the economy and energy sources. It is considered most likely that the combined positive impacts of each project (i.e., Padloper PV 5, 6 and 7) would exceed its negative impacts resulting in an overall net benefit with mitigation. Creation of employment and business opportunities, generate income for affected

NEED	
Question	**Response**
	landowner/s, promotion of renewable energy projects, and the development and/or growth of locally owned industries were identified as some of the positive socio-economic impacts during the construction and operation phase of the proposed projects. The project was therefore deemed acceptable in terms of socio-economic impacts and should be allowed to proceed.
2.5.14. 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	The impact of the proposed project on heritage features, including archaeology and cultural landscape and palaeontology (Appendix D.3 of this BA Report), has been assessed the Heritage Impact Assessment and Palaeontology Impact Assessment, respectively. Potential impacts to heritage resources were identified as an impact during the construction and decommissioning phases. The overall findings of the Heritage Impact Assessment are that all significant sites have been avoided and no impacts are anticipated. The study further notes that impacts to the landscape are unavoidable but, in this case, are deemed within acceptable limits. From a palaeontology perspective, disturbance, damage or destruction of fossils within the development footprint due to excavations and surface clearance was identified as an impact, rated with an overall very low significance with the implementation of mitigation measures. In addition, the studied concluded that fossil heritage of scientific and conservational interest in the development footprint is rare
2.5.15. in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	The proposed PV facility is also located in REDZ 11, and the proposed power line is located partially within the Eastern Strategic Transmission corridor. Several renewable energy facilities are proposed in the area, which lends itself potentially to a renewable energy development area. Refer to Section D of this BA Report for an outline of the renewable energy projects authorised in a 30 km radius.
2.6. How were a risk-averse and cautious approach applied in terms of socio-economic impacts?	
2.6.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	Refer to the Socio-Economic Assessment summarised in Section D and included in Appendix D.7 of this BA Report.
2.6.2. What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?	

NEED	
Question	**Response**
2.6.3. 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?	
2.7. How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:	
2.7.1. Negatve impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measues were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	Refer to the Socio-Economic Assessment summarised in Section D and included in Appendix D.7 of this BA Report.
2.7.2. Positive impacts. What measures were taken to enhance positive impacts?	
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 socioeconomic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	
2.9. What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	
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 unfairl discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? 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?	
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?	
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?	
2.13. What measures were taken to:	
2.13.1. ensure the participation of all interested and affected parties,	

NEED	
Question	**Response**
2.13.2. provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,	The Public Participation Process (PPP) that has been undertaken as part of this BA is detailed in Section C of this report, as well as in Appendix D. The Draft BA Report was released for a 30-day comment period, extending from 14 August to 13 September, to all the relevant authorities and stakeholders. Various methods are being employed to notify potential Interested and Affected Parties (I&APs) of the proposed projects, namely, through a newspaper advert, site notice boards and notification letters via email, as well as SMS texts. The BA Process is taking cognisance of all interests, needs and values espoused by all I&APs, where relevant. Opportunity for public participation will be provided to all I&APs throughout the BA process in terms of the 2014 NEMA EIA Regulations (as amended). A detailed Comments and Responses Report (CRR) has been compiled with comments received in the pre-application Phase (Part C of this report package).
2.13.3. ensure participation by vulnerable and disadvantaged persons,	
2.13.4. promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,	
2.13.5. ensure openness and transparency, and access to information in terms of the process,	
2.13.6. 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,	
2.13.7. ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein was promoted.	
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)?	Refer to the Socio-Economic Assessment summarised in Section D and included in Appendix D.7 of this BA Report.
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 of dangers 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?	An EMPr has been developed to address environmental impacts, as well as health and safety concerns. An Environmental Control Officer will be appointed to monitor compliance during the construction and decommissioning phases.
2.16. Describe how the development will impact on job creation in terms of, amongst other aspects:	
2.16.1. the number of temporary versus permanent jobs that will be created,	Refer to the Socio-Economic Assessment summarised in Section D and included in Appendix D.7 of this BA Report.
2.16.2. 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),	
2.16.3. the distance from where labourers will have to travel,	
2.16.4. the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits),	

NEED	
Question	**Response**
2.16.5. the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	
2.17. What measures were taken to ensure:	
2.17.1. that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment,	Legislation, policies and guidelines, which could apply to impacts of the proposed project on the environment, have been considered. The scope and content of this BA Report has been informed by applicable integrated environmental management legislation and policies. This has been included in Section A of this BA Report.
2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	The PPP that has been undertaken as part of this BA is detailed in Section C of this report, as well as in Appendix D. The Draft BA Report was released for a 30-day comment period, extending from 14 August to 13 September, to all the relevant authorities and stakeholders. Various methods are being employed to notify potential I&APs of the proposed projects, namely, through a newspaper advert, site notice boards and notification letters via email, as well as SMS texts. The BA Process is taking cognisance of all interests, needs and values espoused by all I&APs, where relevant. Opportunity for public participation will be provided to all I&APs throughout the BA process in terms of the 2014 NEMA EIA Regulations (as amended). A detailed CRR has been compiled with comments received in the pre-application Phase (Part C of this report package).
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?	The outcomes of this BA Process and the associated conditions of the EA (should it be received) will serve to address this question.
2.19. Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	The proposed mitigation measures included in the EMPr and summarised in Section D of this report have been informed by the specialist studies undertaken and this includes a detailed assessment of the environment as well as the impacts associated with the proposed development. Solar energy facilities can be dismantled and completely removed from the site leased for the development and do not permanently prevent alternative land-uses on the same land parcel. Based on material and socio-economic terms, and measured to the value of the best alternative that is not chosen, the proposed project will result in positive opportunity costs.
2.20. What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing,	The EMPr of this proposed project must form part of the contractual agreement and be adhered to by both the contractors/workers and the Applicant.

NEED	
Question	**Response**
controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	
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?	Refer to Section A.13 of this BA Report, which deals with Alternatives. This section outlines the suitability of the proposed activity.
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?	Refer to Section D of this report for a summary of the cumulative impacts. The Socio-Economic Assessment, included in Appendix D.7 of this BA Report, identified the following cumulative impacts and significance: • Cumulative impacts from expenditure on the construction, operation and decommissioning of the project (High positive) • Cumulative impacts associated with the funding of local socio-economic development, enterprise development and shareholding during operations (High positive); • Cumulative impacts associated primarily with the influx of people (Moderate negative); • Cumulative impacts on tourism (Moderate negative); and • Cumulative impacts on surrounding landowners (Moderate negative).
DESIRABILITY	
Is this project part of a national programme to address an issue of national concern or importance?	The proposed PV facility is also located in REDZ 11, and the proposed power line is located partially within the Eastern Strategic Transmission corridor. REDZs are geographical areas where the development of large-scale wind and solar PV is encouraged and incentivized with a shorter decision time frame.
Do location factors favour this land use (associated with the development proposal) at this place? (This relates to the contextualisation of the proposed land use on the proposed site within its broader context.)	

SECTION B: DESCRIPTION OF THE AFFECTED ENVIRONMENT

This section of the BA Report provides a broad overview of the affected environment for the proposed project and the surrounding region. The receiving environment is understood to include biophysical, socio-economic and heritage aspects which could be affected by the proposed development or which in turn might impact on the proposed development.

This information is provided to identify the potential issues and impacts of the proposed project on the environment and vice versa. The information presented within this chapter has been sourced from:

- Input from the specialists that form part of the project team;
- Feedback from the DFFE National Web-based Screening Tool (hereafter referred to as Screening Tool), where applicable;
- Review of information available on the South African National Biodiversity Institute (SANBI) Biodiversity Geographical Information System (BGIS) and Agricultural Geo-Referenced Information System (AGIS); and
- The Beaufort West Local Municipality and Central Karoo District Municipality Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs).

Feedback from the Screening Tool is provided in the sections below, only where it is applicable. For example, it is not applicable to the Socio-Economic Assessment and the Traffic Impact Statement.

It is important to note that this chapter intends to provide a broad overview of the affected environment. Detailed descriptions of the preferred project site focused on significant environmental aspects of these projects are provided in the relevant specialist studies (Appendix C of this BA Report).

B.1 Background

The proposed Padloper PV 5 and the Padloper EGI 5 are situated on the following farm portions:

Affected Farm Portion	SG Code	Padloper PV 5	Padloper EGI 5
Portion 3 of Farm Driefontein No. 26	C05200000000002600003	✓	✓
Portion 2 of Farm Driefontein No. 26	C05200000000002600002		✓

The preferred sites have a 202 ha developable area. As previously noted, the proposed projects are located within the Beaufort West Local Municipality, which falls within the Central Karoo District Municipality, and are situated approximately 18 km from Murraysburg in the Western Cape Province. Figure A.2 in Section A of this report provides a locality map of the proposed project area.

B.2 Biophysical Environment

B.2.1 Climate Conditions

The site has low rainfall with a mean annual precipitation of 288 mm per annum. Generally, the study area experiences cold and dry winters with warm to hot summers. It receives the bulk of its annual rainfall during summer and early autumn (i.e., between December and April) (Figure B.1). Drought has been experienced to varying degrees in different parts of the study area, with many of the farms surrounding Loxton (approximately 150 km west of the study area) having received little to no rain over the past ten years.

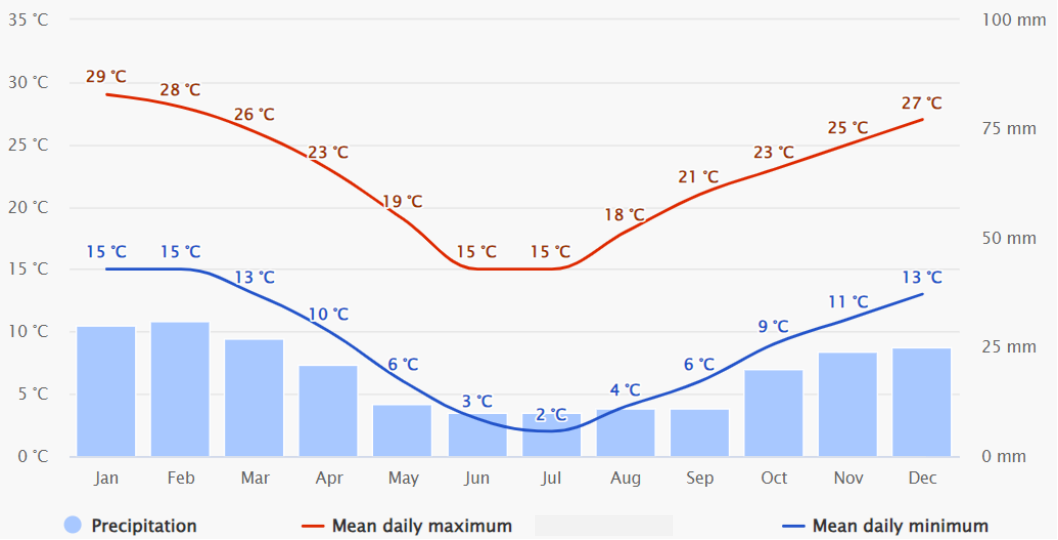

Figure B.1. Long-term mean a) temperatures (°C); and b) mean precipitation (mm) for Murraysburg, Western Cape. (Source: https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/murraysburg_south-africa_972549)

The specialist studies included in Appendix D provide additional details regarding the climatic conditions on site.

B.2.1.1 Climate Change

Temperatures in the Central Karoo region are anticipated to rise with resulting lower annual rainfall in the medium to long term, although it is uncertain what impact increasing climate change will have on rainfall patterns in the region, as some research is suggesting that parts of the Western Cape Province may even receive greater annual precipitation. Lower rainfall will also mean higher levels of evaporation and average wind velocities are expected to increase as well. As a result, these increasingly hot, arid conditions will cause the Karoo vegetation to become less resilient with an overall reduction in carrying capacity and a potential increase in veld fires. In addition, agricultural potential of the region is expected to be severely impacted with a further decline in productivity and yield, which is undoubtedly exacerbated by the ongoing drought prevailing in the area. This will ultimately require the adoption of

more drought-tolerant farming practices or the implementation of alternative land uses such as renewable energy generation developments, in particular solar and wind to ensure economic growth[9].

B.2.2 Regional Geology

The 1:250 000 Victoria West 3122 (1989) Geological map (Council of Geoscience, Pretoria) indicates that the proposed development is underlain by the Balfour (Pb, green) of the Adelaide Subgroup (Beaufort Group, Karoo Supergroup) while small areas of the development footprint are underlain by Jurassic dolerite (Jd, red). The PalaeoMap of the South African Heritage Resources Information System indicates that the Palaeontological Sensitivity of the Jurassic Dolerite is Zero as it is igneous in origin and thus unfossiliferous while that of the Adelaide Subgroup is Very High (Almond and Pether, 2009; Almond et al., 2013).

The Jurassic dolerite present in the development form part of the Karoo Igneous Province is one of the worlds classic continental flood basalt (CFB) provinces. This Suite was formed approximately 183 million years ago and consists of intrusive and extrusive rocks that occur over a large area (Duncan *et al*., 2006). Generally, the flood basalts do not contribute to prominent volcanic structures but instead are formed by successive eruptions from a set of fissures that form sub-horizontal lava flows (sills and dikes) varying in thickness. This lava caps the landscape on which they erupted. As the Karoo is an old flood basalt province it is today preserved as erosional fragments of a more extensive lava cap that covered much of southern Africa in the geological past. It is estimated that the Karoo lava outcrop currently covering at least 140 000 km^2, was larger in the past [~2 000 000 km^2 (Cox 1970, 1972)].

The proposed development is underlain by a series of Karoo sandstones, mudstones, and shales, deposited under fluvial environments of the Adelaide Subgroup that forms part of the Beaufort Group. The Beaufort Group is the third of the main subdivisions of the Karoo Supergroup. The Beaufort group overlays the Ecca Group and consists essentially of sandstones and shales, deposited in the Karoo Basin from the Middle Permian to the early part of the Middle Triassic periods and was deposited on land through alluvial processes. The Beaufort Group covers a total land surface area of approximately 200 000 km^2 in South Africa and is the first fully continental sequence in the Karoo Supergroup and is divided into the Adelaide subgroup and the overlying Tarkastad subgroup. The Adelaide Subgroup contains alternating greyish-red, bluish-grey, or greenish grey mudrocks in the southern and central parts of the Karoo Basin with very fine to medium-grained, grey lithofeldspathic sandstones.

A detailed description of the geology of the study area is provided in the Palaeontological Impact Assessment (Appendix D.3) of this BA Report.

B.2.3 Topography and Landscape

The broader area surrounding the proposed Padloper PV and EGI Clusters is largely characterised by a mix of flat to undulating and hilly terrain with distinctive koppies and hills in evidence while several pans dot the larger landscape. The terrain drops relatively steeply towards the valleys associated with the Snyderkraal and Buffels Rivers in the west and south respectively. Steep slopes also mark the divide between the central sector of the site and the higher lying, more mountainous areas that dominate the north- east. The elevation of the site ranges between about 1260 and 1445 m above mean sea level (mamsl). Higher lying areas are characterised by intrusions and lower lying areas by drainage channels infilled with quaternary sediments, i.e., ephemeral river beds.

[9] Central Karoo District Municipality Spatial Development Framework (Draft), Western Cape Department of Environmental Affairs, and Development Planning (DEA&DP), 2019

The Geotechnical Assessment (Appendix D.10) described the topography in the region in terms of development based on classes suggested by Stiff *et al*. (1996). According to this classification, majority of the region is classified as “most favourable” and “intermediate” due to the generally flat nature of the site. A portion along the western boundary of proposed Padloper PV 5 footprint is classified as least favourable due to a large topographical feature along this boundary. The PV site itself lies on a very flat plateau. Aside from flat rock exposures on the surface, rock outcrops tend to be present only around the margins of the plateau where they form a small scarp (Figure B.2). The substrate is a mixture of sand and gravel, with low vegetation. The powerline traverses a shallow, silty valley.

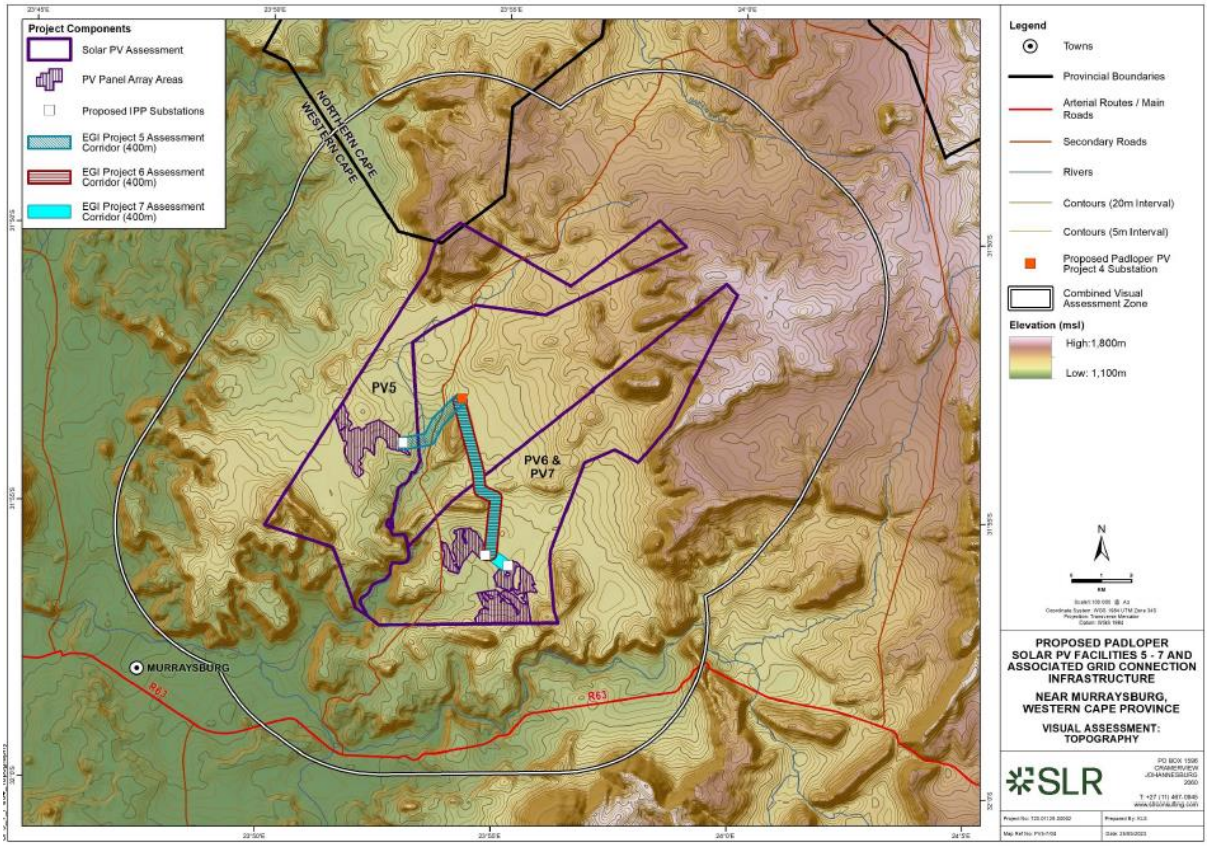

Figure B.2. Topography of the general study area for the proposed (Schwartz, 2023).

Detailed descriptions of the topography and landscape are provided in the Specialist Assessments included in Appendix D of this BA Report.

B.2.4 Agriculture and Soils

The land type classification denotes areas that display a marked degree of uniformity with respect to terrain form, soil pattern and climate. A terrain unit within a land type is any part of the land surface with homogeneous form and slope.

The proposed project falls within the Fc131 and Ib126 units. The Fc and Ib land types typically comprise of the following dominant soil types; Mispah, Valsrivier, Hutton, Rock outcrops. These soils predominantly very shallow, medium textured soils on underlying weathered bedrock.

Soils with limited depth have insufficient moisture capacity to reliably carry a crop through the season. The cropping potential of the area is completely limited by the combination of climate (arid climate with low moisture availability) and soil constraints (limited soil depth) so that it is totally unsuitable for rain-fed crop production. The very low agricultural potential of the facility footprints limits its viable agricultural use to grazing only. The land use on the site and immediate surrounds is mostly grazing. The land has a long-term grazing capacity of 20 -22 hectares per large stock unit.

Refer to the Agriculture Compliance Statement (Appendix D.1 of the BA Report) for additional information.

B.2.5 Geohydrology

According to DWAF (2002), the proposed project site is underlain by a fractured aquifer (i.e., an aquifer in which groundwater flows in joints, fissures, cracks and fractures within the rock (Figure B.4). The aquifer is classified as having an average yield potential of 0.5 – 2.0 litres per second (L/s). Based on the DWAF (2002) mapping of the regional groundwater quality, the electrical conductivity (EC) of the groundwater in the area generally ranges between 70 and 300 milli-Siemens per metre (mS/m). This is considered “moderate” groundwater quality, with respect to drinking water standards.

Both these classifications are based on regional datasets, and therefore, only provide an indication of the possible/likely conditions. Groundwater in the area is generally considered as being of moderate quality and boreholes have a low yield (Figure B.4).

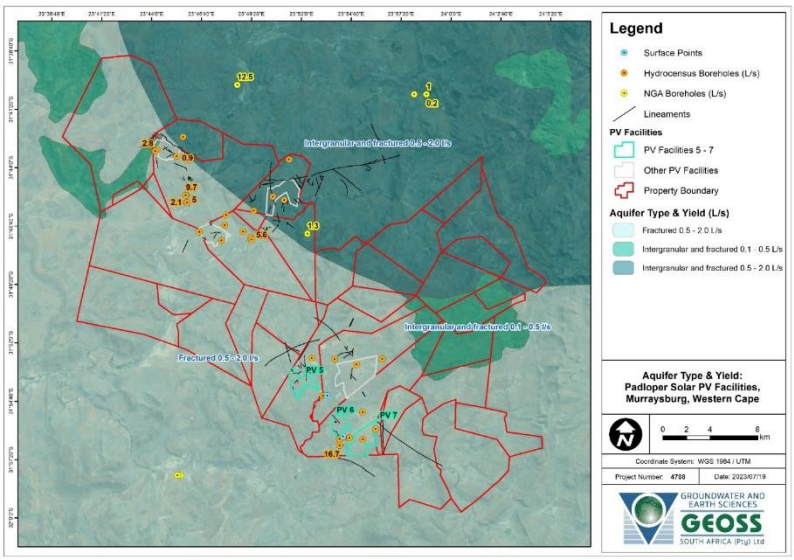

Figure B.3. Regional aquifer yield (DWAF, 2002) and borehole yields (L/s).

Based on the DWAF (2002) mapping of the regional groundwater quality, the electrical conductivity§ (EC) of the groundwater in the area ranges between 70 and 300 milli-Siemens per metre** (mS/m). This is considered “marginal” groundwater quality (Figure B.4), with respect to drinking water standards. Both these classifications are based on regional datasets, and therefore, only provide an indication of the possible/likely conditions. Groundwater in the area is generally considered as being of marginal quality and boreholes have a low yield.

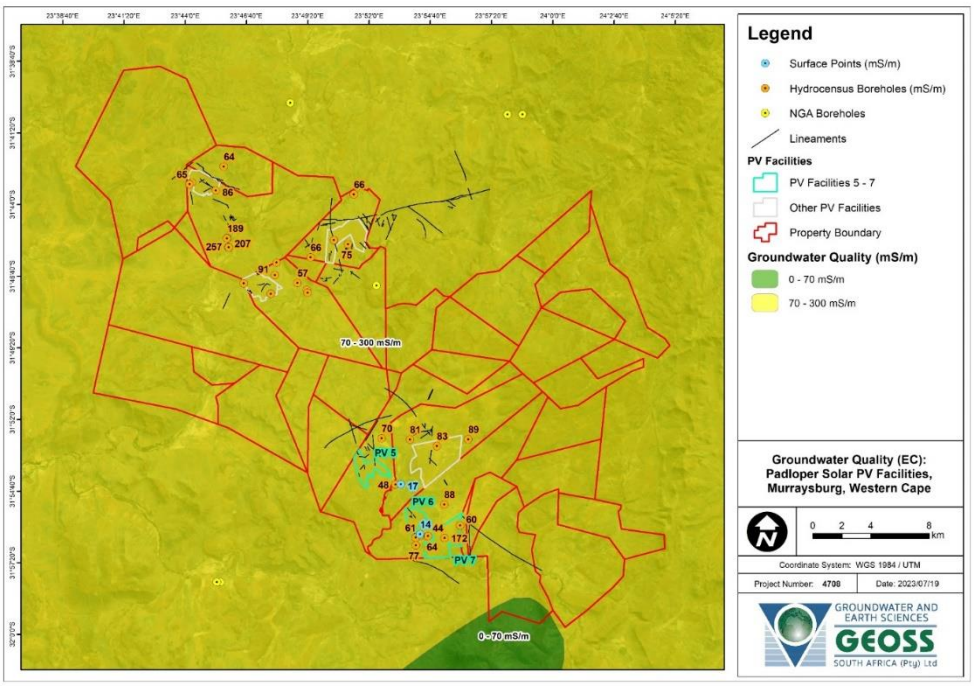

Figure B.4. Regional groundwater quality (mS/m) from DWAF (2002) and borehole groundwater quality (EC in mS/m).

The Geohydrology Assessment (Appendix D.9 of the BA Report) included an assessment of the study area to determine if there are any groundwater users in the area. The National Groundwater Archive (NGA) database provides data on borehole positions, groundwater chemistry and yield, where available. The NGA search and the site investigation concluded that 36 boreholes exist, of which at the time of the investigation, 10 were equipped with functioning windpumps, 8 with submersible pumps (5 Solar PV powered), one that was closed, and least 17 boreholes with no equipment.

Based on the information collected from the NGA database, the following can be said:

- Water levels of the boreholes in the region are shown to range between 3.0 m and 19.15 mbgl, with a mean depth of 7.91 mbgl.
- The pH of the groundwater in the area ranges between 7.2 and 7.4, with a mean pH of 7.3.
- Borehole depths in the area range between 19.2 m and 84.8 m, with a mean depth of 47.5 m.
- Few yield values are available for the area, presumably since water is mostly used for watering of livestock (often <31 563 m3/a). The available yield data has a range of 0.17 L/s and 12.5 L/s, with an average yield of 3.7 L/s.

Figure B.5 below shows the number of boreholes in the vicinity in terms of the NGA, WARMS and GEOSS database, as well as the additional boreholes identified in the study area.

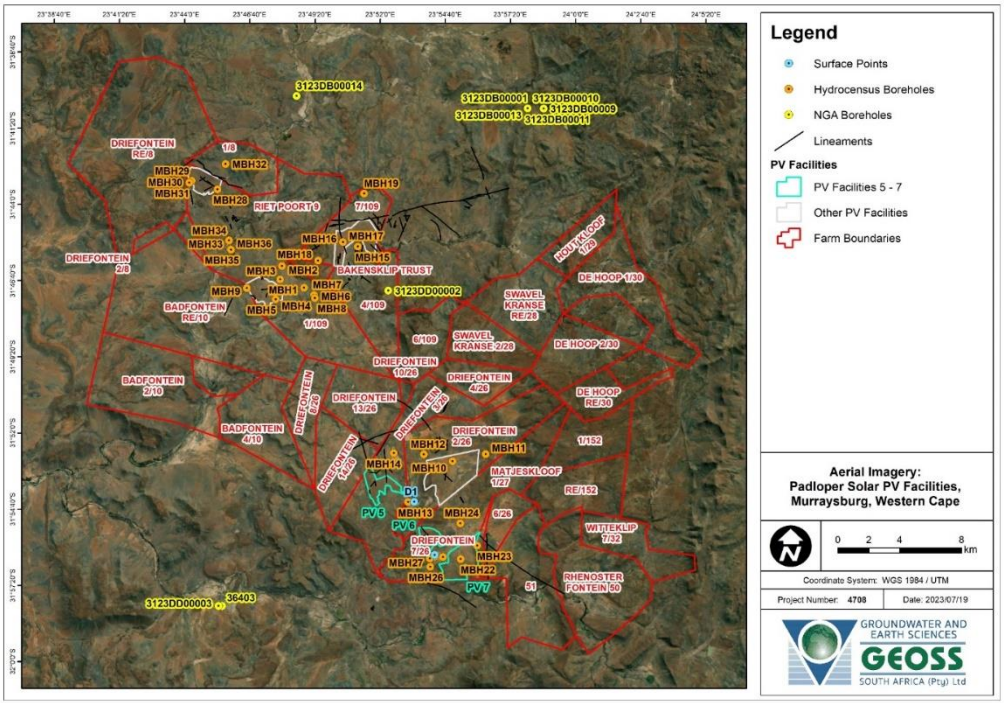

Figure B.5. Number of Boreholes in the vicinity of the proposed projects.

B.2.6 Strategic Water Source Areas

Strategic Water Source Areas (SWSAs) are defined as "areas of land that either: (a) supply a disproportionate (i.e. relatively large) quantity of mean annual surface water runoff in relation to their size and so are considered nationally important; or (b) have high groundwater recharge and where the groundwater forms a nationally important resource; or (c) areas that meet both criteria (a) and (b)" (Le Maitre *et al*., 2018:1 in DEFF, 2019: Page 61).

Thirty-seven groundwater SWSAs have been identified in South Africa and are considered to be strategically important at a national level for water and economic security (Le Maitre *et al*. 2018 in DEFF, 2019: Page 61). The total area for groundwater SWSAs extends approximately 104 000 km^2 and covers approximately 9% of the land surface of South Africa (Le Maitre *et al*. 2018, in DEFF 2019: Page 61).

There are no SWSAs within the proposed project site. The closest surface water SWSA is located over 100 km to the south-west, while the nearest groundwater SWSA is situated about 19 km to the east (SANBI, 2017).

B.2.7 Aquatic Biodiversity

Various resources, such as, but not limited to, the SANBI BGIS and National Fresh Water Priority Areas (NFEPA), have been used to define the regional vegetation, water resources, fauna and anticipated ecological sensitivity of the study area. A literature review of existing reports, scientific studies, databases, reference works, guidelines and legislation relevant to the study area was conducted to establish the baseline ecological and vegetative condition of the site and associated environment. Details pertaining to the aquatic environment are provided in the Aquatic Biodiversity and Species Assessment (Appendix D.5 of this BA Report). The information provided in this section is based on Colloty (2023).

B.2.7.1 General context

The National Wetland Inventory (van Deventer *et al*., 2018), National Freshwater Ecosystems Priority Atlas (Nel *et al*. 2011), which is included into the National Biodiversity Assessment (SANBI, 2018), have indicated that several important riverine systems could occur within the greater region, i.e., riverine reaches associated with the Synderkraal River catchment.

Furthermore, these spatial databases indicated that some of these systems are perennial but having assessed and or travelled through the region for several years, all of the system would be considered non-perennial or ephemeral.

The proposed project is located in the L21D and L21E (Buffels River) Quinary Catchments of the Drought Corridor Ecoregion in the Mzimvubu-Tsitsikamma Water Management Area (Gqeberha Regional Office).

The vegetation type characterizing the study area is Upper Karoo Hardeveld and Eastern Upper Karoo (Mucina & Rutherford, 2006; SANBI, 2022). Sour grass and fynbos are present in the mountains while karooveld is typical in most of the region. Shrubs and Acasia karoo (thorn trees) are present along watercourses. The Upper Karoo Hardeveld vegetation consist of “Steep slopes of Koppies, butts, mesas and parts of the Great Escarpment covered with large boulders and stones supporting sparse dwarf Karoo scrub with drought-tolerant grasses of genera such as Aristida, Eragrostis and Stipagrostis” (Mucina & Rutherford, 2006). The Eastern Upper Karoo vegetation is characterised by “Flats and gently sloping plains (interspersed with hills and rocky areas of Upper Karoo Hardeveld in the west, Besemkaree Koppies Shrubland in the northeast and Tarkastad Montane Shrubland in the southeast), dominated by dwarf microphyllous shrubs, with ‘white’ grasses of the genera Aristida and Eragrostis (these become prominent especially in the early autumn months after good summer rains). The grass cover increases along a gradient from southwest to northeast” (Mucina & Rutherford, 2006; SANBI, 2022).

B.2.7.2 Biodiversity Conservation Planning

Critical Biodiversity Areas and Ecological Support Areas

Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) are indicated in terms of the Western Cape Biodiversity Spatial Plan (WCBSP) (2017). This preliminary data provided by the WCBSP is the product of a systematic biodiversity planning assessment which identifies portions of land that require safeguarding to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services, across terrestrial and aquatic realms (CapeNature, 2017). These spatial priorities are used to inform sustainable development in the Western Cape Province.

In addition to the above, CBAs and ESAs are separated further into CBA 1 and 2 as well as ESA 1 and 2, respectively. It is important to note that CBA 1 show areas in a natural condition and those that are potentially degraded or represent secondary vegetation are considered to be CBA 2. Similarly, a distinction is made between ESAs that are likely to be functional (i.e., in a natural, near-natural or moderately degraded condition – ESA 1), and ESAs that are likely severely degraded or have no natural cover remaining and therefore require restoration where feasible i.e., ESA 2. The ESAs are not considered essential from a conservation perspective for meeting biodiversity targets; however, they may offer some ecological services.

Other Natural Areas (ONAs) have not been identified as a priority but retain most of their natural character and perform a range of biodiversity and ecological infrastructure functions. Land use

guidelines for Terrestrial ONAs are not required to meet biodiversity targets. ONAs represent the largest area in the region and form a matrix within which the CBAs and ESAs occur.

The site and grid connection corridor were earmarked as having potential CBA 1, ESA 1 and FEPA catchments associated with the main stem rivers within the region. Based on the site observation, the habitat associated with these areas, or habitat functions (important catchments and or water courses were then mapped to a fine scale level as thus indicated as No-go (Very High) for the site. The proposed layout has thus avoided these areas.

This BA Report has considered the impact of the proposed projects on CBAs and ESAs.

Freshwater Ecosystem Priority Areas

Freshwater Ecosystem Priority Areas (FEPAs) are priority areas for conserving freshwater ecosystems and supporting sustainable use of water resources and upstream management areas. The National Freshwater Ecosystem Priority Area (NFEPA) maps indicated that the proposed power line corridor traverses' catchments associated with the main stem rivers. The data further indicates no wetlands are located within the site. As noted above, important catchments and or water courses were then mapped to a fine scale level and are avoided by the site layout.

Critically Endangered and Threatened Ecosystems

The study area is not located within an International Bird Area (IBA) or a Strategic Water Resource Area and did not contain any Wetland Clusters or listed Threatened Ecosystems.

B.2.7.3 Aquatic Ecosystems

The National Wetland Inventory (van Deventer *et al*., 2018), National Freshwater Ecosystems Priority Atlas (Nel *et al*. 2011), which is included into the National Biodiversity Assessment (SANBI, 2018), have indicated that several important riverine systems could occur within the greater region, i.e., riverine reaches associated with the Synderkraal River catchment. Furthermore, these spatial databases indicated that some of these systems are perennial but having assessed and or travelled through the region for several years, all of the system would be considered non-perennial or ephemeral.

Current waterbody inventories (van Deventer *et al*., 2020), 1: 50 000 topocadastral surveys mapping indicated the potential for several wetlands within the greater study region. These inventories include wetland spatial data based on landcover 2007 data, previous assessments and wetland information retained by the Provincial authorities, combined into one database that formed part of the updated National Spatial Biodiversity Assessment, 2018.

The aquatic features within the study area are all mostly in a largely natural (B Category) ecological condition and are considered High in terms of Ecological Sensitivity and Low in terms of Ecological Importance respectively. Based on the information collected during the field investigations, these ratings are verified and upheld for the riverine systems. The High Ecological Sensitivity rating for the natural water sources, is further substantiated by the fact that some of the affected catchments are included in both the National Freshwater Priority Atlas and the respective provincial Biodiversity Spatial Plan CBA spatial layers.

Based on the information collected during the field investigations, these ratings are verified and upheld for the riverine systems. The High Ecological Sensitivity rating for the natural water sources, is further

substantiated by the fact that some of the affected catchments are included in both the National Freshwater Priority Atlas and the respective provincial Biodiversity Spatial Plan Critical Biodiversity Areas (CBA) spatial layers.

B.2.7.4 Aquatic Species

Coupled to the aquatic delineations, information was collected on potential species that could occur within the wetlands and water courses, especially any areas that would contain open water for long periods and or conservation worthy species (Listed or Protected). Refer to the detailed Aquatic and Species Assessment for the lists of plant and animal species that could occur in the study area. It must be noted that none of the dominant riparian / wetland associated plant species observed are listed or protected under any form of legislation.

Amphibian species are known to occur within the region based on collection data for the region, but little is known of the actual distribution of frogs within the study area. Therefore, based on mapping data contained in Minter *et al*. (2004) and the FrogMAP spatial database, the assessment notes that 7 frog species, with the Conservation Status of 'Least concern' could potentially occur in the study area. Three of these seven species were observed during this assessment.

B.2.7.5 Screening Tool Descriptions and Site Verifications

Figure B.6 and B.7 below presents the information from the Screening Tool for the Aquatic Biodiversity Combined Sensitivity for the proposed project.

Evident from this data is that much of the area under consideration is considered to be of low sensitivity in terms of the aquatic biodiversity prevalent in the region. The data does however indicate "very high" sensitivity. Features rated as 'very high' sensitivity for the proposed Padloper PV 5 included ESA 1 and the presence of a FEPA catchment. Features rated as 'very high' sensitivity for the proposed Padloper EGI 5 included CBA 1, ESA1 and the river with a condition score of AB.

The site and grid connection corridor were earmarked as having potential CBA 1, ESA 1 and FEPA catchments associated with the main stem rivers within the region. These were rated as Very High sensitivity in the screening tool results. Based on the site observation, the habitat associated with these areas, or habitat functions (important catchments and or water courses were then mapped to a fine scale level as thus indicated as No-go (Very High) for the site. The proposed layout has thus avoided these areas.

In summary, the Very High Sensitivity habitats / areas were confirmed for this project, with the project footprint being located within the remaining Low sensitivity areas.

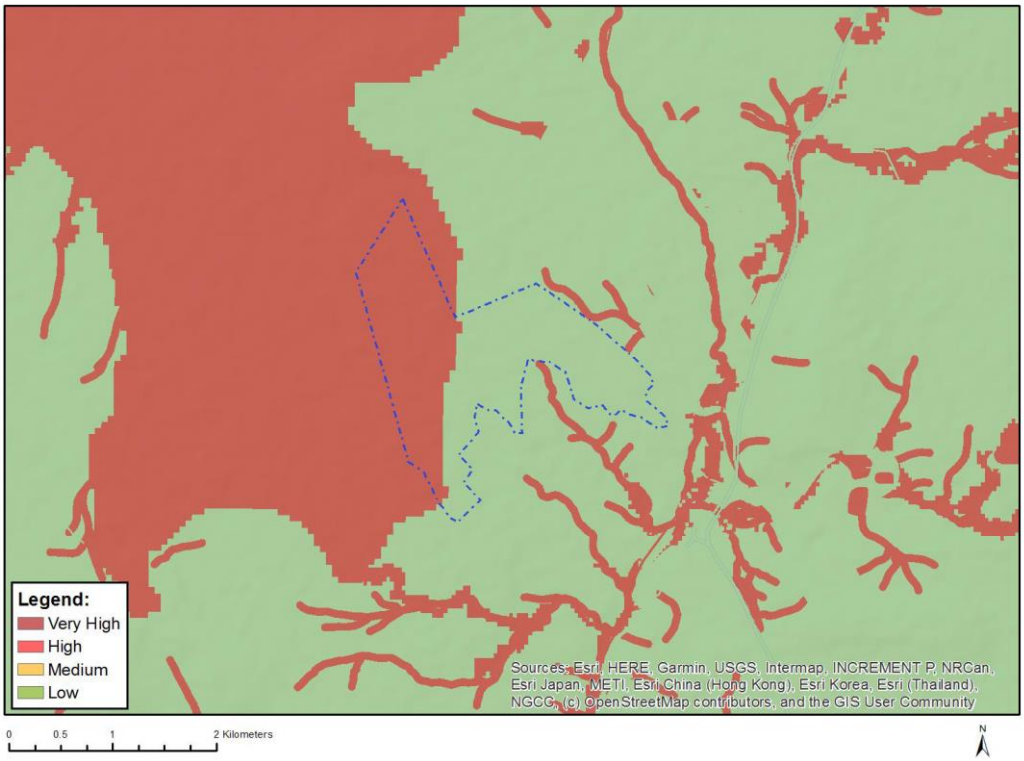

Figure B.6. Map depicting Aquatic Biodiversity Combined Sensitivity in and around proposed Padloper PV 5 project (Source DFFE Screening Tool, 2023).

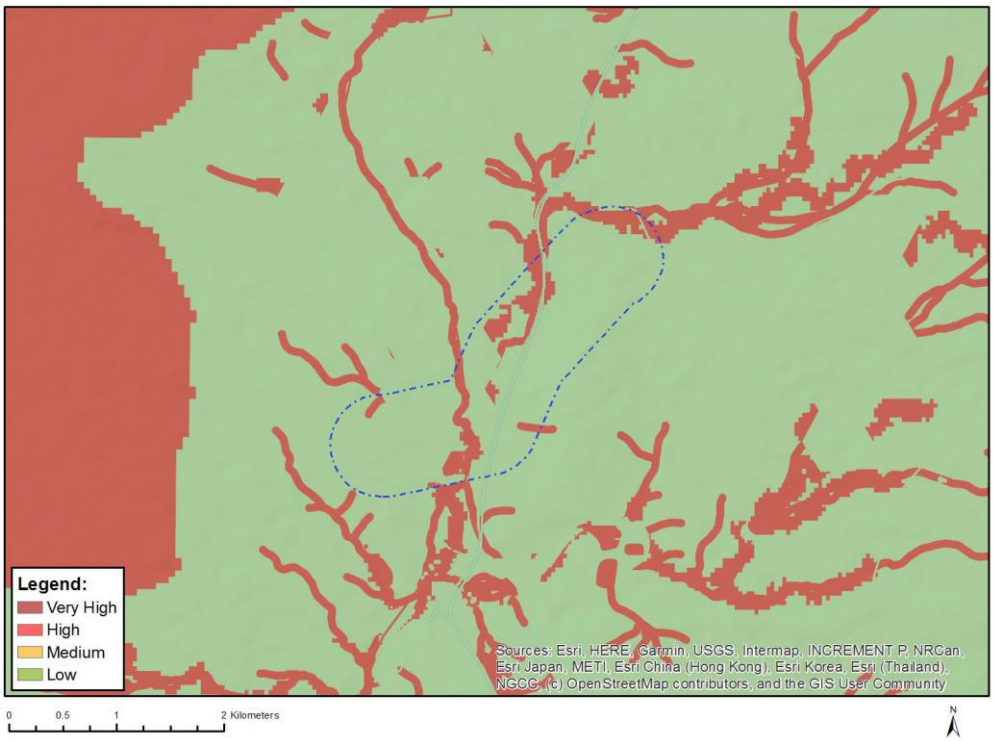

Figure B.7. Map depicting Aquatic Biodiversity Combined Sensitivity in and around the proposed Padloper EGI 5 corridor (Source DFFE Screening Tool, 2023).

B.2.8 Terrestrial Biodiversity

Various resources, such as, but not limited to, the SANBI BGIS and aerial imagery, have been used to define the regional vegetation, water resources, fauna and anticipated ecological sensitivity of the study area. A literature review of existing reports, scientific studies, databases, reference works, guidelines and legislation relevant to the study area was conducted to establish the baseline ecological and vegetative condition of the site and associated environment. Details pertaining to the terrestrial environment are provided in the Terrestrial Biodiversity and Species Assessment (Appendix D.4 of this BA Report). The information provided in this section is based on Colloty (2023).

B.2.8.1 General Context

Refer to Section B.8.1 above for information on the general context of the site from an ecological perspective.

B.2.8.2 Biodiversity Conservation Planning

Refer to Section B.8.2 above for information on the biodiversity conservation planning of the site from an ecological perspective.

B.2.8.3 Terrestrial Ecosystems

The study area falls within the Nama-Karoo Biome and Upper Karoo Bioregion. According the Mucina and Rutherford (2006) and the updated Vegetation Map of South Africa released by SANBI in 2018 (NBA, 2018 beta version 2019), the project areas are located within the Eastern Upper Karoo (NKu 4) vegetation type (Figure B.8). The vegetation unit, which is largely uniform in species composition and species abundance throughout site is listed as Least Concern with regard Conservation Status.

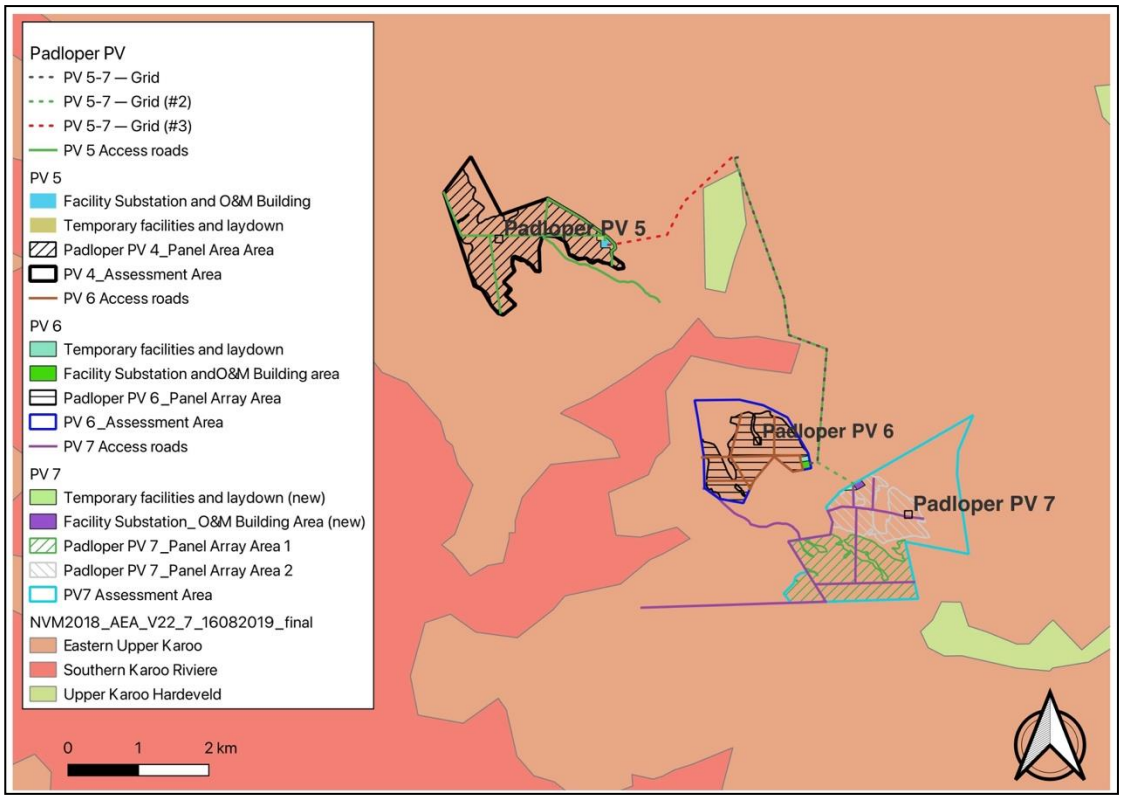

Figure B.8. The vegetation units as shown in NBA 2018 vegetation map spatial data (VEGMAP).

B.2.8.4 Ecological Processes, Functioning and Drivers

The grasslands within the greater region are typically fire and or frost driven, which keeps these areas from becoming woody tree dominated. Currently little occurs in terms of habitat fragmentation, except for naturally occurring ridges and outcrops mentioned above, however these areas provide certain microclimates for unique species, most listed or protected. This is also largely since the rocky areas also protect these species from the fires and frost, thus providing them with opportunities to develop / survive.

These habitats or corridors associated with these habitats have been mapped as 'no-go' areas as they provide habitat variability and unique species assemblages when compared to the grassland areas.

B.2.8.5 Terrestrial Species

As noted above, the vegetation within the study site is largely uniform in species diversity and plant cover (i.e., only dominated by a small number of grass and herb species) and in a fair condition. The detailed Terrestrial Ecology and Species assessment noted that this is possibly due to the higher-than-normal rainfall, that has occurred within the region over the past two years.

Grass cover (abundance) was more dominant than usually recorded within the region, however an increase in forb and geophytic species was not noted when compared to past surveys conducted by the specialist in the region. The only change is overall species richness / diversity, i.e., and increase in species complexity was observed along ridgelines, rocky outcrops and koppies, while the remaining portions of the site was species poor. The field surveys focused on identifying dominant flora species,

main habitat types as well as the actual and potential presence of Species of Conservation Concern (SCC) (either classified as Threatened by the International Union for Conservation of Nature (IUCN) (2022), protected by the National Environmental Management: Biodiversity Act (NEM:BA) (2007, as amended) or other legislation applicable provincially or nationally).

The following are fauna species that potentially occur within the study area and are listed as protected species (species indicated in **bold** text below were observed within the study sites during the field visit):

Schedule 1: Specially Protected Fauna as per the Western Cape Nature Conservation Ordinance (Ordinance No. 3 of 2000)

- *Felis nigripes* - Black-footed cat / Miershooptier
- *Felis silvestris* - African wild cat / Afrika wildekat
- *Ictonyx striatus* - Striped polecat / Stinkmuishond
- *Mellivora capensis* - Honey badger / Ratel
- ***Otocyon megalotis* - Bat-eared fox / Bakoorvos**
- *Proteles cristatus* – Aardwolf / Maanhaarjakkals
- *Vulpes chama* - Cape fox / Silver jackal Silwervos
- *Orycteropus afer* - Aardvark / Ant-bear Erdvark / Aardvark
- Atelerix frontalis – South African hedgehog
- Family: Chamaeleonidae - Chamaeleons, all species
- **Family: *Cordylidae* Girdled lizards, all species**

B.2.8.6 Key Landscape Features

Refer to Section B.8.1 above for information on the general context of the site from an ecological perspective including landscape features.

B.2.8.7 Screening Tool Descriptions and Site Verification

Figures B.9 to B.14 below indicate the results of the Screening Tool in terms of terrestrial plant species, terrestrial animal species, and the terrestrial biodiversity combined sensitivity, respectively, for the proposed project.

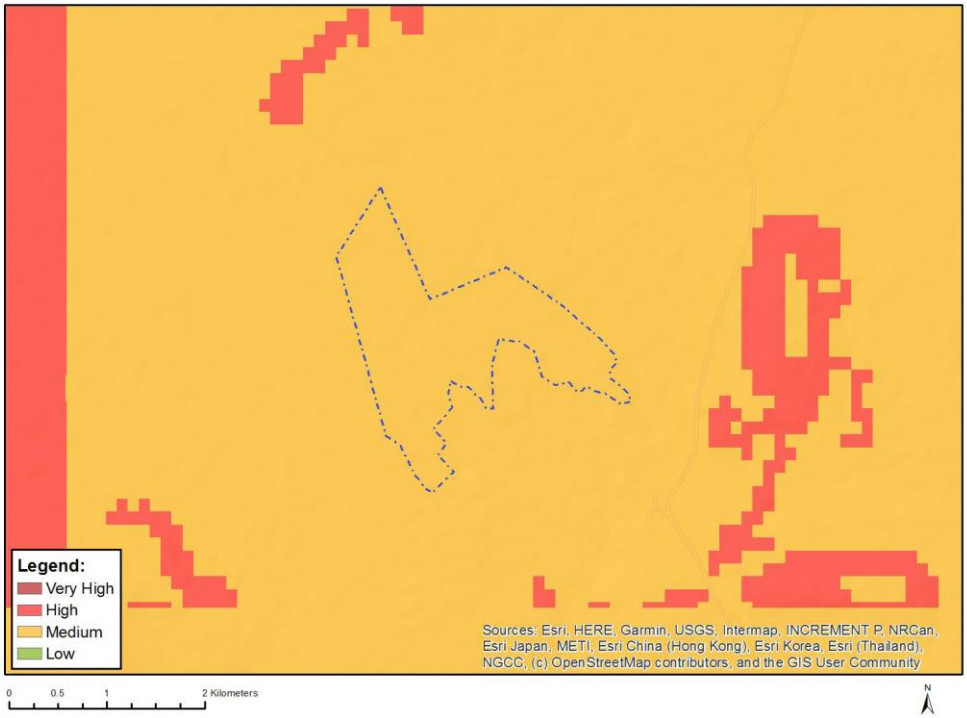

Figure B.9. Map indicating Terrestrial Animal Species sensitivity for the proposed Padloper PV 5 study area and surrounds. (Source: DFFE Screening Tool, 2023).

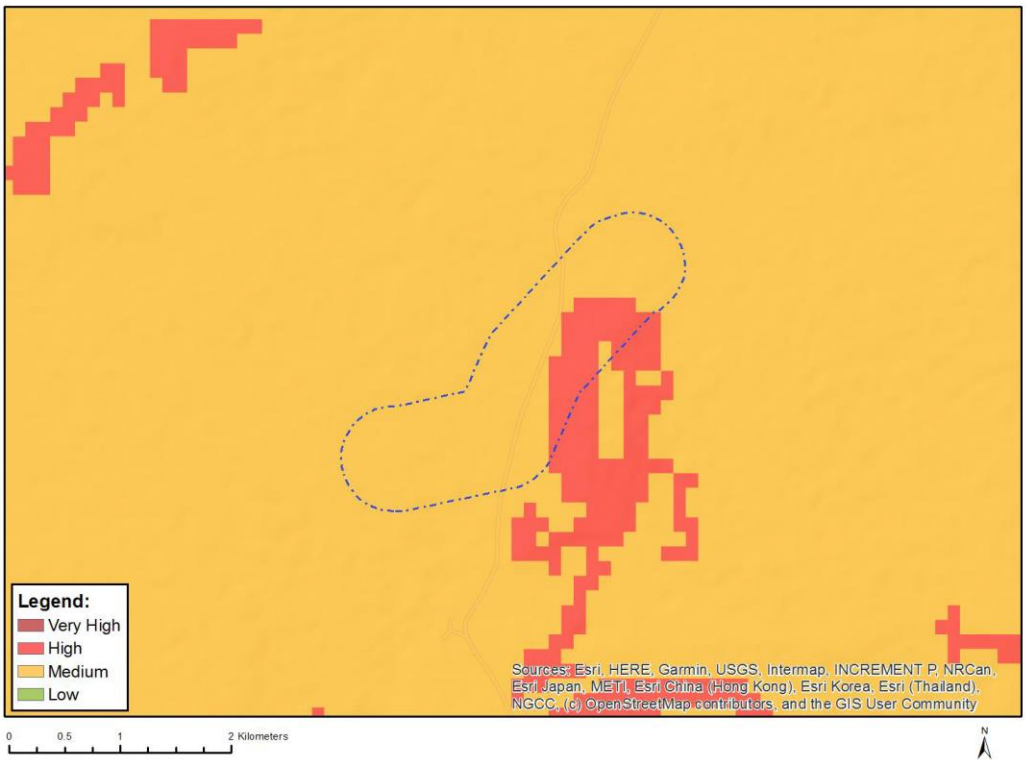

Figure B.10. Map indicating Terrestrial Animal Species sensitivity for the proposed Padloper EGI 5 corridor and surrounds (Source: DFFE Screening Tool, 2023).

Figure B.11. Map indicating Terrestrial Plant Species sensitivity for the proposed Padloper PV 5 study area and surrounds. (Source: DFFE Screening Tool, 2023).

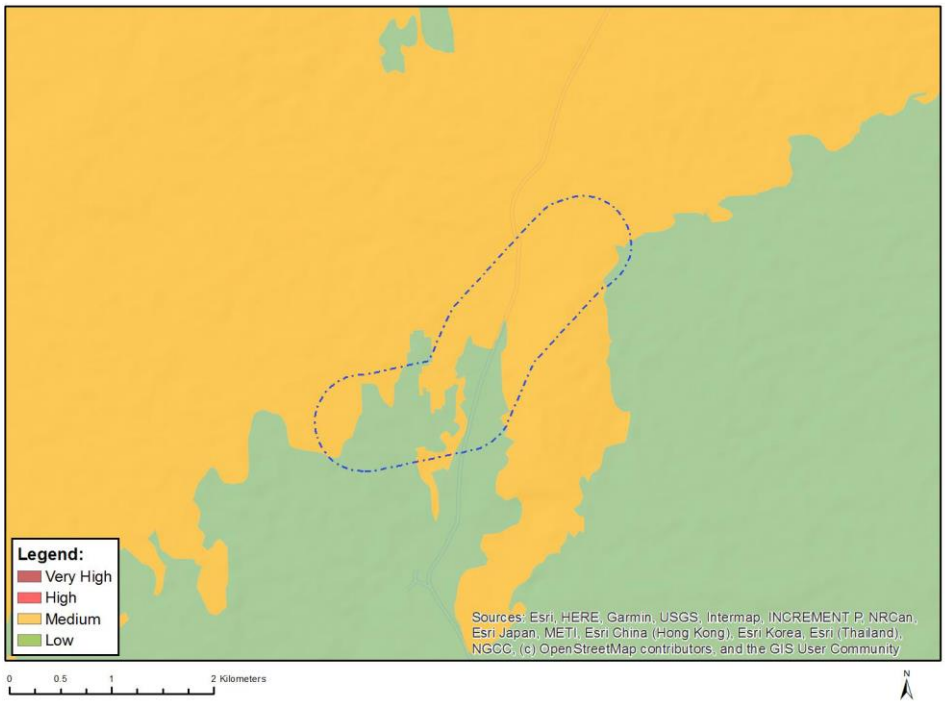

Figure B.12. Map indicating Terrestrial Plant Species sensitivity for the proposed Padloper EGI 5 corridor and surrounds. (Source: DFFE Screening Tool, 2023).

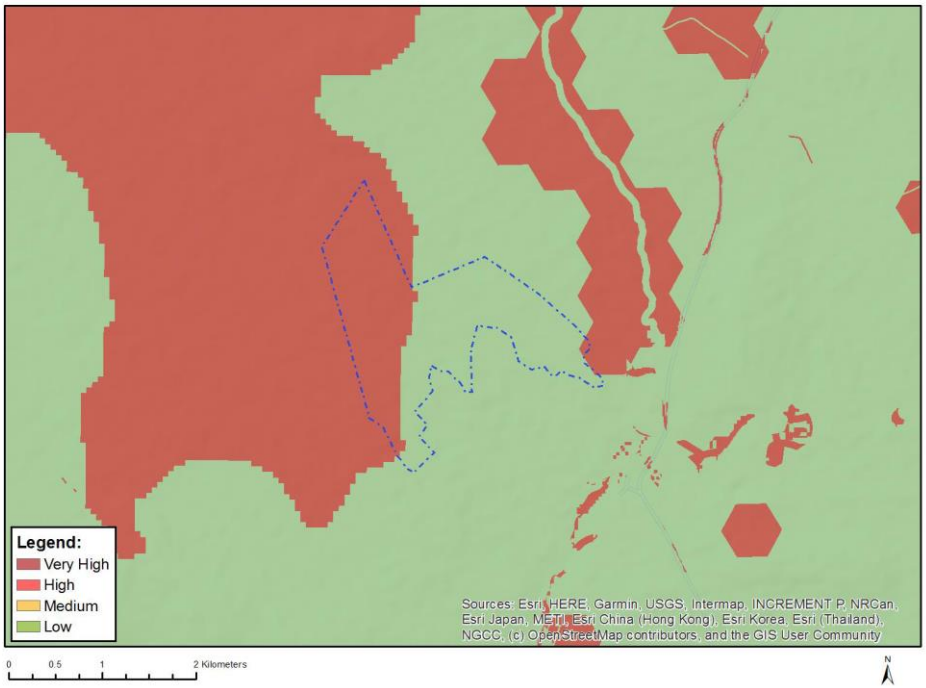

Figure B.13. Map indicating Terrestrial Biodiversity Combined sensitivity for the proposed Padloper PV 5 study area and surrounds. (Source: DFFE Screening Tool, 2023).

Figure B.14. Map indicating Terrestrial Biodiversity Combined sensitivity for the proposed Padloper EGI 5 corridor and surrounds. (Source: DFFE Screening Tool, 2023).

Based on the screening report generated, the Terrestrial Biodiversity Animal Species Sensitivity Theme for the PV facility component of the project (Figure B.9) is indicated as Medium due to the potential presence of Riverine Rabbit (*Bunolagus monticularis)*. The Terrestrial Biodiversity Animal Species Sensitivity Theme for the EGI component of the project (Figure B.10) is indicated as High sensitivity with majority of the corridor being rated as Medium due to the potential presence of Riverine Rabbit (*Bunolagus monticularis*) the high sensitivity due to the potential presence of Avifaunal species.

Based on the screening report generated, the Terrestrial Biodiversity Plant Species Sensitivity Theme for the PV facility component of the project (Figure B.11) is indicated as Medium due to the potential presence of *Hereoa concave*. The Terrestrial Biodiversity Plant Species Sensitivity Theme for the EGI component of the project (Figure B.12) is indicated as Medium sensitivity with portions of the corridor being rated as Low sensitivity. The medium sensitivity rating is allocated due to the potential presence of the *Hereoa convace*, Sensitive species 945, and *Anisodontea malvastroides*.

Based on the Screening Report generated, the Terrestrial Biodiversity Combined Sensitivity Theme for the PV facility component of the project (Figure B.13) is indicated as Very High due to the site being located in areas identified as CBA 1 and a FEPA catchment. The Terrestrial Biodiversity Combined Sensitivity Theme for the EGI component of the project (Figure B.14) is also indicated as Very high. The Very High rating is based on the corridor traversing areas identified as ESA 1 and CBA 1 Terrestrial.

Based on the above outcomes, the specialist confirmed with the environmental sensitivities identified within the site and grid corridor. The findings were informed by a detailed site visit, which allowed for fine scale mapping of any of the habitats or units identified in by the screening tool where applicable.

As noted above, the site and grid connection corridor were earmarked as having potential CBA 1, ESA 1 and FEPA catchments associated with the main stem rivers and or terrestrial environments within the region. These were rated as Very High or Medium sensitivity in the Screening Tool results. Based on the site observation, the habitat associated with these areas, or habitat functions (habitats for the sensitive plant and animal species listed, important catchments (FEPAs) and or water courses (ESAs) were then mapped to a fine scale level as thus indicated as No-go (Very High) for the site. The proposed layout has thus avoided these areas by either avoiding watercourses and or ridges (rocky outcrops and inselbergs). The latter habitats contain areas that are favoured by the plant species listed, while the riverine areas could contain habitat for Riverine Rabbit.

When compared to the results of the Screening Tool results in relation to the receiving environment, the proposed layout (PV areas and buildings) have avoided any areas that would be considered, as Very High sensitivity which have been avoided by either through complete avoidance or making use of already disturbed areas such as lands or roads/tracks.

B.2.9 Protected Areas

The closest Protected Area is the Mountain Zebra Camdeboo Protected Area located approximately 12 km to the east of the site (Figure B.15). No Protected Areas (PAs) occur within the development footprints, while a portion of the PV 5 site is located within a protected area expansion site for the Karoo Escarpment Grassland region.

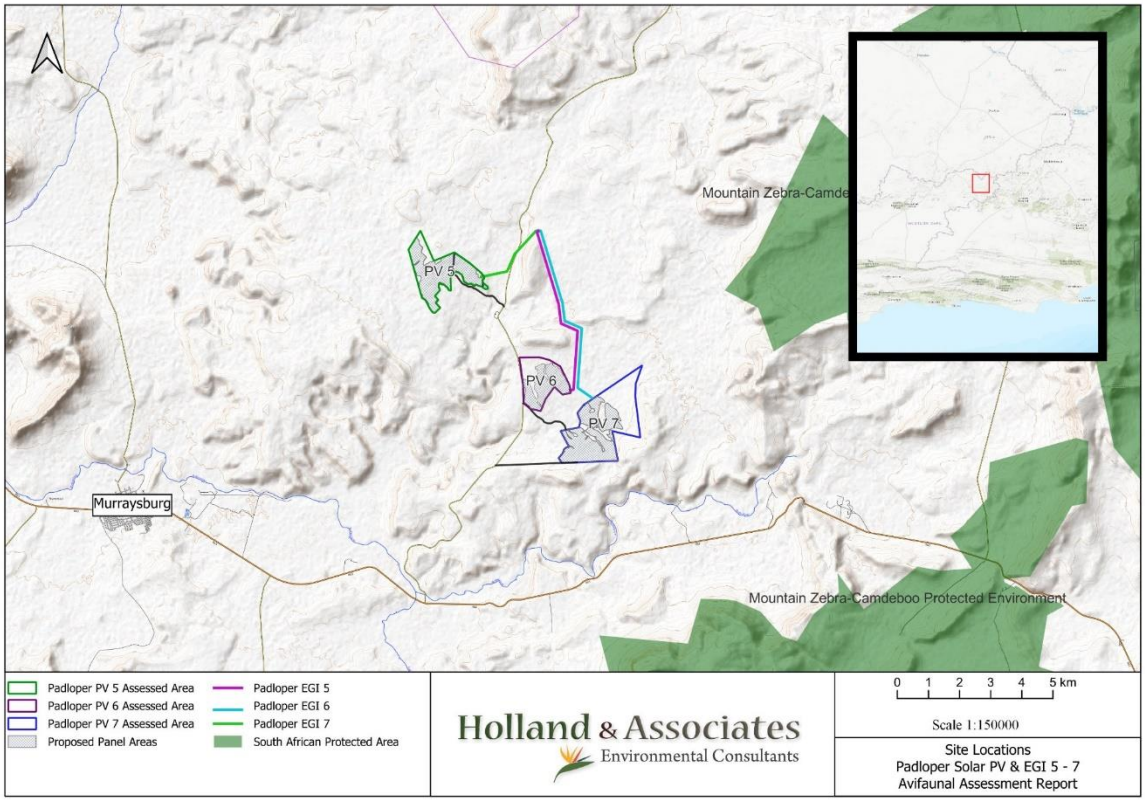

Figure B.15. Locality of the Project in relation to Protected Areas.

The study area also does not fall within any National Protected Areas Expansion Strategy (NPAES) areas.

B.2.10 Avifauna

A detailed description of the avifauna species encountered within the study area during the site monitoring, and the potential impact of the proposed project development on these bird species is provided in the Avifauna Impact Assessment (Appendix D.6 of this BA Report).

The Project Area of Influence (PAOI) is not located within any Protected or Important Bird Areas (IBA). The closest Important Bird Area to the projects is the Platberg-Karoo Conservancy located approximately 60 km north-east of the PAOI. The closest IBA is the Soetdoring Nature Reserve, which is about 30 km SE from the PAOI.

The Avifauna specialist conducted the first seasonal (summer) survey from 28 February to 8 March 2022. Following this initial survey, the proposed PV facilities comprising the Padloper PV and EGI cluster were reduced from eleven to seven sites for which a second (winter) survey was conducted

from 6 – 11 July 2022. A final monitoring report was submitted in August 2022, following the winter survey. An additional site survey of the grid connection routes was undertaken in September 2022 to survey areas not covered by avifaunal pre-application monitoring. The on-site surveys were conducted according to the best practice guidelines for avifaunal impact studies for solar developments, compiled by BirdLife South Africa (BLSA) in 2017 (Jenkins *et al.,* 2017).

The South African Bird Atlas Project 2 (SABAP2) has recorded 194 species, including 11 SCC within 19 pentads covering and adjacent to the study area, which potentially occur in the study area. During the summer and winter surveys a total of 107 species were recorded in the area, including six SCC and 15 endemic or near-endemic species. Further, walked transect results from the site and adjacent riverine area indicate a low average abundance of individuals (Index of Kilometric Abundance (IKA) = 19.5) and species (25 species) on the PV site, and a low average abundance (IKA 38.6) but high diversity (52 species) in the riverine area.

A Verreaux's Eagle nest was located during the pre-construction monitoring surveys east of the Padloper PV 5. A 1 km 'No-go' development buffer has been applied around this nest and is not infringed on by the proposed Padloper PV 5 project (Figure B.16).

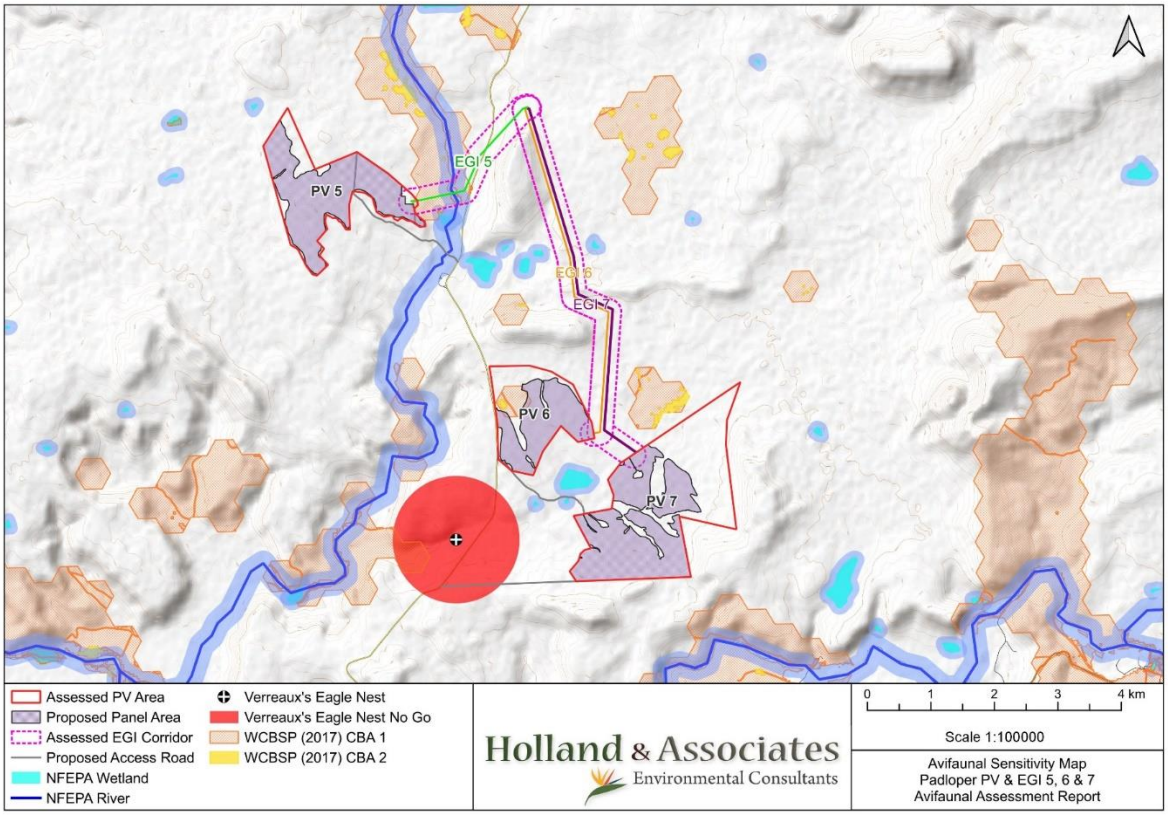

Figure B.16. Avifaunal sensitivities within the combined PAOI and surrounds.

The Avifaunal Assessment notes that six avifaunal habitat types were identified in the combined PAOI[10]: Karoo scrub, drainage lines and watercourses, rocky areas, dams and wetlands, cultivated lands and alien trees.

The Conservation Importance (CI) for karoo scrub, rocky areas, drainage lines and watercourses were determined as medium due to more than 50% of the receptor containing natural habitat with potential to support SCC. Dams and wetlands were rated as low CI for the assessment corridor as no confirmed or highly likely populations of SCC occur, and <50% of the receptor contains natural habitat that can support SCC. Alien trees and cultivated lands were rated as medium, due to the record of a Martial Eagle and occurrence of Blue Crane which are listed as Endangered and Near-threatened under Criterion A only with more than 10 locations and possibly more than 10 000 mature individuals.

The Functional Integrity of the karoo scrub, drainage line and watercourses, and rocky areas habitat has been rated as high as the vegetation is semi-intact and has been utilised for sheep grazing for decades, but there is high habitat connectivity, limited road networks, and no signs of major past disturbance such as ploughing apparent. Cultivated areas, dams and wetlands and alien trees were rated as low due to their small size or low rehabilitation potential.

The Receptor Resilience of the karoo scrub, drainage line and watercourse and rocky areas habitat has been rated as medium as a recovery to restore >75% of functionality is assumed to be slow, but possible with rehabilitation, over more than 10 years. It was rated as very low for dams and wetlands and cultivated areas, as these are artificial habitats that can be restored readily. It was rated as low as regrowing alien trees such as the willow trees on site providing nesting substrate would only recover slowly over more than 10 years.

The resulting Site Ecological Importance (SEI) rating was determined as medium for karoo scrub, drainage lines and watercourses, which means with minimisation and restoration mitigation development activities with medium impact are acceptable if followed by appropriate restoration activities. The Site Ecological Importance rating of Medium indicates that the site is potentially suitable for development if minimisation and restoration mitigation are implemented. Impacts of medium negative impact significance are acceptable, if followed by restoration activities (SANBI 2022).

The Avifauna specialist concluded that the proposed development site avoids all areas identified as of high sensitivity during pre-application monitoring and is considered the preferred alternative site from an avifaunal perspective. The access road follows an existing farm road over its entire length and is also considered the best alternative location from an avifaunal perspective. Due to the footprint of the proposed development, a loss of approximately 205 ha of potential SCC habitat is however unavoidable, and even with mitigation this impact is expected to be of medium negative significance for the SCCs that occur here (confirmed or high probability of occurrence). These are Blue Crane, Karoo Korhaan, Ludwig's Bustard, Lanner Falcon, Martial Eagle, and Verreaux's Eagle. However, due to these species having much surrounding equivalent habitat available, this loss of habitat is not deemed to have unacceptably high impacts on these species if the recommended mitigation measures are implemented.

[10] The Project Area of Influence (PAOI) was the footprints of the proposed development areas with a 2 km buffer around each PV site (i.e., PV 5-7) and EGI corridors. The combined PAOI is a 2 km buffer around the combined footprint of all three PV and three EGI projects (i.e., PV and EGI 5-7).

B.2.10.1 Screening Tool Descriptions and Site Verification

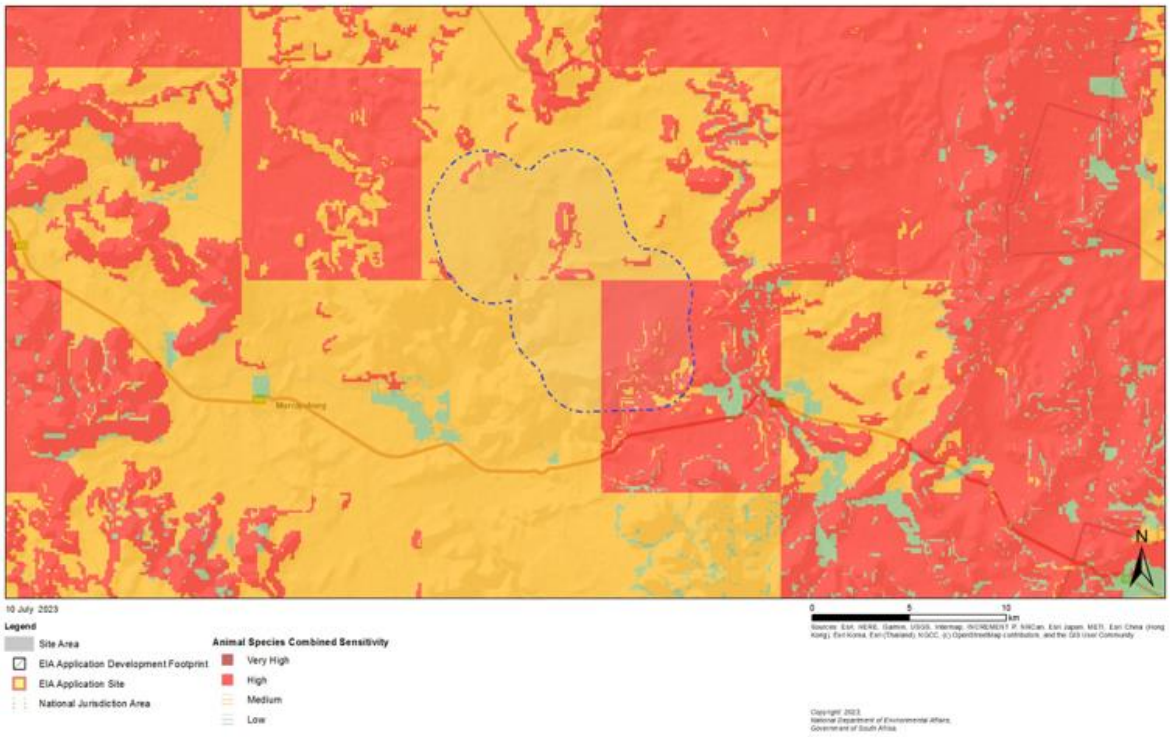

Figure B.17. Screening Tool outcomes of the relative animal species them for the combined PAOI[9].

A Screening Tool Report was run for the combined PAOI[11] was generated. The Screening Tool identified the site as of low sensitivity under the avian theme. It must however be noted that the National web-based Screening Tool contains little information for the avian theme in areas outside of Renewable Energy Development Zones and this is thus not a reliable indication of the potential sensitivity of the site from an avifaunal perspective.

The Screening Tool identified the PAOI as of high sensitivity for avian SCC *Aquila verreauxii* (Verreaux's Eagle) and *Neotis ludwigii* (Ludwig's Bustard) Figure B.17). Pre-construction avifaunal monitoring was conducted in the study area over a period of 9 days in March 2022, over 6 days in July 2022 and over 2 days in September 2022. The presence of Verreaux's Eagle (Vulnerable) was confirmed within the PAOI, with three active nests being found within the study area, more than 1 km outside of the proposed development footprint. Verreaux's Eagle are a territorial species with territories that surround their nests, which are not necessarily in the centre of their territory, with an estimated average home range size of 27.7. ± 14.5 km^2.

The presence of Ludwig's Bustard (Endangered) was also confirmed. In addition, the following SCC were confirmed within the PAOI that were not identified by the Screening Tool: Blue Crane (Near-threatened), Karoo Korhaan (Near-threatened), Secretarybird (Endangered) and Lanner Falcon (Vulnerable). The avifaunal specialist has been working in the study area on adjacent projects since 2014 and is also aware of a Martial Eagle (Endangered) nest located in the area. An immature Martial eagle was 0.

[11] The Project Area of Influence (PAOI) was the footprints of the proposed development areas with a 2 km buffer around each PV site (i.e., PV 5-7) and EGI corridors. The combined PAOI is a 2 km buffer around the combined footprint of all three PV and three EGI projects (i.e., PV and EGI 5-7).

Due to the mobile nature of avian species, it must be assumed by applying the precautionary principle, that all species identified in the combined PAOI for the Padloper PV and EGI development 5-7 could potentially occur or pass through each of the proposed seven Padloper Solar PV Facility and EGI sites.

Therefore, the results of the screening tool rating for avian species as of high sensitivity in terms of the Screening Tool classification are confirmed by the specialist for all six sites, due to the confirmed presence and high likely probability of occurrence for seven SCC, detailed above.

B.2.11 Visual Aspects and Sensitive Receptors

A detailed description of the landscape and sensitive receptors of the proposed project is provided in the Visual Impact Assessment (Appendix D.2 of this BA Report).

The visual assessment provides information on landscape, terrain and vegetation, as well as other aspects such as land use and sensitive receptors. As described in Section B.2.2 of this section, the landscape character of the proposed project and surrounds is flat to undulating and hilly terrain with distinctive koppies and hills. The terrain drops relatively steeply towards the valleys associated with the Snyderkraal and Buffels Rivers in the west and south respectively. Steep slopes also mark the divide between the central sector of the site and the higher lying, more mountainous areas that dominate the north- east.

According to the South African National Land Cover dataset (Geoterraimage 2020), much of the study area is classified as shrubland interspersed with small patches of grassland and forested (natural wooded) land. Larger tracts of grassland and forested land however occur along the main watercourses in the area and on the areas of higher elevation in the north-east of the study area. Vegetation cover across the study area is predominantly short and sparse and thus will not provide any significant visual screening. In some instances, however, tall exotic trees planted around farmhouses will restrict views from receptor locations.

As noted in Section B.2.4 above, agricultural activity in the area is restricted by the arid nature of the local climate and areas of cultivation are largely concentrated along the main watercourses in the study area. As such, the natural vegetation has been retained across much of the study area. Livestock (sheep) farming is also fairly common although farm properties are quite large and livestock densities are relatively low. In addition, the area has a very low density of rural settlement, with relatively few isolated farmsteads in evidence. Built form in much of the study area is limited to isolated farmsteads including farm worker's dwellings and ancillary farm buildings, gravel access roads, low voltage powerlines, telephone lines, fences, windmills and irrigation infrastructure.

The sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements.

The Visual Impact Assessment identified nine potentially sensitive visual receptor locations, within 5 km of the respective Solar Facility assessment areas (farm portions) and grid assessment corridors. One of the receptor locations identified, namely Salem Self-Catering was found to be linked to leisure-based (specifically nature-based) tourism and is therefore considered to be a sensitive receptor location. The remaining eight receptor locations are believed to be farmsteads which are regarded as potentially

sensitive visual receptors as the proposed development will likely alter natural or semi-natural vistas experienced from these locations.

In many cases, roads along which people travel, are regarded as sensitive receptors. The primary thoroughfare in the study area is the R63 Main Road, which traverses the southern sector of the combined study area. This route provides a major link between Graaf-Reinet in the East and the N1 National Route in the west. The section of this road traversing the study area is not considered part of a designated scenic route, although the route is an important link and is likely to be utilised, to some extent, by tourists en-route to other parts of the Western and Northern Cape. As a result, it is a potentially sensitive receptor road – i.e., a road being used by motorists who may object to the potential visual intrusion of the proposed SEF and EGI projects.

The secondary road traversing the study area in a north-south direction, along with the other minor thoroughfares in the area, are primarily used as a local access roads and are not specifically valued or utilised for their scenic or tourism potential. As such they are not regarded as visually sensitive.

The current visual sensitivity mapping undertaken in the Visual Impact Assessment is in greater detail at the site scale and takes into account detailed viewshed mapping and local site conditions, as indicated in Figure B.28.

B.2.11.1 Screening Tool Descriptions and Site Verification

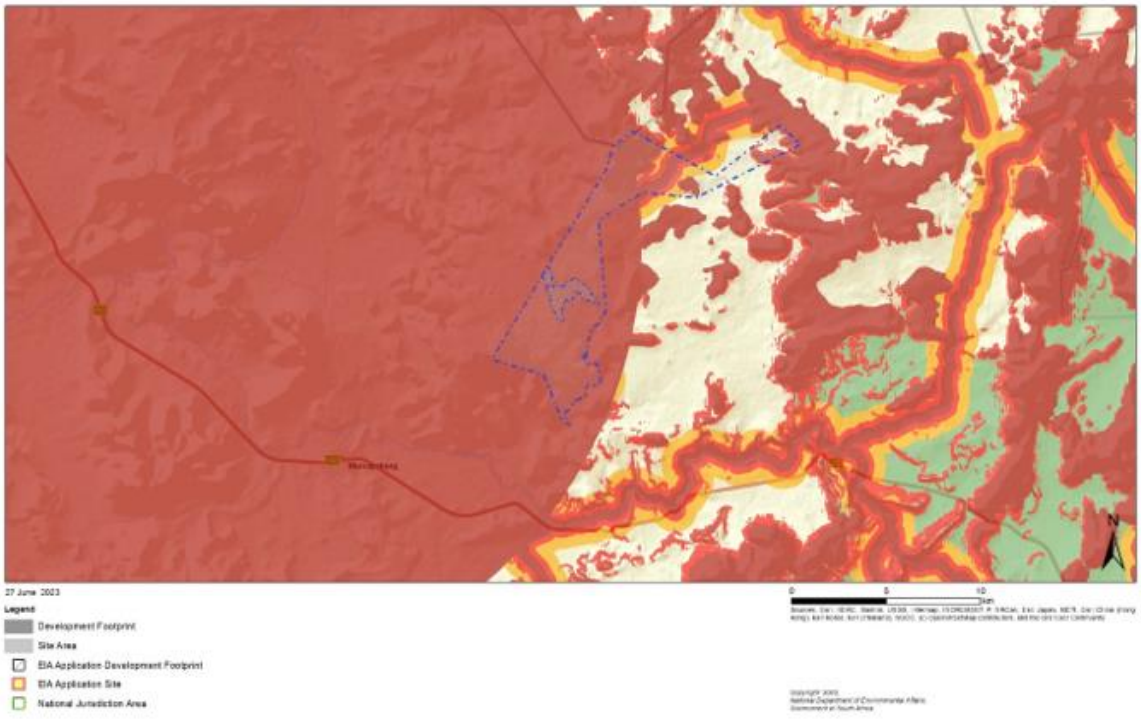

Figure B.18. Landscape (Solar) Combined Sensitivity as depicted on the Screening Tool (DFFE, 2023).

The Landscape Theme of the Screening Tool identifies areas of very high sensitivity in respect of solar PV development within the project area for Padloper Solar Facility 5 (Figure B.18). According to the Screening Tool, aside from some areas identified as mountain tops, high ridges and steep slopes, much of the site is within 20 km of a South African Large Telescope and this factor has resulted in areas of

"Very High" landscape sensitivity across almost all of the site, including the area identified for the PV Panel arrays.

The detailed visual assessment generated zones of potential visual sensitivity (Figure B.19). In addition to some scattered areas of higher elevation, the zones of potential visual sensitivity include a 500 m buffer around the three residences / farmhouses within 500 m of the farm portion boundary. Based on the findings of this assessment the specialist concluded that the PV Array Area for PV 5 has avoided these areas.

The assessment employed GIS-based visibility analysis, to determine which sectors of the grid assessment corridors would be visible to the highest numbers of receptors in the study area. This analysis considered all the sensitive and potentially sensitive receptor locations identified. However, due to the nature of the terrain and the fact that there are relatively few affected receptors, widely scattered across the area, the more visible sections of grid assessment corridors were not considered to be significantly sensitive. In addition, investigation determined that only one homestead is located within 500 m of any of the grid assessment corridors. This homestead is located within the project assessment area. As such, no specific areas of visual sensitivity were identified along the proposed route alignment.

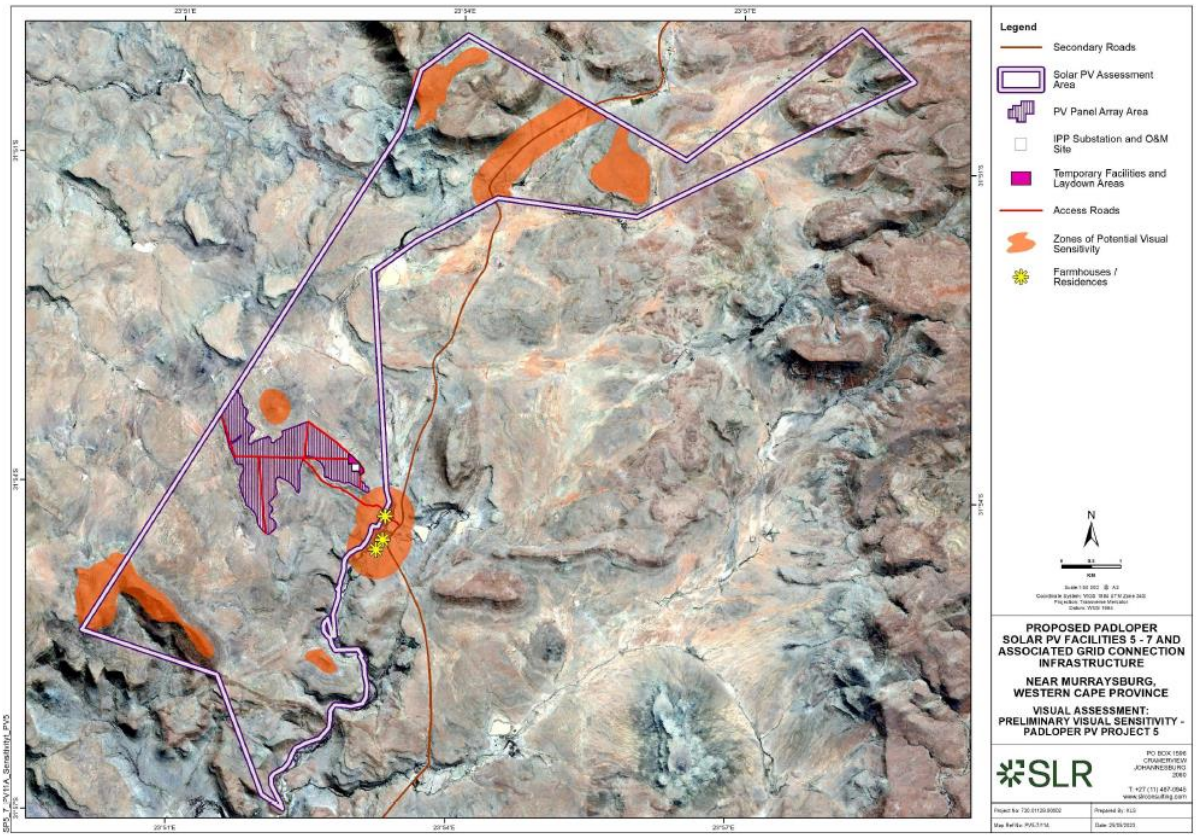

Figure B.19. Zones of potential visual sensitivity based relevent to the proposed Padloper PV 5 project (Schwartz, 2023).

The specialist concluded that although the Screening Tool identifies significant areas of very high landscape sensitivity for the proposed project, the site sensitivity verification exercise conducted in respect of this VIA did not indicate the presence of mountaintops, high ridges or any significantly steep slopes. This assessment, confirmed by the field investigation, showed the presence of undulating and

hilly terrain with some koppies and hills in evidence The sensitivity analysis above has recognised these ridges and identified the higher ridges as zones where development would be least preferred. In addition, efforts to obtain confirmation of the presence of a large telescope within 20 km of the site have not been successful and as such this factor has not been included in the sensitivity analysis.

B.2.12 Heritage: Archaeology and Cultural Landscape

A detailed description of the archaeological features and cultural landscape within the study area is included in the Heritage Impact Assessment, which is included in Appendix D.3 of this BA Report. The information presented in this section is based on the Heritage Impact Assessment.

The sites were subjected to detailed foot surveys on 19th and 20th September 2022 by three archaeologists. This was during spring but, in this dry area, the season makes no meaningful difference to vegetation covering and hence the ground visibility for the archaeological survey. Other heritage resources are not affected by seasonality. During the survey the positions of finds and survey tracks were recorded on a hand-held Garmin Global Positioning System (GPS) receiver set to the WGS84 datum. Photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape setting of the proposed development. It should be noted that the amount of time between the dates of the field inspection and final report do not materially affect the outcome of the report.

The detailed Heritage Impact Assessment explains that the Karoo region has a long history going back to the Early Stone Age (ESA) as testified to by occasional diagnostic artefacts from this period (generally handaxes). Middle Stone Age (MSA) artefacts are generally the most commonly encountered stone age materials in the Karoo and are generally well patinated, indicating their great age. Later Stone Age (LSA) finds are less common but generally of higher significance because of their better contexts (Orton *et al.* 2016). The vast majority of material tends to be what is referred to as background scatter. This can be defined as “widespread isolated artefacts whose distribution results from either primary or secondary causes” (Orton 2016:121). Most sites are scatters of stone artefacts, often accompanied by ostrich eggshell fragments and sometimes pottery, but some include fragments of bone and, rarely, archaeological deposits. The latter would normally be found in rock shelters but, due to the nature of the local geology, overhangs are rare. Rock shelters form in sandstone bands, but the rock outcrops in the vicinity of the present study area are mostly of dolerite.

During the site investigation, the specialist recorded a small, ephemeral scatter of large artefacts (recorded as waypoint 186). These were found in a denuded area suggesting that they may have been beneath the modern surface prior to the erosion taking place. It is likely that they are from the ESA. Heavily patinated hornfels blade that is likely from the MSA and was found amongst a low density background scatter of artefacts that mostly seemed to be from the MSA. One archaeological site of some interest was found at the edge of the Padloper PV 5 study area. It is a pre-colonial stone-walled site located at the base of a low scarp at waypoint 184. A lower grindstone lay face-up within the enclosure and a light scattering of large, grey flakes was present in the area. Elsewhere along the scarp, a small scatter of LSA materials was seen in an area that may have been wind-protected by several large bushes.

Along the powerline route a scratched dolerite boulder and abandoned and eroded furrow were seen, while close to the north-eastern end of the route a short section of stone walling was found. According to the assessment findings, several such walls were noted in this general area, some with modern rifle cartridges associated.

Section 38(3)(b) of the NHRA requires an assessment of the significance of all heritage resources. In terms of Section 2(vi), ‘‘cultural significance’’ means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. The reasons that a place may have cultural significance are outlined in Section 3(3) of the NHRA.

A detail list of finds from the heritage survey is included in the detailed Heritage Impact Assessment (Appendix D.3 of the BA Report). Overall the assessment confirmed that Archaeological resources were sparse with just one being graded above NCW. This one was considered to have Medium cultural significance for its scientific value and is allocated a grade of IIIB. It occurs immediately outside the study area and 50 m from the nearest proposed solar panels (Figure B.20).

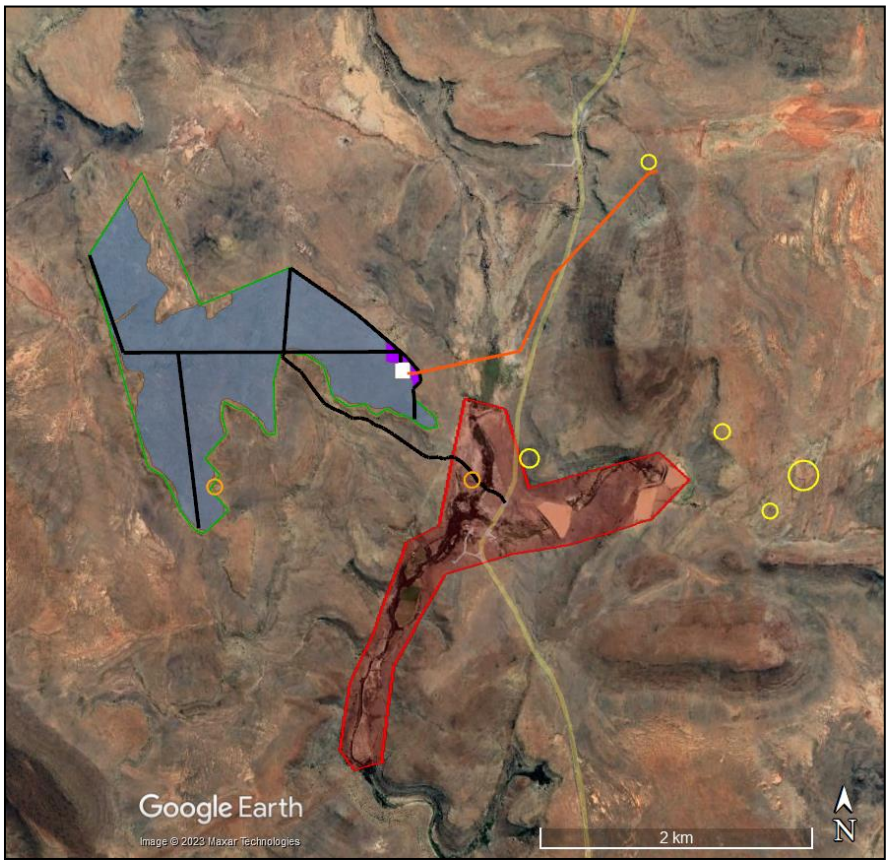

Figure B.20. Site distribution map showing sites from the current assessment for proposed development (Heritage features graded IIIA, IIIB and IIIC have been displayed in Red, Orange and Yellow, respsectively) (Orton, 2023).

B.2.12.1 Screening Tool Descriptions and Site Verification

Figure B.21 and Figure B.22 indicate the archaeological and heritage sensitivity as captured on the Screening Tool. It can be derived from the Screening Tool that the sensitivity is Low for both the Padloper PV 5 and its associated power line (i.e., Padloper EGI 5). The field surveys have revealed that the PV site is indeed of generally low sensitivity, however one high heritage sensitivity site is located immediately adjacent to the PV 5 study area, one medium sensitivity site near the powerline and one high sensitivity site along the access road.

Figure B.21. The Screening Tool map for Archaeology and Cultural Heritage Combined Sensitivity for the proposed Padloper PV 5 area and surrounds (DFFE, 2023).

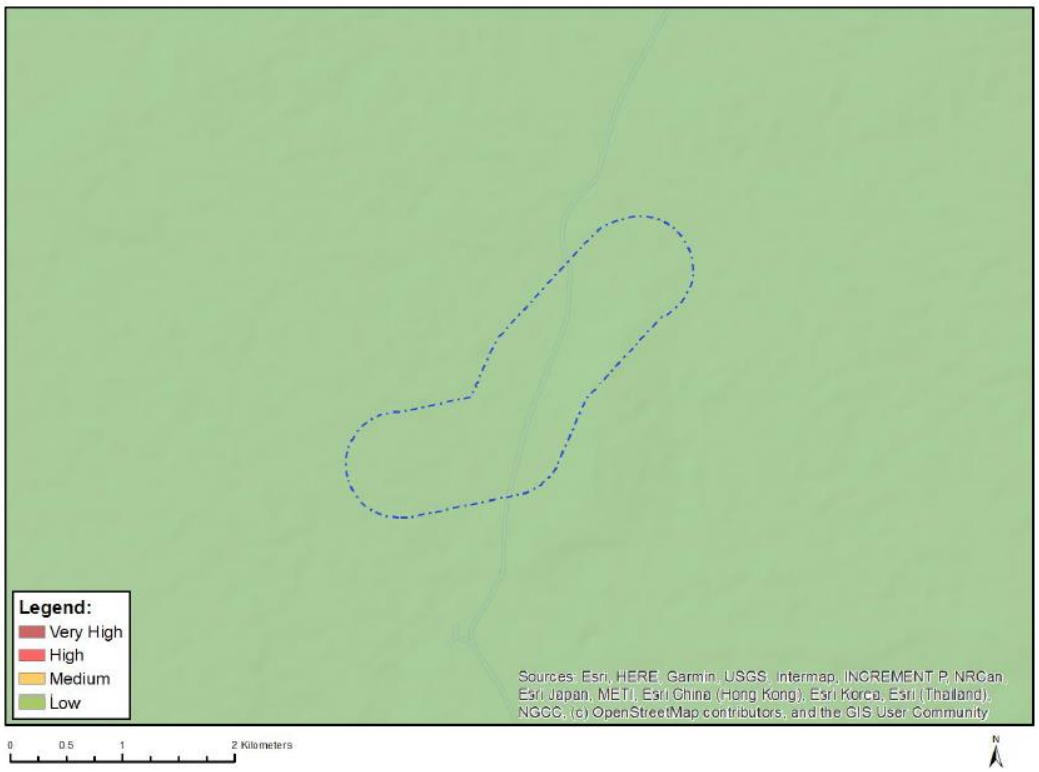

Figure B.22. The Screening Tool map for Archaeology and Cultural Heritage Combined Sensitivity for the proposed Padloper EGI 5 corridor and surrounds (DFFE, 2023).

B.2.13 Palaeontology

A detailed description of the palaeontological features within the proposed power line corridor and recommended mitigation measures is provided in the Palaeontology Impact Assessment (Appendix D.3 of this BA Report), which forms part of the Heritage Impact Assessment (Appendix D.3 of this BA Report).

The proposed project is mostly underlain by the Balfour Formation (Adelaide Subgroup, Beaufort Group, Karoo Supergroup). The PalaeoMap of the South African Heritage Resources Information System (SAHRIS) indicates that the Palaeontological Sensitivity of the Adelaide Subgroup is Very High (Almond and Pether, 2009; Almond et al., 2013). Updated Geology compiled by the Council of Geosciences (Council for Geoscience, Pretoria) refines the geology and indicates that the proposed project is entirely underlain by the Balfour Formation (Adelaide Subgroup, Karoo Supergroup).

The site-specific field survey conducted by the specialist in January 2023 confirmed that no fossiliferous outcrops were detected in the wider development footprint. The specialist notes that this could be attributed to dolerite intrusions that metamorphized potentially fossiliferous Beaufort sediments, low relief of the development area as well as poor bedrock exposure and relative unfossiliferous superficial sediments. However, it must be emphasised that the presence of well-preserved fossils is not ruled out.

B.2.13.1 Screening Tool Descriptions and Site Verification

The Screening Tool indicates that the Palaeontological Sensitivity of the study area is Very High (Figure B.23 and Figure B.24). The findings of the Screening Tool are disputed as far as the impact of the Padloper Solar PV 5 is concerned, based on actual conditions recorded on the ground during the site visit in January 2023.

Figure B.23. The Screening Tool map for Palaeontology Combined Sensitivity for the proposed Padloper PV 5 area and surrounds (DFFE, 2023).

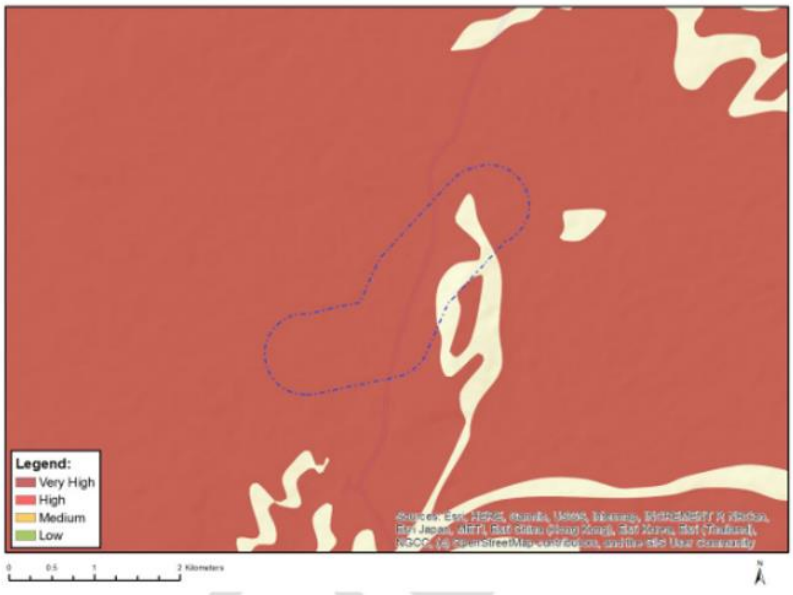

Figure B.24. The Screening Tool map for Palaeontology Combined Sensitivity for the proposed Padloper EGI 5 corridor ans surrounds (DFFE, 2023).

Based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the overall development footprint (PV and EGI 400 m assessment corridor) is rare. This is in contrast with the Very High Sensitivity allocated to the development area by the SAHRIS Palaeosensitivity Map and Screening Tool.

B.3 Socio-Economic Character

The information provided below has been extracted from the Socio-Economic Assessment, which is included in Appendix D.7 of this BA Report.

This Socio-Economic Assessment covers the individual land parcels on which the proposed project will be developed if approved, and the nearest towns, as the anticipated socio-economic impacts will be spread to varying degrees across these localities. The project site falls within the Beaufort West Local Municipality (BWLM). The study area falls within the Central Karoo District Municipality (CKDM). The nearest major towns include Murraysburg immediately to the south and south-west of the proposed project sites, Richmond roughly 50km to the north, Nelspoort roughly 70km to the south-west and Victoria West roughly 70km to the north-west.

Beaufort West Local Municipality (BWLM) had a population of 51 074 in 2019, up from 49 586 in 2011, which translates to a population growth rate of around 0.4% per annum over the eight-year period (see figure below). This is lower than the annual growth rate for the Central Karoo District Municipality (CKDM), which was 1.2% over the same period. BWLM had an average household size of 3.8 in 2019.

Between 2011 and 2016, BWLM's dependency ratio[12] showed a decreasing trend over time as an ever-larger proportion of the population was falling into the working age group. The dependency ratio decreased from 59.7 in 2011 to 56.7 in 2019. The Western Cape Provincial Government had previously projected that

[12] The dependency ratio expresses the ratio of those typically not in the labour force (being lower than the age of 15 and higher than the age of 64) to those typically in the labour force (people of ages 15 to 64).

it would continue to reduce to 55.1 by 2024. However, more recent information suggests that this trend reversed between 2016 and 2019, with an increase in the dependency ratio to a high in recent years of 65. Interviews with municipal representatives indicate that this could be due to higher than anticipated rates of in-migration over the period.

In terms of education, statistics published by the Western Cape Government indicate that learner enrolment has been increasing gradually in recent years (WCPG, 2020a). This is a promising trend. However, while the demand for education has risen, supply has decreased according to the measure of the number of public ordinary schools, which has fallen by one per year over the 2018–2019 period. This combination of trends has resulted in higher learner-teacher ratios in the municipality, at 1:33.2 in 2019 (higher than the provincial average of 1:30.5 and the national average of 29.3).

According to StatsSA for 2011 and 2016, as well as 2019 statistics generated by Quantec and reported in the Western Cape Treasury's 2020 socio-economic profile for Beaufort West, a greater proportion of households had access to a flush toilet connected to sewerage, weekly refuse removal and electricity and lighting in 2016 as compared to 2011 throughout the local and district municipalities. This progression was somewhat reversed in the 2016–2019 period, with relatively more households not having access to electricity for lighting in recent years. The greatest relative improvement over the 2011–2016 period was in the proportion of households with a flush toilet connected to sewerage, which increased from 83% to 95% in the BWLM and from 78% to 94% in the CKDM over the period. This trend, too, was reversed in more recent years. However, the proportion of households with piped water inside their dwelling fell from 81% to 78% in BWLM and from 77% to 74% in CKDM between 2011 and 2016, but apparently increased to 98% in 2019 for both BWLM and CKDM. Interviews with municipal representatives suggest that in-migration of poor families has led to the expansion of informal settlements where the provision of service delivery remains relatively low.

According to the Western Cape Government, there are relatively few informal houses in either the BWLM or in the CKDM. In the BWLM, 99.6% of households live in formal dwellings, which is a slightly higher proportion of households than the CKDM with 97.8%.

In terms of tourism, the specialists gathered information on current tourism using planning documents for the district and local municipalities, interviews with the local tourism organisation and other stakeholders, own observation and accommodation search websites including SafariNow, AirBnB, Lekkeslaap and Google.

The area surrounding the project site is picturesque and offers hiking, mountain biking, some game viewing and birdwatching. Tourism is an important source of income for guesthouse operators. Some of the landowners in the area have signed up to the Mountain Zebra-Cambedoo Protected Environment, which is a privately owned corridor "proclaimed in 2016 for the purpose of maintaining the landscape in terms of its scenic, biodiversity and landscape value through collective action by the private landowners and to protect the area from detrimental developments" (SANParks, 2023). This organisation is not necessarily against development but seeks to support only forms of development which do not threaten the area's natural heritage and agricultural resources. Overall, there are two tourism facilities (i.e., accommodation) that are located less than 2 km from the project site (on farm portions being included on the development of the proposed project.

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The specialist noted that impacts on tourism are dependent on how the site is developed and managed to minimise negative biophysical impacts. The measures recommended in other specialist reports to these impacts (primarily the minimisation of visual, heritage, traffic and ecological impacts) would thus also minimise tourism impacts.

The specialist assessment concluded that it is considered most likely that the combined positive impacts of the proposed project would exceed its negative impacts resulting in an overall net benefit with mitigation.

B.4 Traffic Impact Assessment

The potential impacts on traffic have been addressed in the Traffic Impact Assessment (Appendix D.13). The main objective of this study is to determine the impact/s of the proposed development on the immediate and greater area concerning transportation.

Further to the game reserves, game farms, nature reserves and National Parks noted above, further high-level research has been undertaken to document some of the key eco-tourism activities in the area. The assessment considered the transportation of normal and abnormal vehicles, which are made up of, among other things; PV components, BESS components, construction materials, equipment, construction workers and employees.

Formalised public transportation around the Murraysburg area is very limited. Most commuting by non-vehicle owners around farm areas is in the form of hiking or privately arranged group travel. The TIA found that commuting by foot is common in Murraysburg and surrounding areas. However, the proposed facilities are approximately 25 km from the closest residential areas, making walking to the facilities unlikely. Notwithstanding the above, the surrounding road network features sufficiently wide and clear verges for safe commuting by foot, and the road widths are sufficient to accommodate cyclists.

The development is in close proximity to national road R63 and provincial road DR2404. It can be accessed from likely points of supply through an existing road network comprising asphalt and gravel roads that are in good and suitable condition, including for the transportation of abnormal loads.

Access to the proposed facilities already exists in the form of farm access points but the vertical alignment and width of the access roads will need to be upgraded to accommodate the proposed adjusted land use.

Hlanguza (2023) did not foresee any major risks concerning the proposed development and noted that the proposed development will have nominal impact on the existing traffic network.

B.5 Civil Aviation and Defence

As required by GN 320, Civil Aviation and Defence Site Sensitivity Verifications were compiled. These are included in Appendix D.11 and D.12 of this BA Report. Overall, the proposed project areas fall within a low sensitivity area from a Civil Aviation and Defence perspective.

SECTION C: PUBLIC PARTICIPATION

C.1 Introduction to the Public Participation Process

This section provides an overview of the tasks undertaken during the BA Processes, with a particular emphasis on providing a clear record of the Public Participation Process (PPP) that was followed.

It is important to note that the BA Processes for the projects comprising the Padloper PV and EGI Cluster are being undertaken separately as listed in Section A.1 of this BA Report, however the projects have been split into two batches. Batch 1 comprises of Projects 5 – 7. The BA Processes for the projects comprising Batch 1 are being undertaken concurrently. Batch 2 comprises of the BA Processes for Projects 1 - 4 and 8 – 11, and these processes are being undertaken separately. Approval to proceed with this phased release approach was granted during the second pre-application meeting undertaken with the DFFE on 9 June 2023.

An integrated PPP has been undertaken for the BA Processes (i.e., Padloper PV and EGI 5-7). The integrated PPP for the proposed projects ensured that all public participation documents (such as newspaper advertisements, site notices, notification letters, emails etc.) served to notify Interested and Affected Parties (I&APs), Stakeholders and Organs of State of the availability of the combined report for the abovementioned projects and provided I&APs with an opportunity to comment on the report. This approach was undertaken due to the projects entailing the same activity (i.e., generation of energy using a renewable source (i.e., Solar PV), and distribution of electricity via power lines) and being located in close proximity to each other, on adjacent farm portions.

The PPP for these BA Processes are driven by a stakeholder engagement process that includes inputs from authorities, I&APs, technical specialists and the project proponent. Guideline 4 on "Public Participation in support of the EIA Regulations" published by the former Department of Environmental Affairs and Tourism (DEAT) in May 2006, states that public participation is one of the most important aspects of the EA Process. This stems from the requirement that people have a right to be informed about potential decisions that may affect them and that they must be afforded an opportunity to influence those decisions. Effective public participation also improves the ability of the Competent Authority (CA) to make informed decisions and results in improved decision-making as the view of all parties are considered.

An effective PPP could therefore result in stakeholders working together to produce better decisions than if they had worked independently. The DEAT guideline, referred to above, states the following in terms of PPP:

- "*Provides an opportunity for I&APs, EAPs and the CA to obtain clear, accurate and understandable information about the environmental impacts of the proposed activity or implications of a decision;*
- *Provides I&APs with an opportunity to voice their support, concern and question regarding the project, application or decision;*
- *Enables an applicant to incorporate the needs, preferences and values of affected parties into its application;*

- *Provides opportunities for clearing up misunderstanding about technical issues, resolving disputes and reconciling conflicting interests;*
- *Is an important aspect of securing transparency and accountability in decision-making; and*
- *Contributes toward maintaining a health, vibrant democracy*."

To the above, one can add the following universally recognised principles for public participation:

- Inclusive consultation that enables all sectors of society to participate in the consultation and assessment processes;
- Provision of accurate and easily accessible information in a language that is clear and sufficiently non-technical for I&APs to understand, and that is sufficient to enable meaningful participation;
- Active empowerment of grassroots people to understand concepts and information with a view to active and meaningful participation;
- Use of a variety of methods for information dissemination in order to improve accessibility, for example, by way of discussion documents, meetings, workshops, focus group discussions, and the printed and broadcast media;
- Affording I&APs sufficient time to study material, to exchange information, and to make contributions at various stages during the assessment process;
- Provision of opportunities for I&APs to provide their inputs via a range of methods, for example, via written submissions or direct contact with members of the BA team; and
- Public participation is a process and vehicle to provide sufficient and accessible information to I&APs in an objective manner to assist I&APs to identify issues of concern, to identify alternatives, to suggest opportunities to reduce potentially negative or enhance potentially positive impacts, and to verify that issues and/or inputs have been captured and addressed during the assessment process.

At the outset it is important to highlight two key aspects of public participation:

- There are practical and financial limitations to the involvement of all individuals within a PPP. Hence, public participation aims to generate issues that are representative of societal sectors, and not each individual. Hence, the PPP will be designed to be inclusive of a broad range of sectors relevant to the proposed project.
- The PPP will aim to raise a diversity of perspectives and will not be designed to force consensus amongst I&APs. Indeed, diversity of opinion rather than consensus building is likely to enrich ultimate decision-making. Therefore, where possible, the PPP will aim to obtain an indication of trade-offs that all stakeholders (i.e., I&APs, technical specialists, the authorities and the development proponent) are willing to accept with regard to the ecological sustainability, social equity and economic growth associated with the project.

The Department of Environmental Affairs (2017), Public Participation guideline in terms of NEMA EIA Regulations was also considered during this BA Process.

The key steps in the PPP for the BA are described below. This approach is structured in line with the requirements of Chapter 6 (PPP) of the 2014 NEMA EIA Regulations (as amended, i.e., GN R326), as well as the approved Public Participation Plan, as described below. Various mechanisms have been undertaken to provide notice to all potential and registered I&APs of the proposed projects, as described below.

The BA Processes commenced in August 2022, whereby the specialist studies were commissioned, and the CA was consulted. Following the pre-application meeting and after receiving environmental sensitivity data collected during specialist site visits, the project infrastructure layouts were revised to avoid environmental sensitivities (where possible). The Draft BA Reports were released to I&APs, Stakeholders and Organs of State (including the National DFFE) for a 30-day comment period, extending from 14 August 2023 to 13 September 2023. All comments received during the 30-day review have been incorporated and addressed, as applicable and where relevant, into the detailed CRR and appended to this Final BA Report that has been submitted to the DFFE for decision-making together with the amended Application for EA. Copies of the content and proof of correspondence received from I&APs are included in Appendix F.9 of this BA Report.

C.2 Pre-Application Meeting and Consultation with the DFFE

An initial Pre-Application Meeting took place with the CA, the National DFFE, on 30 August 2023 (Reference Number: Reference: 2022 08 0007) in order to discuss and agree on, Environmental Assessments required for the proposed projects, as well as various aspects, such as the project overview; specialist studies to be commissioned; Public Participation Process; proposed schedule; listed activities; and the approach to the cumulative impact assessment.

As noted above, following the pre-application meeting and after receiving environmental sensitivity data collected during specialist site visits, the project infrastructure layouts were revised to avoid environmental sensitivities (where possible). Prior to proceeding with the BA Processes, a query was submitted to the assigned DFFE Case Officers to confirm the level of detail required for the project layouts and the proposed combination approach. In response to this query, the EAP was advised to submit a new pre-application meeting request whereby the CAs process related requirements will be discussed. In line with the guidance provided by the assigned Case Officers. A second pre-application meeting request was submitted, and the requested meeting took place on 9 June 2023 (Reference number: 2023-05-0032).[13]

Refer to Appendix G.1 of this BA Report for a copy of the Pre-Application Meeting Request Forms submitted to the DFFE; Appendix G.2 for a copy of the presentations delivered at the Pre-Application Meetings undertaken on 30 August 2022 and 9 June 2023; Appendix G.3 for a copy of the Pre-Application Meeting Notes and correspondence with the DFFE regarding Approval of the Pre-Application Meeting Presentation and Notes.

C.3 Landowner Written Consent

Regulation 39 (1) of the 2014 NEMA EIA Regulations (as amended) states that "*if the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land*".

[13] It is important to note that the BA Processes for the projects comprising the Padloper PV and EGI Cluster are being undertaken separately as listed in Section A.1 of this BA Report, however the projects have been split into two batches. Batch 1 comprises of Projects 5 – 7. The BA Processes for the projects comprising Batch 1 are being undertaken concurrently. Batch 2 comprises of the BA Processes for Projects 1 - 4 and 8 – 11, and these processes will be undertaken at a later stage, separately. Approval to proceed with this phased release approach was granted during the second pre-application meeting undertaken with the DFFE on 9 June 2023.

Regulation 39 (2) of the 2014 NEMA EIA Regulations (as amended) further states that "*sub-regulation (1) does not apply in respect of: (a) linear activities; (b) activities constituting, or activities directly related to prospecting or exploration of a mineral and petroleum resource or extraction and primary processing of a mineral or petroleum resource; and (c) strategic integrated projects as contemplated in the Infrastructure Development Act, 2014*".

The proposed Padloper Solar Facilities constitute non-linear activities, and landowner consent is therefore required for the land portions. Written consent has been obtained from the landowners on which the non-linear infrastructure is proposed to be located. The written consent has been included as an appendix to the Application for EA, which is being submitted to the DFFE, together with the BA Report. Landowner consent for the negotiated powerline route within the assessed EGI corridor is also required. This is included as an appendix to the amended Application for EA, which is being submitted to the DFFE, together with this BA Report.

C.4 Site Notice Boards

One specific mechanism of informing I&APs of the proposed projects includes the placement of site notice boards. Regulation 41 (2) (a) of the 2014 NEMA EIA Regulations (as amended) requires that a notice board providing information on the project and BA Process is fixed at a place that is conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of the site where the application will be undertaken or any alternative site.

Notice boards were placed were placed at the entrances and/or along the fences of the key affected farm portions on which the proposed project will be constructed, as well as at other strategic locations, as well as government and public facilities in Murraysburg. The site notice boards were placed on 17 February 2023. Table C.1 provides a breakdown of the locations at which the site notice boards were placed. A copy of the site notice boards as well as proof of placement of site notice boards are included in Appendix F.1 of this BA Report.

Table C.1. Site Notice Board Placement for the Proposed Projects

#	Locality/ Description	Coordinates
1	Entrance at the Murrysburg Public Library	31°57'46.79"S; 23°45'46.90"E
2	Along the MR607, north of the Remainder of Farm Riet Poort No.9	31°40'1.17"S; 23°48'42.50"E
3	Along the MR607, at the proposed access point to the proposed Padloper PV 2, east of the proposed Padloper PV 2 on the Remainder of Farm Riet Poort No.9.	31°44'11.31"S; 23°46'43.30"E
4	Along the MR607, at the proposed access point to the proposed Padloper PV 3, west of the proposed Padloper PV 3 and south of the proposed Padloper PV 2.	31°46'55.71"S; 23°45'14.46"E
5	Along DR2404, at the proposed access point to the proposed Padloper PV 5, south-east of the proposed Padloper PV 5 on Portion 2 of the Farm Driefontein No.26.	31°54'25.56"S; 23°53'21.69"E
6	Along DR2404, and the proposed EGI 5 route, directly west of the proposed Padloper PV 4 on Portion 2 of the Farm Driefontein No.26.	31°53'22.90"S; 23°53'42.63"E

#	Locality/ Description	Coordinates
7	Along DR2404, at the proposed access point to the proposed Padloper PV 4, north-east of the proposed Padloper PV 4 on Portion 2 of the Farm Driefontein No.26.	31°52'39.35"S; 23°53'54.73"E
8	Along the DR2404, which traverses the Portion 7 of the Farm Driefontein No.26, on the eastern border of the proposed Padloper PV 6.	31°55'38.38"S; 23°53'47.97"E
9	Along the DR2404, which traverses the Portion 7 of the Farm Driefontein No.26, west of proposed Padloper PV 7.	31°56'28.32"S; 23°53'48.75"E
10	Entrance at the Three Sisters Shell Garage along the N12, east of the proposed Padloper Solar and EGI cluster.	31°53'43.18"S; 23° 3'56.46"E

Site notice boards were placed in Englishman and Afrikaans; and included the following, in compliance with Regulation 41 (3) of the 2014 NEMA EIA Regulations (as amended):

- The details of the proposed project that are subjected to public participation;
- Explanation that a BA process is applicable to the proposed project;
- The nature and location of the proposed project;
- Details on where further information on the BA project can be obtained; and
- The manner in which and the person to whom representations in respect of the BA Project can be made.

C.5 Newspaper Advertisements

Regulation 41 (2) (c) of the 2014 NEMA EIA Regulations (as amended) requires the placement of a newspaper advertisement in one local newspaper or any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of the NEMA EIA Regulations.

In line with this, in order to notify and inform the public of the proposed projects, to invite I&APs to register on the project database, as well as to inform I&APs of the release of the Draft BA Report for comment, the BA Process was advertised in two local newspapers at the commencement of the 30-day comment period for the Draft BA Reports. Specifically, newspaper advertisements were placed in the *Courier* and the *Graaf-Reinet Advertiser* in English, Afrikaans and isiXhosa. In line with Regulation 41 (3) of the 2014 NEMA EIA Regulations (as amended), the newspaper included the details of the project website, where information available on the proposed project can be downloaded from. Refer to Appendix F.2 of this BA Report for copies and proof of placement of the newspaper advertisements.

C.6 Determination of Appropriate Measures

Refer to the section below which provides a detailed outline of the measures taken to include all potential I&APs, stakeholders and Organs of State in the BA Process.

In terms of Regulation 41 (2) (e) of GN R326, no persons have been identified as desiring but unable to participate in the process. All comments received during this 30-day review period have been captured and adequately responded to in the detailed CRR and appended to this Final BA Report that

has been submitted to the DFFE for decision-making together with the amended Application for EA. Copies of the content and proof of correspondence received from I&APs are included in Appendix F.9 of this BA Report.

Therefore, no alternative methods were deemed necessary and agreed to by the CA. It was proposed that if during the BA Process, persons are identified as desiring but unable to participate due to illiteracy, disability or any other disadvantage, then the EAP will contact the I&AP to discuss the proposed projects and provide assistance, where needed.

In line with Regulation 41 (2) (b) of GN R326 and prior to the commencement of the BA Process (and advertising the EA Process in the local print media), an initial database of I&APs (including key stakeholders and Organs of State) was developed for the BA Processes. This was undertaken based on research and other projects in the project area. Appendix E of this BA Report includes a copy of the I&AP Database, which indicates interaction with I&APs, key stakeholders and all I&APs that have been added to the project database.

In line with Regulation 41 (2) (b) of GN R326, the database includes the details of the following:

- Landowners of the affected farm portions;
- Occupiers of the affected farm portions;
- Landowners of the neighbouring adjacent farm portions;
- The municipal councillor of the ward in which the proposed projects will be undertaken;
- The municipality which has jurisdiction in the area (i.e., Beaufort West Local Municipality and the Central Karroo District Municipality);
- Relevant Organs of State that have jurisdiction in respect of any aspect of the activity; and
- Any other party as required by the competent authority.

The I&AP database contains, as a minimum, the competent authority (DFFE); relevant state departments (e.g. the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform, Northern Cape Department of Water and Sanitation, Western Cape Department of Agriculture, Department of Mineral Resources etc.) relevant organs of state (e.g. Pixley ka Seme Municipality, Central Karoo District Municipality, Eskom SOC etc); as well as potential and registered I&APs (e.g. landowners, neighbours etc.).

The above stakeholders, Organs of State and I&AP were sent written notification of the release of the Draft BA Report for comment and written notification of the submission of the Final BA Report. The above stakeholders, Organs of State and I&APs will also be sent written notice conveying the outcome of the EA Application.

While I&APs have been encouraged to register their interest in the project from the start of the process, following the public announcements, the identification and registration of I&APs is ongoing for the duration of the study. Stakeholders from a variety of sectors, geographical locations and/or interest groups are expected to show an interest in the proposed project, for example:

- Provincial and Local Government Departments;
- Local interest groups, for example, Councillors and ratepayer's associations;
- Surrounding landowners;
- Farmer organisations;
- Environmental Groups and NGOs; and
- Grassroots communities and structures.

As per Regulation 42 of the GN 326, in terms of the electronic database, I&AP details are captured and automatically updated as and when information is distributed to or received from I&APs. This ongoing record of communication is an important component of the PPP. It must be noted that while not required by the regulations, those I&APs proactively identified at the outset of the BA Process will remain on the project database throughout the process and will be kept informed of all opportunities to comment and will only be removed from the database by request.

C.7 Approach to the PPP

In terms of Regulation 41 (6) of GN R326 the section below outlines the PPP for this assessment in order to provide potential I&APs, Stakeholders and Organs of State access to information on the project and the opportunity to comment at the various stages of the assessment process.

Subsequent to the initial pre-application meeting held with the DFFE, a Background Information Document (BID) was released via email on 2 September 2022, to all potential I&APs on the project database. The BID introduced the proposed projects, conveyed the need for environmental authorisations and specialist studies that are being undertaken, outlined the key steps in the proposed processes and notified I&APs on the comment and registration period with extended from 2 September 2022 to 5 October 2022. Refer to Appendix F. 1 for correspondence sent to potential I&APs for the release of the BID, Appendix F.2 for the correspondence received from I&APs during the BID 30-day comment and registration period and the CRR for the responses provided to comments received from potential I&APs.

C.7.1 BA Report Phase - Review of the Draft BA Report

As noted above, the Draft BA Reports for the Padloper PV 5-7 projects were released to I&APs, Stakeholders and Organs of State for a 30-day comment period extending to 13 September 2023. All comments received during this 30-day review period have been captured and adequately responded to in the detailed CRR and appended to this Final BA Report that has been submitted to the DFFE for decision-making together with the amended Application for EA. Copies of the content and proof of correspondence received from I&APs are included in Appendix F.9 of this BA Report.

- **Database Development and Maintenance**: In line with Regulation 41 (2) (b) of GN R326, an initial database of potential I&APs was developed for the BA Process and has been updated throughout the process.

- **Protection of Personal Information:** In accordance with the Protection of Personal Information Act (Act 4 of 2013), the CSIR will conduct itself responsibly when collecting, processing, storing and sharing any personal information collected for the purposes of PPP in terms of the 2014 NEMA EIA Regulations (as amended). By registering as an I&AP and/or submitting information and comments, the stakeholder essentially consents to the collection, collation, processing, and storing of such information and the use and disclosure of such information for the aforementioned purpose. This is explained on all correspondence sent throughout the BA Processes. The stakeholders have also been given an opportunity to send an email to the EAP if they wish to opt out of communications on the proposed project.
- **Site Notice Board**: As noted in Section C (5) above, notice boards were placed for the proposed projects. A copy and proof of placement of the notice boards is included in Appendix F.1 of this BA Report.

- **Newspaper Advertisements:** A newspaper advertisement (in the English, Afrikaans and isiXhosa languages) was placed in two regional newspapers (i.e., The Courier and the Graaf-Reinet Advertiser) notifying all potential and registered I&APs of the commencement of the BA Processes and the availability of the Draft BA Report for a 30-day comment period. Refer to Appendix F.2 of this BA Report for copies the content and proof of placement of the newspaper advertisements.

- **Submission of the Application Form and Draft BA Reports to the DFFE**: The Application Form for EA and Draft BA Report were submitted to the DFFE via the DFFE Novell Filr System and proof of upload is being emailed to the DFFE. Proof of submission of the Draft BA Report to the DFFE and proof of upload to the DFFE Novell Filr System is included in Appendix F.8 of this Final BA Report.

- **Letter 1 to I&APs (Commencement of the BA Process)**: Written notification of the availability of the BA Report (i.e., Letter 1) was being sent to all I&APs and Organs of State (including landowners and adjacent landowners) included on the project via email, where email addresses were available, at the commencement of the 30-day review period on the BA. The letter sent included information on the projects and notification of the release and availability of the reports. Proof of the email, as well as copies of the Letter 1 will be included in the Final BA Report which will be submitted to the CA for decision-making. A follow up email will also be sent to all I&APs on the database to serve as a reminder of the closure of the comment period and to seek as many comments as possible.

- **Text Messaging**: SMS texts were also being sent to all potential I&APs on the database (at the time of releasing the Draft BA Report for comment), where cell phone numbers were available, to inform them of the proposed project and how to access the Draft BA Reports. Furthermore, a reminder SMS text will also be sent to all I&APs on the database to request for comment on the Draft BA Report and to remind I&APs of the comment period closure. Proof of text messaging is included in Appendix F.9 of this Final BA Report.

- **Executive Summaries of the BA Report**: Executive Summaries of the BA Report were being emailed to I&APs on the database together with Letter 1 and uploaded to the project website and Google Drive.

- **30-day Comment Period**: As noted above, potential I&APs, including authorities and Organs of State, were notified via Letter 1, of the 30-day comment and registration period which will extend to 13 September 2023 (excluding public holidays), which they were given an opportunity to submit comments on the Draft BA Reports and/or to register on the I&AP project database.

- **Availability of Information:** The Draft BA Reports were made available for a 30-day comment period which extended from 14 August 2023 to 13 September 2023 (excluding public holidays) and were distributed to ensure access to information on the project and to communicate the outcome of specialist studies. The Draft BA Reports were uploaded to the project website (https://www.csir.co.za/environmental-impact-assessment) for registered I&APs to access it. As a supplementary mechanism, the Draft BA Reports were also made available on an alternative web-platform (i.e., Google Drive). Proof of upload of the Draft BA Reports to the project website and Google Drive as mentioned above is included in Appendix F.9 of this Final BA Report. If an I&AP could not access the reports via the project website or via the Google Drive, and if additional information was required (other than what was provided in the Executive Summaries), then the I&AP could have contacted the EAP, who then made an electronic copy available (where feasibly possible). Proof of such delivery made by the EAP is included in Appendix F.9 of this Final BA Report.

- **Comments Received**: A key component of the BA Process is documenting and responding to the comments received from I&APs and the authorities. All comments received during the 30-day comment period of the BID, and the 30-day comment period of the Draft BA Reports are recorded and addressed in the detailed CRR. have been recorded and addressed, was released with the Draft BA Reports. Copies of all comments received during the during the 30-day comment period of the BID, and the 30-day comment period of the Draft BA Reports are included in Appendix F.4 and F.10, respectively

C.7.2 Compilation of Final BA Report for Submission to the DFFE

Following the 30-day commenting period of the BA Report and incorporation of the comments received into the CRR, the Final BA Report along with all relevant appendices and the CRR have been submitted to the DFFE in line with Regulation 19 (1) (a) of the 2014 NEMA EIA Regulations (as amended). The Final BA Report has been submitted electronically to the DFFE via the Novell Filr system, as recommended by the DFFE since June 2020.

In line with best practice, I&APs on the project database are being notified via Letter 2 via email (where email addresses are available) of the submission of the Final BA Reports to the DFFE for decision-making. To ensure ongoing access to information, a copy of the Final BA Report and the CRRs (detailing comments received during the BA Phase and responses thereto) will be placed on the project website (i.e. https://www.csir.co.za/environmental-impact-assessment). As a supplementary mechanism, the Final BA Report will also be uploaded to other alternative web-platforms such as Dropbox or Google Drive. Also, the Final BA Report that has been submitted to the DFFE for decision-making includes proof of the PPP that was undertaken to date in order to inform registered I&APs, Organs of State and key stakeholders of the availability of the Draft BA Report for the 30-day review period (as explained above).

Note that in terms of Regulation 19(1)(a) of the 2014 NEMA EIA Regulations (as amended), the independent EAP is required to submit the Final BA Report to DFFE for decision-making within 90 days of receipt of the application by the DFFE. The DFFE will have 57 days (from receipt of the Final BA Report) to either grant or refuse EA (in line with Regulation 20 (1) of the 2014 NEMA EIA Regulations (as amended). In line with best practice, registered I&APs will be notified via Letter 3 (Competent Authority's decision on the Final BA Report and Notification of Opportunity to Appeal) via email (where email addresses are available) of the outcome of the decision-making on the Final BA Report.

C.7.3 Environmental Decision-Making and Appeal Period

Subsequent to the decision-making phase, if EAs are granted by the DFFE for the proposed projects, all registered I&APs, Organs of State and stakeholders on the project database will receive notification of the issuing of the EAs and the associated appeal period. The 2014 NEMA EIA Regulations (as amended) (i.e. Regulation 4 (1)) states that after the Competent Authority has a reached a decision, it must inform the Applicant of the decision, in writing, within 5 days of such decision. Regulation 4 (2) of the 2014 NEMA EIA Regulations (as amended) stipulates that I&APs need to be informed of the EA and associated appeal period within 14 days of the date of the decision. All registered I&APs will be informed of the outcome of the EAs and the appeal procedure, as well as the respective timelines.

The distribution of the EAs (should such authorisations be granted by the DFFE), as well as the notification of the appeal period, will include a letter (i.e., Letter 3 (Competent Authority's decision on

the Final BA Report and Notification of Opportunity to Appeal)) to be sent via email to all registered I&APs, Stakeholders and Organs of State on the database, where email addresses are available. The letter will include information on the appeal period, as well as details regarding where to obtain a copy of the EAs. A copy of the EAs will be emailed with Letter 3. The EAs will also be uploaded to the project website (i.e. https://www.csir.co.za/environmental-impact-assessment). SMS texts will also be sent to all I&APs on the database, where cell phone numbers are available, to inform them of the EAs (should they be granted).

SECTION D: IMPACT ASSESSMENT

This section includes a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the construction phase, operational phase, and decommissioning phase, in line with the requirements of the 2014 NEMA EIA Regulations (as amended).

D.1 Approach to the BA: Methodology of the Impact Assessment

The identification of potential impacts includes impacts that may occur during the construction, operational and decommissioning phases of the proposed development. The assessment of impacts includes direct, indirect as well as cumulative impacts. In order to identify potential impacts (both positive and negative) it is important that the nature of the proposed project is well understood so that the impacts associated with the project can be assessed. The process of identification and assessment of impacts includes:

- Determining the current environmental conditions in sufficient detail so that there is a baseline against which impacts can be identified and measured;
- Determining future changes to the environment that will occur if the activity does not proceed;
- Developing an understanding of the activity in sufficient detail to understand its consequences; and
- Identifying significant impacts which are likely to occur if the activity is undertaken.

The impact assessment methodology has been aligned with the requirements for BA Reports as stipulated in Appendix 1 (3) (1) (j) of the 2014 NEMA EIA Regulations (as amended), which states the following:

"A BA Report must contain the information that is necessary for the Competent Authority to consider and come to a decision on the application, and must include an assessment of each identified potentially significant impact and risk, including –

(i) cumulative impacts;
(ii) the nature, significance and consequences of the impact and risk;
(iii) the extent and duration of the impact and risk;
(iv) the probability of the impact and risk occurring;
(v) the degree to which the impact and risk can be reversed;
(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and
(vii) the degree to which the impact and risk can be mitigated".

As per the then Department of Environmental Affairs and Tourism (DEAT) Guideline 5: Assessment of Alternatives and Impacts, the following methodology is applied to the prediction and assessment of impacts and risks. Potential impacts and risks have been rated in terms of the direct, indirect and cumulative:

- **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 cumulative impacts have been assessed by identifying other renewable energy projects and other applicable (and relevant) projects, such as construction and upgrade of electricity generation, and transmission or distribution infrastructure in the local area (i.e., within 30 km of the proposed Padloper Solar and EGI Cluster). There are various renewable energy projects being investigated in the local area that are at different stages of planning, ranging from projects that were awarded Preferred Bidder status in terms of the REIPPPP.

The approach for this BA is that the assessment includes all renewable energy and EGI projects within 30 km that have received an EA at the time of the second CA engagement (i.e., May 2023). Refer to Section C.2 above where additional context is provided. The information was collected from the National DFFE Renewable Energy EIA Application (REEA) database, 2023 Quarter 1 as well as from the South African Heritage Resources Information System (SAHRIS), and Eskom's Generation Connection Capacity Assessment (2020). This is the most accurate and up-to-date data available to the project team. There may be some projects with "in-process" applications for which data is not yet publicly available. This is the data found to be available and efforts were made to determine gaps and recent amendments. The REEA database contains land parcels, and not the project footprints. In most cases the actual development footprint of the nearby Renewable Energy developments could not be easily quantified or accessed spatially. Hence the land parcels are larger than the land the PV will occupy. Some of the projects may not get developed. For these reasons this data tends towards a worst-case scenario as it will be an overestimation of the extent of the land covered by Solar PV panels.

Table D.1, Table D.2 and Table D.3 provides more details; and Figure D.1 provides an illustration of the projects considered in the cumulative impact assessment.

A summary of the process flow followed in the cumulative impact assessment is provided below:

- A list of authorised Renewable Energy and EGI projects within a 30 km radius was identified based on research, DFFE REEA and the Eskom GCCA.
- This resulted in 17 Renewable Energy Projects being identified.
- In addition to the above, the proposed Padloper PV 1 – 7 and Padloper EGI 1 – 7 developments was also considered in conjunction with the projects identified.
- Considering all of the above, the cumulative impacts were then clearly defined, and where possible the size of the identified impact was quantified and indicated, i.e., hectares of cumulatively transformed land. With regards to the levels of transformation, the current state of the affected area was also taken into consideration. In most cases the actual development footprint of the nearby Renewable Energy developments could not be easily quantified or accessed spatially. For example, the REEA database contains land parcels, and not the footprints. Hence the land parcels were considered, which took into account the worst case.

This typically allowed the determination of the following aspects (or similar aspects) in the **relevant** specialist assessments:

- The total affected land parcel area taken up by authorised renewable energy projects and their grid connections within the 30 km radius.
- The total affected land parcel area of the Padloper PV 5 project and grid connections.
- Combined land parcel area affected by renewable energy developments within the 30 km radius around the proposed Padloper PV and EGI Cluster.
- The total area within the 30 km radius around the proposed projects.
- The total combined size of the land parcels affected by renewable energy projects and their grid connections as a percentage of the available habitat in the 30 km radius.

- Therefore, the assessment of cumulative impacts was based on the specialist and EAP's knowledge of similar approved Renewable Energy and EGI projects in the 30 km radius. However, the following points are important to note in terms of the cumulative impact assessment:
  - The assessment of cumulative impacts is not necessarily solely focused on an assessment of impacts linked to previously authorised similar developments and consideration of their mitigation measures, but also about the sensitivities of the land on which the projects take place. For example, from a heritage point of view, it is also about other heritage resources, the type of locations they could occur in, and any other developments that may have impacted on heritage resources.

Table D.1. Proposed renewable energy and EGI projects that have received EA within 30 km of the proposed projects (Source: DFFE REEA, Q1- 2023)

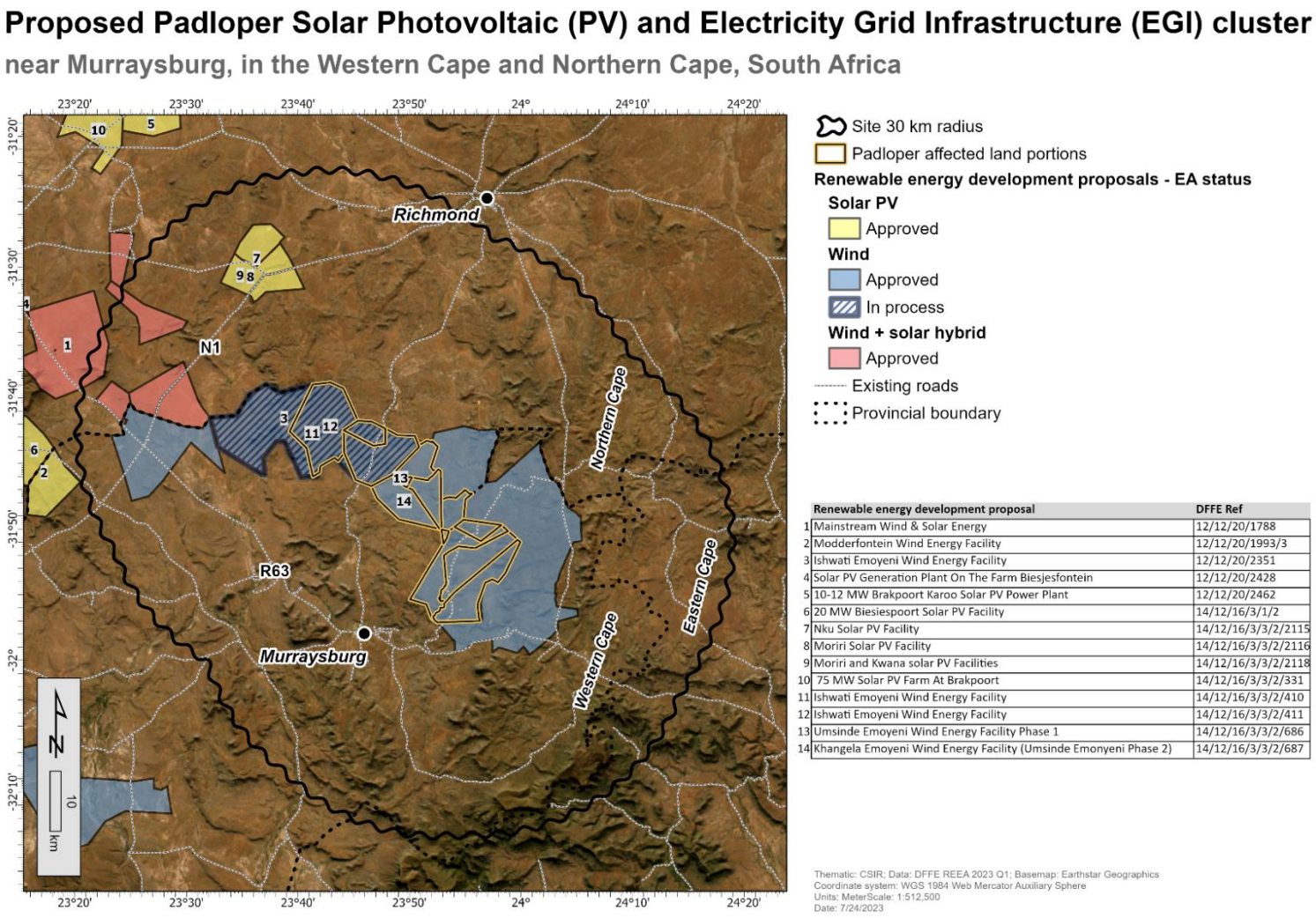
DFFE REFERENCE	EA PROCESS	PROJECT TITLE	APPLICANT	PROVINCE	TECHNOLOGY	MW	STATUS
12/12/20/1788	Scoping and EIA	Proposed Development of the Mainstream Wind and Solar Energy Facility at Victoria West	South Africa Mainstream Renewable Power Developments (Pty) Ltd	Northern Cape	Wind and Solar PV	700	Approved
12/12/20/1788/AM1	Amendment		South Africa Mainstream Renewable Power Developments (Pty) Ltd	Northern Cape	Wind and Solar PV		Approved
12/12/20/1788/AM2	Amendment		South Africa Mainstream Renewable Power Developments (Pty) Ltd	Northern Cape	Wind and Solar PV		Approved
12/12/20/1788/AM3	Amendment		South Africa Mainstream Renewable Power Developments (Pty) Ltd	Northern Cape	Wind and Solar PV		Approved
12/12/20/1993/3	Amendment	Proposed establishment of Modderfontein Wind Energy Facility on a site near Victoria West, Northern Cape Province	Coria (PFK) Investments 28 (Pty) Ltd	Northern Cape	Wind	190,4	Approved
12/12/20/1993/3/AM5	Amendment	The proposed construction of the 190,4 MW Modderfontein wind energy facility located South of Victoria West within the Ubuntu and the Beaufort west local municipalities in the Northern and Western Cape Provinces	South African Renewable Green Energy (Pty) Ltd	Northern Cape	PV		Approved
12/12/20/2351	Scoping and EIA	Proposed Ishwati Emoyeni Wind Energy Facility and Supporting Eskom Transmission and Distribution Grid Connection Infrastructure Near Murraysburg, Beaufort West Local Municipality, Western Cape Province.	Special Energy Project Pty Ltd	Western Cape	Wind	280	Approved
12/12/20/2351/AM2	Amendment	The construction of the 140 MW Ishwati Emoyeni wind energy facility (WEF) and its associated infrastructure located North West of the Town of Murraysburg in the Beaufort West local municipality in the Western Cape Province	Special Energy Project Pty Ltd	Western Cape	Wind	140	Approved
12/12/20/2428	Scoping and EIA	The development of a 19 MW Photovoltaic Solar Power Generation Plant on the Farm Biesjesfontein 270 Near Victoria West, Northern Cape Province	Aurora Power Solutions (Pty) Ltd	Northern Cape	PV	19	Approved
12/12/20/2428/AM1	Amendment		Bellatrix Solar PV Project (Pty) Ltd	Northern Cape	PV		Approved
12/12/20/2428/AM2	Amendment		Bellatrix Solar PV Project (Pty) Ltd	Northern Cape	PV		Approved
12/12/20/2462	Basic Assessment	The Proposed Construction of the Brakpoort Karoo Photovoltaic Solar Power Plant on	Blue Sky Solar (Pty) Ltd	Northern Cape	PV	12	Approved
12/12/20/2462/AM1	Amendment		Blue Sky Solar (Pty) Ltd	Northern Cape	PV		Approved

12/12/20/2462/AM2	Amendment	Portion 6 of the Farm Kraanvogelvlei No 174 In Victoria West, Northern Cape Province	Blue Sky Solar (Pty) Ltd	Northern Cape	PV		Approved
14/12/16/3/1/2	Scoping and EIA	Proposed Biesiespoort PV Facility on a Site South of Victoria West, Ubuntu Local Municipality, Northern Cape Province	South African Renewable Green Energy (Pty) Ltd	Northern Cape	PV	30	Approved
14/12/16/3/3/2/2115	Scoping and EIA	Nku solar PV facility, Northern Cape Province	Great Karoo Renewable Energy (Pty) Ltd	Northern Cape	PV	100	Approved
14/12/16/3/3/2/2116	Scoping and EIA	Moriri solar PV facility, Northern Cape Province	Great Karoo Renewable Energy (Pty) Ltd	Northern Cape	PV	100	Approved
14/12/16/3/3/2/2118	Scoping and EIA	The establishment of the Moriri and Kwana solar PV facilities, Northern Cape Province	Great Karoo Renewable Energy (Pty) Ltd	Northern Cape	PV	100	Approved
14/12/16/3/3/2/331	Scoping and EIA	The Proposed Construction the Photovoltaic Solar Farm at Brakpoort Near Victoria West, Northern Cape Province	AF-ROM Energy	Northern Cape	PV	75	Approved
14/12/16/3/3/2/331/AM2	Amendment		Brakpoort Solar (Pty) Ltd	Northern Cape	PV		Approved
14/12/16/3/3/2/331/AM2	Amendment		Brakpoort Solar (Pty) Ltd	Northern Cape	PV		Approved
14/12/16/3/3/2/410	Scoping and EIA	Proposed Ishwati Emoyeni Wind Energy Facility and Supporting Eskom Transmission and Distribution Grid Connection Infrastructure Near Murraysburg, Beaufort West Local Municipality, Western Cape Province.	Special Energy Project (Pty) and Eskom Holdings SOC Limited	Western Cape	Wind	115	Approved
14/12/16/3/3/2/411	Scoping and EIA		Special Energy Project (Pty) and Eskom Holdings SOC Limited	Western Cape	Wind	0	Approved
14/12/16/3/3/2/686	Scoping and EIA	Proposed Umsinde Emoyeni wind energy facility phase 1 and its associated electrical grid connection phase 1, Western and Northern Cape Provinces	Emoyeni Wind Farm Project Proprietary Limited	Western Cape	Wind	147	Approved
14/12/16/3/3/2/686/AM2	Amendment	The Umsinde Emoyeni WEF near Murraysburg within the Western Cape and the Northern Cape Provinces	Umsinde Emoyeni Wind Farm (Pty) Ltd	Western Cape	Wind		Approved
14/12/16/3/3/2/687	Scoping and EIA	Proposed Umsinde Emoyeni wind energy facility phase 2 and its associated electrical grid connection phase 2, Western and Northern Cape Provinces	Emoyeni Wind Farm Project Proprietary Limited	Western Cape	Wind	147	Approved
14/12/16/3/3/2/687/AM2	Amendment	The Khangela Emoyeni WEF near Murrayburg within the Beaufort West and Ubuntu LM'S in the Western Cape and the Northern Cape Provinces	Khangela Emoyeni Wind Farm (Pty) Ltd	Western Cape	Wind		Approved

Table D.2. Proposed Padloper PV and EGI developments and EGI

DFFE REFENCE	EA PROCESS	PROJECT TITLE	APPLICANT	EAP	PROVINCE	TECHNOLOGY	STATUS
14/12/16/3/3/1/2839	BA	Proposed development of the Padloper Solar PV Facility 1 and associated infrastructure (i.e., Padloper PV 1), near Murraysburg in the Northern Cape Province	Padloper PV (Pty) Ltd	CSIR	Northern Cape	Solar PV	In Process
14/12/16/3/3/1/2840	BA	Proposed development of the Padloper Solar PV Facility 2 and associated infrastructure (i.e., Padloper PV 2), near Murraysburg in the Western Cape Province	Padloper PV (Pty) Ltd	CSIR	Western Cape	Solar PV	In Process
14/12/16/3/3/1/2841	BA	Proposed development of the Padloper Solar PV Facility 3 and associated infrastructure (i.e., Padloper PV 3), near Murraysburg in the Western Cape Province	Padloper PV (Pty) Ltd	CSIR	Western Cape	Solar PV	In Process
14/12/16/3/3/1/2842	BA	Proposed development of the Padloper Solar PV Facility 4 and associated infrastructure (i.e., Padloper PV 4), near Murraysburg in the Western Cape Province	Padloper PV (Pty) Ltd	CSIR	Western Cape	Solar PV	In Process
14/12/16/3/3/1/2815	BA	Proposed development of the Padloper Solar PV Facility PV 5 (i.e., Padloper PV 5), the proposed development of 132 kV Electrical Grid Infrastructure between the proposed Padloper PV 5 and the proposed Padloper PV 4 (i.e., Padloper EGI 5), and their associated infrastructure, near Murraysburg in the Western Cape Province	Padloper PV (Pty) Ltd	CSIR	Western Cape	Solar PV and EGI	In Process
14/12/16/3/3/1/2816	BA	Proposed development of the Padloper Solar PV Facility PV 6 (i.e., Padloper PV 6), the proposed development of 132 kV Electrical Grid Infrastructure between the proposed Padloper PV 6 and the proposed Padloper PV 4 (i.e., Padloper EGI 6), and their associated infrastructure, near Murraysburg in the Western Cape Province	Padloper PV (Pty) Ltd	CSIR	Western Cape	Solar PV and EGI	In Process
14/12/16/3/3/1/2817	BA	Proposed development of the Padloper Solar PV Facility PV 7 (i.e., Padloper PV 7), the proposed development of 132 kV Electrical Grid Infrastructure between the proposed Padloper PV 7 and the proposed Padloper PV 4 (i.e., Padloper EGI 7), and their associated infrastructure, near Murraysburg in the Western Cape Province	Padloper PV (Pty) Ltd	CSIR	Western Cape	Solar PV and EGI	In Process
14/12/16/3/3/1/2844	BA	Proposed development of a 132 kV Overhead Power Line and associated Electrical Grid Infrastructure between the proposed Padloper PV 1 and the proposed authorised Ishwati Emoyeni Collector Substation (i.e., Padloper EGI 1), near Murraysburg in the Northern Cape and Western Cape Provinces	Padloper PV (Pty) Ltd	CSIR	Northern Cape and Western Cape	EGI	In Process
14/12/16/3/3/1/2845	BA	Proposed development of a 132 kV Overhead Power Line and associated Electrical Grid Infrastructure between the proposed	Padloper PV (Pty) Ltd	CSIR	Western Cape	EGI	In Process

DFFE REFENCE	EA PROCESS	PROJECT TITLE	APPLICANT	EAP	PROVINCE	TECHNOLOGY	STATUS
		Padloper PV 2 and the proposed authorised Ishwati Emoyeni Collector Substation (i.e., Padloper EGI 2), near Murraysburg in the Western Cape Province					
14/12/16/3/3/1/2846	BA	Proposed development of a 132 kV Overhead Power Line and associated Electrical Grid Infrastructure between the proposed Padloper PV 2 and the proposed Padloper PV 3 (i.e., Padloper EGI 3), near Murraysburg in the Western Cape Province	Padloper PV (Pty) Ltd	CSIR	Western Cape	EGI	In Process
14/12/16/3/3/1/2847	BA	Proposed development of a 132 kV Overhead Power Line and associated Electrical Grid Infrastructure between the proposed Padloper PV 4 and the proposed authorised Ishwati Emoyeni Collector Substation (i.e., Padloper EGI 4), near Murraysburg in the Northern Cape and Western Cape Provinces.	Padloper PV (Pty) Ltd	CSIR	Northern Cape and Western Cape	EGI	In Process



	Renewable energy development proposal	DFFE Ref
1	Mainstream Wind & Solar Energy	12/12/20/1788
2	Modderfontein Wind Energy Facility	12/12/20/1993/3
3	Ishwati Emoyeni Wind Energy Facility	12/12/20/2351
4	Solar PV Generation Plant On The Farm Biesjesfontein	12/12/20/2428
5	10-12 MW Brakpoort Karoo Solar PV Power Plant	12/12/20/2462
6	20 MW Biesiespoort Solar PV Facility	14/12/16/3/1/2
7	Nku Solar PV Facility	14/12/16/3/3/2/2115
8	Moriri Solar PV Facility	14/12/16/3/3/2/2116
9	Moriri and Kwana solar PV Facilities	14/12/16/3/3/2/2118
10	75 MW Solar PV Farm At Brakpoort	14/12/16/3/3/2/331
11	Ishwati Emoyeni Wind Energy Facility	14/12/16/3/3/2/410
12	Ishwati Emoyeni Wind Energy Facility	14/12/16/3/3/2/411
13	Umsinde Emoyeni Wind Energy Facility Phase 1	14/12/16/3/3/2/686
14	Khangela Emoyeni Wind Energy Facility (Umsinde Emonyeni Phase 2)	14/12/16/3/3/2/687

Figure D.1. Projects within the 30 km radius considered for the Cumulative Impact Assessment.

In addition to the above, the impact assessment methodology includes the following aspects:

Nature of impact/risk - The type of effect that a proposed activity will have on the environment.

Status - Whether the impact/risk on the overall environment will be:
- Positive - environment overall will benefit from the impact/risk;
- Negative - environment overall will be adversely affected by the impact/risk; or
- Neutral - environment overall not be affected.

Spatial extent – The size of the area that will be affected by the impact/risk:
- Site specific;
- Local (<10 km from site);
- Regional (<100 km of site);
- National; or
- International (e.g., Greenhouse Gas emissions or migrant birds).

Duration – The timeframe during which the impact/risk will be experienced:
- Very short term (instantaneous);
- Short term (less than 1 year);
- Medium term (1 to 10 years);
- Long term (the impact will cease after the operational life of the activity (i.e., the impact or risk will occur for the project duration)); or
- Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient (i.e., the impact will occur beyond the project decommissioning)).

Consequence – The anticipated consequence of the risk/impact:
- Extreme (extreme alteration of natural systems, patterns or processes, i.e., where environmental functions and processes are altered such that they permanently cease);
- Severe (severe alteration of natural systems, patterns or processes, i.e., where environmental functions and processes are altered such that they temporarily or permanently cease);
- Substantial (substantial alteration of natural systems, patterns or processes, i.e., where environmental functions and processes are altered such that they temporarily or permanently cease);
- Moderate (notable alteration of natural systems, patterns or processes, i.e., where the environment continues to function but in a modified manner); or
- Slight (negligible alteration of natural systems, patterns or processes, i.e., where no natural systems/environmental functions, patterns, or processes are affected).

Reversibility of the Impacts - the extent to which the impacts/risks are reversible assuming that the project has reached the end of its life cycle (decommissioning phase):
- High reversibility of impacts (impact is highly reversible at end of project life i.e., this is the most favourable assessment for the environment);
- Moderate reversibility of impacts;
- Low reversibility of impacts; or
- Impacts are non-reversible (impact is permanent, i.e., this is the least favourable assessment for the environment).

Irreplaceability of Receiving Environment/Resource Loss caused by impacts/risks – the degree to which the impact causes irreplaceable loss of resources assuming that the project has reached the end of its life cycle (decommissioning phase):

- High irreplaceability of resources (project will destroy unique resources that cannot be replaced, i.e., this is the least favourable assessment for the environment);
- Moderate irreplaceability of resources;
- Low irreplaceability of resources; or
- Resources are replaceable (the affected resource is easy to replace/rehabilitate, i.e., this is the most favourable assessment for the environment).

Using the criteria above, the impacts are further assessed in terms of the following:

Probability – The probability of the impact/risk occurring:

- Extremely unlikely (little to no chance of occurring);
- Very unlikely (<30% chance of occurring);
- Unlikely (30-50% chance of occurring)
- Likely (51 – 90% chance of occurring); or
- Very Likely (>90% chance of occurring regardless of prevention measures).

To determine the significance of the identified impact/risk, the consequence is multiplied by probability (qualitatively as shown in Figure D.2). This approach incorporates internationally recognised methods from the Intergovernmental Panel on Climate Change (IPCC) (2014) assessment of the effects of climate change and is based on an interpretation of existing information in relation to the proposed activity, to generate an integrated picture of the risks related to a specified activity in a given location, with and without mitigation. Risk is assessed for each significant stressor (e.g. physical disturbance), on each different type of receiving entity (e.g. the municipal capacity, a sensitive wetland), qualitatively (very low, low, moderate, high, and very high) against a predefined set of criteria (i.e. probability and consequence):

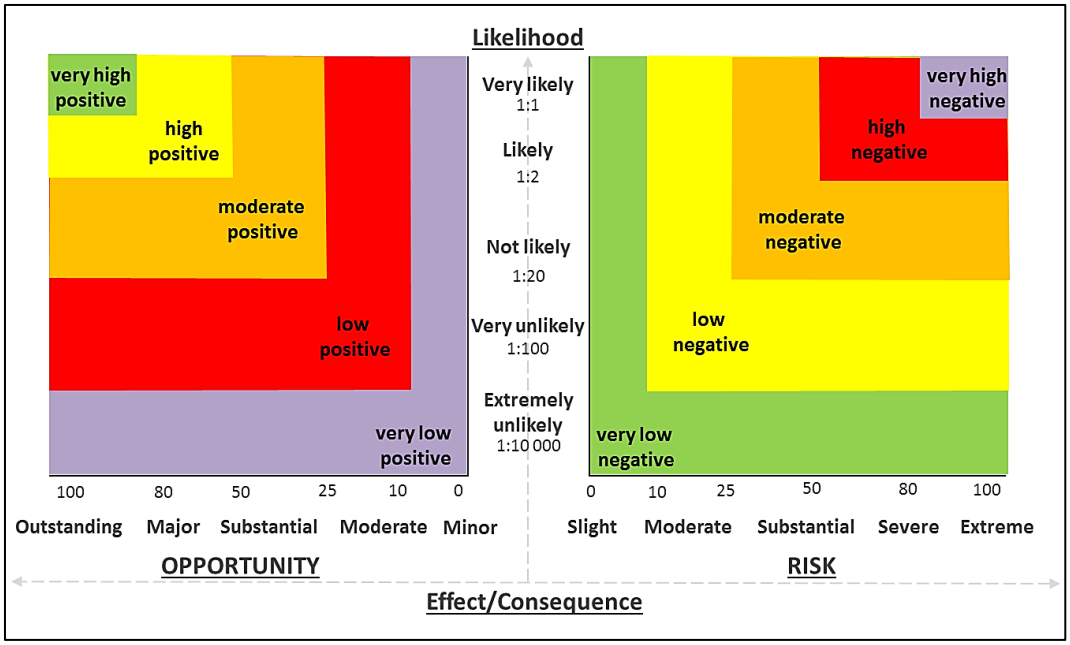


Figure D.2. Guide to assessing risk/impact significance as a result of consequence and probability

Significance – Will the impact cause a notable alteration of the environment?

- Very low (the risk/impact may result in very minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);
- Low (the risk/impact may result in minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);
- Moderate (the risk/impact will result in moderate alteration of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated);
- High (the risk/impact will result in major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making); and
- Very high (the risk/impact will result in very major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making (i.e. the project cannot be authorised unless major changes to the engineering design are carried out to reduce the significance rating)).

With the implementation of mitigation measures, the residual impacts/risks will be ranked as follows in terms of significance (based on Figure D.2):

- Very low = 5;
- Low = 4;
- Moderate = 3;
- High = 2; and
- Very high = 1.

Confidence – The degree of confidence in predictions based on available information and specialist knowledge:

- Low;
- Medium; or
- High.

Impacts have been collated into the EMPr (Appendices H-J of the BA Report) and these include the following:

- Quantifiable standards for measuring and monitoring mitigatory measures and enhancements (as applicable). This includes a programme for monitoring and reviewing the recommendations to ensure their ongoing effectiveness.
- Identifying negative impacts and prescribing mitigation measures to avoid or reduce negative impacts. Where no mitigatory measures are possible this is stated.
- Positive impacts and augmentation measures have been identified to potentially enhance positive impacts where possible.

Other aspects to be taken into consideration in the assessment of impact significance are:

- Impacts are evaluated for the construction and operational phases of the development. The assessment of impacts for the decommissioning phase is brief, as there is limited understanding at this stage of what this might entail. The relevant rehabilitation guidelines and legal requirements applicable at the time will need to be applied;
- Impacts have been evaluated with and without mitigation in order to determine the effectiveness of mitigation measures on reducing the significance of a particular impact;

- The impact evaluation has, where possible, taken into consideration the cumulative effects associated with this and other facilities/projects which are either developed or in the process of being developed in the local area; and
- The impact assessment attempts to quantify the magnitude of potential impacts (direct and cumulative effects) and outline the rationale used. Where appropriate, national standards are used as a measure of the level of impact.

D.2 Assessment of Environmental Risks and Impacts

The issues and impacts presented in this Section have been identified via the environmental *status quo* of the receiving environment (environmental, social and heritage features present on site - as discussed in Section B of this BA Report) and input from specialists that form part of the project team. The impact assessments of the specialist studies undertaken to inform this BA have been summarised in this section. It should be noted that unless otherwise stated, impacts identified and their associated significance are deemed to be negative.

Refer to Appendix D of this report for the full specialist studies undertaken (including the Terms of Reference for each study). All proposed mitigation measures, as relevant, have been carried over into the EMPr, included in Appendices H - J of this report.

D.2.1 Agriculture

The Agriculture Compliance Statement was undertaken by Johann Lanz to inform the outcome of this BA from an agricultural and soils perspective. The complete Agriculture Compliance Statement is included in Appendix D. 1 of this report. The assessment was based on a verification of current agricultural land use on the facility footprints and was informed by existing soil and agricultural potential data for the facility footprints. This includes soil data, land capability data, field crop boundaries etc. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the Agriculture Compliance Statement. The information below is extracted from Lanz (2023).

D.2.1.1 Approach and Methodology

An Agricultural Compliance Statement for Padloper PV project and was required and undertaken in terms of the requirements of the *Protocol for the specialist assessment and minimum report content requirements of environmental impacts on agricultural resources by onshore wind and/or solar photovoltaic energy generation facilities where the electricity output is 20 megawatts or more*, gazetted on 20 March 2020 in GN 320 (in terms of Sections 24(5)(A) and (H) and 44 of NEMA, 1998). As per the requirement of the Protocol in GN 320, the assessment was based on a desktop analysis of existing soil and agricultural potential data for the site. Various information and desktop sources of information were used.

D.2.1.2 Relevant Project Aspects relating to Agricultural Impacts

For agricultural impacts, the exact nature of the different infrastructure within a development has very little bearing on the significance of impacts. What is of most relevance is simply the occupation of the land and whether it is being occupied by a solar panel, a road, a building or a substation makes no difference. What is of most relevance and addressed in this assessment, therefore, is simply the total footprint of the facility that excludes agricultural land use or impacts agricultural land.

D.2.1.3 Potential Impacts

Two direct mechanisms have been identified that lead to decreased agricultural potential for the proposed project by:

- **Occupation of land** - Agricultural land directly occupied by the development infrastructure will become restricted for agricultural use, with consequent potential loss of agricultural productivity for the duration of the project lifetime. However, the Agriculture and Soils Study notes that the production potential of that land is limited to only being suitable as low carrying capacity grazing land. The loss of such land, of which there is no scarcity in the country, represents a minimal loss of agricultural production potential in terms of national food security and for the affected farm.
- **Soil erosion and degradation –** Erosion can occur as a result of the alteration of the land surface run-off characteristics, predominantly through the establishment of hard surface areas including roads. Loss of topsoil can result from poor topsoil management during construction related excavations. Soil erosion and loss of topsoil are completely preventable. The stormwater management that will be an inherent part of the engineering on site and standard, best-practice erosion control and topsoil management measures recommended and included in the EMPr, are likely to be effective in preventing soil erosion and loss of topsoil.

Two indirect mechanisms have been identified that could lead to increased agricultural potential through:

- **Increased financial security for farming operations –** Reliable and predictable income will be generated by the farming enterprises through the lease of the land to the energy facilities. This is likely to increase their cash flow and financial security and could improve farming operations and productivity through increased investment into farming.
- **Improved security against stock theft and other crime** due to the presence of security infrastructure and security personnel at the energy facility.

The potential cumulative agricultural impact of importance is a regional loss (including by degradation) of future agricultural production potential. The defining question for assessing the cumulative agricultural impact is this:

- What loss of future agricultural production potential is acceptable in the area, and will the loss associated with the proposed development, when considered in the context of all past, present or reasonably foreseeable future impacts, cause that level in the area to be exceeded?

Department of Forestry, Fisheries and the Environment (DFFE) requires compliance with a specified methodology for the assessment of cumulative impacts. This is positive in that it ensures engagement with the important issue of cumulative impacts. However, the required compliance has some limitations and can, in the opinion of the author, result in an over-focus on methodological compliance, while missing the more important task of effectively answering the above defining question.

The cumulative impact assessment has considered all renewable energy projects within a 30 km radius. All of these projects have the same agricultural impacts in an almost identical agricultural environment, and therefore the same mitigation measures apply to all.
In quantifying the cumulative impact, the area of land taken out of agricultural use as a result of all the projects considered in the cumulative impact assessment (total generation capacity of 2789 MW) will amount to a total of approximately 4687 hectares. This is calculated using the industry standards of 2.5 and 0.3 hectares per megawatt for solar and wind energy generation respectively, as per the

Department of Environmental Affairs (DEA) Phase 1 Wind and Solar Strategic Environmental Assessment (SEA) (2015). As a proportion of the total area within a 30 km radius (approximately 282,700 ha), this amounts to only 1.66% of the surface area. This is within an acceptable limit in terms of loss of low potential agricultural land which is only suitable for grazing, and of which there is no scarcity in the country. This is particularly so when considered within the context of the following point.

In order for South Africa to develop the renewable energy generation that it urgently needs, agriculturally zoned land will need to be used for renewable energy generation. It is preferable to incur a cumulative loss of lower potential agricultural land in a region which has been designated as a REDZ, than to lose agricultural land that has a higher potential, and that is much scarcer, to renewable energy development elsewhere in the country.

In terms of the loss of agricultural land to renewable energy, it should also be noted that renewable energy development can only be located in fairly close proximity to a substation that has available capacity. This effectively protects most agricultural land in the country from renewable energy development because only a small proportion of the country's total land surface is located in close enough proximity to an available substation to be viable for renewable energy development.

As discussed above, the risk of a loss of agricultural potential by soil degradation can effectively be mitigated for renewable energy developments and therefore does not pose a cumulative risk.

Due to all of the considerations discussed above, the cumulative impact of loss of future agricultural production potential is assessed as low. It will not have an unacceptable negative impact on the agricultural production capability of the area and it is therefore recommended that the development be approved.

D.2.1.4 Concluding Statement

An Agricultural Compliance Statement is not required to formally rate agricultural impacts. It is only required to indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site.

Nevertheless, it is confirmed that the agricultural impact of the proposed PV development is assessed as being of Low significance predominantly due to no viable crop land being lost as a result of the proposed development. The cropping potential of the area is completely limited by the combination of climate (arid climate with low moisture availability) and soil constraints (limited soil depth) so that it is totally unsuitable for rain-fed crop production. The very low agricultural potential of the facility footprints limits its viable agricultural use to grazing only.

Therefore, from an agricultural impact point of view, it is recommended that the proposed development be approved.

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D.2.2 Visual Impact Assessment

The Visual Impact Assessment was undertaken by Kerry Schwartz to inform the outcome of this BA from a visual perspective. The complete Visual Impact Assessment is included in Appendix D. 2 of this BA report. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the Visual Impact Assessment. The information below is extracted from Schwartz (2023).

D.2.2.1 Approach and Methodology

The methodology of the Visual Impact Assessment involved a combination of desktop-level assessment supported by field-based observation. A two (2) day site visit was undertaken between the 23rd and the 24th of August 2022 (late-winter) to:

- verify the landscape characteristics identified via desktop means;
- conduct a photographic survey of the proposed study area;
- verify the sensitivity of visual receptor locations identified via desktop means;
- eliminate receptor locations that are unlikely to be influenced by the proposed development;
- identify any additional visually sensitive receptor locations within the study area; and
- assist with the assessment and rating of receptor impacts.

Physical landscape characteristics such as topography, vegetation and land use are important factors influencing the visual character and visual sensitivity of the study area. Baseline information about the physical characteristics of the study area was initially sourced from spatial databases provided by National Geospatial Information (NGI), the South African National Biodiversity Institute (SANBI) and the South African National Land Cover Dataset (Geoterraimage – 2020). The characteristics identified via desktop means were later verified during a site visit. In addition, visual receptor locations and routes that are sensitive and / or potentially sensitive to the visual intrusion of the proposed development were assessed to determine the impact of the proposed development on each of the identified receptor locations.

A rating matrix was used to objectively evaluate the significance of the potential visual impacts associated with the proposed project, both before and after implementing mitigation measures. Mitigation measures were identified (where possible) to minimise the potential visual impact of the proposed development. The rating matrix is based on several different factors including geographical extent, probability, reversibility, irreplaceable loss of resources, duration, extent and consequence in order to assign a level of significance to the potential visual impact of the project.

A separate rating matrix was used to assess the visual impact of the proposed project on the identified visual receptor locations (both sensitive and potentially sensitive). This matrix is based on three parameters, namely the distance of an identified visual receptor from the proposed development, the presence of screening factors and the degree to which the proposed development would contrast with the surrounding environment.

Refer to Appendix D.2 of this BA Report for the detailed rating matrix as well as the full list of main information sources used in the VIA.

Relevant Project Aspects relating to Visual Impacts Components of the proposed project that are relevant in terms of visual aspects are those typically associated with such developments, with a specific focus on solar PV facilities and overhead power lines.

D.2.2.2 Potential Impacts

The potential direct visual impacts resulting from the proposed project on landscape features and receptors are listed below for each of the project phases, including cumulative impacts.

Construction Phase:

- Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction.

- Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.
- Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers.
- Surface disturbance during construction would expose bare soil (scarring) which could visually contrast with the surrounding environment.
- Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.
- Litter on the construction site may result in visual pollution.

Operational Phase:

- The PV arrays and / or powerlines may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.
- The proposed SEF and / or EGI project will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts.
- Glint and glare (from PV Panel arrays) may impact nearby receptors.
- Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers.
- The night-time visual environment will be altered as a result of operational and security lighting at the proposed PV facility and substation.

Decommissioning Phase:

- Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts.
- Decommissioning activities may be perceived as an unwelcome visual intrusion.
- Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers.
- Surface disturbance during decommissioning would expose bare soil (scarring) which could visually contrast with the surrounding environment.
- Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.
- Decommissioned infrastructure left on the site may be visually intrusive.

Cumulative Impacts:

- Additional renewable energy and associated grid connection infrastructure developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts.
- Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings.
- Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes.
- The night-time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.

D.2.2.3 Impact Assessment

The table below includes an assessment of the potential impacts identified for the proposed project for the construction, operational and decommissioning phases.

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential Mitigation Measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
CONSTRUCTION PHASE (Direct Impacts)						
▪ Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction. ▪ Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during construction would expose bare soil (scarring) which could visually contrast with the surrounding environment. ▪ Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	*Status*	Negative	*Moderate (3)*	▪ Carefully plan to minimise the construction period and avoid construction delays. ▪ Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting. ▪ Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Vegetation clearing should take place in a phased manner. ▪ Inform any receptors within 500 m of the site of the construction programme and schedules. ▪ Make use of existing gravel access roads where possible. ▪ Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible. ▪ Ensure that suitable dust suppression techniques are implemented: o on all access roads; o in all areas where vegetation clearing has taken place; o on all soil stockpiles. ▪ Maintain a neat construction site by removing litter, rubble and waste materials regularly.	*Low (4)*	*Medium*
	Spatial Extent	Local				
	Duration	Short Term				
	Consequence	Substantial				
	Probability	Very Likely				
	Reversibility	High				
	Irreplaceability	Low				

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential Mitigation Measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
▪ Litter on the construction site may result in visual pollution.						
OPERATIONAL PHASE						
• The PV arrays may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. • The proposed solar PV facility will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts. • Glint and glare may impact nearby receptors. • Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. • The night time visual environment will be altered as a result of operational and security lighting at the proposed PV facility	*Status* *Spatial Extent* *Duration* *Consequence* *Probability* *Reversibility* *Irreplaceability*	*Negative* *Local* *Long-term* *Substantial* *Very likely* *Moderate* *Low*	*Moderate (3)*	▪ Restrict vegetation clearance on the site to that which is required for the correct operation of the facility. ▪ As far as possible, limit the number of maintenance vehicles which are allowed to access the site. ▪ Ensure that suitable dust suppression techniques are implemented on all gravel access roads. ▪ As far as possible, limit the amount of security and operational lighting present on site. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Lighting fixtures should make use of minimum lumen or wattage. ▪ Mounting heights of lighting fixtures should be limited, or alternatively, foot-light or bollard level lights should be used. ▪ If economically and technically feasible, make use of motion detectors on security lighting. ▪ Buildings on the site should be painted with natural tones that fit with the surrounding environment.	*Moderate (3)*	*Medium*

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential Mitigation Measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
				▪ Non-reflective surfaces should be utilised where possible.		
• The power line may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. • The proposed power line will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts. • Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. • The night-time visual environment will be altered as a result of operational and security lighting associated with the development.	*Status* *Spatial Extent* *Duration* *Consequence* *Probability* *Reversibility* *Irreplaceability*	*Negative* Local Long-term Moderate Very likely High Low	*Low (4)*	▪ Where possible, limit the amount of security and operational lighting associated with the power line development. ▪ Where possible, avoid placing lights on tower/pylon structures. ▪ As far as possible, limit the number of maintenance vehicles using access roads. ▪ Ensure that suitable dust suppression techniques are implemented on all gravel access roads. ▪ Non-reflective surfaces should be utilised where possible.	*Low (4)*	*Medium*
DECOMMISSIONING PHASE						
Impact 1 ▪ Vehicles and equipment required for decommissioning will alter the natural character of the study area	*Status* *Spatial Extent* *Duration*	*Negative* *Local* *Short Term*	*Moderate (3)*	▪ All infrastructure that is not required for post-decommissioning use should be removed. ▪ Carefully plan to minimize the decommissioning period and avoid delays.	*Low (4)*	*Medium*

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential Mitigation Measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
and expose visual receptors to visual impacts. ▪ Decommissioning activities may be perceived as an unwelcome visual intrusion. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during decommissioning would expose bare soil (scarring) which could visually contrast with the surrounding environment. ▪ Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact. ▪ Decommissioned infrastructure left on the site may be visually intrusive.	*Consequence* *Probability* *Reversibility* *Irreplaceability*	*Substantial* *Very likely* *High* *Low*		▪ Maintain a neat decommissioning site by removing rubble and waste materials regularly. ▪ Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. ▪ All cleared areas should be rehabilitated as soon as possible.		
DECOMMISSIONING PHASE (Direct Impacts)						
Impact 1 ▪ Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. ▪ Decommissioning activities may be perceived as an unwelcome visual intrusion.	*Status* *Spatial Extent* *Duration* *Consequence* *Probability*	*Negative* *Local* *Short Term* *Substantial* *Very likely*	*Moderate (3)*	▪ All infrastructure that is not required for post-decommissioning use should be removed. ▪ Carefully plan to minimize the decommissioning period and avoid delays. ▪ Position storage/stockpile areas in unobtrusive positions in the landscape, where possible. ▪ Maintain a neat decommissioning site by removing rubble and waste materials regularly.	*Low (4)*	*Medium*

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential Mitigation Measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during decommissioning would expose bare soil (scarring) which could visually contrast with the surrounding environment. ▪ Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact. ▪ Decommissioned infrastructure left on the site may be visually intrusive.	*Reversibility*	*High*		▪ Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. ▪ All cleared areas should be rehabilitated as soon as possible.		
	Irreplaceability	*Low*				

The table below includes an assessment of the potential **cumulative impacts** identified for the proposed project for the construction, operational and decommissioning phases.

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential Mitigation Measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
CONSTRUCTION PHASE						
• Additional renewable energy and associated grid connection	*Status*	*Negative*	*Moderate (3)*	▪ Carefully plan to minimise the construction period and avoid construction delays.	*Moderate (3)*	*Medium*
	Spatial Extent	*Local*				

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential Mitigation Measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
infrastructure developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. • Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings. • Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. • The night-time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.	*Duration* *Consequence* *Probability* *Reversibility* *Irreplaceability*	*Short Term* *Substantial* *Very likely* *High* *Low*		▪ Where possible, restrict construction activities to daylight hours in order to negate or reduce *the visual impacts associated with lighting. ▪ Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Vegetation clearing should take place in a phased manner. ▪ Inform receptors within 500 m of the site of the construction programme and schedules. ▪ Make use of existing gravel access roads where possible. ▪ Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible. ▪ Ensure that suitable dust suppression techniques are implemented: ○ on all access roads; ○ in all areas where vegetation clearing has taken place; and ○ on all soil stockpiles. ▪ Maintain a neat construction site by removing litter, rubble and waste materials regularly.		
OPERATIONAL PHASE						

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential Mitigation Measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
• Additional renewable energy and associated grid connection infrastructure developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. • Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings. • Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. • The night-time visual environment could be altered as a result of operational and security lighting at multiple	*Status* *Spatial Extent* *Duration* *Consequence* *Probability* *Reversibility* *Irreplaceability*	*Negative* *Local* *Long Term* *Substantial* *Very likely* *Moderate* *Low*	*Moderate (3)*	▪ Restrict vegetation clearance on the site to that which is required for the correct operation of the facility. ▪ As far as possible, limit the number of maintenance vehicles which are allowed to access the site. ▪ Ensure that suitable dust suppression techniques are implemented on all gravel access roads. ▪ As far as possible, limit the amount of security and operational lighting present on site. ▪ Where possible, avoid placing lights on tower/pylon structures. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Lighting fixtures should make use of minimum lumen or wattage. ▪ Mounting heights of lighting fixtures should be limited, or alternatively, foot-light or bollard level lights should be used. ▪ If economically and technically feasible, make use of motion detectors on security lighting. ▪ Buildings on the site should be painted with natural tones that fit with the surrounding environment. ▪ Non-reflective surfaces should be utilised where possible.	*Moderate (3)*	*Medium*

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential Mitigation Measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
renewable energy facilities in the broader area.						
DECOMMISSIONING PHASE						
• Additional renewable energy and associated grid connection infrastructure developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. • Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings. • Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes.	*Status* *Spatial Extent* *Duration* *Consequence* *Probability* *Reversibility* *Irreplaceability*	*Negative* *Local* *Short Term* *Moderate* *Very likely* *High* *Low*	*Low (4)*	▪ All infrastructure that is not required for post-decommissioning use should be removed. ▪ Carefully plan to minimize the decommissioning period and avoid delays. ▪ Maintain a neat decommissioning site by removing rubble and waste materials regularly. ▪ Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. ▪ All cleared areas should be rehabilitated as soon as possible.	*Low (4)*	*Medium*

D.2.2.4 Concluding Statement

A broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a moderate visual sensitivity. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs. No formal protected areas and relatively few sensitive or potentially sensitive receptor locations were identified in the study area, thus confirming the moderate level of visual sensitivity.

The assessment identified nine potentially sensitive visual receptor locations within the combined study area. Although the findings of the desktop assessment were largely confirmed during the field investigation, it was not possible to confirm the presence of receptors at all the identified locations due to access restrictions. Notwithstanding this limitation, all the identified receptor locations were assessed as part of the VIA as they are still regarded as being potentially sensitive to the visual impacts associated with the proposed development.

Only one of the identified receptor locations is expected to experience high levels of visual impact as a result of the proposed development. This receptor location is however inside the assessment area for the Padloper Solar Facilities 6 and 7 and it is understood that the landowner is involved in the Padloper PV and EGI Cluster and thus would not view the proposed development is a negative light.

Although the R63 receptor road traverses the study area, the PV arrays and powerlines are some considerable distance from the road and not visible from much of the road.

It is SLR Consulting's opinion that the potential visual impacts associated with the proposed project is negative and of moderate significance. Given the low level of human habitation and the relatively low number of sensitive and potentially sensitive receptor locations however, the project is deemed acceptable from a visual perspective and the EA should be granted. SLR Consulting is of the opinion that the impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

D.2.3 Heritage Impact Assessment (Archaeology and Cultural Landscape)

The Heritage Impact Assessment was undertaken by Dr. Jayson Orton to inform the outcome of this BA from an archaeology and cultural landscape perspective. The complete Heritage Impact Assessment is included in Appendix D.3 of this BA Report. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the Heritage Impact Assessment. The information below is extracted from Orton (2023).

D.2.3.1 Approach and Methodology

A survey of available literature was carried out to assess the general heritage context into which the development would be set. The information sources used in this report include, maps, Aerial photographs, cadastral data and data from SAHRIS (please refer to Appendix D. 3 of this BA Report for a detailed table of the information used in this assessment with relevant dates of each source referenced in the text as needed). Data was also collected via a field survey. The sites were subjected to detailed foot surveys on 19th and 20th September 2022 by three archaeologists (Dr. Jayson Orton, Steve van den Heever and Joseph Matembo). This was during spring but, in this dry area, the season makes no meaningful difference to vegetation covering and hence the ground visibility for the

archaeological survey. Other heritage resources are not affected by seasonality. During the survey the positions of finds and survey tracks were recorded on a hand-held Garmin Global Positioning System (GPS) receiver set to the WGS84 datum. Photographs were taken at times in order to capture representative samples of both the affected heritage and the landscape setting of the proposed development. The data quality is suitable for the purpose of informing this report. It should be noted that the amount of time between the dates of the field inspection and final report does not materially affect the affect the outcome of the report.

D.2.3.2 Relevant Project Aspects relating to Heritage Impacts

All aspects of the proposed development are relevant since excavations for foundations may impact on archaeological and/or palaeontological remains, while the above-ground aspects create potential visual (contextual) impacts to the cultural landscape and any significant heritage sites that might be visually sensitive.

D.2.3.3 Potential Impacts

The potential impacts identified during the Heritage Impact Assessment include:

Construction Phase

- Damage or destruction of archaeological materials
- Intrusion of solar facility and equipment into the landscape
- Intrusion of EGI and equipment into the landscape

Operational Phase

- Intrusion of solar facility and equipment into the landscape
- Intrusion of EGI and equipment into the landscape

Decommissioning Phase

- Intrusion of solar facility and equipment into the landscape
- Intrusion of EGI and equipment into the landscape

Cumulative impacts

- Damage or destruction of archaeological materials
- Intrusion of solar facility and equipment into the landscape

D.2.3.4 Impact Assessment

The impact assessments for both projects are the same. The assessments for palaeontology are provided in the following section. The table below includes an assessment of the potential **direct impacts** identified for the construction, operational and decommissioning phases.

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential Mitigation Measures	Significance and Ranking (Post-Mitigation)	Confidence Level
Construction Phase						
Damage or destruction of archaeological materials by the proposed project	Status	Negative	Very low (5)	▪ Ensure avoidance of the site at waypoint 184. ▪ Report any chance finds.	Very low (5)	High
	Spatial extent	Local				
	Duration	Permanent				
	Consequence	Slight				
	Probability	Very unlikely				
	Reversibility	Non-reversible				
	Irreplaceability	High				
Intrusion of solar facility and equipment into the landscape	Status	Negative	Moderate (3)	▪ Minimise duration of construction period ▪ Minimise cut-and-fill and landscape scarring in general. ▪ Ensure effective rehabilitation of areas disturbed by construction activities which are not needed during operation.	Low (4)	High
	Spatial extent	Local				
	Duration	Short term				
	Consequence	Substantial				
	Probability	Very likely				

	Reversibility	Moderate				
	Irreplaceability	Moderate				
Intrusion of EGI and equipment into the landscape	Status	Negative	Low (4)	▪ Ensure effective rehabilitation of areas disturbed by construction activities which are not needed during operation. ▪ Minimise cut-and-fill and landscape scarring in general (the associated access track up the hill in the east is most important in this regard). ▪ Minimise duration of construction period.	Very low (5)	High
	Spatial extent	Local				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Operational Phase						
Intrusion of solar facility into the landscape	Status	Negative	Moderate (3)	▪ Ensure that all maintenance vehicles stay within designated areas. ▪ Make use of motion sensors, downlighters, etc to minimise lighting impacts at night. ▪ Paint structures in earthy tones to reduce contrast where technically feasible.	Low (4)	High
	Spatial extent	Local				
	Duration	Long term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
	Status	Negative	Low (4)	▪ Ensure that all maintenance vehicles stay within designated areas.	Very low (5)	High
	Spatial extent	Local				

Intrusion of EGI and equipment into the landscape	Duration	Long term				
	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	Moderate..900				
	Irreplaceability	Moderate				
Decommissioning Phase						
Intrusion of solar facility and equipment into the landscape	Status	Negative	Moderate (3)	▪ Minimise duration of decommissioning period. ▪ Ensure effective rehabilitation of all areas disturbed by decommissioning activities.	Low (4)	High
	Spatial extent	Local				
	Duration	Short term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Intrusion of EGI and equipment into the landscape	Status	Negative	Low (4)	▪ Minimise duration of decommissioning period. ▪ Ensure effective rehabilitation of all areas disturbed by decommissioning activities.	Very low (5)	High
	Spatial extent	Local				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	Moderate				

	Irreplaceability	Moderate				
Cumulative impacts						
Impacts to archaeology	Status	Negative	Very low (5)	▪ Ensure avoidance of the site at waypoint 184. ▪ Report any chance finds.	Very low (5)	High
	Spatial extent	Local				
	Duration	Permanent				
	Consequence	Slight				
	Probability	Very unlikely				
	Reversibility	Non-reversible				
	Irreplaceability	High				
Intrusion of solar facility and equipment into the landscape	Status	Negative	Low (4)	▪ Ensure that all maintenance vehicles stay within designated areas. ▪ Make use of motion sensors, downlighters, etc to minimise lighting impacts at night. ▪ Paint structures in earthy tones to reduce contrast where technically feasible.	Very low (5)	High
	Spatial extent	Regional				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Intrusion of EGI and equipment into the landscape	Status	Negative	Low (4)	▪ Ensure that all maintenance vehicles stay within designated areas.	Very low (5)	High
	Spatial extent	Regional				
	Duration	Long term				

	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

D.2.3.5 Concluding Statement

The solar facility layout was revised to avoid the single significant archaeological site at waypoint 184 and impacts to this site are not expected. A house lies adjacent to the eastern part of the proposed facility access road. The current farm track lies 19 m from the corner of this house and its reuse should not result in any impacts to the structure. It should, nonetheless, be demarcated as a No-Go area. Reuse of the road through the buffer is thus acceptable. One archaeological site occurs 80 m from the north-eastern end of the powerline route and is not expected to be impacted.

Given the generally low sensitivity of the various study areas - the lack of impacts to heritage resources, the heritage specialist is of the opinion that the proposed Padloper PV 5 along with its respective EGI (and associated infrastructure) may be authorised in full but subject to the following recommendations which should be included as conditions of authorisation and contained in the EMPr.

D.2.4 Palaeontology Impact Assessment

The Palaeontology Impact Assessment (PIA) was undertaken by Elize Butler to inform the outcome of this BA from a palaeontological perspective. As noted above, an integrated HIA containing Archaeology, Cultural Landscape and Palaeontology has been undertaken for the project in line with the requirements of HWC. However, for ease of reference, this section only deals with the Palaeontology. The complete Heritage Impact Assessment is included in Appendix D.3 of this BA Report. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the Palaeontology Impact Assessment. The information below is extracted from Butler (2023) (Appendix D.3 of this BA Report).

D.2.4.1 Approach and Methodology

The present field-based PIA assesses the potential impacts on fossil heritage on the development. footprint. The approach to this study can be briefly summarized as follows. All possible information was consulted. This included National DFFE Screening Tool, Google Earth Kmz files, Background Information Document (BID) for the proposed development obtained from CSIR Environmental Management Services; Google Earth satellite imagery; Palaeosensitivity map on SAHRIS website, 1;250 000 Beaufort West 3222(1979) Geological Map (Council for Geosciences, Pretoria) including 1:250 000 geological map (3122 Victoria West) and relevant sheet explanations (i.e. Roux and Keyser 1988); Published geographical and paleontological literature; relevant PIAs in the area; and a four day comprehensive site-specific field survey of the development footprint for the combined projects conducted on foot and motor vehicle in January. The fossil potential of the proposed development area was determined by crisscrossing the development footprint and by physically investigating all bedrock outcrops to determine the lithology and fossil content of the outcrops. Fossils occurring at the surface is very unpredictable and a representative sample size of the area has been investigated. However, it is important to note that the absence of fossils in a development footprint does not necessarily mean that paleontological significant material is not present on site (on or beneath ground surface).

D.2.4.2 Relevant Project Aspects relating to Palaeontological Impacts

All aspects of the proposed development are relevant since excavations for foundations may impact on archaeological and/or palaeontological remains.

D.2.4.3 Potential Impacts

The key impacts on local palaeontological heritage resources considered are direct and relate to the potential disturbance, damage, destruction or sealing-in of scientifically important and legally protected fossils preserved at or beneath the surface of the ground due to construction phase excavations (e.g., PV module footings, building foundations, underground cables, storm water channels), and ground clearance (e.g., access roads, solar arrays).

The impacts identified only apply to the construction phase of the proposed developments since further significant impacts on fossil heritage during the planning, operational and decommissioning phases of the facilities are not anticipated.

It should be noted that, based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the overall development footprint (PV and overhead power line 400 m corridor) is rare. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. 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. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils. The Cumulative impacts of the development near Murraysburg is considered to be Medium pre-mitigation and Low post-mitigation and falls within the acceptable limits for the project.

Construction Phase

- Loss of fossil heritage
- Disturbance/damage and destruction of fossils at /below surface

Cumulative impact

- Loss of fossil heritage

D.2.4.4 Impact Assessment

The table below includes an assessment of the potential **direct impacts** identified for the proposed Padloper PV 5, EGI 5 and their associated infrastructure.

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
CONSTRUCTION PHASE						
Loss of fossil Heritage Disturbance/damage and destruction of fossils at /below surface	*Status*	**Negative**	**Low (4)**	▪ Implement the Chance Find Protocol.	**Very Low (5)**	**High**
	Spatial Extent	**Site specific**				
	Duration	**Permanent**				
	Consequence	**Moderate**				
	Probability	**Unlikely**				
	Reversibility	**Non-reversible**				

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
	Irreplaceability	**Irreplaceable**				

Renewable energy facilities within the Padloper PV Cluster development area (30 km radius range) will have a Medium Palaeontological Sensitivity. If all the mitigation measures are carried out, a conservative estimate of the cumulative impacts on fossil Heritage will be Low.

The table below includes an assessment of the cumulative impact during construction phase for the proposed Padloper PV 5, EGI 5 and their associated infrastructure.

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
CONSTRUCTION PHASE						
Loss of fossil Heritage	*Status*	**Negative**	**Moderate (3)**	▪ Implement the Chance Find Protocol.	**Low (4)**	**High**
	Spatial Extent	**Site specific**				
	Duration	**Permanent**				
	Consequence	**Moderate**				
	Probability	**Unlikely**				
	Reversibility	**Non-reversible**				
	Irreplaceability	**Irreplaceable**				

D.2.4.5 Concluding Statement

Based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the overall development footprint (PV facility and overhead power line 400 m corridor) is rare. A medium Palaeontological Significance has been allocated for the construction phase of the PV development pre-mitigation and a low significance post mitigation. The construction phase will be the only development phase impacting Palaeontological Heritage and no significant impacts are expected to impact the Operational and Decommissioning phases. As the No-Go Alternative considers the option of 'do nothing' and maintaining the status quo, it will have a Neutral impact on the Palaeontological Heritage of the development. The Cumulative Impacts of the development near Murraysburg is considered to be Medium pre-mitigation and Low post-mitigation and falls within the acceptable limits for the project.

It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. 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. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils. The significance of the impact occurring will be negative low before mitigation. The post-mitigation, the significance of the impact will be very low.

However, the study also notes that the proposed project is mostly underlain by the Balfour Formation (Adelaide Subgroup, Beaufort Group, Karoo Supergroup) with a small portion underlain by Jurassic Dolerite. It is further explained that the Balfour Formation (Adelaide Subgroup, Beaufort Group, Karoo Supergroup) has a Very High Palaeontological Sensitivity. Therefore, the Environmental Control Office/designated responsible person for this project, must constantly monitor Balfour Formation area during surface clearance and construction. If Palaeontological Heritage is uncovered during surface clearing and excavations, the Chance find Protocol attached should be implemented immediately.

D.2.5 Terrestrial Biodiversity and Species

The Terrestrial Biodiversity and Species Assessment was undertaken by Brian Colloty of EnviroSci (Pty) Ltd. The complete Terrestrial Biodiversity and Species Assessment is included in Appendix D.4 of this BA Report. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the Terrestrial Biodiversity and Species Assessment. The information below is extracted from Colloty (2023) (Appendix D.4 of the BA Report).

D.2.5.1 Approach and Methodology

The approach and methodology adopted in the Terrestrial Biodiversity and Species Assessment is described in this section.

A desktop and literature review of the study area under investigation was conducted to collate as much information as possible prior to detailed fieldwork conducted specifically in the summer months of February (4 – 8) and March (22 – 24) 2022. The purpose of the desktop assessment was to rank relevant areas according to their ecological sensitivity and to identify areas of ecological risk prior to the site visit.

Other relevant literature, for example from the South African Biodiversity Information Facility, South African Herpetological Atlas Projects, relevant Red Data books, ordinances and all systematic bioregional / conservation plans) was also reviewed.

Fieldwork was limited to visual sightings by means of transect walks and plot-based sampling. Particular attention was paid to the occurrence of Red Data species or protected species as follows:

Vegetation units were sampled by means of the following techniques at each of the proposed development sites:

- Data collection was plot-based and in the form of vegetation samples within selected reference areas to categorise the various vegetation units.
- Results from the data analysis provided a description of the dominant and typical species occurring on the site(s), and includes:
    - Threatened, endemic or rare species, with an indication of the relative functionality and conservation importance of the specific community in the area under investigation (i.e., study area);
    - Invasive or exotic species present and localities in the area; and the
    - Functional and conservation importance of all vegetation communities in the investigation area.

Mammals were sampled by means of the following techniques:

- Fieldwork included visual sightings by means of transect walks to evaluate the presence of mammal taxa. During the site visit, specific attention was given to signs (droppings, burrows, vocalisations, etc.) of taxa and the presence of suitable habitat;

- A full list of species observed and expected to occur was made; and
- Specific reference was made to the occurrence of Red Data species.

Herpetofauna (reptiles and amphibians) were sampled by means of the following techniques:

- Visual observations (including nocturnal surveys);
- Active searching techniques; and
- Vocalisations (for amphibians).

Invertebrates were sampled by means of the following techniques:

- Random linear transects using standard hand nets while focussing on specific indicator groups;
- All taxa caught, were identified to species level if appropriate taxonomic literature is available (as is the case for butterflies), otherwise the concept known as Recognisable Taxonomic Units (RTUs) or morphospecies will be applied;
- The presence of conservation important taxa was verified by intensive searching of likely habitat types or burrows; and
- Additional information on faunal communities residing within the area of investigation was sourced from distributional data/records (both recent and historical), relevant literature, the private sector and other atlas projects.

Habitat areas (based on the species compositions of the vegetation analysis, topography and soils) were ranked into High / No-Go, Medium or Low classes in terms of their significance based on the Ecological Sensitivity and Conservation Importance. A sensitivity and habitat map (including buffer zones if applicable) was produced based on the above information. This combined with the aquatic sensitivity map and was utilised by the project proponent to finalise the development layout.

D.2.5.2 Relevant Project Aspects relating to Terrestrial Biodiversity and Species Impacts

The following project related activities are relevant from a terrestrial biodiversity perspective:

- Clearance or partial clearance of vegetation, where applicable, during the construction phase.
- Establishment of roadways (i.e. access roads leading to the site and internal gravel access roads) and hard panning of surfaces, with minor storm water management aspects being introduced during the construction and operational phases.
- Establishment of modular arrays with concomitant cabling and provision of invertors within the arrays.
- Establishment of a BESS; offices and related infrastructure, as well as a yard for storage and general operations.
- Establishment an on-site substation, which will be fenced and isolated from the balance of the site.
- Placement of pylons for overhead powerline pylons

D.2.5.3 Potential Impacts

The following direct and indirect impacts of the facilities, which are aligned with those contained in the Biodiversity Assessment Protocol were assessed and included the following:

Construction Phase

- Potential impact 1: Loss of Species of Special Concern (SSC).
- Potential impact 2: Damage and disturbance of the habitats rated as Very High Sensitivity.

- Potential impact 3: Loss of ecosystem services, and or habitats that would result in habitat fragmentation, especially those included in any Biodiversity Conservation plans as CBAs or Ecological Support Areas. This in turn could also lead to habitat fragmentation.
- Potential impact 4: Displacement of any animals because of any disturbance or habitat loss. This includes animal mortalities related to construction vehicle traffic.

Operational and Maintenance Phase

- Potential impact 5: Displacement of any animals which mostly includes animal mortalities related to vehicle traffic.

Decommissioning Phase

- Potential impact 6: Damage and disturbance of the habitats rated as Very High Sensitivity.
- Potential impact 7: Displacement of any animals because of any disturbance or habitat loss. This includes animal mortalities related to construction vehicle traffic.

Cumulative Impacts:

The cumulative impact assessment considers other proposed, approved and existing facilities and power lines within the 30 km radius.

Given the above, cumulative impacts arising from the implementation of this project and other land use changes in the region are likely to exhibit the following:

- Cumulative impact: All activities, when combined with present day activities.

D.2.5.4 Impact Assessment

The impact assessments for both projects are the same. The table below includes an assessment of the potential impacts identified for the Padloper PV 5, Padloper EGI 5 and their associated infrastructure for the construction, operational and decommissioning phase.

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential Mitigation Measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
CONSTRUCTION PHASE						
Loss of Species of Special Concern (SSC)	*Status*	Negative	**Low (4)**	• A preconstruction walkdown must be conducted to identify any areas that contain any terrestrial plant SSC so that these can be demarcated and avoided in the final design process. • Any remaining species that could not be avoided must then be relocated in a Search and Rescue programme that should be initiated prior to construction. Note this has not been included as a means to reduce the impact rating. • Develop Construction EMPr, Monitoring and Rehabilitation Plan.	**Very Low (5)**	High
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Unlikely				
	Reversibility	Moderate				
	Irreplaceability	Low				
Damage and disturbance of the habitats rated as Very High Sensitivity – Direct Impact	*Status*	Negative	**Low (4)**	• A pre-construction walkthrough by a terrestrial specialist is recommended and they can assist with the development of the Construction Rehabilitation and Monitoring Plan, coupled to micro-siting of the final layout. • Where large cut and fill areas are required for roads, these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation. • All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprint during the construction phase.	**Very Low (5)**	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				
Loss of ecosystem services, and or habitats	*Status*	Negative	**Low (4)**	• Develop and implement a Construction Rehabilitation and Monitoring Plan post Environmental Authorisation.	**Very Low (5)**	High
	Spatial Extent	Site specific				

Impact	*Impact Criteria*		*Significance and Ranking (Pre-Mitigation)*	*Potential Mitigation Measures*	*Significance and Ranking (Post-Mitigation)*	*Confidence Level*
that would result in habitat fragmentation, especially those included in any Biodiversity Conservation plans as Critical Biodiversity areas or Ecological Support Areas. This in turn could also lead to habitat fragmentation – Direct Impact	*Duration*	Short term		This must be developed following the finalisation of the PV and road layout and a walk down has been completed. This plan should include relocation of suitable plant species, but more important protect any topsoil stores and promote the collection of vegetative material and propagules / seed to assist with the revegetation of the site. • Where possible, temporary construction laydown or assembly areas should be sited on transformed areas. • Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re- establishment of plant cover is desirable to prevent erosion.		
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				
Displacement of any animals because of any disturbance or habitat loss. This includes animal mortalities related to construction vehicle traffic – Direct Impact	*Status*	Negative	**Low (4)**	• Clear demarcation during the construction phase of all undisturbed sensitive areas that are not within the direct footprint to ensure that there is no uncontrolled access by construction vehicles and labourers. • Educate contractors as to the importance of the undisturbed conservations areas and importance of avoiding them. • All vehicles must stick to designated and prepared roads and adhere to the speed limit on site of 40 km/hr. • Mitigating the risk of poaching by preventing individuals from wandering in the veld after hours; banning the possession of dogs on site by construction and maintenance staff.	**Very Low (5)**	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				
OPERATIONAL PHASE						
Potential impact 5: Displacement of any animals which mostly includes animal mortalities related to vehicle traffic - Direct	*Status*	Negative	**Low (4)**	• All vehicles must stick to designated and prepared roads and adhere to the speed limit on site of 40km/hr.	**Very Low (5)**	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Unlikely				
	Reversibility	Moderate				

Impact	*Impact Criteria*		*Significance and Ranking (Pre-Mitigation)*	*Potential Mitigation Measures*	*Significance and Ranking (Post-Mitigation)*	*Confidence Level*
	Irreplaceability	Low				
DECOMMISSIONING PHASE						
Loss of ecosystem services, and or habitats that would result in habitat fragmentation, especially those included in any Biodiversity Conservation plans as Critical Biodiversity areas or Ecological Support Areas. This in turn could also lead to habitat fragmentation – Direct Impact	*Status* *Spatial Extent* *Duration* *Consequence* *Probability* *Reversibility* *Irreplaceability*	Negative Site specific Short term Moderate Likely Moderate Low	**Low (4)**	• Develop and implement a Decommissioning Rehabilitation and Monitoring Plan. • Where possible, temporary construction lay-down or assembly areas should be sited on transformed areas. • Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re- establishment of plant cover is desirable to prevent erosion.	**Very Low (5)**	High
Displacement of any animals because of any disturbance or habitat loss. This includes animal mortalities related to vehicle traffic – Direct Impact	*Status* *Spatial Extent* *Duration* *Consequence* *Probability* *Reversibility* *Irreplaceability*	Negative Site specific Short term Moderate Likely Moderate Low	**Low (4)**	• Clear demarcation during the decommissioning phase of all undisturbed sensitive areas that are not within the direct footprint to ensure that there is no uncontrolled access by construction vehicles and labourers. • Educate contractors as to the importance of the undisturbed conservations areas and importance of avoiding them. • All vehicles must stick to designated and prepared roads and adhere to the speed limit on site of 40km/hr. • Mitigating the risk of poaching by fencing in the accommodation compounds (if present) of the construction crews, to prevent individuals from wandering in the veld after hours; banning the possession of dogs on site by staff.	**Very Low (5)**	High

When assessing the impacts, it is unlikely that additional large-scale impacts on the terrestrial environment would occur, this being based on the fact that once stable / vegetated, the works areas would not create any additional disturbances. This is assuming that the mitigation in the construction, operational and decommissioning phases are adhered to.

Therefore, the cumulative assessment considers the various proposed renewable projects that occur within a 30 km radius of this site and their associated grid connections as well as the remainder of the Padloper cluster projects. EnviroSci has assisted with assessing and micro-siting several of these projects, thus understands these developments and the potential impacts and proposed mitigations.

The table below includes an assessment of the potential cumulative impacts identified for the Padloper PV 5, Padloper EGI 5 and their associated infrastructure for the construction, operational and decommissioning phases.

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential Mitigation Measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
CONSTRUCTION PHASE						
Additional activities within delineated Very High Sensitivity Areas	*Status*	*Negative*	Low (4)	It is assumed that all projects will adhere to the site-specific recommendations in their respective EMPrs to ensure that impacts are mitigated where possible – including avoidance of identified sensitive systems and usage of existing disturbance areas.	Very low (5)	High
	Spatial Extent	*Site specific*				
	Duration	*Long term*				
	Consequence	*Moderate*				
	Probability	*Unlikely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				
OPERATIONAL PHASE						

Displacement of fauna	*Status*	*Negative*	Very low (5)	It is assumed that all projects will adhere to the site-specific recommendations in their respective EMPrs to ensure that impacts are mitigated where possible - including usage of existing disturbance area and stabilisation of erosion points (sandbags in the short term) using gabions and reno mattress as required.	Very low (5)	High
	Spatial Extent	*Site specific*				
	Duration	*Short term*				
	Consequence	*Low*				
	Probability	*Unlikely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				
DECOMMISSIONING PHASE						
Displacement of fauna	*Status*	*Negative*	Very low (5)	It is assumed that all projects will adhere to the site-specific recommendations in their respective EMPrs to ensure that impacts are mitigated where possible - including usage of existing disturbance area and stabilisation of erosion points (sandbags in the short term) using gabions and reno mattress as required.	Very low (5)	High
	Spatial Extent	*Site specific*				
	Duration	*Short term*				
	Consequence	*Low*				
	Probability	*Unlikely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				

D.2.5.5 Concluding Statement

The nature of the project is such that it carries a low to moderate intensity impact on terrestrial resources, with highest number of impacts being associated creation of PV panel areas, roads, installation of cables and other infrastructures across the site. The project areas are however small, allowing for retention of much of the natural area so the ecosystems should remain largely unaffected. This is largely based on the assumption that all Very High sensitivity habitats can be avoided, through the use of the existing tracks and roads shown in this assessment.

In conclusion, most of the anticipated impacts will include disturbance during the construction phase, while changes to form and function of the site will be limited in the operational phase, and it is anticipated that all these would be Very Low post mitigation.

Based on the findings of this study, the specialist finds no reason to withhold an authorisation of any of the proposed activities, assuming that the key recommended mitigations measures are implemented.

D.2.6 Aquatic Biodiversity and Species

The Aquatic Biodiversity Assessment was undertaken by Brian Colloty of EnviroSci (Pty) Ltd to inform the outcome of this BA from an aquatic biodiversity perspective. The complete Aquatic Biodiversity and Species Assessment is included in Appendix D.5 of this BA Report. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the Aquatic Biodiversity and Species Assessment. The information below is extracted from Colloty (2023).

D.2.6.1 Approach and Methodology

The approach and methodology adopted in the Aquatic Biodiversity and Species Assessment is described in this section.

This aquatic assessment followed the approaches of several national guidelines with regards to wetland assessment. These have been modified by the author, to provide a relevant mechanism of assessing the present state of the study area's aquatic systems, applicable to the specific environment. They were used in a clear and objective manner, to identify and assess the potential impacts associated with the proposed development sites based on information collected within the relevant farm portions.

Current water resource classification systems make use of the Hydrogeomorphic (HGM) approach, and for this reason, the National Wetland Classification System (NWCS) approach was used in this study. It is important to understand the legal definition of a wetland, the means of assessing wetland conservation and importance and the relevant legislation aimed at protecting wetlands.

D.2.6.2 Relevant Project Aspects relating to Aquatic Biodiversity and Species Impacts

The following project related activities are relevant from an aquatic biodiversity perspective:

- Site access and clearing of vegetation for permanent structures, laydown yards and roads;
- Establishment of laydown yard/construction camps;
- Excavations and earthworks for infrastructure setting;
- Stockpiling and movement of soils and construction materials;

- Storage and use of chemicals, fuels and oils;
- Diversion and crossing of watercourses by roadways; and
- Storm-water management.

D.2.6.3 Potential Impacts

Due to the nature of the project layouts, the overall impacts are typically related to the construction and decommissioning phases of the project, i.e., when the soils are disturbed when the road networks and hard surface areas are developed. It has been assumed that the overhead cable sections will have the poles placed outside of the demarcated water course areas and would thus have less of an impact or if they have to span waterbodies such as floodplain areas, no access tracks will be created in these areas and only the poles will be installed.

Construction Phase

- Potential impact 1: Loss of aquatic species of special concern.
- Potential impact 2: Damage or loss of riparian and watercourse systems and disturbance of the waterbodies in the construction phase.
- Potential impact 3: Spills and leaks from construction vehicles / machinery when working in or near the delineated systems, impacting localised surface water quality.

Operational Phase

- Potential impact 4: Creation of hard surfaces, resulting in runoff, erosion and sedimentation.

Decommissioning Phase

- Potential impact 5: Damage or loss of riparian and watercourse systems and disturbance of the waterbodies in the construction phase.
- Potential impact 6: Spills and leaks from construction vehicles / machinery when working in or near the delineated systems, impacting localised surface water quality.

Cumulative Impacts

- Cumulative impact: The cumulative assessment considers the various proposed renewable projects (and their associated infrastructure) that occur within a 30 km radius of this site and their associated grid connections as well as the remainder of the Padloper cluster projects.

D.2.6.4 Impact Assessment

The table below includes an assessment of the potential impacts identified for the Padloper PV 5, Padloper EGI 5 and their associated infrastructure for the construction, operational and decommissioning phases.

Impact	*Impact Criteria*		*Significance and Ranking (Pre-Mitigation)*	*Potential Mitigation Measures*	*Significance and Ranking (Post-Mitigation)*	*Confidence Level*
CONSTRUCTION PHASE						
Loss of Species of Special Concern (SSC)	*Status*	Negative	Low (4)	• A preconstruction walkdown must be conducted to identify any areas that may contain any aquatic SSC so that these can be demarcated and avoided in the final design process. • Any remaining species that could not be avoided must then be relocated in a Search and Rescue programme that should be initiated prior to construction. (Note this has not been included to reduce the impact rating) • Develop Construction EMPr, Monitoring and Rehabilitation Plan.	Very Low (5)	High
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Unlikely				
	Reversibility	Moderate				
	Irreplaceability	Low				
Damage or loss of riparian and riverine systems and disturbance of the waterbodies in the construction phase	*Status*	Negative	Low (4)	• A pre-construction walkthrough by an aquatic specialist is recommended so they can assist with the development of the SWMP and Aquatic Construction Rehabilitation and Monitoring Plan, coupled to micro-siting of the final layout. • Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc). • Furthermore, the following applies to watercourse crossing upgrades associated with the proposed development: ○ All pipe culverts must be removed and replaced with suitable sized box culverts, where road levels are raised.	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				

Impact	*Impact Criteria*		*Significance and Ranking (Pre-Mitigation)*	*Potential Mitigation Measures*	*Significance and Ranking (Post-Mitigation)*	*Confidence Level*
				○ River levels, regardless of the current state of the river / water course will be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a pre-construction walkdown. ○ Where large cut and fill areas are required, these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation. Monitoring • All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings.		
Impact on localised surface water quality (Spills and leaks from construction vehicles / machinery when working in or near the delineated systems)	*Status*	Negative	Low (4)	• All liquid chemicals including fuels and oil, including for the BESS, must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely. • Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment). • Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel. • All construction camps, laydown areas, wash bays, batching plants or areas and any stores should be more than 50m from any demarcated water courses. • Littering and contamination associated with construction activity must be avoided through effective construction camp management.	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				

Impact	*Impact Criteria*		*Significance and Ranking (Pre-Mitigation)*	*Potential Mitigation Measures*	*Significance and Ranking (Post-Mitigation)*	*Confidence Level*
				• No stockpiling should take place within or near a water course. • All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable.		
OPERATIONAL PHASE						
Creation of hard surfaces resulting in runoff, erosion and sedimentation	*Status*	Negative	Low (4)	• A SWMP must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. Effective stormwater management must include effective stabilisation (gabions and reno mattresses) of exposed soil. • Monitoring should occur on a monthly basis for 6 months post construction and where any unstable soils occur, these must be protected with temporary stabilisation dependent on the scale of the impact i.e., sandbags - hay bales) until areas become revegetated. If any areas require permanent erosion protection (e.g., gabions or stone pitching) then this must be included in the WULA / GA application.	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Unlikely				
	Reversibility	Moderate				
	Irreplaceability	Low				
DECOMMISSIONING PHASE						
Damage or loss of riparian and riverine systems and disturbance of the waterbodies.	*Status*	Negative	Low (4)	• Development of the SWMP and Aquatic Rehabilitation and Monitoring Plan, is recommended. • Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc). • Furthermore, the following applies to watercourse crossing upgrades: • All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential Mitigation Measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
				footprints and especially in areas near the decommissioned crossings.		
Impact on localised surface water quality *(Spills and leaks from construction vehicles / machinery when working in or near the delineated systems)*	*Status*	Negative	Low (4)	• All liquid chemicals including fuels and oil, including for the BESS, must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely. • Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment). • Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel. • All construction camps, laydown areas, wash bays, batching plants or areas and any stores should be more than 50m from any demarcated water courses. • Littering and contamination associated with construction activity must be avoided through effective construction camp management. • No stockpiling should take place within or near a water course. • All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable.	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				

When assessing the impacts, it is unlikely that additional large-scale impacts on the terrestrial environment would occur, this being based on the fact that once stable / vegetated, the works areas would not create any additional disturbances. This is assuming that the mitigation in the construction, operational and decommissioning phases are adhered to.

Therefore, the cumulative assessment considers the various proposed renewable projects that occur within a 30 km radius of this site and their associated grid connections as well as the remainder of the Padloper cluster projects. EnviroSci has assisted with assessing and micro-siting several of these projects, thus understands these developments and the potential impacts and proposed mitigations.

The table below includes an assessment of the potential cumulative impacts identified for the Padloper PV 5, Padloper EGI 5 and their associated infrastructure for the construction, operational and decommissioning phases.

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential Mitigation Measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
CONSTRUCTION PHASE						
Additional activities within delineated Very High Sensitivity Areas	*Status*	*Negative*	Low (4)	It is assumed that all projects will adhere to the site-specific recommendations in their respective EMPrs to ensure that impacts are mitigated where possible – including avoidance of identified sensitive systems and usage of existing disturbance areas.	Very low (5)	High
	Spatial Extent	*Site specific*				
	Duration	*Long term*				
	Consequence	*Moderate*				
	Probability	*Unlikely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				
OPERATIONAL PHASE						
Displacement of fauna	*Status*	*Negative*	Very low (5)	It is assumed that all projects will adhere to the site-specific recommendations in their respective EMPrs to ensure that impacts are mitigated where possible - including usage of existing disturbance	Very low (5)	High
	Spatial Extent	*Site specific*				
	Duration	*Short term*				

	Consequence	*Low*		area and stabilisation of erosion points (sand bags in the short term) using gabions and reno mattress as required.		
	Probability	*Unlikely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				
DECOMMISSIONING PHASE						
Displacement of fauna	*Status*	*Negative*	Very low (5)	It is assumed that all projects will adhere to the site-specific recommendations in their respective EMPrs to ensure that impacts are mitigated where possible - including usage of existing disturbance area and stabilisation of erosion points (sand bags in the short term) using gabions and reno mattress as required.	Very low (5)	High
	Spatial Extent	*Site specific*				
	Duration	*Short term*				
	Consequence	*Low*				
	Probability	*Unlikely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				

D.2.6.5 Concluding Statement

The outcomes of the risk assessment indicate minor impacts from the proposed activities. A variety of aquatic features, mostly ephemeral in nature were identified within the study areas and, where required, the layout has taken some cognisance of these features by selecting areas that have already been impacted. On these grounds the current overall impact on the aquatic environment is Very Low (with mitigation).

Based on the findings of this study, the specialist finds no reason to withhold an authorisation of any of the proposed activities, assuming that the key recommended mitigations measures are implemented.

D.2.7 Avifauna Impact Assessment

The Avifauna Impact Assessment was undertaken by Anja Albertyn of Holland & Associates Environmental Consultants (Pty) Ltd, to inform the outcome of this BA from an avifaunal perspective. The complete Avifauna Impact Assessment is included in Appendix D.6 of this BA Report. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the Avifauna Impact Assessment. The information below is extracted from Albertyn (2023).

D.2.7.1 Approach and Methodology

The Avifauna Impact Assessment includes a description of the affected environment from an avifaunal perspective, mapping of the sensitivity of the site in terms of avifaunal features such as habitat use, roosting, feeding and nesting / breeding, feedback of the sensitivity in terms of the Screening Tool, an assessment of the potential impacts of the proposed development on avifauna including cumulative impacts, and recommendations for sufficient mitigation measures.

In addition to pre-application monitoring the study area was visited on two days on 22 and 23 September 2022 with particular emphasis placed on surveying the proposed EGI corridors and searching for nests within the combined Project Area of Influence. The methodology for this avian species specialist assessment is based on the Birdlife SA Best Practice Guidelines for Birds & Solar Energy (Birdlife SA 2017) ('the Birds & Solar Energy Guidelines), the "Protocol for the Specialists Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species" (GN No. 1150 of 30 October 2020) (the 'Protocol'), as well as the associated "Species Environmental Assessment Guidelines" (SANBI 2022) (the 'SANBI Guidelines') which the Protocol refers to.

Cumulative impacts were assessed for past, existing, and proposed projects within a 30 km radius of the project. Avifaunal reports were obtained for adjacent projects as far as possible. Refer to Section 3 of the full detailed Avifauna Impact Assessment (Appendix D.6) for a complete list of obtained reports.

D.2.7.2 Relevant Project Aspects relating to Avifaunal Impacts

Components of the proposed project that are relevant in terms of avifauna are listed below:

- Solar Field, comprising Solar Arrays;
- Building Infrastructure including offices; operational and maintenance control centre; warehouse/workshop; ablution facilities; converter/inverter stations; on-site substation and/or a switching substation; and guard houses; associated infrastructure;
- Internal 132 kV power lines/underground cables;

- BESS;
- Access roads;
- Internal gravel roads;
- Fencing around the PV Facilities; and
- Construction work area (i.e. laydown area).

D.2.7.3 Potential Impacts

The potential impacts include:

Construction Phase:

- Disturbance and displacement of avifauna
- Habitat loss and displacement

Operational Phase:

- Disturbance
- Collisions with PV Panels
- Electrocutions
- Barrier effects
- Collisions with EGI

Decommissioning Phase:

- Disturbance
- Habitat Loss

Cumulative Impacts:

- Loss of habitat due to clearing, alteration and exclusion, as well as from reclamation
- Increased barrier effect from the combination of the seven padloper Solar PV projects.

No indirect impacts were identified.

D.2.7.4 Impact Assessment

The table below includes an assessment of the potential impacts identified for the Padloper PV 5 for the construction, operational and decommissioning phases.

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential Mitigation Measures	Significance and Ranking (Post-Mitigation)	Confidence Level
CONSTRUCTION PHASE						
Disturbance and displacement of avifauna	**Status**	Negative	Moderate (3)	Ensure that the layout avoids sensitive areas identified by the avifauna specialist. Note that the current layout assessed as part of the BA Process has already achieved this. Avifaunal pre-construction walkthrough (EMPr).	Very low (5)	High
	Spatial Extent	Local				
	Duration	Medium				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	High				
Habitat loss and displacement	**Status**	Negative	High (2)	Ensure that the layout avoids sensitive areas identified by the avifauna specialist. Note that the current layout assessed as part of the BA	Moderate (3)	High
	Spatial Extent	Local				
	Duration	Long-term				
	Consequence	Severe				
	Probability	Very likely				

	Reversibility	Moderate		Process has already achieved this. Avifaunal pre-construction walkthrough (EMPr).		
	Irreplaceability	Low				
OPERATIONAL PHASE						
Disturbance	**Status**	Negative	Low (4)	Ensure that the layout avoids sensitive areas identified by the avifauna specialist. Note that the current layout assessed as part of the BA Process has already achieved this. Minimisation of disturbance footprint to the development footprint (EMPr).	Very Low (5)	High
	Spatial Extent	Local				
	Duration	Long-term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Low				
Collisions with PV Panels	**Status**	Negative	Moderate (3)	Ensure that the layout avoids sensitive areas identified by the avifauna specialist. Note that the current layout assessed as part of the BA	Low (4)	Medium
	Spatial Extent	Regional				
	Duration	Long-term				
	Consequence	Substantial				
	Probability	Unlikely				
	Reversibility	Low				

	Irreplaceability	High		Process has already achieved this. Single-fence design (EMPr). Operational monitoring and carcass searching (EMPr).		
Electrocutions	**Status**	Negative	Moderate (3)	Insulation of all electrical infrastructure, and use of bird friendly designs as per Eskom Technical Standards (EMPr). Operational monitoring and carcass searching (EMPr).	Very low (5)	High
	Spatial Extent	Regional				
	Duration	Long-term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	High				
Barrier effects	**Status**	Negative	Low (4)	Ensure that the layout avoids sensitive areas identified by the avifauna specialist. Note that the current layout assessed as part of the BA Process has already achieved this.	Low (4)	Medium
	Spatial Extent	Regional				
	Duration	Long-term				
	Consequence	Moderate				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				

DECOMMISSIONING PHASE						
Disturbance	**Status**	Negative	Moderate (4)	Ensure that the layout avoids sensitive areas identified by the avifauna specialist. Note that the current layout assessed as part of the BA Process has already achieved this. Avifaunal pre-decommissioning walkthrough (EMPr).	Very low (5)	High
	Spatial Extent	Local				
	Duration	Medium				
	Consequence	Moderate				
	Probability	Highly likely				
	Reversibility	High				
	Irreplaceability	Low				
Habitat Loss	**Status**	Negative	Very low (5)	Avifaunal pre-decommissioning walkthrough (EMPr). Rehabilitation of disturbed vegetation within the entire development footprint.	Moderate (3)	Medium
	Spatial Extent	Site-specific				
	Duration	Long-term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
CUMULATIVE IMPACTS						
Impacts	**Status**	Negative	Moderate (3)	Implementation of EMPrs for all projects.	Moderate (3)	Medium
	Spatial Extent	Regional				

	Duration	Long-term		Authorisation, auditing and enforcement (Competent Authority).		
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Medium				
	Irreplaceability	Low				

The table below includes an assessment of the potential impacts identified for the Padloper EGI 5 for the construction, operational and decommissioning phases.

Impact	**Impact Criteria**		**Significance and Ranking (Pre-Mitigation)**	**Potential Mitigation Measures**	**Significance and Ranking (Post-Mitigation)**	**Confidence Level**
CONSTRUCTION PHASE						
Disturbance and displacement of avifauna	**Status**	Negative	Low (4)	Ensure that the alignment avoids sensitive areas identified by the avifauna specialist. Note that the current alignment assessed as part of the BA Process has already achieved this.	Very low (5)	High
	Spatial Extent	Local				
	Duration	Medium				
	Consequence	Moderate				
	Probability	Highly likely				
	Reversibility	High				
	Irreplaceability	Low				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential Mitigation Measures	Significance and Ranking (Post-Mitigation)	Confidence Level
				Avifaunal pre-construction walkthrough (EMPr).		
Habitat loss and displacement	**Status**	Negative	Moderate (3)	Ensure that the alignment avoids sensitive areas identified by the avifauna specialist. Note that the current alignment assessed as part of the BA Process has already achieved this. Avifaunal pre-construction walkthrough (EMPr).	Low (4)	High
	Spatial Extent	Local				
	Duration	Long-term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Low				
OPERATIONAL PHASE						
Disturbance	**Status**	Negative	Low (4)	Ensure that the alignment avoids sensitive areas identified by the avifauna specialist. Note that the current alignment assessed as part	Very Low (5)	High
	Spatial Extent	Local				
	Duration	Long-term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	High				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential Mitigation Measures	Significance and Ranking (Post-Mitigation)	Confidence Level
	Irreplaceability	Low		of the BA Process has already achieved this. Minimisation of disturbance footprint to the development footprint (EMPr).		
Collisions with EGI	**Status**	Negative	High (2)	Ensure that the alignment avoids sensitive areas identified by the avifauna specialist. Note that the current alignment assessed as part of the BA Process has already achieved this. Single-fence design (EMPr). Operational monitoring and carcass searching (EMPr).	Moderate (3)	High
	Spatial Extent	Regional				
	Duration	Long-term				
	Consequence	Severe				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	High				
Electrocutions	**Status**	Negative	Moderate (3)	Insulation of all electrical infrastructure, and use of bird friendly designs as per	Very low (5)	High
	Spatial Extent	Regional				
	Duration	Long-term				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential Mitigation Measures	Significance and Ranking (Post-Mitigation)	Confidence Level
	Consequence	Substantial		Eskom Technical Standards (EMPr). Operational monitoring and carcass searching (EMPr).		
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	High				
DECOMMISSIONING PHASE						
Disturbance	**Status**	Negative	Low (4)	Ensure that the alignment avoids sensitive areas identified by the avifauna specialist. Note that the current alignment assessed as part of the BA Process has already achieved this. Avifaunal pre-decommissioning walkthrough (EMPr).	Very low (4)	High
	Spatial Extent	Local				
	Duration	Medium				
	Consequence	Moderate				
	Probability	Highly likely				
	Reversibility	High				
	Irreplaceability	Low				
Habitat Loss	**Status**	Negative	Moderate (3)	Avifaunal pre-decommissioning walkthrough (EMPr).	Low (4)	Medium
	Spatial Extent	Site-specific				
	Duration	Long-term				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential Mitigation Measures	Significance and Ranking (Post-Mitigation)	Confidence Level
	Consequence	Substantial		Rehabilitation of disturbed vegetation within the entire development footprint.		
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Low				

D.2.7.5 Concluding Statement

The Site Ecological Importance rating of medium indicates that the PV site is potentially suitable for development if minimisation and restoration mitigation are implemented. Impacts of medium negative impact significance are acceptable, if followed by restoration activities (SANBI 2022).

The proposed PV development site avoids all areas identified as of high sensitivity during pre-application monitoring and is considered the preferred alternative site from an avifaunal perspective. The access road follows an existing farm road over its entire length and is also considered the best alternative location from an avifaunal perspective.

The impact assessment has identified potential impacts to avian species, most of which can be mitigated to a very low or low negative level. No residual impacts of high significance were identified for the proposed development.

Due to the footprint of the proposed PV development, a loss of approximately 205 ha of potential SCC habitat is however unavoidable, and even with mitigation this impact is expected to be of Medium negative significance for the SCCs that occur here (confirmed or high probability of occurrence). These are Blue Crane, Karoo Korhaan, Ludwig's Bustard, Lanner Falcon, Martial Eagle, and Verreaux's Eagle. However, due to these species having much surrounding equivalent habitat available, this loss of habitat is not deemed to have unacceptably high impacts on these species if the recommended mitigation measures are implemented.

The impact assessment for the proposed power line has identified potential impacts to avian species, most of which can be mitigated to a Very Low or Low negative level. No residual impacts of high significance were identified for the proposed development. The main negative impact of the proposed development is collisions with the EGI, which is difficult to mitigate for Ludwig's Bustard. Therefore, the impact significance rating with mitigation remains of moderate negative significance. The combined Site Ecological Importance rating of medium indicates that with minimisation and restoration mitigation, development activities with medium impact are acceptable if followed by appropriate restoration activities. The specialist assessment therefore concluded that the proposed power line development can be mitigated to an acceptable level of impact.

Overall, the cumulative impact of the proposed developments in a 30 km radius on avifauna is rated as of Moderate negative impact significance with and without mitigation. The contribution of the proposed development to the cumulative impact is considered to be relatively small, i.e., the proposed development will not result in a change in impact significance for cumulative impacts.

Based on the above results of the assessment, the proposed development is deemed acceptable from an avifaunal perspective, if all of the above mitigation measures are included for implementation in the EMPr.

D.2.8 Socio-Economic Assessment

The Socio-Economic Assessment was undertaken by James Kinghorn and Hugo Van Zyl of Independent Economic Researchers (Pty) Ltd, to inform the outcome of this BA from a socio-economic perspective. The complete Socio-Economic Assessment is included in Appendix D.7 of this BA Report. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the Socio-Economic Assessment. The information below is extracted from Kinghorn and Van Zyl (2023) (Appendix D.7 of the BA Report).

D.2.8.1 Approach and Methodology

Guidance on the approach was taken primarily from the Department of Environmental Affairs and Development Planning (Western Cape) guidelines on economic specialist input to Environmental Impact Assessment (EIA) processes (van Zyl *et al*., 2005) augmented by the guidelines on social specialist input to EIA processes (Barbour, 2007). This included guidance on the appropriate level of detail required for the assessment in order that it be adequate for informing decision-making without going into superfluous detail (i.e., superfluous detail in this report as well as superfluous detail when the briefs of other specialist studies forming part of the BA Process are taken into account).

Data analysis was then conducted by evaluating relevant data from various sources published over different time periods in order to gain a long-term perspective. Information was analysed to establish status quo socio-economic conditions, prevailing social structures, local demographic trends, and potential change processes present in the study area. The overview was then used to interpret the impacts and measure the extent of socio-economic impacts that could be derived from the proposed activities.

D.2.8.2 Relevant Project Aspects relating to Socio-Economic Impacts

From a socio-economic perspective, the most important project related aspects are employment creation over the lifetime of the project; and the Economic Development Plan (EDP) the Applicant is to develop for implementation should the projects obtain preferred bidder status in terms of the REIPPPP or similar tender processes.

D.2.8.3 Potential Impacts

The potential impacts identified for the Socio-Economic Assessment include:

Construction Phase:

- Impacts from expenditure on the construction of the project
- Impacts associated primarily with the influx of people
- Impacts on tourism
- Impacts on surrounding landowners and communities

Operational Phase:

- Impacts from expenditure on the operation of the project
- Impacts associated with the funding of local socio-economic development, enterprise development and shareholding
- Impacts associated primarily with the influx of people
- Impacts on tourism
- Impacts on surrounding landowners and communities

Decommissioning Phase:

- Impacts from expenditure on the decommissioning of the project
- Impacts associated primarily with the influx of people
- Impacts on tourism
- Impacts on surrounding landowners and communities

Cumulative Impacts:

The impacts below are relevant to the construction, operational and decommissioning phases.

- Cumulative impacts from expenditure on the construction, operation and decommissioning of the project
- Cumulative impacts associated with the funding of local socio-economic development, enterprise development and shareholding during operations
- Cumulative impacts associated primarily with the influx of people
- Cumulative impacts on tourism
- Cumulative impacts on surrounding landowners

D.2.8.4 Impact Assessment

The table below includes an assessment of the potential socio-economic impacts identified for the Padloper PV 5 and its associated infrastructure for the construction, operational and decommissioning phases.

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation and Pre-Enhancement)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation and Post-Enhancement)*	*Confidence Level*
CONSTRUCTION PHASE						
Impacts from expenditure on the construction of the project	*Status*	Positive	**Moderate (3)**	• Setting targets for how much local labour should be used based on the needs of the Applicant and the availability of existing skills and people that are willing to undergo training. Opportunities for the training of unskilled and skilled workers from local communities should be maximized. • Using local sub-contractors where possible and requiring that contractors from outside the local area that tender also meet targets for how many locals are given employment. • Exploring ways to enhance local community benefits with a focus on broad-based BEE and preferential procurement. • Setting up a skills and services database in partnership with the local municipality and civil society for the local area before any hiring or contracting decisions are made. This can help to ensure fairness and limit potential interference in hiring processes. • An effective employee induction programme is essential to ensuring that new employees, some of whom will be unfamiliar with the responsibilities of maintaining employment, are adequately prepared and motivated to adjust to the lifestyle required of them. This programme should incorporate life skills training as well as basic financial literacy training. • Counselling services should be made available to employees to ensure that they have adequate guidance.	**High (3)**	High
	Spatial Extent	National				
	Duration	Medium term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Replaceable				

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation and Pre-Enhancement)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation and Post-Enhancement)*	*Confidence Level*
				• Assisting smaller enterprises where possible in tendering for contracts and in accessing finance which are common constraints to their participation in projects. • Avoiding potential service provider decisions that may lead to abuse or local dissatisfaction. For example, only appointing one accommodating rental agent or one catering supplier may lead to local dissatisfaction regarding the spreading of project benefits. • As far as possible, avoid significant variation in salaries between various contractors for the same types of jobs. When variations are too high, the likelihood of dissatisfaction increases.		
Impacts associated primarily with the influx of people	*Status*	Negative	**Moderate (3)**	▪ A 'locals first' policy with regards to construction labour needs. ▪ The community should be able to contact the site manager or his/her representative to report any issues which they may have. The site manager and his/her representative should be stationed within the area and should therefore be available on hand to deal with and address any concerns which may be raised. ▪ A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction process. ▪ The Applicant and the contractors should, develop a Code of Conduct for the project. The Code should identify what types of behaviour and activities by workers are not permitted in agreement with surrounding landowners and land managers. For example, access on land that is not part of the development will not be allowed. ▪ The Applicant and the contractor should implement a Tuberculosis (TB) and HIV/AIDS awareness programme for all workers at the outset of the construction phase. ▪ Arrangements must be made to enable workers from outside the area to return home at reasonably regular intervals. This would reduce the risk posed by non-local construction workers to local family structures and social networks. ▪ Condoms should be freely available to employees and all contractor workers.	**Moderate (3)**	Medium
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Low				

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation and Pre-Enhancement)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation and Post-Enhancement)*	*Confidence Level*
	Irreplaceability	Moderate		▪ The contractor should make the necessary arrangements for ensuring that all non-local construction workers are transported back to their place of residence once the construction phase is completed. ▪ Close coordination with the municipality is required, including regular meetings.		
Impacts on tourism	*Status*	Negative	**Low (4)**	• Impacts on tourism are dependent on how the site is developed and managed to minimise negative biophysical impacts. The measures recommended in other specialist reports to these impacts (primarily the minimisation of visual, heritage, traffic and ecological impacts) would thus also minimise tourism impacts.	**Low (4)**	Medium
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Moderate				
	Probability	Unlikely				
	Reversibility	Low				
	Irreplaceability	Moderate				
Impacts on surrounding landowners and communities	*Status*	Negative	**Moderate (3)**	▪ No construction workers, except for security personnel, should be allowed to stay on the site overnight. ▪ The community should be able to contact the site manager to report any issues which they may have. The site manager should be stationed within the area and should therefore be available on hand to deal with and address any concerns which may be raised. ▪ A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction or operations processes. ▪ The Applicant should develop a Code of Conduct for the project. The Code should identify what types of behaviour and activities by workers are not permitted in agreement with surrounding landowners and land managers. ▪ The movement of workers on and off the site should be closely managed and monitored by the contractors. In this regard the	**Low (4)**	Medium
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Moderate				

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation and Pre-Enhancement)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation and Post-Enhancement)*	*Confidence Level*
				contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis. ▪ The Applicant should implement measures to assist and, if needed, fairly compensate potentially affected surrounding landowners whereby damages to farm property, stock theft or significant disruptions to farming activities can be minimized or reduced. Measures should be agreed on before construction commences. ▪ The EMPr must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested. ▪ Mitigation measures proposed by other specialists, in particular those prescribed in the TIA, need to be adhered to.		
OPERATIONAL PHASE						
Impacts from expenditure on the operation of the project	*Status*	Positive	**Moderate (3)**	▪ Setting targets for how much local labour should be used based on the needs of the Applicant and the availability of existing skills and people that are willing to undergo training. Opportunities for the training of unskilled and skilled workers from local communities should be maximized. ▪ Using local sub-contractors where possible and requiring that contractors from outside the local area that tender also meet targets for how many locals are given employment. ▪ Exploring ways to enhance local community benefits with a focus on broad-based BEE and preferential procurement. ▪ Setting up a skills and services database in partnership with the local municipality and civil society for the local area before any hiring or contracting decisions are made. This can help to ensure fairness and limit potential interference in hiring processes. ▪ An effective employee induction programme is essential to ensuring that new employees, some of whom will be unfamiliar with the responsibilities of maintaining employment, are adequately prepared and motivated to adjust to the lifestyle required of them. This programme should incorporate life skills training as well as basic financial literacy training. ▪ Counselling services should be made available to employees to ensure that they have adequate guidance.	**High**	High
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Severe				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Replaceable				

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation and Pre-Enhancement)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation and Post-Enhancement)*	*Confidence Level*
				▪ Assisting smaller enterprises where possible in tendering for contracts and in accessing finance which are common constraints to their participation in projects. ▪ Avoiding potential service provider decisions that may lead to abuse or local dissatisfaction. For example, only appointing one accommodating rental agent or one catering supplier may lead to local dissatisfaction regarding the spreading of project benefits.		
Impacts associated with the funding of local socio-economic development, enterprise development and shareholding	*Status* *Spatial Extent* *Duration* *Consequence* *Probability* *Reversibility* *Irreplaceability*	Positive Regional Long term Substantial Very likely Moderate Replaceable	**Moderate (3)**	▪ The project must comply with the requirements of the REIPPPP and/or BBBEE requirements. ▪ The Applicant must establish a communications committee early on in the project to ensure inclusive planning and regular feedback from stakeholders. ▪ Community development should be guided by a community needs analysis, drawn up by a third party and based on local socio-economic conditions, a review of planning documents such as the IDP, and discussions with local and district-level government and community representatives. Interventions should be planned in collaboration with other energy developers in the area where relevant. ▪ Close liaison with local and district-level municipal managers, local councillors and other stakeholders involved in socio-economic development is required to ensure that any projects are integrated into wider socio-economic development strategies and plans.	**Moderate (3)**	Medium
Impacts associated primarily with the influx of people	*Status* *Spatial Extent* *Duration*	*Negative* *Local* *Long term*	**Low (4)**	▪ A 'locals first' policy with regards to construction and operational labour needs. ▪ The community should be able to contact the site manager or his/her representative to report any issues which they may have. The site manager and his/her representative should be stationed within the area and should therefore be available on hand to deal with and address any concerns which may be raised. ▪ A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction or operations processes.	**Low (4)**	Medium

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation and Pre-Enhancement)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation and Post-Enhancement)*	*Confidence Level*
	Consequence	*Moderate*		▪ The Applicant and the contractors should, develop a Code of Conduct for the project. The code should identify what types of behaviour and activities by workers are not permitted in agreement with surrounding landowners and land managers. For example, access on land that is not part of the development will not be allowed. ▪ Condoms should be freely available to employees and all contractor workers. ▪ Close coordination with the district and local municipalities is encouraged.		
	Probability	*Likely*				
	Reversibility	*Low*				
	Irreplaceability	*Moderate*				
Impacts on tourism	*Status*	Local	**Low (4)**	▪ Impacts on tourism are dependent on how the site is developed and managed to minimise negative biophysical impacts. The measures recommended in other specialist reports to these impacts (primarily the minimisation of visual, heritage, traffic and ecological impacts) would thus also minimise tourism impacts.	**Low (4)**	Medium
	Spatial Extent	Medium term				
	Duration	Moderate				
	Consequence	Unlikely				
	Probability	Low				
	Reversibility	Moderate				
	Irreplaceability	Local				
Impacts on surrounding	*Status*	Negative	**Moderate (3)**	▪ See business opportunities during the construction phase enhancement measures.	**Low (4)**	Medium
	Spatial Extent	Local				

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation and Pre-Enhancement)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation and Post-Enhancement)*	*Confidence Level*
landowners and communities	*Duration*	Long term		▪ The proponent should investigate providing training and skills development to enable locally based service providers to provide the required services for the operational phase.		
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Moderate				
DECOMMISSIONING PHASE						
Impacts from expenditure on the construction of the project	*Status*	Positive	**Moderate (3)**	• Setting targets for how much local labour should be used based on the needs of the Applicant and the availability of existing skills and people that are willing to undergo training. Opportunities for the training of unskilled and skilled workers from local communities should be maximized. • Using local sub-contractors where possible and requiring that contractors from outside the local area that tender also meet targets for how many locals are given employment. • Exploring ways to enhance local community benefits with a focus on broad-based BEE and preferential procurement. • Setting up a skills and services database in partnership with the local municipality and civil society for the local area before any hiring or contracting decisions are made. This can help to ensure fairness and limit potential interference in hiring processes. • An effective employee induction programme is essential to ensuring that new employees, some of whom will be unfamiliar with the responsibilities of maintaining employment, are adequately prepared and motivated to adjust to the lifestyle required of them. This programme should incorporate life skills training as well as basic financial literacy training. • Counselling services should be made available to employees to ensure that they have adequate guidance.	**High (2)**	*High*
	Spatial Extent	National				
	Duration	Medium				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Replaceable				

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation and Pre-Enhancement)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation and Post-Enhancement)*	*Confidence Level*
				• Assisting smaller enterprises where possible in tendering for contracts and in accessing finance which are common constraints to their participation in projects. • Avoiding potential service provider decisions that may lead to abuse or local dissatisfaction. For example, only appointing one accommodating rental agent or one catering supplier may lead to local dissatisfaction regarding the spreading of project benefits. • As far as possible, avoid significant variation in salaries between various contractors for the same types of jobs. When variations are too high, the likelihood of dissatisfaction increases.		
Impacts associated primarily with the influx of people	*Status*	Negative	**Moderate (3)**	• A 'locals first' policy with regards to decommissioning labour needs. • The community should be able to contact the site manager or his/her representative to report any issues which they may have. The site manager and his/her representative should be stationed within the area and should therefore be available on hand to deal with and address any concerns which may be raised. • A complaints register should be available on site to any individual who may have a particular complaint with regards to the decommissioning process. • The Applicant and the contractors should, develop a Code of Conduct for the project. The code should identify what types of behaviour and activities by workers are not permitted in agreement with surrounding landowners and land managers. For example, access on land that is not part of the development will not be allowed. • The Applicant and the contractor should implement a TB and HIV/AIDS awareness programme for all workers at the outset of the construction phase. • Arrangements must be made to enable workers from outside the area to return home at reasonably regular intervals. This would reduce the risk posed by non-local decommissioning workers to local family structures and social networks. • Condoms should be freely available to employees and all contractor workers.	**Low (4)**	*Medium*
	Spatial Extent	Regional				
	Duration	Long Term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Low				

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation and Pre-Enhancement)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation and Post-Enhancement)*	*Confidence Level*
				• The contractor should make the necessary arrangements for ensuring that all non-local construction workers are transported back to their place of residence once the construction phase is completed. • Close coordination with the municipality is required, including regular meetings.		
Impacts on tourism	*Status*	Negative	**Low (4)**	• Impacts on tourism are dependent on how the site is developed and managed to minimise negative biophysical impacts. The measures recommended in other specialist reports to these impacts (primarily the minimisation of visual, heritage, traffic and ecological impacts) would thus also minimise tourism impacts.	**Low (4)**	*Medium*
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Moderate				
	Probability	Unlikely				
	Reversibility	Low				
	Irreplaceability	Moderate				
Impacts on surrounding landowners and communities	*Status*	Negative	**Moderate (3)**	▪ A 'locals first' policy with regard to labour needs. ▪ The community should be able to contact the site manager or his/her representative to report any issues which they may have. The site manager and his/her representative should be stationed within the area and should therefore be available on hand to deal with and address any concerns which may be raised. ▪ A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction or operations processes. ▪ The Applicant and the contractors should, develop a Code of Conduct for the project. The Code should identify what types of behaviour and activities by workers are not permitted in agreement with surrounding landowners and land managers. For example, access on land that is not part of the development will not be allowed. ▪ Condoms should be freely available to employees and all contractor workers. ▪ Close coordination with the district and local municipalities is encouraged.	**Low (4)**	Medium
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Moderate				

The table below includes an assessment of the potential cumulative impacts identified for the Padloper PV 5 and their associated infrastructure for the construction, operational and decommissioning phase.

Impact	***Impact Criteria***		***Significance / Ranking (Pre-Mitigation and Pre-Enhancement)***	***Potential Mitigation Measures***	***Significance / Ranking (Post-Mitigation and Post-Enhancement)***	***Confidence Level***
CONSTRUCTION PHASE						
Impacts from expenditure on the construction of the project	*Status*	Positive	**Moderate (3)**	• Setting targets for how much local labour should be used based on the needs of the Applicant and the availability of existing skills and people that are willing to undergo training. Opportunities for the training of unskilled and skilled workers from local communities should be maximized. • Using local sub-contractors where possible and requiring that contractors from outside the local area that tender also meet targets for how many locals are given employment. • Exploring ways to enhance local community benefits with a focus on broad-based BEE and preferential procurement. • Setting up a skills and services database in partnership with the local municipality and civil society for the local area before any hiring or contracting decisions are made. This can help to ensure fairness and limit potential interference in hiring processes. • An effective employee induction programme is essential to ensuring that new employees, some of whom will be unfamiliar with the responsibilities of maintaining employment, are adequately prepared and motivated to adjust to the lifestyle required of them. This programme should incorporate life skills training as well as basic financial literacy training. • Counselling services should be made available to employees to ensure that they have adequate guidance. • Assisting smaller enterprises where possible in tendering for contracts and in accessing finance which are common constraints to their participation in projects. • Avoiding potential service provider decisions that may lead to abuse or local dissatisfaction. For example, only appointing one	**High (3)**	High
	Spatial Extent	Regional				
	Duration	Medium term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation and Pre-Enhancement)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation and Post-Enhancement)*	*Confidence Level*
				accommodating rental agent or one catering supplier may lead to local dissatisfaction regarding the spreading of project benefits. • As far as possible, avoid significant variation in salaries between various contractors for the same types of jobs. When variations are too high, the likelihood of dissatisfaction increases.		
Impacts associated primarily with the influx of people	*Status*	Negative	**Moderate (3)**	▪ A 'locals first' policy with regards to construction labour needs. ▪ The community should be able to contact the site manager or his/her representative to report any issues which they may have. The site manager and his/her representative should be stationed within the area and should therefore be available on hand to deal with and address any concerns which may be raised. ▪ A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction process. ▪ The Applicant and the contractors should, develop a Code of Conduct for the project. The Code should identify what types of behaviour and activities by workers are not permitted in agreement with surrounding landowners and land managers. For example, access on land that is not part of the development will not be allowed. ▪ The Applicant and the contractor should implement a TB and HIV/AIDS awareness programme for all workers at the outset of the construction phase. ▪ Arrangements must be made to enable workers from outside the area to return home at reasonably regular intervals. This would reduce the risk posed by non-local construction workers to local family structures and social networks. ▪ Condoms should be freely available to employees and all contractor workers. ▪ The contractor should make the necessary arrangements for ensuring that all non-local construction workers are transported back to their place of residence once the construction phase is completed. ▪ Close coordination with the municipality is required, including regular meetings.	**Moderate (3)**	Medium
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation and Pre-Enhancement)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation and Post-Enhancement)*	*Confidence Level*
Impacts on tourism	*Status*	Negative	**Moderate (3)**	• Impacts on tourism are dependent on how the site is developed and managed to minimise negative biophysical impacts. The measures recommended in other specialist reports to these impacts (primarily the minimisation of visual, heritage, traffic and ecological impacts) would thus also minimise tourism impacts.	**Moderate (3)**	Medium
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Impacts on surrounding landowners and communities	*Status*	Negative	**Moderate (3)**	▪ No construction workers, except for security personnel, should be allowed to stay on the site overnight. ▪ The community should be able to contact the site manager to report any issues which they may have. The site manager should be stationed within the area and should therefore be available on hand to deal with and address any concerns which may be raised. ▪ A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction or operations processes. ▪ The Applicant should develop a Code of Conduct for the project. The Code should identify what types of behaviour and activities by workers are not permitted in agreement with surrounding landowners and land managers. ▪ The movement of workers on and off the site should be closely managed and monitored by the contractors. In this regard the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis. ▪ The Applicant should implement measures to assist and, if needed, fairly compensate potentially affected surrounding landowners whereby damages to farm property, stock theft or significant	**Moderate (3)**	Medium
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation and Pre-Enhancement)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation and Post-Enhancement)*	*Confidence Level*
				disruptions to farming activities can be minimized or reduced. Measures should be agreed on before construction commences. ▪ The EMPr must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested. ▪ Mitigation measures proposed by other specialists, in particular those prescribed in the TIA, need to be adhered to.		
OPERATIONAL PHASE						
Impacts from expenditure on the operation of the project	*Status*	Positive	**Moderate (3)**	▪ Setting targets for how much local labour should be used based on the needs of the Applicant and the availability of existing skills and people that are willing to undergo training. Opportunities for the training of unskilled and skilled workers from local communities should be maximized. ▪ Using local sub-contractors where possible and requiring that contractors from outside the local area that tender also meet targets for how many locals are given employment. ▪ Exploring ways to enhance local community benefits with a focus on broad-based BEE and preferential procurement. ▪ Setting up a skills and services database in partnership with the local municipality and civil society for the local area before any hiring or contracting decisions are made. This can help to ensure fairness and limit potential interference in hiring processes. ▪ An effective employee induction programme is essential to ensuring that new employees, some of whom will be unfamiliar with the responsibilities of maintaining employment, are adequately prepared and motivated to adjust to the lifestyle required of them. This programme should incorporate life skills training as well as basic financial literacy training. ▪ Counselling services should be made available to employees to ensure that they have adequate guidance. ▪ Assisting smaller enterprises where possible in tendering for contracts and in accessing finance which are common constraints to their participation in projects. ▪ Avoiding potential service provider decisions that may lead to abuse or local dissatisfaction. For example, only appointing one accommodating rental agent or one catering supplier may lead to local dissatisfaction regarding the spreading of project benefits.	**High**	High
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation and Pre-Enhancement)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation and Post-Enhancement)*	*Confidence Level*
Impacts associated with the funding of local socio-economic development, enterprise development and shareholding	*Status*	Positive	**Moderate (3)**	▪ The project must comply with the requirements of the REIPPPP and/or BBBEE requirements. ▪ The Applicant must establish a communications committee early on in the project to ensure inclusive planning and regular feedback from stakeholders. ▪ Community development should be guided by a community needs analysis, drawn up by a third party and based on local socio-economic conditions, a review of planning documents such as the IDP, and discussions with local and district-level government and community representatives. Interventions should be planned in collaboration with other energy developers in the area where relevant. ▪ Close liaison with local and district-level municipal managers, local councillors and other stakeholders involved in socio-economic development is required to ensure that any projects are integrated into wider socio-economic development strategies and plans	**High (2)**	High
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Impacts associated primarily with the influx of people	*Status*	*Negative*	**Moderate (3)**	▪ A 'locals first' policy with regards to construction and operational labour needs. ▪ The community should be able to contact the site manager or his/her representative to report any issues which they may have. The site manager and his/her representative should be stationed within the area and should therefore be available on hand to deal with and address any concerns which may be raised. ▪ A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction or operations processes. ▪ The Applicant and the contractors should, develop a Code of Conduct for the project. The Code should identify what types of behaviour and activities by workers are not permitted in agreement with surrounding landowners and land managers. For example,	**Moderate (3)**	Medium
	Spatial Extent	*Local*				
	Duration	Medium term				
	Consequence	Moderate				

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation and Pre-Enhancement)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation and Post-Enhancement)*	*Confidence Level*
	Probability	Likely		access on land that is not part of the development will not be allowed. ▪ Condoms should be freely available to employees and all contractor workers. ▪ Close coordination with the district and local municipalities is encouraged.		
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Impacts on tourism	*Status*	Negative	**Moderate (3)**	▪ Impacts on tourism are dependent on how the site is developed and managed to minimise negative biophysical impacts. The measures recommended in other specialist reports to these impacts (primarily the minimisation of visual, heritage, traffic and ecological impacts) would thus also minimise tourism impacts.	**Moderate (3)**	Medium
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Impacts on surrounding landowners and communities	*Status*	Negative	**Moderate (3)**	▪ No construction workers, except for security personnel, should be allowed to stay on the site overnight. ▪ The community should be able to contact the site manager to report any issues which they may have. The site manager should be stationed within the area and should therefore be available on hand to deal with and address any concerns which may be raised.	**Moderate (3)**	Medium
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Moderate				

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation and Pre-Enhancement)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation and Post-Enhancement)*	*Confidence Level*
	Probability	Likely		▪ A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction or operations processes. ▪ The Applicant should develop a Code of Conduct for the project. The Code should identify what types of behaviour and activities by workers are not permitted in agreement with surrounding landowners and land managers. ▪ The movement of workers on and off the site should be closely managed and monitored by the contractors. In this regard the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis. ▪ The Applicant should implement measures to assist and, if needed, fairly compensate potentially affected surrounding landowners whereby damages to farm property, stock theft or significant disruptions to farming activities can be minimized or reduced. Measures should be agreed on before construction commences. ▪ The EMPr must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested. ▪ Mitigation measures proposed by other specialists, in particular those prescribed in the TIA, need to be adhered to.		
	Reversibility	Moderate				
	Irreplaceability	Moderate				
DECOMMISSIONING PHASE						
Impacts from expenditure on the construction of the project	*Status*	Positive	**Moderate (3)**	• Setting targets for how much local labour should be used based on the needs of the Applicant and the availability of existing skills and people that are willing to undergo training. Opportunities for the training of unskilled and skilled workers from local communities should be maximized. • Using local sub-contractors where possible and requiring that contractors from outside the local area that tender also meet targets for how many locals are given employment. • Exploring ways to enhance local community benefits with a focus on broad-based BEE and preferential procurement. • Setting up a skills and services database in partnership with the local municipality and civil society for the local area before any	**High (2)**	*High*
	Spatial Extent	Regional				
	Duration	Medium term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation and Pre-Enhancement)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation and Post-Enhancement)*	*Confidence Level*
				hiring or contracting decisions are made. This can help to ensure fairness and limit potential interference in hiring processes. • An effective employee induction programme is essential to ensuring that new employees, some of whom will be unfamiliar with the responsibilities of maintaining employment, are adequately prepared and motivated to adjust to the lifestyle required of them. This programme should incorporate life skills training as well as basic financial literacy training. • Counselling services should be made available to employees to ensure that they have adequate guidance. • Assisting smaller enterprises where possible in tendering for contracts and in accessing finance which are common constraints to their participation in projects. • Avoiding potential service provider decisions that may lead to abuse or local dissatisfaction. For example, only appointing one accommodating rental agent or one catering supplier may lead to local dissatisfaction regarding the spreading of project benefits. • As far as possible, avoid significant variation in salaries between various contractors for the same types of jobs. When variations are too high, the likelihood of dissatisfaction increases.		
Impacts associated primarily with the influx of people	*Status*	Negative	**Moderate (3)**	• A 'locals first' policy with regards to decommissioning labour needs. • The community should be able to contact the site manager or his/her representative to report any issues which they may have. The site manager and his/her representative should be stationed within the area and should therefore be available on hand to deal with and address any concerns which may be raised. • A complaints register should be available on site to any individual who may have a particular complaint with regards to the decommissioning process. • The Applicant and the contractors should, develop a Code of Conduct for the project. The Code should identify what types of	**Moderate (3)**	*Medium*
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation and Pre-Enhancement)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation and Post-Enhancement)*	*Confidence Level*
				behaviour and activities by workers are not permitted in agreement with surrounding landowners and land managers. For example, access on land that is not part of the development will not be allowed. • The Applicant and the contractor should implement a TB and HIV/AIDS awareness programme for all workers at the outset of the construction phase. • Arrangements must be made to enable workers from outside the area to return home at reasonably regular intervals. This would reduce the risk posed by non-local decommissioning workers to local family structures and social networks. • Condoms should be freely available to employees and all contractor workers. • The contractor should make the necessary arrangements for ensuring that all non-local construction workers are transported back to their place of residence once the construction phase is completed. • Close coordination with the municipality is required, including regular meetings.		
Impacts on tourism	*Status*	Negative	**Moderate (3)**	• Impacts on tourism are dependent on how the site is developed and managed to minimise negative biophysical impacts. The measures recommended in other specialist reports to these impacts (primarily the minimisation of visual, heritage, traffic and ecological impacts) would thus also minimise tourism impacts.	**Moderate (3)**	*Medium*
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Impacts on surrounding landowners and communities	*Status*	Negative	**Moderate (3)**	▪ A 'locals first' policy with regard to labour needs. ▪ The community should be able to contact the site manager or his/her representative to report any issues which they may have. The site manager and his/her representative should be stationed within the area and should therefore be available on hand to deal with and address any concerns which may be raised. ▪ A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction or operations processes.	**Moderate (3)**	Medium
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Moderate				
	Probability	Likely				

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation and Pre-Enhancement)*	*Potential Mitigation Measures*	*Significance / Ranking (Post-Mitigation and Post-Enhancement)*	*Confidence Level*
	Reversibility	Moderate		▪ The Applicant and the contractors should, develop a Code of Conduct for the project. The Code should identify what types of behaviour and activities by workers are not permitted in agreement with surrounding landowners and land managers. For example, access on land that is not part of the development will not be allowed. ▪ Condoms should be freely available to employees and all contractor workers. ▪ Close coordination with the district and local municipalities is encouraged.		
	Irreplaceability	Moderate				

D.2.8.5 Concluding Statement

The project is not free of commercial risk nor would it be realistic to expect this. However, the balance between financial benefits and costs are likely to be positive for the applicant and landowner partners, barring unforeseen risks. In term of wider positive impacts, the project would be largely supportive of local and regional socio-economic development and energy supply planning imperatives including the diversification of the economy and energy sources.

Negative impacts would primarily arise at a local scale. It is anticipated that, with mitigation, the risks posed to the community by the influx of people, including job seekers, would be manageable and of a low significance with mitigation. Tourism facilities and attractions in the areas surrounding the project site are relatively limited and sparsely distributed. The tourism context combined with likely visual and associated heritage impacts in a landscape with scenic qualities should limit tourism impacts to a low significance during both construction and operations with mitigation. Impacts on surrounding landowners and communities, including to their sense of place, are expected to be low negative with mitigation during construction and operations.

It is considered most likely that the combined positive impacts of the project would exceed its negative impacts resulting in an overall net benefit with mitigation. The project is therefore all deemed acceptable in terms of socio-economic impacts and should be allowed to proceed.

D.2.9 Geohydrology Assessment

The Geohydrology Assessment was undertaken by Hardy Luttig and Shane Teek of GEOSS South Africa (Pty) Ltd to inform the outcome of this BA from a geohydrological perspective. The complete Geohydrology Assessment is included in Appendix D.9 of this BA Report. The following section provides a summary of the Approach, Key Findings, and Concluding Statement undertaken for the Geohydrology Assessment. The information below is extracted from Luttig and Teek (2023).

D.2.9.1 Approach and Methodology

The procedure adopted for this study involved a desktop study. The initial desktop study involved obtaining and reviewing all relevant data to the project. This included analysing data from the National Groundwater Archive (NGA), as well as additional groundwater yield and groundwater chemistry from other databases, as well as geological maps of the area.

The site visit was conducted between 3 January - 6 January 2023 to verify collected/existing data and collect additional data, where possible. This included a hydrocensus of groundwater users in the area and noting hydrogeological features of relevance.

Calculations based on the General Authorisation (GA) abstraction rates per land portion/farm within the respective quaternary catchments were carried out to determine whether the water volumes required for construction and operation of the proposed development could be met by groundwater abstraction under a GA for water use, or whether a Water Use License (WUL) would be required. It should be noted that there are factors apart from the volume that might require that the water use be licensed.

Additional information will be discussed in this report addressing the potential use of boreholes identified during the hydrocensus, as well as, providing areas optimal for further groundwater development should existing sources prove insufficient.

Finally, the hydrogeological risks associated with the proposed developments were highlighted and appropriate mitigation measures provided where possible.

D.2.9.2 Relevant Project Aspects relating to Geohydrology Impacts

As noted below the Applicant's preferred water source is water sourced from boreholes on site. The two other potential water sources have been discussed in Section A of this BA Report.

Generally, groundwater can be impacted negatively in two manners, namely:

- Over-abstraction (where groundwater abstraction exceeds recharge rates) which can result in the alteration of groundwater flow directions and gradients; and
- Quality deterioration (i.e., from anthropogenic activities negatively impacting groundwater quality).

D.2.9.3 Potential Impacts

The potential impacts identified in the Geohydrology Assessment are listed below and are applicable to all phases of the proposed development.

- Groundwater impact as a result of groundwater abstraction.

Presently, these boreholes are solely used for livestock watering and domestic use, the impact of which is minimal in terms of groundwater abstraction. It is anticipated that several boreholes across several farm portions will be required to meet the demands of the proposed Padloper PV 5-7 as they are located in close proximity, on adjacent farm portions. The cumulative peak (construction) water demands of Padloper PV 5 - 7 (80 000 m^3/a) is lower than the GA abstraction rates for the area (80 000 m^3/a).

Based on the above, the study notes that the impact on the groundwater availability of this facility is low/insignificant, since there is likely a similar/lower cumulative volume presently being extracted. It is anticipated that several boreholes across each of the farm portions on which Padloper PV 5 - 7 are to be constructed will be required to meet the demands for construction and operation of the facilities.

Based on the GA for the total area (7 956.258 209.09 ha) from which water is proposed to be abstracted for the development of the Padloper PV 5-7, 40 000 m^3/a (1.27 L/s) is available under a GA water use. The cumulative water requirement (per annum) for Padloper PV 5-7, during the construction phase is 80 000 m^3/a (1.27 L/s), and during the operational phase is 21 000 m^3/a (0.67 L/s). These yields fall within the average yield potential of the underlying aquifers (0.1 – 2.0 L/s) based on the available regional hydrogeological information (DWAF, 2002).

Therefore, it is believed that the impact on the groundwater availability of the proposed Padloper PV project is low/insignificant, since there is likely a similar lower cumulative volume presently being extracted.

Groundwater monitoring is recommended to ensure that groundwater abstraction is sustainable due to the high number of existing boreholes in the area. This would also be required to ensure that the abstraction volume is kept under the calculated GA volume per annum for the development of the proposed Padloper PV and EGI Cluster, should the water be used under a GA water use.

The monitoring will also indicate if the groundwater resource is impacted and mitigation measures can be instituted before long term impacts occur. Mitigation for over-abstraction would be reduction in abstraction and implementation of any saving techniques where possible. It is therefore improbable that

the groundwater resource will be depleted as a result of over abstraction, should a quarterly monitoring programme be instated. Refer to the Appendices H – L of this BA Report for the detailed monitoring programme as recommended by the specialist assessment.

- Aquifer vulnerability classification

The national scale groundwater vulnerability map, which was developed according to the DRASTIC methodology (DWAF, 2005), indicates that the site has a "Low / Medium" vulnerability to surface-based contaminants (Conrad and Munch, 2007). The "Low / Medium" rating is associated with, amongst other factors, the depth to the water table, the geology/soil type(s) in the area, the amount of recharge and the topography in this region.

- Potential Impact on Groundwater Quality as a result of Accidental Oil Spillages or Fuel Leakages

Groundwater vulnerability can be defined as the "tendency for contaminants to reach a specified position in the groundwater system after introduction at some location" (National Research Council, 1993). The national scale groundwater vulnerability map, which was developed according to the DRASTIC methodology (Conrad and Munch, 2007) indicates that that Padloper PV 5 has a low/medium vulnerability to surface-based contaminants. A precautionary approach must be implemented, and reasonable measures must be undertaken to prevent oil spillages and fuel leakages from occurring during the construction phase. Further, biodegradable cleaning agents should be selected for cleaning Solar PV panels. With effective implementation of the above prevention / mitigation actions, the impact of the project on groundwater as a consequence of accidental oil spillages and fuel leakages is predicted to be of very low significance. Refer to the Appendices H – L of this BA Report for the detailed monitoring programme as recommended by the specialist assessment.

D.2.9.3.1 Cumulative impacts

- Groundwater Availability:

Potential risk of over abstraction in the area exists; however, the cumulatively proposed Padloper PV and EGI Cluster demands 220 000 m^3/a during the Construction Phase, and 57 000 m^3/a during the Operational Phase. The total extent of the proposed Padloper PV and EGI Cluster is 22 309.95 ha and the total amount of groundwater that can be abstracted for such an extent (in this region) under a GA water use is 240 000 m^3/a. Since the cumulative demand of the development is lower than the amount available under a GA water use, the impact on groundwater availability of the proposed Padloper PV and EGI Cluster is anticipated to be low and very low under the Construction and Operational phases, respectively.

Boreholes used for groundwater supply will need to be scientifically yield tested to ensure abstraction of groundwater is sustainable. Provided appropriate mitigation measures (e.g., water saving techniques) are in place during all phases of the proposed development, the impact on groundwater quality is anticipated to be low to negligible. In addition, an appropriate groundwater monitoring program (i.e., abstraction volumes, chemistry, and water levels) will need to be instated to ensure proper management and protection of the groundwater resources locally and minimise potential impacts on neighbouring properties.

If and when details of other developments are planned for the region, this impact assessment will need to be required based on the neighbouring facilities groundwater demands. Further, if the water/groundwater demands of the proposed development changes, the assessment will need to be revised.

- Groundwater Quality:

Potential risk of groundwater contamination exists during all phases of the development. The cumulative impacts of the proposed development on the groundwater resources in the area is anticipated to be low, particularly if an appropriate groundwater monitoring program is established (with chemical sampling at appropriate time intervals, e.g., quarterly/biannually) to ensure little to no groundwater contamination is taking place. The cumulative impacts of the proposed development could be reduced by implementing mitigation measures which mainly involve physical barriers between contaminant sources and the bare soil surface, e.g., drip trays beneath vehicles, and/or making use of biodegradable cleaning agents when cleaning Solar PV panels.

D.2.9.4 Concluding Statement

The study notes that it is anticipated that the underlying aquifers will be able to deliver the requisite cumulative demands during the construction (22100 000 m^3/a) and operational (5745 000 m^3/a) phases, for each of the proposed developments comprising the Padloper PV and EGI Cluster, i.e., Padloper PV 1-7. The impact of the proposed Padloper Solar PV 5 is anticipated to be low in terms of groundwater quality and groundwater availability.

Further, the cumulative water demands of the proposed Padloper Solar PV Development are anticipated to be low in terms of groundwater availability and quality. However, the needs of the neighbouring developments and farm owners/ landowners will also need to be established to ensure sustainable groundwater abstraction.

Instatement of an appropriate groundwater monitoring plan is paramount to ensure sustainable and responsible management of the groundwater reserves in the region. Therefore, a quarterly groundwater monitoring programme should be instated to ensure that no groundwater contamination takes place during the construction or decommissioning phases of this development. Further, monitoring would serve to ensure that the water use is lawful, and confirm that impacts of abstraction on the regional aquifer(s) is negligible.

D.2.10 Geotechnical impacts

This section is informed by the desktop Geotechnical Assessment included in Appendix D. 10 of the BA Report.

The Geotechnical Assessment was undertaken by Hardy Luttig and Shane Teek of GEOSS South Africa (Pty) Ltd to inform the outcome of this BA from a geotechnical perspective. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the Geotechnical Assessment. The information below is extracted from Luttig and Teek (2023).

D.2.10.1 Potential Impacts

The potential impacts identified in the desktop Geotechnical Assessment are listed below:

Construction Phase:

- Removal of rocks and other geologic materials for site levelling and grading, resulting in loss of geologic materials, e.g., topsoil removal/loss, and potentially the destruction of habitats of endemic species.
- Contamination of geologic materials as a consequence of the construction activities by earthworks machinery and other apparatus

Operational Phase:

- Increased unnatural hard surfaces yielding increased runoff, potentially increasing erosion
- Contamination of geologic materials as a consequence of typical maintenance activities, as example, washing of solar panels, or spillages associated with battery energy storage facilities

Decommissioning Phase:

- Increased unnatural hard surfaces yielding increased runoff, potentially increasing erosion.
- Contamination of geologic materials as a consequence of the construction activities by earthworks machinery and other apparatus

Cumulative Impacts

Construction Phase:

- Displacement of geologic materials.
- Contamination of geologic materials

Operational Phase:

- Displacement of geologic materials
- Contamination of geologic materials

Decommissioning Phase:

- Increased unnatural hard surfaces yielding increased runoff, potentially increasing erosion
- Contamination of geologic material

D.2.10.2 Impact Assessment

The table below includes an assessment of the potential **impact** identified for the Padloper PV 5 and the associated infrastructure

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential Mitigation Measures	Significance and Ranking (Post-Mitigation)	Confidence Level
Construction Phase						
Displacement of geologic materials (i.e. Removal of rocks and other geologic materials for site levelling and grading, resulting in loss of geologic materials, e.g. topsoil removal/loss, and potentially the destruction of habitats of endemic species.)	*Status*	Negative	**Low (4)**	• Favour dolerite as an aggregate, as opposed to Karoo sandstones and mudstones. Subject to investigation. • Any road cuttings should be designed by an appropriately qualified professional. • Drainage in the region should be designed and managed appropriately. • Investigate and confirm the geotechnical suitability of each structure (or other appropriate level of investigation) prior to construction (i.e., determine that soil with an adequate bearing capacity is obtained beneath each footing). Such investigations would not be required to fulfil the requirements of the EIA process. However, it would be necessary prior to construction. • Only strip vegetation necessary for the next phase of construction. • Install temporary drainage to divert stormwater away from active construction activities, where required. • SWMP must be developed in the preconstruction phase. It should detail the stormwater structures and management interventions that must be installed to manage	**Very Low (5)**	Medium
	Spatial extent	Local				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

				the increase of surface water flow directly into any natural systems (in consultation with suitably qualified professionals). Effective stormwater management must include effective stabilisation (e.g., gabions and reno mattresses) of exposed soil. • Suitable stormwater management systems must be installed along roads and other areas and be monitored during the first few months of use. Any erosion/sedimentation must be resolved through any additional interventions that may be necessary (e.g., extension, energy dissipaters, spreaders, etc.). • Where impacted through construction-related activities, all sloped areas must be stabilised to ensure proper rehabilitation is implemented and erosion is controlled. • Sloped areas stabilised using designed structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly. • Any rehabilitation should be scheduled to ensure rehabilitation can take place at the optimal time for vegetation establishment. • Where earthwork is being undertaken near any watercourses, slopes must be stabilised using suitable materials, e.g., sandbags or geotextile fabric, to prevent sand and rock from entering the channel. • Appropriate rehabilitation and re-vegetation measures for any disturbed watercourse banks must be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilised as soon as development allows.		
Contamination of geologic materials as a consequence of the	Status Spatial extent	Negative Local	Low (4)	▪ Minimise duration of construction period. ▪ Minimise cut-and-fill and landscape scarring in general.	Very Low (5)	Medium

construction activities by earthworks machinery and other apparatus.)	Duration	Short term		▪ Ensure effective rehabilitation of areas disturbed by construction activities which are not needed during operation.		
	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Operational Phase						
Increased unnatural hard surfaces yielding increased runoff, potentially increasing erosion	Status	Negative	Low (4)	• Install drainage to divert stormwater away from activities, roads/tracks, structures, where required. • Generic management for typical infrastructure of the proposed development, including: 1. SWMP must be developed in the preconstruction phase and should detail the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems, where possible and lawful. Effective stormwater management must include effective stabilisation (e.g., gabions and Reno mattresses) of exposed soil etc. 2. Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through any additional interventions that may be necessary (e.g., extension, energy dissipaters, spreaders, etc.). 3. Sloped areas stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments.	Very low (5)	Medium
	Spatial extent	Local				
	Duration	Long				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

				4. No regular maintenance activities to take place outside of the authorised footprint and all vehicles to remain on authorised roads and tracks.		
Contamination of geologic materials	Status	Negative	Low (4)	• During the execution of the operations, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g., including ensuring that construction equipment is well maintained. • Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover/bunding. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. • Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used. • If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.	Very low (5)	Medium
	Spatial extent	Local				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Decommissioning Phase						
Increased unnatural hard surfaces yielding increased runoff, potentially increasing erosion	Status	Negative	Very low (5)	• Only drive and park vehicles where necessary. • Land rehabilitation to near natural state, i.e. removal of foundations and backfilling of any resultant voids within the soil, as well as removal of hard surfaced areas. Replacement soil should be sourced locally to ensure homogeneity. • Reinstate natural topography where cut-to-fill embankments have been constructed.	Very low (5)	Medium
	Spatial extent	Local				
	Duration	Short				
	Consequence	Slight				
	Probability	Likely				

	Reversibility	Moderate		• Implement generic environmental management procedures for infrastructure.		
	Irreplaceability	Moderate				
Contamination of geologic materials	Status	Negative	Very low (5)	• During the execution of the decommissioning, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g., including ensuring that equipment is well maintained. • Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. • Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used. • If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.	Very low (5)	Medium
	Spatial extent	Local				
	Duration	Short				
	Consequence	Slight				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
CUMULATIVE IMPACTS						
CONSTRUCTION PHASE						
Displacement of geologic materials	Status	Negative	Moderate (3)	• Only strip vegetation necessary for the next phase of construction. • Install temporary drainage to divert stormwater away from active construction activities, where required. • SWMP must be developed in the preconstruction phase. It should detail the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into	Low (4)	Medium
	Spatial extent	Regional				
	Duration	Medium-term				
	Consequence	Substantial				
	Probability	Very likely				

	Reversibility	Moderate		any natural systems (in consultation with suitably qualified professionals). Effective stormwater management must include effective stabilisation (e.g., gabions and reno mattresses) of exposed soil. • Suitable stormwater management systems must be installed along roads and other areas and be monitored during the first few months of use. Any erosion/sedimentation must be resolved through any additional interventions that may be necessary (e.g., extension, energy dissipaters, spreaders, etc.). • Where impacted through construction-related activities, all sloped areas must be stabilised to ensure proper rehabilitation is implemented and erosion is controlled. • Sloped areas stabilised using designed structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly. • Any rehabilitation should be scheduled to ensure rehabilitation can take place at the optimal time for vegetation establishment. • Where earthwork is being undertaken in near any watercourses, slopes must be stabilised using suitable materials, e.g. sandbags or geotextile fabric, to prevent sand and rock from entering the channel. • Appropriate rehabilitation and re-vegetation measures for any disturbed watercourse banks must be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilised as soon as development allows.		
	Irreplaceability	Moderate				
Contamination of geologic materials	Status	Negative	Moderate (3)	• During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented, e.g. including ensuring	Low (4)	Medium
	Spatial extent	Regional				

	Duration	Medium-term		that construction equipment is well maintained. • Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. • Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used. • If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.		
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
OPERATIONAL PHASE						
Displacement of geologic materials	Status	Negative	Moderate (3)	• Install drainage to divert stormwater away from activities, roads/tracks, structures, where required. • Generic management for typical infrastructure of the proposed development, including: SWMP must be developed in the preconstruction phase and should detail the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems, where possible and lawful. Effective stormwater management must include effective stabilisation (gabions and reno mattresses) of exposed soil etc. • Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be	Low (4)	Medium
	Spatial extent	Regional				
	Duration	Medium-term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

				resolved through any additional interventions that may be necessary (e.g., extension, energy dissipaters, spreaders, etc.). • Sloped areas stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. • No regular maintenance activities to take place outside of the authorised footprint and all vehicles to remain on authorised roads and tracks.		
Contamination of geologic materials	Status	Negative	Moderate (3)	• During the execution of the operations, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g., including ensuring that construction equipment is well maintained. • Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover/bunding. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. • Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used. • If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.	Low (4)	
	Spatial Extent	Regional				
	Duration	Medium-term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
DECOMMISSIONING PHASE						
	Status	Negative	Moderate (3)	• Only drive and park vehicles where necessary.	Low (4)	Medium

Increased unnatural hard surfaces yielding increased runoff, potentially increasing erosion	Spatial Extent	Local		• Land rehabilitation to near natural state, i.e., removal of foundations and backfilling of any resultant voids within the soil, as well as removal of hard surfaced areas. Replacement soil should be sourced locally to ensure homogeneity. • Reinstate natural topography where cut-to-fill embankments have been constructed. • Implement generic environmental management procedures for infrastructure.		
	Duration	Short				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Contamination of geologic materials	Status	Negative	Moderate (3)	• During the execution of the decommissioning, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g., including ensuring that equipment is well maintained. • Provision must be made for refuelling at the storage area by protecting the soil with an impermeable ground cover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. • Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used. • If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Short				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

D.2.10.3 Concluding Statement

Based on the findings of this study, development should proceed provided the mitigation measures are implemented. The following conclusions can be drawn from the investigation:

The potential impact of the proposed development during the construction, operational and decommissioning phases of the projects is expected to be very low (post-mitigation) and is anticipated to have little effect on the site from a geotechnical point of view. Increased soil erosion may transpire as an impact of development, this may persist for the life of the project. However, the impact of this is expected to be very low and is anticipated to have little effect on the site from a geotechnical point of view. The study notes that variable soil and rock conditions will exist across the site, broadly these have been divided as follows:

- Zone A – Karoo sandstones, siltstones and mudstones
- Zone B – Karoo dolerite
- Zone C – Areas of thicker soil cover (generally within drainage channels).

It is anticipated that conventional foundations can be employed for all structures. Karoo mudrock and sandstone should be avoided when selecting aggregates for concrete mixes.

Owing to the variable geologic and soil conditions across the proposed development area, the subgrade conditions will vary across the site. Therefore, it is recommended that an aggregate for wearing courses be investigated. The excavatability of the stratum on site are anticipated to variable, based on material composition and texture, the degree of weathering, and the nature of discontinuities within the rock and/or soil mass. However, the seismicity in the region is considered low.

The primary concern of this development is alteration of the stability of the soil across the site. Changes in the soil conditions across the site are anticipated mainly to arise as a consequence of increased/concentrated runoff, yielding increased erosion. The area planned for the development of the solar facility is generally of low relief and the topography is gently undulous, therefore, no major cut slopes and/or rock face stabilisations are anticipated for this development. Refer to Appendix D. 10 for the full detailed Geotechnical Assessment.

D.2.11 Traffic Impacts

This section is informed by the desktop Traffic Impact Assessment included in Appendix D.13 of the BA Report.

The Traffic Impact Assessment (TIA) was undertaken by Ntuthuko Hlanguza of SiVEST (Pty) Ltd to inform the outcome of this BA from a traffic perspective. The following section provides a summary of the Approach, Key Findings, Impact Assessment and Concluding Statement undertaken for the TIA. The information below is extracted from Hlanguza (2023).

D.2.11.1 Approach and Methodology

The TIA investigates the transportation implications associated with the abnormal load vehicles transporting components to the site and the transportation of construction materials, equipment and workers to the site during the construction, operational and decommissioning phases. The broad methodology adopted for the TIA included a desktop assessment, where available project related

information was reviewed such as planned spatial development within the project region. A site investigation was conducted in the spring season from 20 to 23 October 2022 wherein the geometric and traffic characteristics of the road network surrounding the proposed development area were assessed, including existing and potential site accesses. A rain event occurred during the site investigation which afforded the rare opportunity of observing the stormwater drainage capacity of the surrounding road network. Consultations were also held in person on 21 October 2022 with the Chief Traffic Inspector of the Beaufort West Local Municipality. Further telephonic/virtual consultations were held with representatives of Western Cape Department of Transport and Public Works (WCDTPW), Northern Cape Department of Roads and Public Works (NCPRPW), and the Eastern Cape Department of Transport (ECDT). The purpose of the consultations was to understand the state and suitability of the transport infrastructure affected by the proposed development, and the requirements of the respective entities for the use of said infrastructure.

D.2.11.2 Relevant Project Aspects relating to Traffic Impacts

The relevant project aspects relating to traffic impacts are linked to the vehicles that need to access the project sites for various reasons. As noted in Section A of this report, it is understood that traffic will be generated as a result of building materials being transported to and from site. Solar panels, frames and inverters are also to be transported via double axle trucks; and transformers will be transported by abnormal load trucks for which a permit will need to be applied for in terms of Section 81 of the National Road Traffic Act.

D.2.11.3 Potential Impacts

The potential impacts identified in the Transport Assessment include the following for the construction, operation and decommissioning phases:

Construction phase:

- Increase in abnormal load traffic;
- Increase in normal load traffic due to the delivery of construction plant, equipment, materials, and solar PV facility components, and the transportation of labour;
- Increase in incidents with pedestrians and livestock; and
- Increased need for road maintenance.

Operational Phase:

- Increase in abnormal load traffic;
- Increase in normal load traffic due to the transportation of staff, the delivery of replacement parts, repairs, and cleaning of panels; and
- Increased need for road maintenance.

Decommissioning Phase

- Increase in abnormal load traffic;
- Increase in normal load traffic due to the delivery and removal of construction plant, equipment, materials, and solar PV facility components, and the transportation of labour;
- Increase in incidents with pedestrians and livestock; and
- Increased need for road maintenance.

D.2.11.4 Impact Assessment

The impact assessments for both projects are the same. The table below includes an assessment of the potential impacts identified for the Padloper PV 5, and the associated infrastructure for the construction, operation and decommissioning phases and cumulative impact.

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential Mitigation Measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
CONSTRUCTION PHASE						
Increased abnormal load traffic	*Status*	*Negative*	*Moderate*	• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods and stagger delivery. • Adequate enforcement of traffic laws and Abnormal Load Permit conditions.	*Low*	*High*
	Spatial Extent	*Regional*				
	Duration	*Short Term*				
	Consequence	*Moderate*				
	Probability	*Likely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				
Increased normal load traffic (plant, equipment, materials, components, labour)	*Status*	*Negative*	*Low*	• Stagger delivery of plant, equipment, materials and SEF components. • Construction of an on-site concrete batching plant to reduce trips. • Ensure staff transport is undertaken in the 'off peak' periods and by bus or minibus.	*Low*	*High*
	Spatial Extent	*Local*				
	Duration	*Short Term*				
	Consequence	*Moderate*				
	Probability	*Very likely*				

	Reversibility	*High*				
	Irreplaceability	*Low*				
Increased incidents with pedestrians and livestock	*Status*	*Negative*	*Moderate*	• Maintenance of farm fences. • Erection of appropriate road signage informing motorists of property accesses and designated animal road crossings. • Maintenance of road verges to provide safe walking space for pedestrians for the duration of the decommissioning period.	*Low*	*High*
	Spatial Extent	*Local*				
	Duration	*Short Term*				
	Consequence	*Severe*				
	Probability	*Unlikely*				
	Reversibility	*High*				
	Irreplaceability	*High*				
Increased need for road maintenance	*Status*	*Negative*	*Low*	• Reduction in the speed of the vehicles. • Construction of gravel roads in terms of TRH20. • Avoid excessive use of gravel roads in wet weather. • Implement a road maintenance program under the auspices of the respective transport department.	*Low*	*Medium*
	Spatial Extent	*Local*				
	Duration	*Short Term*				
	Consequence	*Moderate*				
	Probability	*Very likely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				

OPERATIONAL PHASE						
Increased abnormal load traffic	*Status*	*Negative*	*Low*	• The increase in traffic for this phase of the development is negligible and will not have a significant impact. No mitigation measures are proposed.	*Low*	*High*
	Spatial Extent	*Regional*				
	Duration	*Long Term*				
	Consequence	*Moderate*				
	Probability	*Unlikely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				
Increased normal load traffic (staff, replacement parts, repairs, cleaning)	*Status*	*Negative*	*Very low*	• The increase in traffic for this phase of the development is negligible and will not have a significant impact. No mitigation measures are proposed.	*Very low*	*High*
	Spatial Extent	*Local*				
	Duration	*Long Term*				
	Consequence	*Slight*				
	Probability	*Very likely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				
Increased need for road maintenance	*Status*	*Negative*	*Low*	• Reduction in the speed of the vehicles. • Implement a road maintenance program under the auspices of the respective transport department.	*Low*	*Medium*
	Spatial Extent	*Local*				
	Duration	*Long Term*				
	Consequence	*Moderate*				
	Probability	*Very likely*				

	Reversibility	*Moderate*				
	Irreplaceability	*Low*				
DECOMMISSIONING PHASE						
Increased abnormal load traffic	*Status*	*Negative*	*Moderate*	• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods and stagger delivery. • Adequate enforcement of traffic laws and Abnormal Load Permit conditions.	*Low*	*High*
	Spatial Extent	*Regional*				
	Duration	*Short Term*				
	Consequence	*Moderate*				
	Probability	*Likely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				
Increased normal load traffic (plant, equipment, materials, components, labour)	*Status*	*Negative*	*Low*	• Stagger delivery and removal of plant, equipment, material and SEF components. • Ensure staff transport is undertaken in the 'off peak' periods and by bus or minibus.	*Low*	*High*
	Spatial Extent	*Local*				
	Duration	*Short Term*				
	Consequence	*Moderate*				
	Probability	*Very likely*				
	Reversibility	*High*				
	Irreplaceability	*Low*				

Increased incidents with pedestrians and livestock	*Status*	*Negative*	*Moderate*	• Maintenance of farm fences. • Erection of appropriate road signage informing motorists of property accesses and designated animal road crossings. • Maintenance of road verges to provide safe walking space for pedestrians for the duration of the decommissioning period.	*Low*	*High*
	Spatial Extent	*Local*				
	Duration	*Short Term*				
	Consequence	*Severe*				
	Probability	*Unlikely*				
	Reversibility	*High*				
	Irreplaceability	*High*				
Increased need for road maintenance	*Status*	*Negative*	*Low*	• Reduction in the speed of the vehicles. • Avoid excessive use of gravel roads in wet weather. • Implement a road maintenance program under the auspices of the respective transport department.	*Low*	*Medium*
	Spatial Extent	*Local*				
	Duration	*Short Term*				
	Consequence	*Moderate*				
	Probability	*Very likely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				

The table below includes an assessment of the cumulative impact during construction phase for the proposed Padloper PV 5 and the associated infrastructure.

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential Mitigation Measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
CONSTRUCTION PHASE						
Increased abnormal load traffic	*Status*	*Negative*	*Moderate (3)*	• Stagger the construction of the various proposed Padloper developments as far as possible. • Ensure abnormal vehicles travel to and from the proposed Padloper developments in the 'off peak' periods and stagger delivery. • Coordinate abnormal load trips across all Padloper developments. • Ensure adequate enforcement of traffic laws and Abnormal Load Permit conditions.	*Low (4)*	*High*
	Spatial Extent	*Regional*				
	Duration	*Short Term*				
	Consequence	*Substantial*				
	Probability	*Likely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				
Increased normal load traffic (plant, equipment, materials, components, labour)	*Status*	*Negative*	*Moderate (3)*	• Combined transportation of labour across multiple Padloper developments. • Stagger delivery of plant, equipment, material and Padloper SEF components. • Construction of an "on-site" concrete batching plant for use by multiple Padloper developments to reduce trips. • Coordination between all developers in the area.	*Low (4)*	*High*
	Spatial Extent	*Local*				
	Duration	*Short Term*				
	Consequence	*Substantial*				
	Probability	*Very likely*				
	Reversibility	*High*				
	Irreplaceability	*Low*				
Increased incidents with	*Status*	*Negative*	*High (2)*		*Moderate (3)*	*High*
	Spatial Extent	*Local*				

pedestrians and livestock	*Duration*	*Short Term*		• Maintenance of farm fences. • Erection of appropriate road signage informing motorists of property accesses and designated animal road crossings. • Maintenance of road verges to provide safe walking space for pedestrians for the duration of the decommissioning period.		
	Consequence	*Severe*				
	Probability	*Likely*				
	Reversibility	*High*				
	Irreplaceability	*High*				
Increased need for road maintenance	*Status*	*Negative*	*Moderate (3)*	• Reduction in the speed of the vehicles • Construction of gravel roads in terms of TRH20. • Coordinate implementation of a road maintenance program with multiple Padloper developments. • Avoid excessive use of gravel roads in wet weather. • Coordinated implementation of a road maintenance program under the auspices of the respective transport department.	*Low (4)*	*Medium*
	Spatial Extent	*Local*				
	Duration	*Short Term*				
	Consequence	*Moderate*				
	Probability	*Very likely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				

OPERATIONAL PHASE						
Increased abnormal load traffic	*Status* *Spatial Extent* *Duration* *Consequence* *Probability* *Reversibility* *Irreplaceability*	*Negative* *Regional* *Long Term* *Moderate* *Likely* *Moderate* *Low*	*Low (4)*	• Coordinated delivery of replacement abnormal load components for the Padloper developments.	*Low (4)*	*High*
Increased normal load traffic (staff, replacement parts, repairs, cleaning)	*Status* *Spatial Extent* *Duration* *Consequence* *Probability* *Reversibility* *Irreplaceability*	*Negative* *Local* *Long Term* *Moderate* *Very likely* *Moderate* *Low*	*Low (4)*	• Coordinate maintenance and repair programmes among multiple Padloper facilities (if authorised and possible).	*Low (4)*	*High*
Increased need for road maintenance	*Status* *Spatial Extent* *Duration* *Consequence* *Probability*	*Negative* *Local* *Long Term* *Moderate* *Very likely*	*Low (4)*	• Reduction in the speed of the vehicles at all Padloper facilities. • Coordinated implementation of a road maintenance program under the auspices of the respective transport department.	*Low (4)*	*Medium*

	Reversibility	*Moderate*				
	Irreplaceability	*Low*				
DECOMMISSIONING PHASE						
Increased abnormal load traffic	*Status*	*Negative*	*Moderate (3)*	• Ensure abnormal vehicles travel to and from the proposed Padloper developments in the 'off peak' periods and stagger delivery. • Coordinate abnormal load trips across all Padloper developments (if possible). • Ensure adequate enforcement of traffic laws and Abnormal Load Permit conditions.	*Low (4)*	*High*
	Spatial Extent	*Regional*				
	Duration	*Short Term*				
	Consequence	*Substantial*				
	Probability	*Likely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				
Increased normal load traffic (plant, equipment, materials, components, labour)	*Status*	*Negative*	*Moderate (3)*	• Combined transportation of labour across multiple Padloper developments (if possible). • Stagger delivery and removal of plant, equipment, material and Padloper SEF components (if possible).	*Low (4)*	*High*
	Spatial Extent	*Local*				
	Duration	*Short Term*				
	Consequence	*Substantial*				
	Probability	*Very likely*				
	Reversibility	*High*				
	Irreplaceability	*Low*				

Increased incidents with pedestrians and livestock	*Status*	*Negative*	*High (2)*	• Maintenance of farm fences. • Erection of appropriate road signage informing motorists of property accesses and designated animal road crossings. • Maintenance of road verges to provide safe walking space for pedestrians for the duration of the decommissioning period.	*Moderate (3)*	*High*
	Spatial Extent	*Local*				
	Duration	*Short Term*				
	Consequence	*Severe*				
	Probability	*Likely*				
	Reversibility	*High*				
	Irreplaceability	*High*				
Increased need for road maintenance	*Status*	*Negative*	*Moderate (3)*	• Reduction in the speed of the vehicles. • Coordinate implementation of a road maintenance program with multiple Padloper developments (if possible). • Avoid excessive use of gravel roads in wet weather. • Coordinated Implementation of a road maintenance program under the auspices of the respective transport department.	*Low (4)*	*Medium*
	Spatial Extent	*Local*				
	Duration	*Short Term*				
	Consequence	*Substantial*				
	Probability	*Very likely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				

D.2.11.5 Concluding Statement

The TIA found that the highest traffic impact of the proposed development would occur during the construction phases, which are temporary in nature and whose impacts can be effectively mitigated. The existing site accesses were found to be sufficient for the proposed facility but may require some upgrades. No fatal flaws were identified in the proposed project in respect of transportation and traffic aspects. No environmentally sensitive areas are required and therefore no areas are to be avoided from a transportation perspective.

With reference to this report, associated assessment and the findings made within, the specialist notes that the proposed project has a nominal impact on the existing traffic network. The proposed project is therefore deemed acceptable from a transport perspective, provided the recommendations and mitigation measures in this report are implemented, and hence the Environmental Authorisation (EA) should be granted for the BA application.

D.2.12 Impacts relating to the BESS

This section is informed by the high level safety health and environmental risk assessment for the proposed development of BESS included in Appendix D.8 of the BA Report.

The assessment was undertaken by Deborah Mitchell of iSHEcon (Pty) Ltd to inform the outcome of placement of the BESS within the site layout. The following section provides a summary of the key recommendations and concluding statement undertaken for the assessment. The information below is extracted from Mitchell (2023).

The proposed Padloper PV 5 will have a Battery Energy Storage System (BESS) of up to 900 MWh located adjacent the on-site substation. Considering the nature of the project, the Project Applicant would like to assess all available BESS technologies that could be implemented. The following BESS technologies are being considered; solid state Lithium-ion such as Lithium Iron Phosphate, Lithium Nickel Manganese Cobalt oxides or sodium-ion systems, as well as Redox flow (typically vanadium). The specific technology will only be determined following Engineering, Procurement and Construction (EPC) procurement.

D.2.12.1 Potential Impacts and Recommended Mitigation Measures

The high-level safety health and environmental risk assessment for the proposed development of BESS had the below recommendations for each of the considered technologies:

GENERAL RECOMMENDATIONS

- This Risk Assessment has found that with suitable preventative and mitigative measures in place, none of the identified potential risks are excessively high, i.e., from a Safety, Health and Environment (SHE) perspective no fatal flaws were found with either type of technology (solid state - lithium-ion or redox flow - vanadium) for the BESS installations at the proposed Padloper PV 5.

- At a large facility, without installation of the state-of-the art battery technology that includes protective features, there can be significant risks to employees and first responders. The latest battery designs include many preventative and mitigative measures to reduce these risks to tolerable levels. State-of-the-art technology should be used, i.e., not old technology, such as liquid phase lithium-ion batteries, that may have been prone to fire and explosion risks.

The design should be subject to a full Hazard and Operability Study (HAZOP) prior to commencement of procurement. A HAZOP is a detailed technical systematic study that looks at the intricacies of the design, the control system, the emergency system etc. and how these may fail under abnormal operating conditions. Additional safeguards may be suggested by the team doing the study.

LITHIUM SOLID STATE CONTAINERISED BATTERIES

- With lithium solid-state batteries, the most significant hazard with battery units is the possibility of thermal runaway and the generation of toxic and flammable gases. There have been numerous such incidents around the world with batteries at all scales and modern technology providers include many preventative and mitigation features in their designs. This type of event also generates heat which may possibly propagate the thermal runaway event to neighbouring batteries if suitable state of the art technology is not employed.

- The flammable gases generated may ignite leading to a fire which accelerates the runaway process and may spread the fire to other parts of the BESS or other equipment located near-by.

- If the flammable gases accumulate within the container before they ignite, they may eventually ignite with explosive force. This type of event is unusual but has happened with an older technology container installed at McMicken in the USA in 2019.

- Due to a variety of causes, thermal runaway could happen at any point during transport to the facility, during construction or operation / maintenance at the facility or during decommissioning and safe making for disposal.

- Due to the containerized approach as well as the usual good practice of separation between containers, which should be applied on this project, and therefore the likely restriction of events to one container at a time, the main risks are close to the containers i.e., to transport drivers, employees at the facilities and first responders to incidents.

- In terms of a worst conceivable case container fires, the significant impact zone is likely to be limited to within 10 m of the container and mild impacts to 20 m. Based on the current proposed layouts, impacts at the closest isolated farmhouses to the proposed project is not expected.

- In terms of a worst conceivable case explosion, the significant impact zone is likely to be limited to with 10 m of the container and minor impacts such as debris within 50 m. Based on the current proposed layouts, impacts at the closest isolated farmhouses to proposed project is not expected.

- In terms of a worst reasonably conceivable toxic smoke scenario, provided the units are placed suitably far apart to prevent propagation from one unit to another and large external fires are prevented, the amount of material burning should be limited to one container at any one time. In this case, beyond the immediate vicinity of the fire, the concentrations of harmful gases within the smoke should be low. The proposed BESS installation's locations at the project are well over 500 m from any occupied farmhouse and therefore the risks posed by the BESS are negligible.

VANADIUM REDOX FLOW (VRF) BATTERY INSTALLATIONS

- The most significant hazard with VRF battery units is the possibility of spills of corrosive and environmentally toxic electrolyte. Many preventative and mitigation features will be included in the design and operation, e.g., full secondary containment, level control on tanks, leak detection on equipment etc.

- VRF batteries do not present significant fire and electrical arcing hazards provided they are correctly designed, operated, maintained and managed. Suitable BMS, safety procedures, operating instructions, maintenance procedures, trips, alarms and interlocks should be in place. (Refer to tables in section 4 under preventative and mitigation measures).

TECHNOLOGY AND LOCATION OF BESS FACILITIES

- From a safety and health point of view, the above Risk Assessment shows that risks posed by VRFB systems may be slightly lower than those of Solid State Lithium (SSL) BESS facilities, particularly with respect to fire and explosion risks. From an environmental spill and pollution point of view the VRFB systems present higher short-term risks than the SSL BESSs. However, the above conclusions may be due to the fact that the VRFB technology is not as mature as SSL technology and therefore there is not as much operating experience and accident information available for the VRFB. Overall, from a SHE RA point of view, there is no specific preference for a type of technology.

- From a SHE RA point of view, where there is a choice of location that is further from public roads, water courses or isolated farmhouses, this would be preferred. VRFB hazards are mostly related to possible loss of containment of electrolyte and SSL batteries to fires producing toxic smoke and fire fighting which may result in contaminated of firewater runoff. One would not want these liquids to enter water courses nor the smoke to pass close to houses / public traffic.

RECOMMENDATIONS

The following recommendations have been made in the SHE RA for the BESS:

- There are numerous different battery technologies but using one consistent battery technology system for the proposed project BESS installations in the Murraysburg area would allow for ease of training, maintenance, emergency response and could significantly reduce risks.

- Where reasonably practicable, state-of-the-art battery technology should be used with all the necessary protective features e.g., draining of cells during shutdown and standby-mode, full BMS with deviation monitoring and trips, leak detection systems.

- There are no fatal flaws associated with the proposed Padloper PV 5 BESS installations for either technology type (i.e., VRF or Solid State Lithium).

- The overall BESS design should be subject to a full HAZOP prior to finalization of the design.

- For the VRFB systems an end of life (and for possible periodic purging requirements) solution for the large quantities of hazardous electrolyte should be investigated, e.g., can it be returned to the supplier for re-conditioning.

- Prior to bringing any solid-state battery containers into the country, the contractor should ensure that:
    - An Emergency Response Plan is in place that would be applicable for the full route from the ship to the site. This plan would include details of the most appropriate emergency response to fires both while the units are in transit and once they are installed and operating.
    - An End-of-Life Plan is in place for the handling, repurposing or disposal of dysfunctional, severely damaged batteries, modules and containers.
- The site layout and spacing between lithium solid-state containers should be such that it mitigates the risk of a fire or explosion event spreading from one container to another.
- Under certain weather conditions, the noxious smoke from a fire in a lithium battery container could travel some distance from the unit. The smoke will most likely be acrid and could cause irritation, coughing, distress etc. Close to the source of the smoke, the concentration of toxic gases may be high enough to cause irreversible harmful effects. The BESSs need to be located at a suitable distance from public facilities/residences etc. The proposed BESS must be located more than 500 m from isolated farmhouses. None of the dwellings in the area is within 500 m of the proposed BESS locations for the proposed project.
- Where there is a choice of alternative locations for the BESS, those that are further from water courses would be preferred. VRFB hazards are mostly related to possible loss of containment of electrolyte and solid-state systems may experience fires that may result in loss of containment of liquids or the use of large amounts of fire water which could be contaminated. One would not want these run-offs to enter water courses directly. The size of the buffer between water bodies and the BESS containing chemicals should be set in consultation with a water specialist and was therefore not specified in the SHE Risk Assessment for the BESS.
- Finally, it is suggested once the technology has been chosen and more details of the actual BESS designs for the Padloper PV 5 are available, the necessary updated Risk Assessments should be in place.

D.2.13 Civil Aviation

The Site Sensitivity Verification for Civil Aviation is detailed in this section (Appendix D.11).

On 20 March 2020, in Government Gazette 43110, Government Notice (GN) R320, the Department of Environment, Forestry and Fisheries (DEFF) [now operating as the Department of Forestry, Fisheries and the Environment (DFFE)] published procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) when applying for an Environmental Authorisation (EA). GN R320 prescribes general requirements for undertaking Site Sensitivity Verification, as well as protocols for assessment and minimum report content requirements of environmental impacts associated with specified environmental themes for relevant activities requiring EA. GN R320 was enforced within 50 days of publication of the notice i.e., on 9 May 2020.

GN R320 specifically includes a protocol that provides the criteria for the specialist assessment and minimum report content requirements for impacts on civil aviation installations for relevant activities

requiring EA. This protocol replaces the requirements of Appendix 6 of the 2014 NEMA EIA Regulations (as amended).

This specific protocol states that proposed developments (where relevant) that occur on sites identified as Very High, High or Medium sensitivity, as depicted on the National Web-Based Environmental Screening Tool (Screening Tool), must include a Civil Aviation Compliance Statement. It further states that there are no requirements if the proposed developments occur on sites identified as Low sensitivity on the Screening Tool. However, a Site Sensitivity Verification is required for the Civil Aviation Protocol for all sensitivity levels.

Therefore, since the proposed projects require an EA in terms of the 2014 NEMA EIA Regulations (as amended), and Civil Aviation was identified as a relevant theme in the Screening Tool Report, GN R320 must be complied with.

Screening Tool Reports and/or maps were generated for the proposed projects using the following classifications:

- **SEF Footprint**: Utilities Infrastructure → Electricity → Generation → Renewable → Solar → Solar PV; and
- **EGI:** Utilities Infrastructure → Electricity → Distribution and Transmission → Powerline.

The Solar PV classification results in the use of the Solar PV methodology, whilst the substations and EGI classification results in the use of the general methodology on the Screening Tool.

The civil aviation theme (for Solar PV development) on the Screening Tool depicted that the entire study area is located in **a low sensitivity area from a civil aviation perspective** i.e., there are no major or other types of civil aviation aerodromes or buffers that intersect with the proposed project site.

In line with the above, the civil aviation theme (for substation developments and EGI) on the Screening Tool depicted that the entire proposed project site is located in a low sensitivity area from a civil aviation perspective.

The proposed project study area was determined and verified to be of low sensitivity (as it relates to civil aviation). This was determined through a site visit and based on existing databases, and confirms the sensitivity allocated on the Screening Tool. Based on the above, in terms of GN R320, no further requirements are applicable i.e. a Compliance Statement is not required.

D.2.14 Defence

The Site Sensitivity Verification for Defence is detailed in this section (Appendix D.12)

On 20 March 2020, in Government Gazette 43110, Government Notice (GN) R320, the Department of Environment, Forestry and Fisheries (DEFF) [now operating as the Department of Forestry, Fisheries and the Environment (DFFE)] published procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) when applying for an Environmental Authorisation (EA). GN R320 prescribes general requirements for undertaking Site Sensitivity Verification, as well as protocols for assessment and minimum report content requirements of environmental impacts associated with specified environmental themes for relevant activities requiring EA. GN R320 was enforced within 50 days of publication of the notice i.e. on 9 May 2020.

GN R320 specifically includes a protocol that provides the criteria for the specialist assessment and minimum report content requirements for impacts on defence installations for relevant activities requiring EA. This protocol replaces the requirements of Appendix 6 of the 2014 NEMA EIA Regulations (as amended).

This specific protocol states that proposed developments (where relevant) that occur on sites identified as Very High, High or Medium sensitivity, as depicted on the National Web-Based Environmental Screening Tool (Screening Tool), must include a Defence Compliance Statement. It further states that there are no requirements if the proposed developments occur on sites identified as Low sensitivity on the Screening Tool. However, a Site Sensitivity Verification is required for the Defence Protocol for all sensitivity levels.

Therefore, since the proposed projects require an EA in terms of the 2014 NEMA EIA Regulations (as amended), and Defence was identified as a relevant theme in the Screening Tool Report, GN R320 must be complied with.

In terms of GN R320, this means that no further requirements are applicable i.e., a Compliance Statement is not required, if the site is indeed found to be of low sensitivity during the site visit.

Screening Tool Reports and/or maps were generated for the proposed projects using the following classifications:

- **SEF Footprint**: Utilities Infrastructure → Electricity → Generation → Renewable → Solar → Solar PV; and
- **EGI:** Utilities Infrastructure → Electricity → Distribution and Transmission → Powerline.

The Solar PV classification results in the use of the Solar PV methodology, whilst the substations and EGI classification results in the use of the general methodology on the Screening Tool.

The defence theme (for Solar PV developments) on the Screening Tool depicted that the entire study area is located in a **low sensitivity area from a defence perspective** i.e., there are no major or other types of defence installations or buffers that intersect with the proposed project site.

In line with the above, the defence theme (for substation developments and EGI) on the Screening Tool depicted that the entire study area is located in a low sensitivity area from a defence perspective.

In terms of GN R320, this means that no further requirements are applicable i.e. a Compliance Statement is not required, if the site is indeed found to be of low sensitivity during the site visit.

The proposed project study area was determined and verified to be of low sensitivity (as it relates to defence installations). This was determined through a site visit and based on existing databases, and confirms the sensitivity allocated on the Screening Tool. Based on the above, in terms of GN R320, no further requirements are applicable i.e., a Compliance Statement is not required.

D.2.15 Environmental Sensitivity Mapping

Based on the impact assessment undertaken and the relevant environmental sensitivities identified, the site layout of the solar PV facility has been identified and shown in Figure D.11 and Appendix D of this BA Report. Based on the specialist studies, the key environmental features that have been avoided in terms of the layout of the facilities are listed below.

- **Agriculture**
  - The agricultural protocol requires confirmation that all reasonable measures have been taken through micro-siting to minimize fragmentation and disturbance of agricultural activities. However, the agricultural uniformity and low agricultural potential of the environment, means that the exact positions of all infrastructure will make no material difference to agricultural impacts and there are no sensitivities related to this theme to be mapped.

- **Visual**
  - In addition to some scattered areas of higher elevation, the zones of potential visual sensitivity include a 500 m buffer around the three residences / farmhouses within 500 m of the farm portion boundary.
  - There are currently no areas within the PV and EGI layouts that require avoidance.
  - The viewshed assessment shows that the proposed development will mainly be visible from high points in the landscape. The main exception is an area of remote land to the west of the facility footprint which is at a similar elevation to the site. The viewshed also shows that the facility would be quite highly visible from a section of the local gravel road. The R63 is well outside the viewshed. Because of its length, the powerline would be visible over a greater area. It will also be visible on the skyline in some places.
  - Overall, the significance of the visual impacts is expected to have a Moderate sensitivity rating as a result of potentially sensitive visual receptor locations (i.e., homesteads of landowners) located on affected farm portions for which landowner consent has been obtained, as well as the existing road network with traverses the Padloper PV and EGI Cluster.
  - Refer to Figure D.4 for the visual sensitivity map.

- **Heritage (Archaeology and Cultural Landscape)**
  - Archaeological resources were sparse with just one being graded above Not Conservation Worthy (NCW). This one was considered to have medium cultural significance for its scientific value and is allocated a grade of IIIB. It occurs immediately outside the study area and 50 m from the nearest proposed solar panels.
  - The following were rated as Very High (no-go):
    - The archaeological site at waypoint 184;
    - The house at waypoint 183 and any road widening that occurs must be away from the house;
    - No stones may be removed from any archaeological or historical sites; and
    - A house lies adjacent to the eastern part of the proposed facility access road. The current farm track lies 19 m from the corner of this house and its reuse should not result in any impacts to the structure. It should, nonetheless, be demarcated as a No-Go area.
    - The archaeological sites at waypoints 016 and 172 must be flagged as no-go areas
    - Refer to Figure D.5 for the heritage sensitivity map.

- **Palaeontology**
  - There are no No-go palaeontological sensitivity areas designated by the specialist. The entire site is designated as Low sensitivity.

- **Terrestrial Biodiversity and Species**
  - Rocky ridges and outcrops within the broader study area were rated as Very High (no-go). The assessment found that the highest number of impacts on terrestrial features will result

from the development of PV Panel areas, roads, installation of cables and other infrastructures across the site. However, it was concluded that due to the relatively small size of the project area, retention of much of the natural area is allowed so the ecosystems should remain largely unaffected. This is largely based on the assumption that all Very High sensitivity habitats can be avoided, through the use of the existing tracks and roads shown in this assessment.

- Refer to Figure D.7 for the ecology sensitivity maps.

- **Aquatic Biodiversity and Species**
  - The assessment delineated core functional areas of watercourses with and without riparian vegetation, alluvial washes, drainage lines. Alluvial washes and alluvial watercourses were rated as Very High sensitivity whereas drainage lines were rated as Moderate to Low sensitivity. All Core Functional areas were identified as No-go areas for placement of infrastructure. The site layout for the proposed development has avoided all core functional areas within the proposed project site.
  - Refer to Figure 7 for the ecology sensitivity map.

- **Avifauna**
  - The assessment found that the proposed project site consists of a largely flat area on a slightly elevated plateau. The site contains no NFEPA rivers or wetlands or significant drainage lines. The entire assessed area is mapped as Eastern Upper Karoo vegetation type (Least Concern). The assessed site contains a small area of CBA 1, which is considered to be of medium avifaunal sensitivity. The remainder of the site is of Low avifaunal sensitivity. The CBA 1 area has been largely excluded from the proposed development footprint.
  - The proposed EGI corridor runs across approximately 1 km of CBA1 area, considered to be of medium avifaunal sensitivity, associated with a NFEPA river which it crosses. A 200 m area surrounding the NFEPA river is also considered to be of Medium avifaunal sensitivity. The alignment then follows an existing farm road in a northerly direction for approximately 600 m and then north-east to the Padloper Solar Facility 4 switching station, over areas of low avifaunal sensitivity.
  - Verreaux's Eagle nest was located during the pre-construction monitoring surveys east of the Padloper PV 5. A 1 km 'No-go' development buffer has been applied around this nest and is not infringed on by the proposed Padloper PV 5 project
  - Refer to Figure D.8 for the avifauna sensitivity map.

- **Geotechnical**
  - The Geotechnical Assessment identifies unfavourable steep slopes within the study area. Such slopes are particularly vulnerable to increased levels of erosion, undercutting of geological units less susceptible to weathering and block and wedge failures of jointed geological formations especially in sandstones, mudstones and siltstones. As such slope with an angle of greater than 12° have been rated as Very High (no-go) sensitivity. It must be noted that no infrastructure is planned on slopes rated as Very High (no-go) sensitivity.
  - Refer to Figure D.9 for the geotechnical sensitivity map.

- **BESS**
  - The following Moderate – high buffers were applied to guide the placement of the BESS:
    - Existing main road network (i.e., R 63) – 100 m buffer
    - On-site buildings, substations and transmission lines – < 20 m
    - Farmsteads – 500 m

- Refer to Figure D.10 for the BESS sensitivity map.

- **Socio-Economic**
  - Sensitivity maps in terms of areas to avoid are not applicable for the Socio-Economic Assessment.

- **Geohydrology**
  - Sensitivity maps in terms of areas to avoid are not applicable for the Geohydrology Assessment.

- **Traffic**
  - Sensitivity maps in terms of areas to avoid are not applicable for the Traffic Impact Statement.

Key sensitivity features have been annotated in Figure D.11 (i.e., sensitivity and feature map). For detailed feature maps, refer to the Specialist Assessments (Appendix D of this Final BA Report).

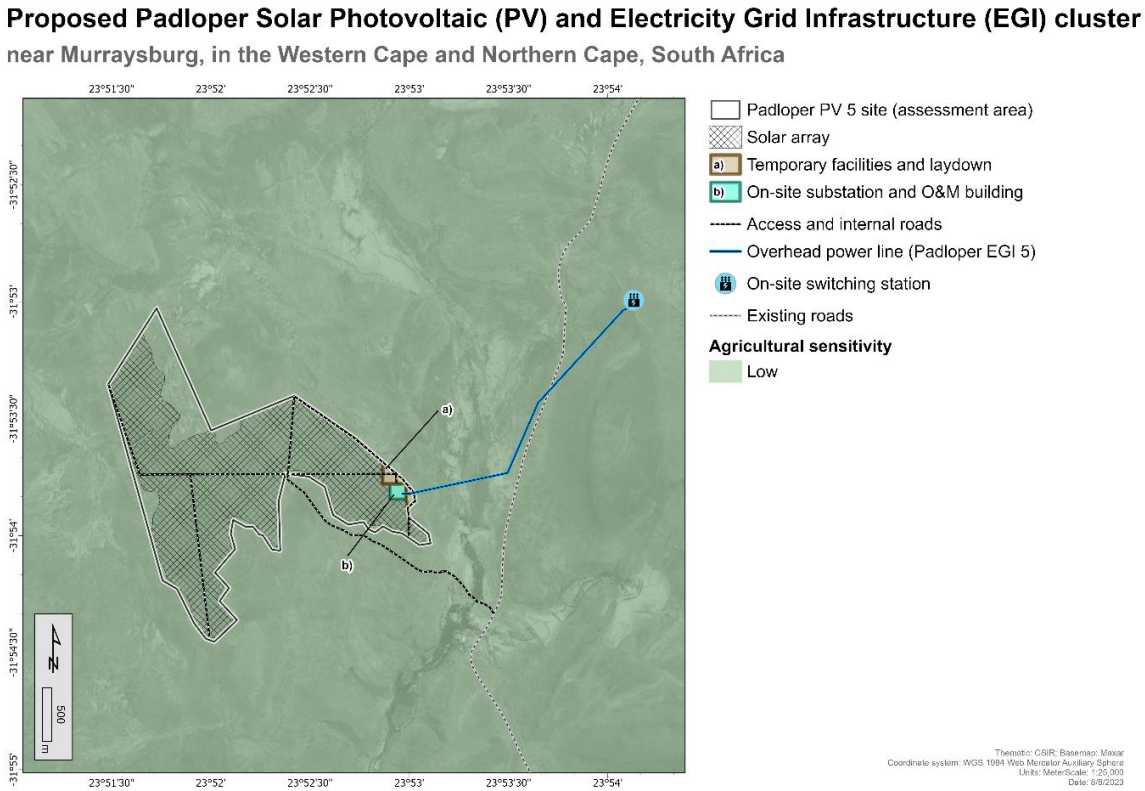

Figure D.3. Sensitivity Map for Agriculture and Soils relevant to the proposed development.

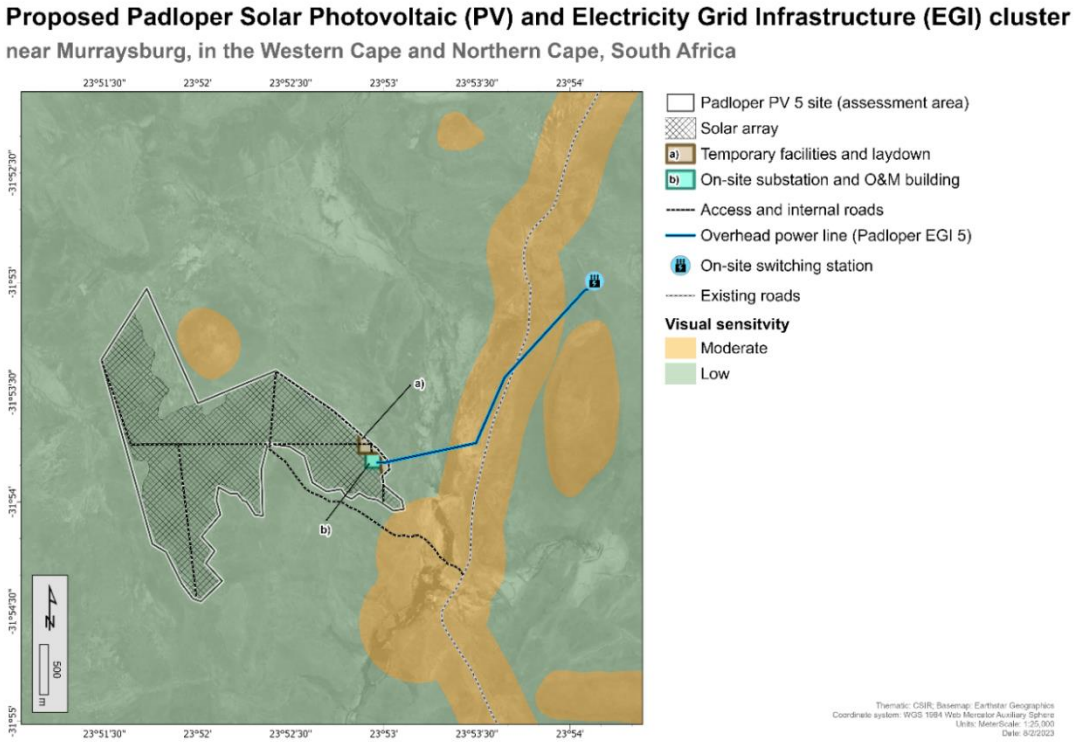

Figure D.4. Sensitivity Map for Visual Aspects relevant to the proposed development.

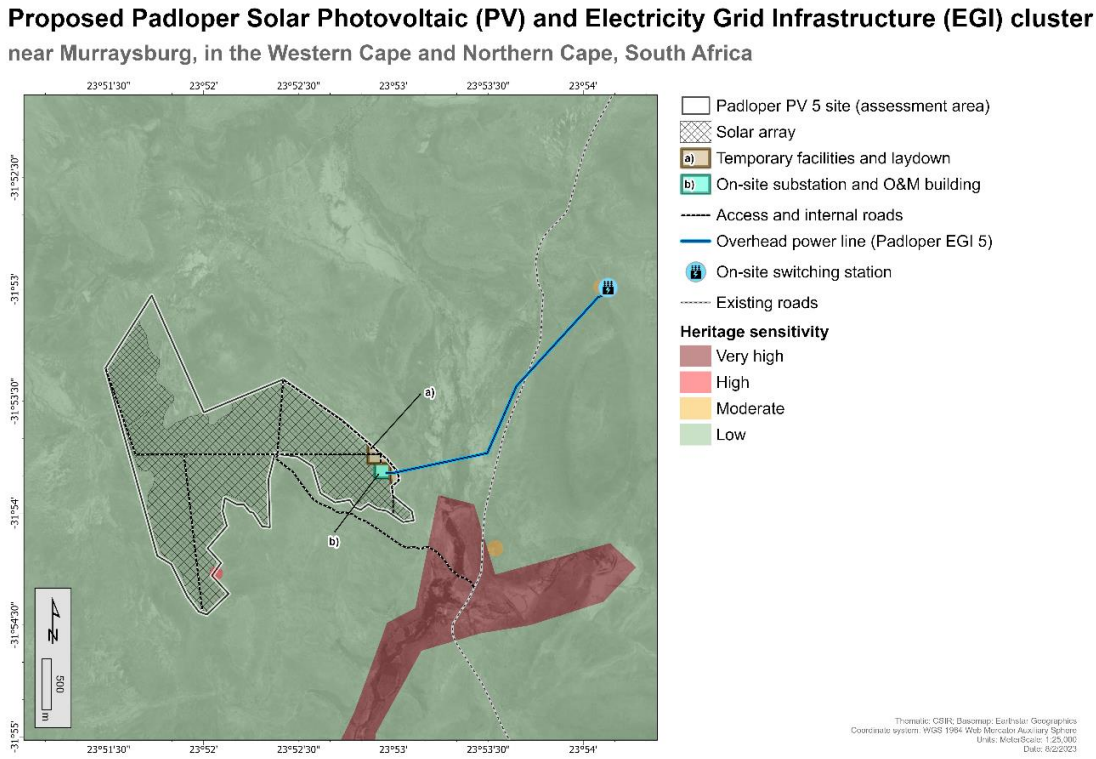

Figure D.5 Sensitivity Map showing Heritage sensitivity relevant to the proposed development.

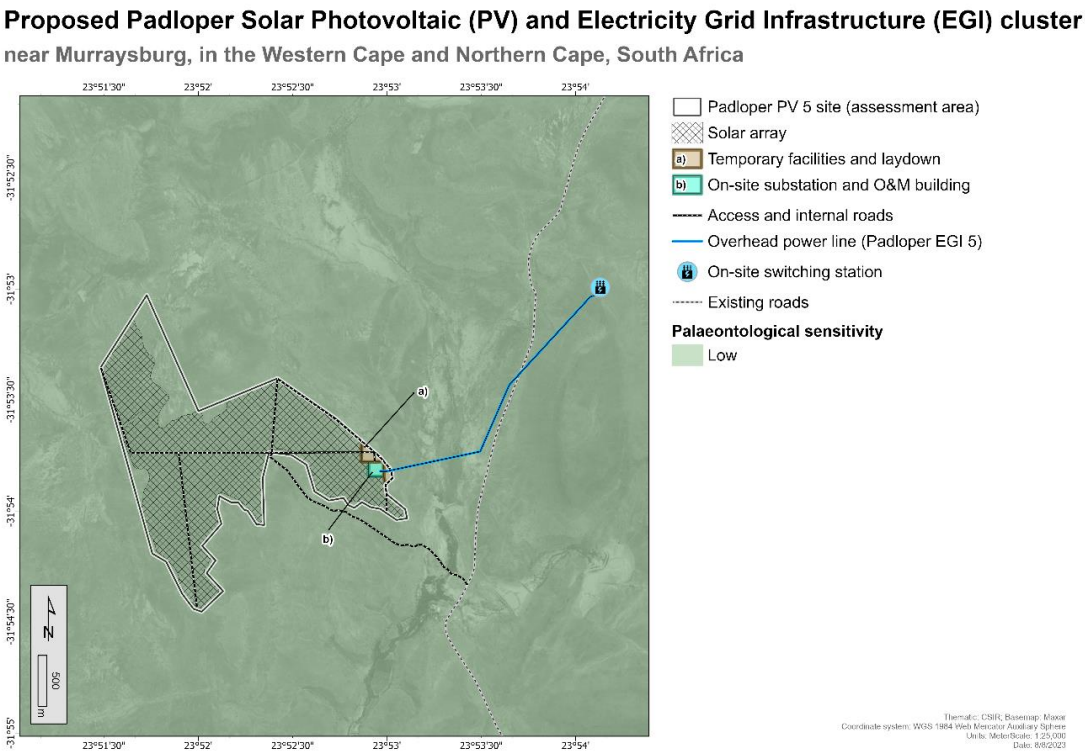

Figure D.6. Sensitivity Map showing Palaeontolgical sensitivity relevant to the proposed development.

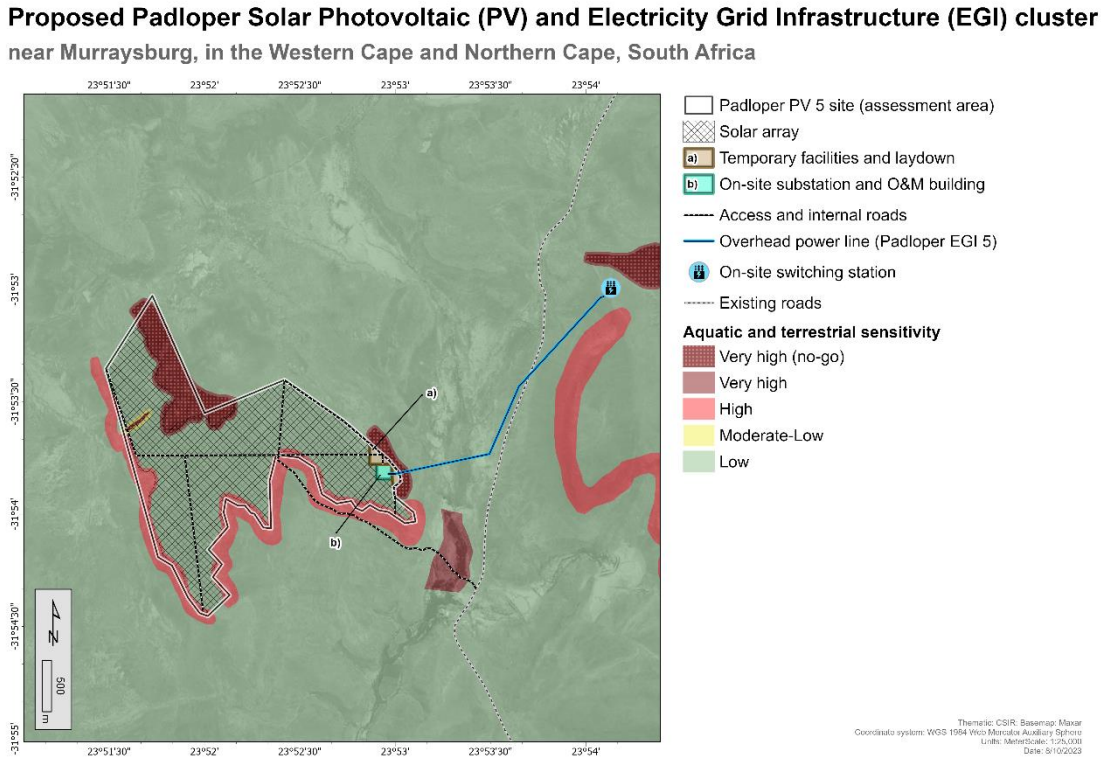

Figure D.7. Sensitivity Map showing sensitive Aquatic and Terrestrial Ecology areas relevant to the proposed development.

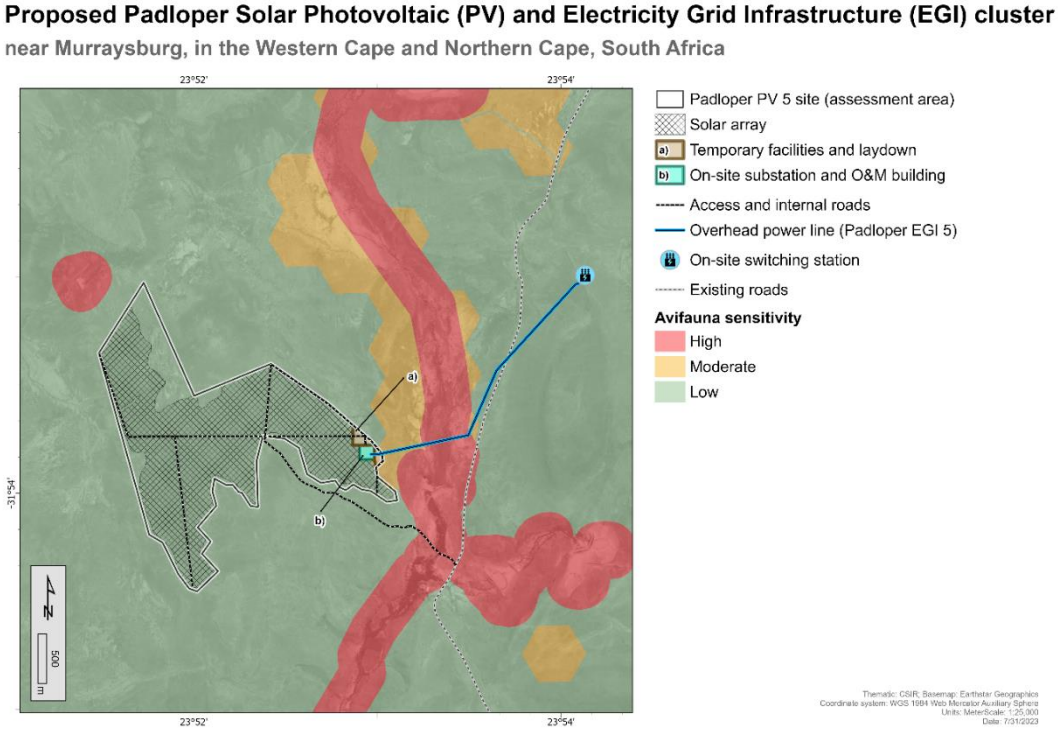

Figure D.8. Sensitivity Map showing sensitive Avifaunal areas relevant to the proposed development

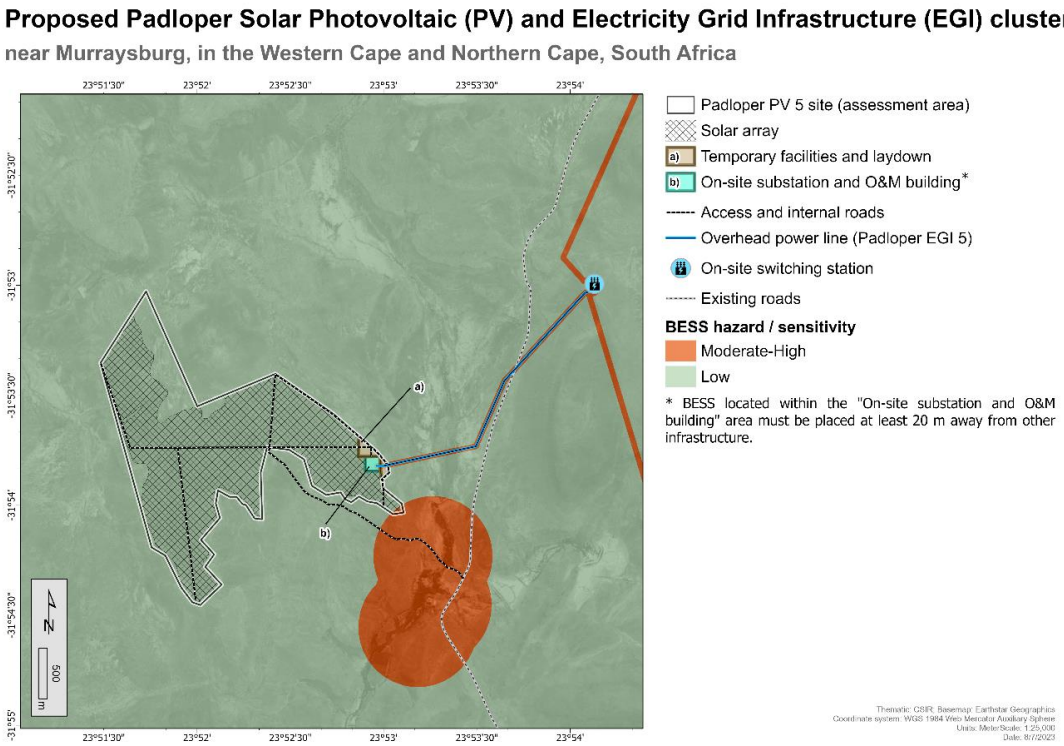

Figure D.9 Sensitivity Map showing less preferred areas for BESS placement.

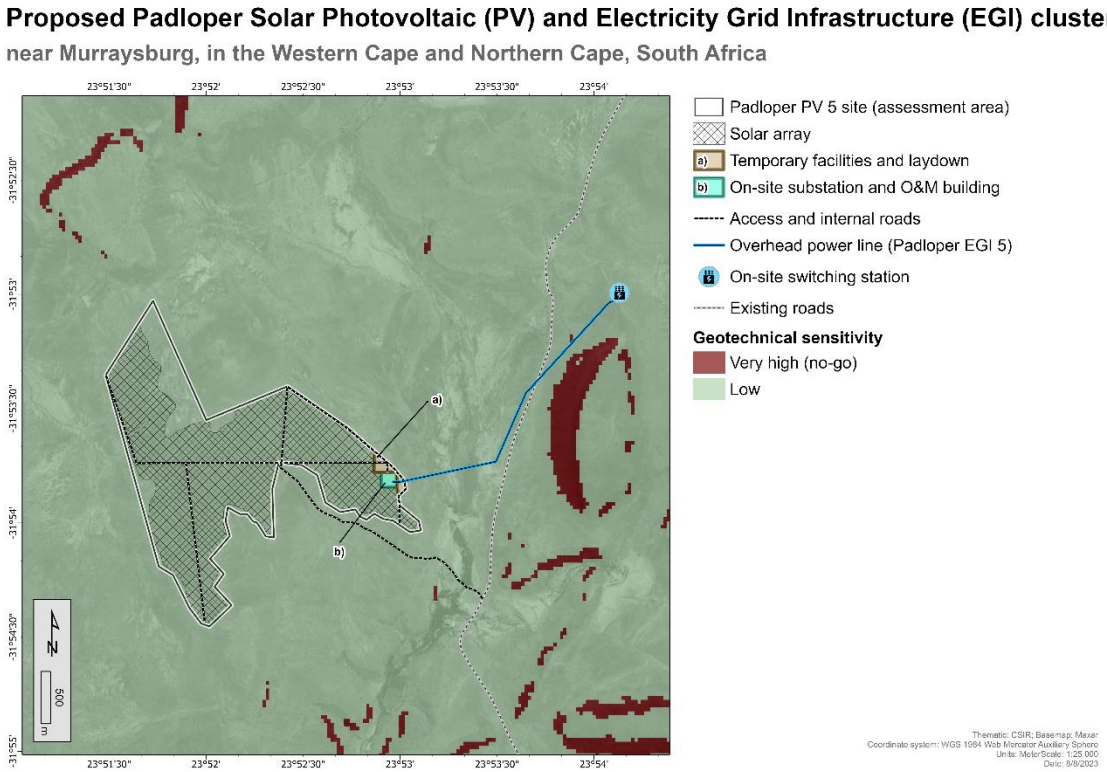

Figure D.10 Sensitivity Map for Geotechnical Aspects for the proposed development.

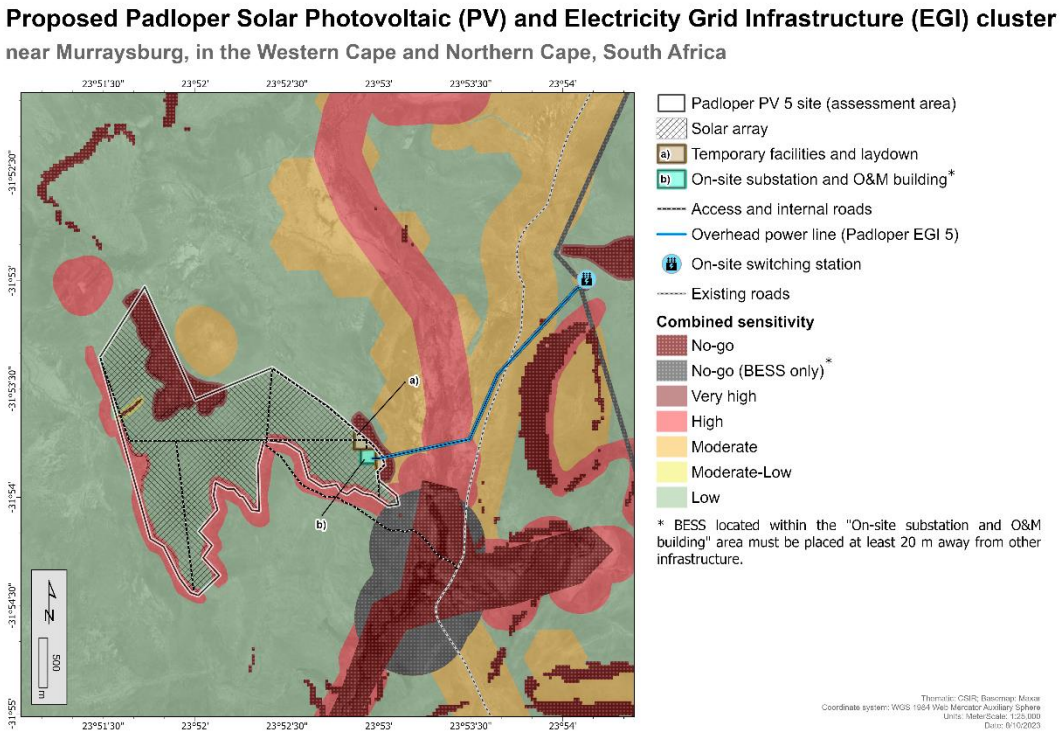

Figure D.11. Combined Sensitivity Map for the proposed development.

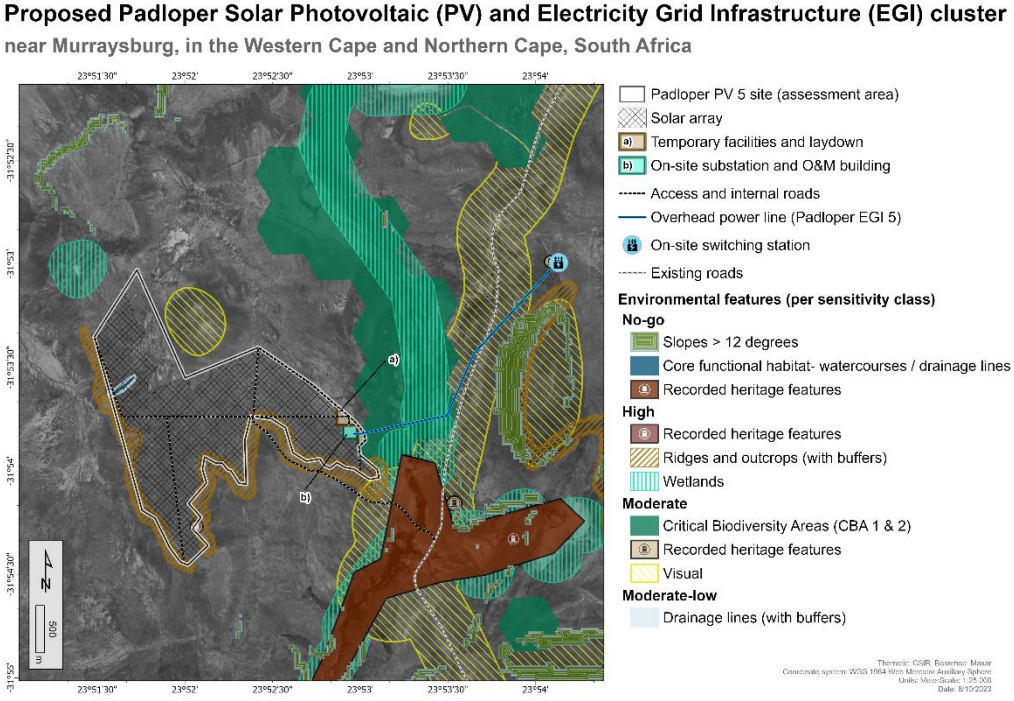

Figure D.12. Combined Sensitivity Features Map for the proposed development.

SECTION E: RECOMMENDATION OF PRACTITIONER & ENVIRONMENTAL IMPACT STATEMENT

This BA Report has investigated and assessed the significance of potential positive and negative direct, indirect and cumulative impacts associated with the proposed Padloper PV 5 project (i.e., Padloper PV 5, Padloper EGI 5 and their associated infrastructure). None of the negative impacts have been identified within this BA that, in the opinion of the EAP who has conducted this BA Process, should be considered "fatal flaws" from an environmental perspective, and thereby necessitate substantial re-design or termination of the project.

Section 24 of the Constitutional Act states that "*everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that prevents pollution and ecological degradation; promotes conservation; and secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development*". Based on this, this BA was undertaken to ensure that these principles are met through the inclusion of appropriate management and mitigation measures, and monitoring requirements. These measures will be undertaken to promote conservation by avoiding the sensitive environmental features present on site and through appropriate monitoring and management plans (refer to the EMPr in Appendices H - J of this BA Report).

It is understood that the information contained in this BA Report and appendices is sufficient to make a decision in respect of the activity applied for. It is recommended that the EA be valid for a period of 10 years.

Alternatives

As noted above, in Section A of this report, the preferred activity was determined to be the development of a renewable energy facility on site using solar PV as the preferred technology. In terms of the preferred location of the site, even though location alternatives were not assessed the layout was designed after provision of sensitivity data by the specialists to ensure that it would have the least possible overall impact. The specialists considered desktop data, field work, existing literature and the National Web-based Environmental Screening Tool to inform the identification of sensitivities. Based on this, a preferred layout for the solar PV facilities was determined. This layout avoids the features on site that have been identified as no-go areas, as explained in Section B and Section D.

There are no alternatives for the component of the project (i.e., the proposed 132 kV overhead power line (Padloper EGI 5) which will facilitate the connection of the proposed Padloper PV 5 to the national electrical grid network via the Ishwati Emoyeni Collector Substation and the Gamma MTS).

Need and Desirability of the Proposed Project

This BA considered the nature, scale and location of the proposed development as well as the wise use of land (i.e., is this the right time and place for the development of these proposed projects). This project is located in REDZ 11 (Beaufort West) which is a geographical area that has been identified on a strategic planning level to have reduced negative environmental impacts but high commercial attractiveness (due to its proximity to, inter alia, the national grid) and socio-economic benefit to the country. The development of solar energy is important for South Africa to reduce its overall environmental footprint from power generation (including externality costs), and thereby to steer the country on a pathway towards sustainability. On a municipal planning level, the proposed project supports the objectives of the Beaufort West Local Municipality IDP (2017-2022) which identifies sustainable development and job creation as key priorities to improve its economic sector. The Beaufort West Local Municipality IDP promotes the creation of an enabling environment to attract investment and support local economy. The proposed project is therefore aligned with the vision and goals of the District and Local Municipalities. It will also stimulate the creation of employment which is much needed in the municipal areas. It will therefore be supportive of the IDP's objective of creating more job opportunities and the creation of an enabling environment to attract investment and support local the economy.

Summary of Key Impact Assessment Findings

Based on the findings of the specialist studies, the proposed project is considered to have an overall moderate to very low negative environmental impact and an overall moderate positive socio-economic impact in all phases (construction, operation and decommissioning, with there being a potential high positive impact during the operational phase (with the implementation of respective mitigation and enhancement measures).

Table E.1 below provides a summary of the impact assessment for each phase of the proposed project (i.e., Padloper PV 5, Padloper EGI 5 and their associated infrastructure) **post mitigation for direct impacts**. Table E.2 provides the same information for the **cumulative impacts**. Table E. 1 and E.2 also indicate where specialist themes have different impact ratings for the Padloper PV 5 and Padloper EGI 5 components.

As indicated in Table E.1, the majority of the **direct negative impacts** were rated with a **low to very low post mitigation impact significance** for the **construction phase**, with only the Avifauna impacts being rated as **moderate to very low**. In terms of the operational and decommissioning phases, the majority of the **direct negative impacts** were rated with a **low to very low post mitigation impact significance**, with only the Avifauna and Visual impacts being rated as **moderate to very low**. In terms of **positive impacts**, the Socio-Economic impacts are rated as **moderate significance** for the construction, and decommissioning phase and **moderate to high** for the operational phase.

Based on Table E.2, the majority of the **cumulative negative impacts** were rated **very low to low post mitigation impact significance with moderate impact significance** being recorded for the Visual and Avifauna themes. As mentioned above, the impact significance recorded in Table E. 2 is applicable to the entire project (i.e., Padloper PV 5, Padloper EGI 5 and their associated infrastructure). In terms of **positive impacts**, the Socio-Economic impacts are rated as **moderate to high significance** to for the construction, and decommissioning phase and **high to very high** for the operational phase.

Table E.1. Overall Impact Significance with the Implementation of Mitigation Measures for Direct Negative and Positive Impacts

Specialist Assessment		Construction Phase		Operational Phase		Decommissioning Phase	
DIRECT NEGATIVE IMPACTS							
Visual	PV	**Low**		**Moderate**		**Low**	
	EGI	**Low**		**Low**		**Moderate**	
Heritage (Archaeology and Cultural Landscape)	PV	**Low**		**Low**		**Low**	
	EGI	**Low**		**Low**		**Low**	
Palaeontology		**Low**		**Insignificant and/or not identified and/or not applicable**		**Insignificant and/or not identified and/or not applicable**	
Terrestrial Biodiversity and Species		**Very Low**		**Very Low**		**Very Low**	
Aquatic Biodiversity and Species		**Very Low**		**Very Low**		**Very Low**	
Avifauna	PV	**Very Low**	**Moderate**	**Low**	**Very Low**	**Low**	**Moderate**
	EGI	**Low**	**Very Low**	**Moderate**	**Very Low**	**Low**	**Very Low**
Socio-Economic		**Low**		**Low**		**Low**	
Geotechnical		**Very Low**		**Very Low**		**Very Low**	
Traffic		**Low**		**Low**		**Low**	
DIRECT POSITIVE IMPACTS							
Socio-Economic		**Moderate**		**Moderate**	**High**	**Moderate**	

Table E.2. Overall Impact Significance with the Implementation of Mitigation Measures for Cumulative Negative and Positive Impacts

Specialist Assessment	Construction Phase	Operational Phase	Decommissioning Phase
CUMULATIVE NEGATIVE IMPACTS			
Visual	**Moderate**	**Moderate**	**Low**
Heritage (Archaeology and Cultural Landscape)	**Very Low**	**Very Low**	**Very Low**
Palaeontology	**Low**	**Insignificant and/or not identified and/or not applicable**	**Insignificant and/or not identified and/or not applicable**
Terrestrial Biodiversity and Species	**Very Low**	**Very Low**	**Very Low**

Specialist Assessment	Construction Phase	Operational Phase	Decommissioning Phase
CUMULATIVE NEGATIVE IMPACTS			
Aquatic Biodiversity and Species	**Very Low**	**Very Low**	**Very Low**
Avifauna	**Moderate**	**Moderate**	**Moderate**
Socio-Economic	**Moderate**	**Moderate**	**Moderate**
Geotechnical	**Low**	**Low**	**Low**
Traffic	**Low**	**Low**	**Low**
CUMULATIVE POSITIVE IMPACTS			
Socio-Economic	**High**	**Moderate** / **Very High**	**High**

Note that all the specialists have recommended that the proposed project receives EA on condition that the recommended mitigation measures are implemented. Also, note that all conclusions and recommendations made in the respective Specialist Impact Assessment Reports have been incorporated into the project specific EMPr for adherence.

Overall Environmental Impact Statement

Taking into consideration the findings of the BA Process, as well as the fact that the proposed **Padloper PV 5 project (i.e., Padloper PV 5, Padloper EGI 5 and their associated infrastructure)** will be located within Beaufort West REDZ (REDZ 11), it is the opinion of the EAP, that the project benefits outweigh the costs and that the projects will make a positive contribution to sustainable infrastructure development in the nearby towns (i.e., Murraysburg and Graaf-Reinet) and surrounding regions, as well as making a positive contribution to energy generation for South Africa. Provided that the specified mitigation measures are applied effectively, it is recommended that the proposed projects receive EAs in terms of the EIA Regulations promulgated under the NEMA.

Cumulative Environmental Impact Statement

The cumulative impacts have been assessed by all the specialists on the project team. The cumulative assessment included approved renewable energy projects within a 30 km radius of the project sites, as well as existing and planned transmission lines, and also the additional proposed projects comprising the Padloper Solar and EGI Cluster. No cumulative impacts have been identified that were considered to be fatal flaws. The specialists recommended that the projects receive EA in terms of the EIA Regulations promulgated under the NEMA, including consideration of cumulative impacts. It is also important to note that the proposed project is located within Beaufort West REDZ (REDZ 11), which supports the development of large-scale wind and solar energy developments. The proposed project is therefore in line with the national planning vision for wind and solar development in South Africa.

Conditions to be included in the EA

In order to ensure the effective implementation of the mitigation and management actions, the relevant and applicable EMPrs have been compiled and is included in Appendices H - J of this BA Report. The mitigation measures necessary to ensure that the proposed projects are planned and carried out in an

environmentally responsible manner are listed in these EMPrs. The EMPrs include the mitigation measures noted in this report and the specialist reports. The EMPr is a dynamic document that should be updated as required and provides clear and implementable measures for the proposed project. The frequency of monitoring and auditing compliance with the conditions of the EA (should such an authorisation be granted) and EMPr, is recommended in the EMPr. The compliance monitoring ranges from weekly to bi-monthly to monthly. It is recommended that regular monitoring be undertaken, as specified in the EMPr. It is further recommended that the submission of compliance reports to the Competent Authority be undertaken quarterly.

Listed below are the **main** recommendations that should be considered for inclusion in the EAs (should such authorisations be granted by the DFFE). These main recommendations as well as additional recommendations are included in the EMPr and BA Report. These recommendations apply to entire proposed Padloper PV 5 project (i.e., Padloper PV 5, Padloper EGI 5 and their associated infrastructure).

- **Agriculture Impacts**

The conclusion of the Agricultural Compliance Statement is that the proposed projects are acceptable and the recommendation for its approval is not subject to any conditions.

- **Visual Impacts:**

    - All key mitigation measures are contained in the EMPr. No conditions were recommended by the specialist.

- **Heritage Impacts (Archaeology and Cultural Landscape):**

    - The archaeological sites at waypoints 016 and 184 must be flagged as a no-go area;
    - The house at waypoint 183 must be flagged as a no-go area and any road widening that occurs must be away from the house;
    - No stones may be removed from any archaeological or historical sites;
    - Lighting mitigation must be employed to ensure that light is directed only to where it is needed and, preferably, that it only switches on when needed;
    - Buildings to be painted in earthy tones where technically feasible;
    - Signage demarcating the entrance of the facility must be modest in nature and should not exceed the height of regular street signage; and
    - If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

- **Palaeontological Impacts**

    - Before any fossil material can be collected from the development site, the specialist involved would need to apply for a collection permit from SAHRA. Fossil material must be housed in an official collection (museum or university), while all reports and fieldwork should meet the minimum standards for palaeontological impact studies proposed by SAHRA (2012).

- **Terrestrial Biodiversity and Species Impacts**

    - A key recommendation is that that during the construction mobilisation process, that the temporary construction camps, stockpiles and laydown areas are located outside of any delineated Very High systems and where possible within existing disturbed areas.
    - A final walkdown by a terrestrial specialist must be conducted to ensure that any of the proposed structures are placed within disturbed areas and sensitive systems are avoided and appropriate construction methods are employed as necessary.

- **Aquatic Biodiversity and Species Impacts**

    - During the construction mobilisation process, the temporary construction camps, stockpiles and laydown areas to be located outside of any delineated aquatic systems and within any existing disturbed areas (where possible).
    - A final walkdown by an aquatic specialist must be conducted to ensure that any of the proposed structures are placed within disturbed areas (where possible) and sensitive systems are avoided and appropriate construction methods are employed as necessary.

- **Avifauna Impacts**

    - All key mitigation measures are contained in the EMPr. No conditions were recommended by the specialist.

- **Socio-Economic Impacts**

    - All key mitigation measures are contained in the EMPr. No conditions were recommended by the specialist.

- **Geohydrology Impacts**

    - The groundwater supply can be sourced from either existing boreholes, 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.
    - It is anticipated that several boreholes across each of the farm portions on which Padloper Solar Facilities 5-7 are to be constructed will be required to meet the demands for construction and operation of the facilities.
    - 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 NGA database would be a useful starting point in determining which of the boreholes should be tested for their yields. Further, the relative sizes, GA volumes/abstraction rates (and cap volumes/rates) of the respective farm portions should also be considered when planning scientific yield testing.
    - Groundwater exploration via geological and geophysical methods is recommended for the proposed Padloper PV 5 site, should existing boreholes not be sufficient to meet the demand. Groundwater exploration aims to understand the geological environment. This can increase the chance of borehole success, and provide more realistic expected yields and expected depths of a borehole to be drilled.
    - 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.

- **Geotechnical Impacts**

    - All key mitigation measures are contained in the EMPrs. No conditions were recommended by the specialist.

- **Traffic Impacts**

The conclusion of the Traffic Impact Assessment is that the proposed project is acceptable and the recommendation for its approval is not subject to any conditions.

- **General**
    - Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion.
    - If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.

Paul Lochner (EAPASA Registration No. 2019/745)

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NAME OF EAP

14 August 2023

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SIGNATURE OF EAP DATE

References:

Refer to detailed reference lists included in each Specialist Assessment chapters in Appendix D of this BA Report. In addition to each of the Specialist Assessments chapters referred to in the text above, as well as various footnotes, below is a list of the key references used.

CSIR (Council for Scientific and Industrial Research). 2017. Protecting South Africa's strategic water source areas. https://www.csir.co.za/protecting-south-africa%E2%80%99s-strategic-water-source-areas. Date accessed: Feb. 2019

Department of Environmental Affairs, 2015. Strategic Environmental Assessment for wind and solar photovoltaic energy in South Africa. CSIR Report Number: CSIR/CAS/EMS/ER/2015/0001/B. Stellenbosch.

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Department of Environment, Forestry and Fisheries, 2019. Strategic Environmental Assessment for the Expansion of Electricity Grid Infrastructure Corridors in South Africa. CSIR Report Number: CSIR/SPLA/EMS/ER/2019/0076/B. ISBN Number: ISBN 978-0-7988-5648-5. Stellenbosch and Durban.

Department of Environment, Forestry and Fisheries, 2019. Strategic Environmental Assessment for the Development of a Phased Gas Pipeline Network in South Africa. CSIR Report Number: CSIR/SPLA/EMS/ER/2019/0077/B. ISBN Number: ISBN 978-0-7988-5649-2. Stellenbosch and Durban.